

Centralised Management of Health Information An Industry First

Centralised management of health information – an industry first

Abstract

The South Eastern Sydney and Illawarra Area Health Services, which amalgamated in January 2005, became the first area health service in NSW to develop a centralised and fully integrated web enabled library information management system. Using a solution supplied by Trimagic Software and developed in conjunction with nominated project managers within the area, a system is now in place with the potential to deliver information to a very large population of health professionals and others both within Sydney and regionally. Generous funding in the interests of promoting research and equal access to information for all provided a major impetus for this very exciting project, due to be officially launched by the NSW Minister for Health in 2006.

This paper aims to describe the project in its entirety, including those factors which initially led to the development of the first co-operative Union/Satellite information management system for health libraries, through to the solution in place today. Over a period of five years, several factors including advances in technology, changing user needs and the re-defined borders of the Area have contributed to the re-design of the solution, and its significantly enhanced scope. The paper will also address some of the special issues involved in the management of such a large project involving different personnel from different areas of the service.

Background

The development of this system has a long and complicated history, beginning with an offer from the Sydney Foundation for Medical Research (SFMR). The SFMR is a continuing trust established with a focus to fund and support medical research within Sydney Hospital. Given this focus, the SFMR has always been very supportive of the Sydney Hospital Medical Library, providing an annual grant for the purchase of books, and taking an active interest in relevant developments, such as the formation of a consortia of libraries within the South Eastern Area Health Service (SESAHS) in 1997, to rationalise and share journal subscriptions. It was at this point the Area librarians started working formally as an Area group and networking their resources. They realised that to be truly effective in their work they needed to rationalise and share these very valuable resources.

In 1998, a Foundation member offering funds to upgrade library services approached Ilona Harsanyi, Library Manager at Sydney Hospital. Ilona, who was at the time working with very old library technology, recognised the need for an automated information management system and conducted some research on systems available, eventually deciding upon a Trimagic solution. Apart from best suiting her needs, Trimagic software was also in use in a number of Area libraries. Dr Dixon-Hughes from the SFMR, a very strong individual supporter of the library, asked for Ilona's long-term vision beyond a system for just Sydney Hospital library. This vision was for an Area wide library management system.

Dr Dixon-Hughes shared and supported this vision and, with the help of Ian Stubbin, Library Manager at the Prince of Wales Hospital, and Dr Tony Sara, Director, Clinical Information Systems, a proposal was submitted to the Foundation to provide funding for an Area wide information management system. The project was named the Winston Library Project, and was officially launched by the Minister for Health on 30th November 2000.

The trend towards resource sharing and library consortia

The move towards an Area wide system in the late 1990's was part of a broader resource-sharing trend within medical libraries throughout Australia, as it is widely acknowledged that "health care is information-

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intensive”, and reflected in “the explosive growth of biomedical literature”¹, and that the costs of providing quality medical information and care in general are very high. A common thread in the literature reviewed reveals that the past decade has seen an “...increased demand for evidence-based information resources, together with the possibility of remote access to on-line databases...” as “paving the way for cooperative and consortial agreements among national and State-based public health facilities.”²

In the case of SESAHS, other contributing factors were the increasing mobility of Area staff and hospital services driving the need for health professionals to access more of the resources available in the whole area, the existence of an effective Area-wide library network as described above, and the compelling argument to rationalise very expensive journal subscriptions. For example, Area purchasing officers discovered eight library subscriptions to the Medical Journal of Australia between eight libraries, representing an expenditure of approximately \$4,000.

To further illustrate a growing need to share resources and improve access to them, various statewide collaborative initiatives implemented at this time were:

- NSW Clinical Information Access Project, established in 1997, now provides access to knowledge bases and full-text journals. All clinicians within the NSW public health system are entitled to use the resources.
- QLD Health Information Network, also established in 1997, provides access to documents and links to Internet sites (e.g. Medline).
- WA Clinical Health Evidence and Knowledge (CHEK-UP), a recently formed health libraries project partnership designed to offer commercially produced databases and full-text electronic information resources to clinicians.
- Development in 1999 of the South Australian Human Services Libraries as an entity within the Department of Human Services with the intent to collaborate on projects of benefit to members (e.g. resource sharing).³

The Winston Library Project

In 2000⁴, the South Eastern Sydney Area Health Service comprised eight health libraries, with a combined total of 4,040 journal titles, and 54,873 monographs. Four libraries already had a variety of Inmagic (Trimagic) software licences, in varying states of currency. A brief description of these services follows:

¹ Mc,Cray, J.C. et al “Improving access to knowledge-based health sciences information: early results from a statewide collaborative effort” Bull Med Libr Assoc 85(2) April 1997 pg: 136.

