

MEETING ON THE APPLICATION OF NEW INFORMATION TECHNOLOGY ON RESOURCE-SHARING AMONG MEDICAL/HEALTH LIBRARIES IN THE WESTERN PACIFIC REGION, 23-26 NOVEMBER 1999, BEIJING, CHINA

COUNTRY REPORT - SINGAPORE

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INTRODUCTION

Geography

Singapore, situated at the crossroads of Southeast Asia, approximately 137 kilometres north of the Equator, comprises the main island of Singapore and some 60 offshore islands. It has a total area of 648 square kilometres, and a total population of 3,865,6000.

Health Care System

Singapore has a dual system of health care delivery. Twenty percent of primary health care is provided by public sector through government polyclinics, the School Health Service and community health services for elderly people. The remaining 80% is provided by general practitioners in private practice. Eighty percent of hospital care is provided by the public sector hospitals comprising of two government and six restructured hospitals. The remaining 20% is provided by 13 private hospitals. The government began restructuring its hospitals in 1986 to give them greater autonomy and flexibility in management and operations so that they can be more efficient and effective in meeting health care needs. The two government hospitals are Alexandra Hospital (AH) and Woodbridge Hospital (WH) and the six restructured hospitals are Ang Mo Kio Community Hospital (AMKH), Changi General Hospital (CGH), KK Women's and Children Hospital (KKH), National University Hospital (NUH), Singapore General Hospital (SGH) and Tan Tock Seng Hospital (TTSH). The public sector hospitals also provide specialised services. In addition, specialist centres like the National Skin Centre (NSC), Singapore National Eye Centre (SNEC), National Heart Centre (NHC), National Neuroscience Institute (NNI), National Cancer Centre (NCC), and National Dental Centre (NDC) provide specialist treatments for complex conditions in the various fields.

Health Care Personnel

Trained doctors, dentists, pharmacists, nurses and other health care personnel provide health care services in Singapore. In 1998, there were 5,148 registered medical practitioners and 1,242 registered specialists; 15,568 nurses and midwives; 914 dentists and 998 pharmacists.

The National University of Singapore (NUS) trains about 200 doctors a year. The Ministry of Health (MOH), the Graduate School of Medical Studies of the NUS, the Academy of Medicine and the College of Family Physicians provide postgraduate training. Doctors receive overseas sub-specialty training under MOH's Health Manpower Development Programme. The hospitals like TTSH and NUH also conduct continuing medical education courses, conferences and seminars. The Postgraduate Medical Institute at SGH aims to evolve into an internationally recognised centre for postgraduate medical education and training.

The NUS trains about 34 dentists a year. Postgraduate training is conducted jointly at the Faculty of Dentistry and the National Dental Centre by the Graduate School of Dental Studies of the NUS.

The NUS conducts a four-year degree course in pharmacy.

The School of Health Sciences of the Nanyang Polytechnic (NYP) and the MOH School of Nursing (SON) train nurses. SON will be closed by December 1999 with the programme

transferred to the Institute of Technical Education at Bishan. Every year, 700 hundred nurses are trained. Full-time courses leading to Advanced Diplomas in Nursing are available at NYP.

The NYP also trains occupational therapists, physiotherapists, radiation therapists and diagnostic radiographers.

MEDICAL/HEALTH LIBRARIES IN SINGAPORE

National University of Singapore Medical Library

Overview

The largest medical library in Singapore is the National University of Singapore Medical Library (NUSML). Its web site is at <http://www.lib.nus.edu.sg/mlb/>. It is the oldest special library within the NUS Library system (web site at <http://www.lib.nus.edu.sg/>). Its history dates back to 1905 when the Straits and Federated Malay States Government Medical School was set up.

Users

NUSML serves primarily the staff and students of the Faculty of Medicine, Faculty of Dentistry, Graduate School of Medical Studies, Graduate School of Dental Studies, and the Pharmacy Department of the Faculty of Science. All NUS staff and students can use all libraries of the NUS Library system. As at Jan 1999, NUS has over 5500 staff, 19,200 undergraduate students and 7,900 graduate students. The richness of the NUSML resources and services has also attracted external corporate members which include pharmaceutical companies and external personal members comprising hospital doctors, health-services personnel, general practitioners, medical officers of the Singapore Armed Forces, and staff of government, scientific organisations and research institutes.

