

**Beam me up!
Supporting PDAs (Personal Digital Assistants)
in medical libraries:
new technology, or just another format?**

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Abstract:

This paper, based on a research trip to North America in 2003, which was generously sponsored by the VALA Travel Scholarship program, reports on ways in which medical libraries are supporting clinicians in the use of hand held computer technology, specifically Personal Digital Assistants PDAs. The types of services and support offered by hospital and academic health science libraries include: evaluating and selecting PDA clinical content, circulating PDA devices pre-loaded with clinical content, creating websites with links to PDA resources, conducting training sessions, facilitating PDA User Groups, and providing syncing cradles and beaming stations for clients. The paper examines library initiatives for integrating new handheld computer technology to services and collections and outlines some of the licensing models for PDA-formatted content.

Introduction

The emergence of handheld technologies, in particular Personal Digital Assistants (PDAs), has provided healthcare professionals with an innovative new platform from which clinical information can be provided at the point of care. With an increasing number of clinical information resources available to clinicians via PDAs, there are opportunities for medical librarians to facilitate and lead the implementation of this new technology in Australia.

Background

The Hollywood Private Hospital Library provides information resources and services to the accredited Visiting Medical Practitioners, Registrars, Residents, Nursing, Allied Health and Administration staff for this private teaching hospital in Perth. The Library, of two staff, offers a full range of services including; literature searches, inter-library loan and document delivery services, access to print and electronic journals, bibliographic databases and the Internet along with orientation and training sessions. As Manager of the Library Service, I have observed an increase in the number of clinical staff using PDAs and was curious to learn more about these hand-held computing devices.

The opportunity to learn new technology and to visit some of the libraries leading the way with PDA initiatives in North America, was presented to me when I was awarded the VALA Travel Scholarship. With the support of the Victorian Association of Library Automation, between May and June 2003, I visited a number of hospital and university health science libraries in the United States and Canada that are providing services using this new technology.

The objectives of the research undertaken for the scholarship were:

- To investigate the approaches being made by medical libraries in North America to develop, manage and implement handheld computer technology for their healthcare professional clients.
- To examine the impact PDAs are having on the practice of librarianship.
- To compare the advantages and disadvantages of the various PDA operating systems.
- To visit libraries which provide PDA support and services to healthcare professionals?
- To gain an understanding of the technical aspects of PDAs and the issues relating to subscription and licensing of content.
- To establish networks with library colleagues who use PDAs.

I attended the Medical Library Association conference in San Diego and the Canadian Health Libraries conference in Edmonton and participated in their Continuing Education sessions on PDAs. I also visited the following organisations:

- OSF St Francis Medical Centre Library and Resource Centre, Peoria.
- University of Illinois Health Sciences Library in Peoria.
- Blessing Professions Library, Blessing Hospital, Quincy.
- Quincy Family Practice, Quincy.
- University of Illinois Health Sciences Library in Chicago.
- John W Scott Library at the University of Alberta in Edmonton, Canada.

Personal Digital Assistants

Personal Digital Assistants, Handhelds, Palmtops and Palm Pilots are all terms referring to pocket sized computer devices that make computing tasks more portable and flexible by being small enough to fit into one's pocket. PDAs are used for a variety of personal and professional uses and the environments in which they are used range from hospitality through to healthcare.

Basic functions of a PDA include an electronic diary, address book, to-do-list, notepad, calculator, expense tracker and alarm clock. Like a computer, the software added to the PDA can make it an indispensable productivity tool which can be used for: word processing, spreadsheets, sending and receiving e-mail, downloading information from the Internet and giving presentations. PDAs are designed to work with a laptop or desktop computer that connects to the PDA via a synching cradle or Infrared beam connection. An historical introduction to the development of PDAs (Shipman 2001) and overview of PDA applications in the clinical setting (Wilcox 2001, Enger 2002) is available elsewhere.

PDA Operating Systems

There are two major Operating Systems for PDAs: Palm OS and PocketPC OS. Manufacturers of PDA models using the Palm Operating system include Palm, Handspring and Sony. Microsoft entered the PDA market with the Windows CE operating system, which has gone through several versions, with the latest being termed Pocket PC. Compaq, Casio and Toshiba are manufacturers of the most popular PocketPC devices. Palm and PocketPC are competing for market share similar to the Apple vs IBM and the VHS vs Beta shakeout a few years ago.