² Ritchie, A and Sowter, B “Availability and accessibility of evidence-based information resources provided by medical libraries in Australia” *Australian Health Review* Vol 23 (1), 2000 pg: 83.

³ Ritchie, A and Sowter, B “Availability and accessibility of evidence-based information resources provided by medical libraries in Australia” *Australian Health Review* Vol 23 (1), 2000 pp: 83-84.

⁴ Written in 2000. The Area has changed since this time.

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1. Sydney Hospital: Special casualty service for the city, with additional specialties in eye and hand surgery. This institution was founded in 1811 as the first hospital in Australia. Some of the library's journal holdings commence from the 1890s and are still current subscriptions.
2. St Vincent's Hospital: Large general teaching hospital with special services of an inner city nature as well as tertiary referral services for the state. The collection supports diverse clinical and research needs including the Heart and Lung Transplant Unit, recognised worldwide as a centre of excellence.
3. Albion Street Clinic: Statewide service supporting AIDS and HIV medicine. It is more an information service than a conventional clinical library, possessing a very specialised collection of national significance.
4. The Learning Service Library at Prince Henry Hospital: Area wide facility specialising in educational materials, teaching aids and nursing resources. This service has since amalgamated with the Prince of Wales Hospital.
5. Royal Hospital for Women: Royal Hospital for Women moved from Paddington to the Randwick campus two years ago and is a tertiary referral women's hospital for New South Wales. The collection is very specialised and even has Russian obstetric journals.
6. St George Hospital: Large teaching and rapidly growing hospital with a comprehensive health management collection. Operates one of the largest emergency departments in the country. In addition to being the designated hospital for Sydney Airport it also serves as the Area's trauma centre.
7. Prince of Wales Hospital: A large general teaching hospital also supporting the medical school at UNSW, the Sydney Children's Hospital, and a number of advanced research institutes.
8. Sutherland Hospital: A district hospital serving the rapidly developing southern end of the SESAHs, with a small but comprehensive library.

Original System Design

In its original design, a web interface offered patrons search-only access to the entire collection. Searchers could identify availability of resources from any Area library, 24 hours a day seven days a week, and request items or inter-library loans via email using an online request form. The design was based on a single union catalogue containing standard bibliographic information for each item, and "satellite" catalogues at each site for librarians to record details about physical items specific to their location, such as call number, barcode etc.

After considerable discussion in the early stages of this project, it was finally decided that the technical architecture for administrators (librarians) should be based on fat client technology. Fat client technology means that although a central server is used, the majority of processing occurs at the local workstation via a Windows application. In this case, a COMPAQ server was installed at the Prince of Wales Hospital site to hold all the data, which could be accessed via the Area's WAN (Wide Area Network). The librarians required the installation of multiple copies of the Inmagic DB/TextWorks program onto their local PC's to manage local content. The WAN (Wide Area Network) configuration was as follows:

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- Windows NT operating system
- Windows IIS (Internet Information Service)
- Inmagic DB/Text WebPublisher
- Trimagic Information Management System (TIMS) – union and satellites. TIMS comprised the system design, including search screens, report forms etc for full library management functionality.

Impetus to upgrade

A number of factors influenced the decision to upgrade at the end of 2004. On 1st January 2005, the South Eastern Sydney and Illawarra Area Health Services amalgamated into a single entity, referred to as SESIAHS. During 2003, the planned amalgamation provided an impetus for the South Eastern Sydney Area Health Service to review their existing Union/Satellite information system, with a view to enabling new library services to join. Together with this, the Area received a presentation of TIMS 7 Enterprise in early 2004, which was the latest web-enabled library automation solution from Trimagic. Area librarians, IT personnel and the Sydney Foundation for Medical Research realised that the new design would offer very significant improvements, as described later in this article.