Collection

NUSML collection covers a wide range of subjects relating to medicine, dentistry, pharmacy and health care. As at July 1999, the print collection comprises over 70,100 titles and 171,500 volumes. There are about 4,460 serial titles, of which 1,640 are active subscriptions. There are 100 compact disc (CD) and 1,700 media titles. The microform collection contains 140 microfilm titles and 410 microfiche titles. The theses collection contains over 1,250 titles.

Complementing the above is the digital library which is accessible through NUSNET, the campus network. The digital library comprises Library InfoGate web databases on all subjects. Included are MEDLINE which is linked to 42 full-text journals, PyscINFO which is linked to 10 full-text journals, Evidence Based Medicine Reviews (Cochrane), EMBASE, International Pharmaceutical Abstracts, Current Contents Connect and Harrison's Online. Also available are examination papers, over 2,000 electronic journals on all subjects of which at least 440 are on medicine, dentistry, pharmacy, health care and biomedical sciences. For user convenience, electronic forms for applying for library services have been included. Another recently added feature is Library Instruction ONline (LION), a new web site set up specifically to provide instruction to users on how to access and use the vast resources made available by the NUS Library.

Facilities and Equipment

The NUS Library system uses the Innopac release 12 integrated library system. It plans to use the Innopac Millenium product in year 2000. Its web-based Library INtegrated online Catalogue, LINC, is available on the Internet at <http://linc.nus.edu.sg>

To facilitate the use of library resources, computers are provided in the library for users to access LINC, electronic journals and library databases. Of these, 4 at the Reference Area are connected to a Hewlett Packard LaserJet 4M-Plus printer. The printer is provided by a commercial vendor whose staff is stationed in a photocopy room in the library. Users pay for printing with stored-value photocopy cards which they buy from the vendor. There are also standalone computers connected with CDROM readers, audio-visual equipment like laser

disc/compact disc (LD/CD) players, video cassette recorder/players, audio cassette recorder/players, television monitors, overhead, sound-film and slide projectors as well as microfiche and microfilm readers.

NUSML has a cluster of computers connected to NUSNET. The computers are provided by the NUS Computer Centre mainly for student use. Students can use them to do other work like word-processing, electronic mailing (emailing), serving the World Wide Web (WWW) in addition to searching LINC and library databases. Secure Plug-and-Play (SPnP) points are available which allow NUS staff and students to connect their own notebook computers to NUSNET and the Internet. Wireless SPnP access is being tried out. Staff usually use the computers in their office to access library resources that are available on NUSNET.

Scanning and self-service photocopy facilities are available in the library. They are provided by a commercial vendor. Users pay for such services with cash, stored-value photocopy cards or cash cards. The services are subject to Copyright Act and NUS Library Rules on Photocopying. There are also top-up machines for topping up the value in the stored-value and cash cards.

There is a self-service library fines payment machine. Users pay their fines with a cash card.

Study carrels are provided for NUS academic staff and graduate students.

Services

In addition to accessing library resources and loan services at the loan counter, users can access their library records, renew their loans, and reserve items online through computers in the library as well as through the Internet. Users with email addresses are sent email notification of overdue books and of books ready for pickup. Print notices are sent to users without email addresses.

Reference and information service is available at NUSML. Queries are received in person, over the phone, by facsimile or email. Library staff provide assistance in the use of the library catalogue, services and collection. Such help is given on a one-to-one basis or in group tutorials. Library tours are conducted. From time to time, thematic displays are put up and bibliographies produced.

Another service provided by NUSML is interlibrary loan. NUSML loans selected materials to government departments, statutory boards, non-profit libraries and research institutions upon application. Interlibrary loan from local and foreign libraries outside NUS is available to NUS academic staff and graduate students. Academic staff can also apply for intra-library from other NUS libraries.