Wilcox (2001 p.659) states that "the Palm OS has become the defacto standard for medical professionals as thousands of medical programs, databases, medical textbooks and websites are available" on this operating system. Palm is currently more popular with the healthcare professionals as there is more clinical content available for that operating system. Microsoft's PocketPC is rapidly catching up however. Some software programs such as UpToDate and Infotriever are only available on the PocketPC platform.

PDA use by Healthcare professionals

Healthcare professionals were early adopters of handheld devices. Due to the small size of PDAs, their portability and ability to provide drug and clinical reference information at the point of care, PDAs are useful as an information tool at the bedside. PDAs have been referred to as the doctor's "New Black Bag". (Shipman 2001)

Evidence of the PDA uptake by physicians is provided by the Harris Interactive poll. LaRochelle (2002 p.68) states that the "number of physicians who use handheld computers increased from 15 percent in 1999 to 26 percent in 2001 and concluded that 50 percent of all physicians will use a handheld by 2005".

In order to gain an understanding of the use of PDAs by doctors, in February 2003, I surveyed the Visiting Medical Practitioners, Registrars and Residents and at the Hollywood Private Hospital. Several library surveys that were available on the Internet were consulted in the design of my survey, including surveys posted by the University of Alberta and the University of Virginia.

I received a 36% response rate, no doubt influenced by the chance to win one of two prizes sponsored by two local companies. Of the 185 responses received, 43% of respondents currently own a PDA; of which 76% use the Palm OS and 24% the PocketPC OS. The most popular model was the Palm 515 followed by Palm Vx then IPAQ.

The survey responses in terms of medical specialties using PDAs are indicated below:

Speciality	# who own a PDA
Anaesthesia	15
Urology	7
Cardiology	6
General Surgery	6
Orthopaedics	4
Psychiatry	4
Radiology	4
Respiratory Medicine	4
Endocrinology	3
Intensive Care	3
Oncology	4
Ophthalmology	3
CCU	2
ENT	1
General Med	2
General Practice	1
Haematology	1
Microbiology	1
Nephology	1
Neurology	1
Ophthalmology	1
Rheumatology	1
Thoracic Surgery	1
Vascular Surgery	1
No specialty indicated	3

Through the survey I sought to gain an understanding of what clinicians currently use their PDAs for and what future possible services the library could offer. The most popular functions of PDAs currently used by respondents are outlined below:

PDA function	No. of responses
Personal organisers (diary, address book etc)	71
Medical Calculators	24
E-MIMS	20
Word Processing	18
Therapeutic Guidelines	11
Patient tracking	10
ePocrates	10
Medical Textbooks	9
Games	8

The medical textbooks currently used by doctors will no doubt be of interest to libraries. Nine respondents indicated that they currently use the following medical textbooks on their PDAs: Harrison's Principles of Internal Medicine (5 responses), Griffith's 5 Minute Clinical Consult (2 responses), Anaesthesia for PDA and Medstat Will's Eye Manual.

Numerous articles in the medical and nursing literature (Zaroukian 2002, Enger 2002, Al-Ubaydli 2003) espouse the possibilities and realities of PDAs in the clinical setting for improving the quality of patient care.

Ways in which libraries are supporting PDAs

A review of the literature indicates that libraries that serve healthcare professionals in hospitals and medical schools have been at the forefront of supporting and implementing this new technology for their clients. The majority of the literature describes North American library initiatives however a few articles (Doran, 2003) and (Petersen, 2001) outline UK and Australian medical library involvement with PDAs. The realm of PDA use is not restricted to healthcare libraries. University, school, public and special libraries are investigating uses for handheld computer technology. Fox (2003) presents a number of ways in which academic, public and special libraries are customising services for Handhelds and maintains the PDA Projects in Libraries website (<http://web.simmons.edu/~fox/PDA.html>). There are a number of listservs designed specifically for the discussion of PDAs in libraries such as MLA-PDA (<http://www.mlanet.org/education/telecon/pda/pdadiscuss>) and PDAlibraries (<http://groups.yahoo.com/group/pdalibraries/>).

Dorsch, Burnette and Heskett (2003) outline 4 models of library PDA support that are familiar in library terms:

- Collection Development Model. This is the process of evaluating, selecting, procuring and managing the licences for PDA resources.
- Instruction / Advisory Model. This is providing formal training sessions, individualised one-on-one consultations and being an informal advisor of PDA hardware, software and content.
- Technical Support Model. This involves the provision and support of synching cradles and IR beaming stations for clients. This role may or may not overlap with the IT department's role.
- Facilitator / Communication Model. This involves developing web pages with links to PDA content, facilitating face to face PDA User Groups or online PDA listservs.