SESIAS now provides services to an area spanning Sydney Harbour to Milton in Southern NSW, encompassing large urban centres, regional centres and small remote areas. Four additional library services have joined the Area wide system, contributing an additional 4000 monographs and 60 current journal titles. A brief description of new hospitals in the Area follows:

1. Shellharbour Hospital: Provides district hospital services in emergency, surgical, medical and mental health. This role is supported by the library, as well as specialities in gynaecology, and breast and laparoscopic surgery. The library services Shellharbour Hospital and Kiama Hospital and Community Health. Kiama is an integrated inpatient/outpatient health care model providing services to the local community.
2. Shoalhaven District Memorial Hospital: Provides services to the area in association with David Berry (rehabilitation and palliative care) and Milton Ulladulla (rural acute facility) Hospitals, linked by The Shoalhaven Rehabilitation, Aged and Extended Care service network, and Community Health. The library was established in 1995 and services all these facilities, as well as supporting the training of medical students in their rural terms.
3. Wollongong Hospital: Major referral hospital for the Illawarra region. Started in 1979 as a small basement library, and now occupies a large area within clinical services. The library services not only the hospital, but also a large community health sector.
4. Port Kembla Hospital: A busy mainly outpatient facility for the Illawarra region. The library is highly specialised, and its collection reflects the important areas of rehabilitation, geriatrics, sexual health and palliative care.

Regional Access to Medical information

A very important focus for the Sydney Foundation for Medical Research is the provision of services to regional and remote areas, and much of their funding is directed towards initiatives in support of this focus. NSWHealth will also be investigating processes to “optimise” public health libraries, and evaluating the current reach of electronic catalogues to rural clinicians and researchers is a planned part of this process, no

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doubt in the light of a growing awareness that “Health information is essential in health care...and that the “digital divide has been identified as a special problem in health care that can lead to significant disparities in care”.⁵ The new system designed for the SESIAHS library network has the potential to deliver information and resources to health professionals widely throughout the Area, and to any other person or even institution outside the Area wishing to subscribe (for example, a general practitioner, medical centre, community health centre etc).

From a review of the literature, it seems that the issue of regional access to medical information is quite a complex one, and that actual access to information is not the only constraint. Dorsch has identified a wide range of barriers to information access including “lack of time, isolation, inadequate library access, lack of equipment, lack of skills, costs, and inadequate Internet infrastructure.”⁶ She asserts that some common threads are evident to all health professionals, namely that information is generally underused in clinical decision making, that the barriers listed above are significant, and colleagues are preferred sources of information. However, rural practitioners are additionally hampered by “isolation, lack of library services, and inadequate access to information.”⁷

In their study looking at the availability and accessibility of evidence-based medical information resources in Australia, Ritchie and Sowter found that although a range of networked and Internet resources are available quite widely (for example Medline and Cinahl), barriers to usage remain. Her study revealed that the most significant problems were physicians’ lack of time and appropriate skills to source the most clinically relevant information. She found that “information retrieval systems are not yet well integrated with clinical practice”⁸ and therefore their potential usage disrupts workflow. Also, without the “mediating role of the librarian or expert searcher”⁹, any information retrieved yields questionable results in terms of both quantity and quality.

In resolving these problems, various authors suggest not only the importance of delivering information in the most appropriate way to meet client needs in rural/regional areas, but also the necessity of initial and on-going training, support and promotion of services by librarians. Although further investigation is required to clearly identify the best and most cost-effective methods of information delivery to poorly serviced regional areas, it is true to say that the SESIAHS system now in place is already technically capable of delivering high quality medical information to those in poorly resourced areas.

Benefits of Centralised Information Management

The new system was purchased in December 2004, and implementation commenced in January 2005. There are currently 73,075 catalogue records and 6,288 borrowers managed by librarians in the twelve information centres described above and earlier in the article. Of these, 5,310 comprise journal titles. The primary benefits for the newly expanded SESIAHS is that Trimagic T.I.M.S library management system is a

⁵ Kreps, G.L “Disseminating relevant health information to underserved audiences: implications of the Digital Divide Pilot Projects” *J Med Libr Assoc.* 2005 October; 93(4 Suppl): pg: 4.

⁶ Dorsch, J “Information needs of rural health professionals: a review of the literature” *Bull Med Libr Assoc* Vol 88 (4), October 2000 pg: 346.