Under the document delivery service, articles not available in NUSML are acquired for academic staff and graduate students. Through the Speedoc service implemented in October 1998, teaching staff can send in electronically their requests for reprints. Users can apply for reprint articles that exist in electronic form to be delivered electronically to their email accounts. Since about July 1999, document delivery service has been extended to Honours-year students. Besides these, NUSML provides photocopies of articles from its collection to legal firms, local and foreign libraries, and corporate members. Currently, the articles are sent by regular mail or facsimile.

As regards current awareness service, NUSML contributes to the online "New Additions" list available through LINC. This list informs users of new titles added to the NUS Library system. Before new books go into circulation, they are displayed for two weeks, during which time reservations can be placed on them. In addition, LINC records for books are enriched with Table of Contents (TOC) data provided by Blackwell's Book Services. Users can access TOC information even before the books arrive in NUS Library. As at June 1999, there are over 77,000 book records with TOC data in LINC. Feedback from faculty staff indicates that they have registered for free current awareness services offered by many publishers in the Internet to have TOC and abstracts of current journal issues emailed to them. The author believes that this development is due in part to faculty staff accessing the increasing number

of electronic journals and through this process are alerted of such free TOC service. Current Contents Connect, a current awareness tool is available on NUSNET. Apart from these, NUSML has a representative to the *LINUS* Editorial Committee. *LINUS*, the NUS Library newsletter aims to inform its users about library resources, services and activities. It is accessible on the web at <http://www.lib.nus.edu.sg/linus/>

Library staff index medical journal articles relating to Singapore, Malaysia, Brunei, and ASEAN as an entity and contribute the records towards the PERIND database which is accessible on Library InfoGate. The PERIND database is included in the SMC Ondisc CDROM jointly published by the NUS Library and Informit, the commercial arm of the Royal Melbourne Institute of Technology in Australia. The other 2 databases of SMC Ondisc, to which NUSML also contributes, contain bibliographic records of the Singapore Malaysia Collection at the NUS Library and theses submitted to and deposited at the Library since 1947.

Under the Library Online Information Search (LOIS) service, over 500 databases in the United States, United Kingdom and Australia are available to NUS academic staff and students, and corporate members.

Another service available is the Video-on-Demand (VOD) service. Under this service, teaching staff can request for course-use materials to be digitised and streamed to computer desktops.

New Information and Communication Technologies in Use

Web, Internet, file transfer and emailing technologies are now very widely used in, if not essential to NUSML.

NUSML has a representative to the NUS Library Web Team who is responsible for putting up and maintaining library web pages. Library electronic forms are available on the Intranet. The NUS Library Innopac integrated system is Y2K and Z39.5 compliant. The NUS Library catalogue is accessible on the WWW. Many library databases are web-based. Electronic journal subscription is increasing at a fast rate. File transfer facility is used in much of its behind-the-scene technical services work like invoice registration and uploading of bibliographic records captured from CDROM databases like Bibliofile into Innopac. NUSML contributes to the electronic publishing of the SMC Ondisc. Multimedia and video streaming technologies have enabled the VOD service. At library orientation web-based and CDROM database searching are demonstrated. PowerPoint presentations may be given.

Like other parts of campus, NUSML provides SPnP points and wireless SPnP access to allow NUS students and staff to connect their notebook computers to NUSNET. NUS staff and students can also access the University's network resources including library services and the Internet from the comfort of their offices, laboratories, canteens, hostels and homes, and when they are overseas through remote access technology like the NUS dialup system, Intranet roaming and PCAnywhere.

Nanyang Polytechnic Library

Overview

The Nanyang Polytechnic (NYP) was established in 1992 with four schools, initially spread over five campuses with library collections serving their needs. Since July 1998, all the schools, including the School of Health Sciences, have been brought together at the new Ang Mo Kio site. As a result, all the library collections are housed together to form the Nanyang Polytechnic Library (NYPL). NYPL's web site is at http://www.nyp.edu.sg/lb/lb_home.htm

Users

NYPL serves about 1,010 staff and 11,500 students. NYP staff include teaching, research, administrative and support staff.