Libraries can find roles in the provision of one or all of these models. Some non-traditional library services involving PDAs include organising vendor demonstrations of PDA hardware and software as organised by the UCLA Library's PDA Fair (Smith, 2000) and Duke University's Mobile Technology Vendor Fair (Crowell 2002)

Libraries Visited - Peoria

The types of services and support offered by libraries will be discussed with regards to the organisations visited as part of the VALA scholarship. In Peoria, Illinois, I visited the OSF St Francis Medical Centre Library and the University of Illinois Health Sciences Library. These two libraries received a US\$50,211 LSTA (Library Services and Technology Act) grant, from the Illinois State Library, to fund a project titled: *"Point of Care to their palms: Medical libraries provide critical knowledge-based resources, technology and training to medical*

professionals.” The overall purpose of the LSTA grant was “to introduce the PDA as a device that could bring library resources – drug information, textbooks and current awareness services – to the point of care”. (Galganski et al., 2002 p.34)

The LSTA grant funded the purchase of PDA devices: 29 Handspring Visors (PalmOS) and 2 IPAQs (PocketPC OS), synching cradles, keyboards, 60 pieces of general and specialised software and licenses for [OVID@Hand](#). The grant also funded 64 hours per month over the eight-month period for a part-time librarian position (Oct 2001 to May 2002). Librarian Lori Bell spent half time on the project, selecting and evaluating clinical software, loading this software onto the PDAs, providing technical support, documentation and training as well as developing the grant’s web page:

<http://library.osfsaintfrancis.org/PDAGRANT/shortfinal.htm>)

Clinical content loaded onto the PDAs included:

- Griffith’s 5 Minute Clinical Consult
- EPocrates – drug database
- ABG Pro – an arterial blood gas analyser
- MedCalc – a medical calculator.

22 devices were used at the OSF St Francis Medical Centre Library for clinical staff and 7 devices were used at the University of Illinois Health Sciences Library for medical students and faculty. The PDAs were circulated the same way as books for a two-week loan period. Interestingly none of the devices have been lost or stolen, which no doubt would be a concern to most libraries contemplating such a service. A few PDAs at the hospital library were returned with cracked screens, which needed to be replaced.

The borrowing of the PDA devices enabled users to make informed decisions about adapting PDA technology into their professional practice. As Peters (2003 p.407) points out: “Unlike trying a device at a local electronics store, libraries provide users an extended trial period for devices loaded with appropriate software, content and services that can be carried into clinical and educational settings where they can be tested for usefulness.”

Staff at both libraries were involved with various aspects of the PDA project. Circulation staff developed lending policies and procedures, along with a checklist of equipment to be loaned. As catalogue records for PDA-formatted content was not available on the OCLC, these had to be originally catalogued by technical services staff. Much time and effort was spent developing user-friendly instructions for the PDAs and providing training on their use.

One of the issues these two libraries initially faced with purchasing PDA-formatted content was dealing with vendors. Vendors were used to dealing with individuals with credit cards, not with large institutions that use purchase orders. The purchase process has become easier now that library vendors like Baker & Taylor and Majors have started selling PDA content on CD-Roms. “Shipping the software on a CD makes installation much faster, (as opposed to relying on Internet connection speeds) and provides a tangible product for technical support staff to catalogue and add to the library’s collection.” (Galganski, 2002 p.35)

Another issue identified was the time consuming task of loading software and clinical content onto the PDAs. This is a factor that libraries need to take into account if deciding to offer the service of circulating PDAs pre-loaded with software and clinical content. Library purchased content is locked to one specific device. Each piece of software needs to be downloaded

individually and synchronised across to the individual PDA devices. The registration process to download software can be very complex and vendors do not always provide very clear instructions on how to download and unlock their software for PDAs. Wading through FAQ pages on the Internet or waiting for e-mail responses for support from vendors can be very time consuming. As noted in the LSTA Project Report “content consciousness-raising may be a major role for health sciences libraries into the foreseeable future”. Library lobbying of vendors to streamline the purchasing and downloading process may assist in improving this situation. The automatic updating of software such as ePocrates involves having direct access to the Internet and network administrator rights, which from behind institutional firewalls, can also pose barriers to the updating of content.