⁷ Ibid pg: 346

⁸ Ritchie, A and Sowter, B “Availability and accessibility of evidence-based information resources provided by medical libraries in Australia” *Australian Health Review* Vol 23 (1), 2000 pg: 78.

⁹ Ibid pg: 78.

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completely centralised solution, and is accessible via intranet and Internet. This has delivered some major enhancements including:

- Elimination of satellite databases. The design offers integrated browser-based application interfaces which allow for unlimited searching and editing.
- The system is available anywhere, with either Internet or intranet access rights, depending upon the category of user (see below). This feature satisfies a fundamental principle of the Foundation, which is to provide funding for Area projects that contribute significantly toward initiatives that support and/or develop research activities within the Area.
- The design can accommodate additional libraries or information centres joining the Union at minimal extra cost.
- The Area can now enjoy the benefits of expanded resources from the Wollongong, Shellharbour, Shoalhaven and Port Kembla libraries.
- Elimination of multiple Area-wide software licences saving future expenditure.
- New centralised list of borrowers for the entire area. With the original system, each library had to maintain a list of borrowers for their own hospital.
- The system is significantly faster.
- More efficient technical maintenance. The entire installation is located at Prince of Wales Hospital, and three “super” users have been allocated to make changes as agreed by the librarians.
- Opportunity to rationalise resources. Further streamlining of the system has “forced” the librarians to re-visit their collections once again and eliminate duplications. This means that extra resources can, and have been, purchased. For example, \$40,000 has already been saved from the elimination of multiple journal subscriptions. Half of this saved money has been used to purchase approximately 180 new titles for the Area.

The system design includes an integrated and largely centralised library management system to meet the workflow requirements of all library staff, and a public access browser interface for a range of different user groups. Librarians’ access a single “union” catalogue to record their holdings. Borrower files have also been centralised so that patron mobility throughout the entire Area can be managed by any one of the librarians. Centralising serials management has also allowed the Area to significantly consolidate serial subscriptions, with obvious benefits to the group as a whole.

Data Conversion

The legacy systems from Shellharbour, Shoalhaven, Wollongong and Port Kembla libraries were varied, and an extensive conversion project was undertaken to capture and include these collections into the system. This involved analysing the source data and preparing a series of “data maps” to identify the content of the source data files and the destination databases and fields within the Trimagic T.I.M.S library management system. The extensive analysis of data presented the opportunity to rationalise content and check data integrity to ensure relevance to all of the hospitals. The Illawarra library staff were actively involved in the

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analysis of workflow issues during this process and through conciliation, effective workflows were established.

System Architecture

The new system entailed a departure from the previous combination of LAN's and the WAN to process and share data throughout the Area. This was the challenge met by the Area's IT Department located in Randwick, Sydney. This Department is responsible for Information Technology to Clinical Services encompassing a very large user community. Strong project management and motivated personnel headed by Dr Tony Sara were integral to the successful outcomes achieved.

In order to make this transition, the architecture decisions were:

- Primary operating system – Microsoft Windows 2003 server
- Primary workstation client – Internet Explorer V6+
- Primary workstation application – Trimagic T.I.M.S V7
- Primary database system – INMAGIC DB/TextWorks
- Development platforms – Microsoft .Net Infrastructure
- Server Hardware – Compaq servers

Varying Access for Different Users

With a mandate to expand but also vary the range of services to a wider client base, a model has been adopted based on the following five groups:

- Group one: All staff employed by SESIAHS who have access to the library OPAC on the intranet. These people can search the catalogue, including full text links to approximately 1200 e-journals and e-books, and request inter-library loans via email.
- Group two: Includes registered borrowers either within or external to the Area, who actually wish to borrow items, and who have a library ID. These might include staff, GP's, lawyers, VMO's etc. In addition to what is available to group one, these users have access to "personal pages". Personal pages deliver "what's new"; loans; loan renewals; and a current awareness service using "push" technology.
- Group three: This group has the entire set of privileges available to groups one and two. Members of this group have registered with a library and been issued with a library ID, but have also applied for a password/PIN number so they can gain access to the OPAC on the intranet via the internet if they were overseas at a conference for instance.
- Group four: Any Internet user who can access a read-only and limited version of the catalogue.
- Group five: Librarians maintaining the system who will also have different access privileges.