Collection

NYPL houses four collections: Business Management, Health Science, Engineering, Information Technology. The four collections comprise 63,800 titles (62,500 books and 1,300 serials) and 83,900 volumes (75,200 books and 8,700 serials). There are 2,300 computer-media titles. These include CDROMs like CINAHL which is linked to 14 full-text journals, MEDLINE which is linked to 16 full-text journals, EMBASE: Psychiatry, EMBASE: Radiology Nuclear Medicine, Cancerlit, Complete Yearbook Collection, and 935 electronic journals of various subjects. The health science electronic journals include 30 titles in [journals@ovid](#), 16 titles in OVID Core Biomedical Collection and 14 titles in OVID Nursing Collection. Its audio-visual resource numbers 2,300 titles and includes video and cassette tapes, slides, video compact discs (VCDs), LDs, digital video discs (DVDs), kits, and games. The microfilm collection comprises 126 titles. In addition, there are examination papers, recommended reading lists, contents pages of journals and requisition forms all of which are accessible online.

Facilities and Equipment

NYPL uses the Sanderson version 6.0 Library Management System which is web-based. To facilitate users using library resources, there are dedicated online public access catalogue (OPAC) computers and Internet workstations.

There are patron-self-check machines which use non-contact smart-card identification for self issue and renewal of loans and for cash card payment. Access-control to the library also uses the technology. NYPL has computers connected with printers and CDROM readers, and photocopiers available to users. In addition, there are research carrels and discussion rooms. LCD screens, scanners and facsimile machine are for library staff use.

Services

Besides circulation services, NYPL provides reference and information service which includes literature searching, both online and manual. Library staff manually retrieve articles for users. They provide technical-inquiry-answering, referral, current awareness and information repackaging and consolidation services. They conduct orientation and bibliographic instruction programmes, library tours and special video screening. Thematic and new arrival displays are put up. Document delivery and interlibrary services are available to staff, final-year students and reciprocal libraries. Interlibrary loan service is also extended to local libraries who are members of the Library Association of Singapore (LAS).

New Information and Communication Technologies in Use

Web, Internet, file transfer and emailing technologies are used at NYPL. Its web page is accessible in the Internet. Its web-based Sanderson Library Management System allows self issue and renewal of loans using non-contact smart-card identification. Bibliographic records captured from SILAS (Singapore Integrated Library Automation Service), an online shared cataloguing service are uploaded into the Sanderson system by file transfer. NYPL subscribes to online electronic journals. Its Windows-based secondary databases like MEDLINE and CINAHL are linked to full-text journals.

Hospital Libraries and Resource Centres

Overview

Supplementing the collections in NUSML and NYPL are the collections in hospital, departmental and specialist centre libraries and resource centres. The information provided here is gleaned from an informal survey of these libraries and resource centres.

Users

These libraries generally serve the medical staff such as doctors, nurses, paraprofessionals like physiotherapists, medical social workers, radiographers and dieticians, technicians, educators and research scientists of the parent institutions. Some like the NUH Training and Education Resource Centre (TRC) and TTSB Library are available to NYP students. The SNEC Library is available to optometry and nursing students. Others like NCC Library,

Health Information Centre (NIC) of the National Health Education Department of the MOH and NUH Pharmacy Information Service (PIS) are referral centres for public access.

Collection

The size of print book collections ranges from 540 titles (NHC) to 15,500 titles (NIC). The size of print serial collections ranges from none to 200 (TTSH Library). CDROMs are available in TRC, PIS, SGH Education Resource Centre (ERC), and NCC, NHC, SNEC, CGH and WH Libraries. Most libraries and resource centres have audio-visual materials including audio tapes and cassettes and video cassettes.

The subject coverage of the different libraries reflects the interests of the clientele served and the functions of the parent institutions. The SNEC Library collects publications by its doctors. To date, there are 400 such titles.

Facilities and Equipment

All the libraries have computers, printers and photocopiers for use by their users. As expected, those with CDROMs in their collections have CDROM readers. The NIC and the NHC Library have LCD screens. All libraries have facsimile machines for use by library staff. The ERC, NIC, and NHC and WH Libraries have scanners.

Services

All of the hospital libraries and resource centres surveyed provide circulation and photocopying services. They also do manual literature search for their users. Most retrieve specific articles for their users. Online searching is also offered by most. A few provide current awareness, document delivery and interlibrary loan services to their staff.