A service that both libraries in Peoria offer is one-on-one training and consultations with clinical staff and students. During my visit to the OSF St Francis Medical Centre Library I observed several one-on-one training sessions with Reference Librarian, Tom Dennis. The questions varied from a nurse educator’s query about placing their clinical practice manual content onto PDAs, through to a resident’s question about using UpToDate on a PDA. This demonstrated the need for librarians to have a wide knowledge of PDAs to provide this type of consultation and training service.

While at the OSF St Francis Medical Centre, Library Manager, Carol Galganski arranged for me to meet with a number of pharmacists and physicians to discuss how they are using PDAs in the clinical setting. Their uses ranged from using a program called iScribe to prescribe drugs on the run through to ePocrates for drug references through to using HanDbase to create a patient database. It is not the scope of this conference paper to discuss the plethora of clinical applications available. As a starting point, I recommend the OSF St Francis Medical Centre Library’s website (<http://library.osfsaintfrancis.org/pda.htm>) and the University of Illinois Health Science Library’s PDA Headquarters website (<http://www.uic.edu/depts/lib/lhsp/resources/pda/pda.shtml>). Both sites have links to clinical content and software reviews on the Internet. A number of other medical PDA websites are included in the bibliography.

I asked Dr Chris Martin, an Internal Medicine Physician at St Francis, his thoughts about the library’s role in supporting PDAs. He commended the hospital library for taking the initiative to obtain the LSTA grant to purchase hardware to circulate to clinicians. He did not, however, view the library’s role as being a hardware supplier; rather he saw their role as being a content evaluator and adviser. (Martin 2003)

Carol Galganski, Jo Dorsch, Peg Burnette and Lori Bell spent a substantial amount of time planning the PDA conference that was held in Peoria on 7th June 2002. This event was attended by librarians from around the United States and Canada. They also developed the MLA continuing education course “PDA Medical Applications and Content for Librarians” that I attended at the MLA conference in San Diego.

These two libraries in Midwest America are PDA pioneers for the library community and are continuing to spread their PDA knowledge and expertise through journal articles, PDA discussion lists and at library conferences and consortia meetings.

Libraries visited – Quincy

I visited the town of Quincy, on the border between Illinois and Missouri, and met with staff from two organisations that are using PDA technology: the Quincy Family Practice and the Blessing Health Professions Library at the Blessing Hospital.

The Quincy Family Practice (<http://www.quincyfp.org>) runs a Residency Program, as a branch of the Southern Illinois University, for 16 resident physicians focusing on rural health. Each resident is provided with a PocketPC (in 2003 they were using Casios) which are loaded with clinical content such as Archimedes, InfoRetriever, Griffith's 5 Minute Clinical Consult, ePocrates, UpToDate, Mobile PDR and Tarascon Pharmacopia. Two staff members assist these residents by providing training and IT support. They have developed documentation on PocketPCs and posted much of the information on their website.

(<http://www.quincyfp.org/pocketpc.htm>)

Arlis Dittmer, Manager of the Blessing Health Professions Library, received a US\$5000 grant from the National Library of Medicine for a project titled "Mobile Decision Support Systems for Nursing Clinicals". The aim of the project was to investigate whether the PDA is a tool that could be used at the bedside by nursing students, faculty and staff. The project's goals and objectives include: (Dittmer 2003)

- Analysing the ability of a PDA to retrieve and organize nursing data for patient care.
- Monitoring student use of evidence-based nursing information.
- Training students, faculty and hospital staff about the functionality of handheld devices.
- Providing access to useful information that is fast to retrieve, easy to read and readily available.

Seven IPAQs, recommended by the hospital's IT department, were purchased for the project. Each device was loaded with important phone numbers, a calendar and the following software packages from Skyscape:

- Davis Drug Guide for Nurses
- RN Labs (Nurse's Manual of Laboratory and Diagnostic Tests)
- RNDiseases
- IFacts
- Griffith's 5 Minute Clinical Consult
- Nursing Care Plans software

Bachelor of Nursing students enrolled in a senior leadership clinical course were divided into two groups. One group and their clinical instructor used PDAs for patient preparation and patient care, and the control group used the standard preparation and care methods – ie looking up print texts. Students in the study group borrowed a PDA from the library for a three day loan period and participated in a PDA training session. Each student in the study completed a pre-test and post-test survey. Results from the survey show that:

- 86% of survey respondents indicated that it is feasible to have PDAs in the library on a lending timetable.
- 77% of survey respondents indicated that senior nursing students use PDAs at the bedside.
- 86% of survey respondents indicated the project be replicated for other levels of nursing students.