An additional service includes a direct link to the Clinical Information Access Programme (CIAP), which is managed by the Health Department of NSW.

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System Security

It can be seen from the above descriptions that secure access was a mandatory system requirement. The vendor and internal IT department collaborated to create security systems that are a unique blend of internal network security and programmed interfaces. This security model provides appropriate and seamless access from any location in Australia or the world to the different range of resources being offered according to a user's group designation.

Internal users of the Area intranet would have difficulty recalling additional passwords beyond their normal logon rights within the internal network, so this model was retained using Windows authentication. Separate interfaces and security technology have been designed for users sitting at any workstation within the Area. Using their usual logon details, the internal user has access to content stored inside the Area network. The logon details also permit access to online resources subscribed to by the Area. Authorised access to such resources is obviously only possible according to the licensing arrangements negotiated between Area librarians and content providers.

For Internet access, an authentication system was created to ensure that content available only to authorised health professionals could not be accessed by the general public. Assigning unique "registration" numbers to remote public users ensures security. These numbers must be entered to gain access to the system and additional library services as required.

The System Today

The new system in place, although not yet actively promoted, is already delivering significant benefits: large amounts of money have been saved, new and valuable resources have been purchased and added to the collection, Internet searching is a reality, and the profile and scope of library services has increased, as demonstrated by the following:

- The Black Dog Institute is an educational, research, clinical and community-oriented facility offering specialist expertise in mood disorders. This institute has chosen the Area library services as its research library, above a large university.
- The Langton Centre provides care and treatment for people with drug, alcohol and other addictions. As part of a programme to investigate treatment options for those with gambling addictions, they have approached the Area library services for research assistance.
- A prominent Sydney law firm has acknowledged library services in writing for their provision of research into the effects of passive smoking, which they used for a large medico-legal matter.
- Since the closure of the Biomedical library at the University of NSW, clients of that service have switched to Area library services.
- Lifetime Care is a division of the Roads & Traffic Authority and has been set up to support individuals with disabilities as a result of motor vehicle accidents. Area library services provide research support to this division.
- The SESIAHS home page and website has recently been upgraded, and a link to the Area catalogue is listed prominently on the opening page.

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Registered Area borrowers travelling interstate, overseas or working from home are now able to search the catalogue via the Internet. The catalogue includes books, journals and full text e-journals. This is a major enhancement, as many busy health professionals conduct research and continuing education outside of their normal working day due to the obvious constraint of time.

These borrowers can also submit loan and inter-library loan requests online directly to the holding library, saving time for them and double-handling by Area librarians. “Personal pages” are available for checking loans and request renewals, and discovering “what’s new”. Registered intranet users can also check loans and request renewals. For other borrowers, the catalogue is available in read-only format on the Internet.

Promotion of the service

The NSW Health Deputy Director-General Bob McGregor launched the system at Sydney Hospital Medical library on 9th August 2006, noting that it is the first of its kind in Australia. Beyond this, a more active and Area-wide promotional campaign will be implemented, engaging the Area’s PR service. In the short term, it is planned to:

- Deliver a promotional and educational Powerpoint about the new service to all personnel in the Area.
- Conduct training sessions in use of the new system for existing employees and for new staff joining the Area during their orientation period.
- Use the SESIAHS website for additional promotional opportunities.

As part of the move by NSW government towards the co-location of general practice clinics on the campuses of major Sydney teaching hospitals to relieve the current burden on accident and emergency centres, another initiative being explored by Area librarians is to affiliate with the Royal Australian College of General Practitioners. This College offers its members access to the full text of major general medical texts, which are not currently available in electronic form within the Area’s own, centralised collection. This collaboration would therefore entitle health practitioners in the Area and other general practitioners the combined resources of the Area and the College. The addition of online general medical texts would be particularly beneficial for the registered medical officers and registrars from the Area who have their placements in regional areas with few or no information resources. Of course Internet access to the collection in general will be of great benefit to these health professionals.

More broadly, the future usage and promotional strategy has not been fully explored, but what is certain is that the infrastructure and technology is now in place to deliver high quality medical information to any person or institution from the entire region wishing to become a registered member. This means that the potential for those in poorly serviced positions or locations to gain access to resources and the expertise of experienced medical librarians is now very real.