Some hospital and resource centres have special services. The KKH Library sends duplicate copies of medical journals to Myanmar either through their own doctors or through "diplomatic bags". The NCC Library is setting up a library bookshop which will sell books for staff's personal or departmental use. The SON Library provides technical-inquiry-answering service. The SNEC Library repackages and consolidates information for its users while the ERC provides slide imaging service. The NIC's rich resource of exhibition panels and 500 video tapes are very popular with the facilitator/educator group of users. The NIC has a "Bookings module" which enables users to book audio-visual resources and print materials for their education programmes. The MOH Training & Health Education Department, of which NIC is a unit, was awarded the WHO Health Education Award in 1987 and the World No-Tobacco Day Medal in 1990.

New Information and Communication Technologies in Use

With regards to integrated library systems, V-Lib is used at the SNEC and CGH Libraries, URICA version 1.5 at SON Library and The Library solution at NCC Library. TTSH Library uses the FoxPro database system which is developed in-house. Other libraries and resource centres either do not yet have an integrated library system or are in the process of "shopping" for one. Some libraries use CDROMs. Several have Internet email facility. A few search free Internet databases and access electronic journals that are free with their print subscriptions.

NETWORKING / RESOURCE SHARING

Because of the size and richness of the NUSML collection, it is almost the default library for the doctors and persons doing medical research in Singapore. Senior government officers and members of statutory boards including public sector doctors and dentists can apply for free membership to the NUS Libraries including Medical Library. Other doctors and dentists, many of whom are NUS graduates can apply for membership under the alumni scheme. Alternatively, they can join as corporate members. Besides directly using NUSML resources as members, health care personnel also tap on NUSML resources through library staff in their hospital and departmental libraries which are often small operations.

Medical libraries in Singapore and in the region co-operate with each other and share their resources mainly through document delivery and interlibrary loan facilities. The *Union List of Medical Periodicals in Southeast Asia* which contains holding information of libraries in the

region facilitates such resource sharing. It is published by the Southeast Asian Medical Information Center of Japan (SEAMIC). From 1975, doctors in Singapore could also request for articles not available in NUSML through the SEAMIC Photocopy Service. The bulk of such requests were channelled through NUSML, the SEAMIC Co-ordinating Library in Singapore. The requests could also be submitted through NYPL and SNEC Library. The free SEAMIC service was discontinued in Feb 1999. Nonetheless, currently, a considerable number of public sector doctors and dentists who are appointed clinical tutors, lecturers and professors by the NUS Faculty of Medicine or part-time lecturers by the NUS Faculty of Dentistry can still request from NUSML for articles not in its collection by being members of the NUS Library. The NUS Library pays for such reprints.

NUSML provides free advisory service to staff from the hospital, departmental and polytechnic libraries upon application. NUSML and NYPL receive librarians from neighbouring countries who visit under the SEAMIC Travel Research Fellowship Programme. The Programme is a very useful continuing education programme for medical librarians in the region. Reports of the Programme indicate that participants benefited greatly from it and welcome its continuance. In 1995, two WHO Fellowship Award recipients from Indonesia were attached to NUSML.

As many of the hospital libraries and resource centres in Singapore currently do not have trained staff, sponsorship for such training programmes may benefit them. The School of Applied Science at the Nanyang Technological University offers a M.Sc. (Information Studies) programme. The programme offered by the School of Information Technology and Applied Science of the Temasek Polytechnic leads to a Diploma in Information Studies. The LAS organises talks and seminars on information and library related issues in addition to annual events where librarians and people in the information field meet and exchange ideas. The LAS publishes the *Directories of Singapore Libraries* and is in the process of producing the year 2000 edition.

Recently, NUS Library worked with OVID Technologies for a consortium price offer for access to OVID databases in government-linked hospitals and some specialist centres. A presentation was given by OVID Technologies.

Feedback received through the informal survey shows that medical librarians welcome opportunities and facilities to network with each other and to be informed of developments in local and regional medical libraries. The increasing availability of library and medical web sites in the Internet facilitates this.

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