- 77% of survey respondents indicated that PDAs be recommended to the hospital administration for nursing staff.

Results from the project indicated that

- The PDA was used primarily for drug information.
- Students were disappointed with the RNDiseases software.
- Students wanted PDAs for a longer period.
- Students thought PDAs were a good product for nursing.

This project demonstrates the initiative of the Library Manager in sourcing funding for a project that integrates the library, nursing staff and students with and handheld computer technology.

Libraries visited – Chicago

In Chicago I visited staff at the University of Illinois at Chicago Health Sciences Library. They received a US\$5000 Technology Awareness Award, from the National Library of Medicine, to conduct training workshops for public health staff. The overall goals of the Technology Awareness workshops were to (De Groote, 2003):

- Increase public health professional's awareness of health information on the Internet in order to educate themselves, patients, and customers.
- Teach public health professionals how to develop local information databases.
- Educate public health professionals on the various uses of Personal Digital Assistants (PDAs).

Laptops were used for Internet training. Due to the difficulties in renting PDAs, it was decided to use grant funding to purchase 5 PDAs along with Margi Presenter. This is a software and hardware system that allows any program running on a PDA, including PowerPoint slides, to be projected onto a screen for large audiences. The Technology Awareness workshops covered the basic functions of PDAs and included information on current awareness resources, clinical information such as drug resources and an infectious diseases database. Hands-on training included how to enter data, locating PDA resources on the Internet, installing software applications and backing up stored data. A Palmi705 wireless PDA was also purchased to demonstrate wireless capabilities.

Libraries Visited – Edmonton

The University of Alberta libraries are very innovative in their approach to initiating services to support PDA users. Denise Koufogiannakis and Pam Ryan have published several papers about PDAs in the library literature, and have presented at the US Medical Libraries Association (MLA) conference and at the Canadian Health Libraries Association (CHLA) conference. I attended their Continuing Education session, prior to the CHLA, entitled "Pocketing a new medium". It was through Denise's posting on a medical libraries listserv and publishing an article in BMC that I was aware of their PDA initiatives and chose to visit the University of Alberta in Edmonton Canada.

The John W Scott Health Sciences Library at the University of Alberta began offering PDA services as a result of a noted increase of students and staff in the library using PDAs. Denise, a PDA user since December 2000, explained that the original impetus for considering library services for PDAs originated from residents' requests for an evidence-based medicine calculator. A Web page was developed, initially with links to PDA resources for health sciences. This webpage (<http://www.library.ualberta.ca/pdazone/index.cfm>) known

as the PDAZone, has been expanded to encompass a wide range of subject areas represented at the University of Alberta. It is a very popular site with 29,276 hits between the period of August 2002 and January 2003. (Carney 2003)

In October 2001 librarians from the John W Scott Library, who were familiar with PDAs, offered a training session for healthcare professionals titled "Making the most of your PDA". Students and staff from various health disciplines attended this inaugural training session. Between October 2001 and February 2003, 14 sessions were offered to all faculties on PDA functions and information resources. Of the 14 sessions conducted, 9 focused on resources for the health sciences. The initial sessions provided an overview of basic features and functions of PDAs. Gathering feedback from participants via a questionnaire helped determine the future direction and content for training sessions. Koufogiannakis, Shores and Roesner (2002) outline the content of their training sessions and results of evaluation from participants in their article "Personal digital assistants at the John W Scott Library; Pocketing a New Medium".

The University of Alberta Libraries creates its own content for PDAs. Pam Ryan formats the Library's newsletter to be PDA-accessible via a popular service known as AvantGo (<http://www.avantgo.com>). AvantGo is a free web-clipping service that allows users to download particular pages (called channels) from the Internet to their PDAs. Pam has also established a listserv as a forum for PDA users to network and share information and ideas about PDAs (<http://www.library.ualberta.ca/pdazone/listserv/index.cfm>). The listserv is used as a conduit for the library to make announcements about new PDA developments.

The University of Alberta has established an IR beaming station in the John W Scott library so that clients can beam database and catalogue search results from a library PC to their PDA. Two reasons for choosing IR beaming as opposed to synchronisation cradles is that IR beaming is compatible with both Palm and PocketPC operating systems and is cheaper than providing and supporting the plethora of synching cradles used for each model of PDA. Decisions on the type of technology used at the University of Alberta were based on what Cornell University had in place and were currently using. Paolillo (2002) explains the technical process of establishing IR beaming kiosks, the costs involved and software used at the Engineering, Mathematics and Physical Sciences Library of Cornell University. Paolillo and Heisey document their IR beaming project on the Internet at (<http://www.library.cornell.edu/EMPSL/PDA-pilot-report.pdf>). Their document provides examples of instructions for clients and a questionnaire used to gather feedback about the IR beaming stations.

A unique service that is provided by the University of Alberta libraries is the lending of e-books on PDA expansion cards for a two-week loan period. Most PDAs come with expansion slots, the size of a postage stamp, so that expansion cards with content on them can be inserted. These e-books on expansion cards can only be read when inserted into the PDA's expansion slot. The cards are secure so the content of the book cannot be copied directly to the PDA. There is potential for libraries to integrate this format of e-book into existing collections, as it allows content to be borrowed, used and returned like a traditional print book. One of the issues, however, is identifying which operating system to support. There are different expansion cards for the various models of PDAs. For example, Palm use MultiMedia Cards, PocketPC use CompactFlash Cards and Sony use a different expansion card again, called a Memory Stick.

Two popular medical titles, Harrison's Principles of Internal Medicine and Griffith's 5 Minute Clinical Consult are being published, by Franklin Electronic Publishers, on a universal expansion card for both operating systems. The John W Scott Health Sciences library was the first known library in the world to lend these e-books on PDA expansion cards. As a pioneer to circulating this new format of content, they were faced with the challenge of cataloguing and packaging these tiny e-books. The small size of the cards prohibits them from being security tagged and so they are currently kept in the reserve collection. They are packaged in an A4 plastic cover so that spine labels and instructions for use can be attached.

The Anglo-American Cataloguing Rules do not cater for the current technical terms for PDA expansion cards. At the time of acquiring these e-books on expansion card, no catalogue records existed anywhere and so some creative original cataloguing needed to be done. Koufogiannakis explains that "The University of Alberta Libraries generally takes a single record approach to integrate print and online resources: the print record is supplemented with information about the online version. This approach proves to be more complex when integrating print and PDA resources, however. In this case, a multiple record approach has been adopted instead because more information is required to describe the features of PDA cards adequately". (Koufogiannakis, 2003) This is important so that users can identify the proper card format for their individual PDA.

Licensing models for PDA content

Publishers of PDA content generally license one download per PDA. This licensing model doesn't allow for libraries to circulate content as is traditionally done. At the Continuing Education session "Pocketing a new medium", Koufogiannakis and Ryan outlined five current licensing models for PDAs:

1. Free with existing licensed product.

PDA content is free with a subscription to an existing licensed product. This would be a preferred licensing model for libraries as it serves their PDA savvy clients and maximises the resources budget. An example of Free with Existing Licensed Product is MDConsult, an online resource combining medical texts, practice guidelines, full text journals and drug information. MDConsult has recently developed MDC Mobile for Palm and PocketPC which, at present, is free to individual and institutional subscribers of MDConsult (personal communication with Sales Rep at MLA). Another example of Free with Existing Licensed Product for individuals, though unfortunately not libraries or institutions, is UpToDate. Individual subscribers to the online content can load the PDA version of UpToDate onto Pocket PC's. UpToDate does not currently support the Palm operating system.

2. User Add-on with purchase

This model allows library clients to purchase (sometimes at a reduced rate) the PDA formatted content if their library has an existing subscription to the online version. Harrison's On Hand (<http://harrisons.accessmedicine.com>) is an example. The textbook Harrison's Principles of Internal Medicine has been available in electronic format on the Internet for several years. It is now also available through Access Medicine in PDA format called Harrison's On Hand. Individual subscribers to Harrison's Online are able to purchase, at a reduced rate, the PDA version to place on their Palm or PocketPC. This licensing model makes the library a promoter of PDA content for which clients need to pay for.

3. Set number of downloads

This model allows software to be loaded on a set number of PDAs for a particular institution. This model is a useful way of evaluating PDA content and may work well for libraries with flexible budgets. OVID@Hand, available from OVID (<http://www.ovid.com>) and PDXMD (<http://www.pdxmd.com>) are examples of vendors using this licensing model. This model however is fraught with issues for libraries in terms equity, budgeting and managing passwords for each download.

4. Institutional Site Licence

Institutional site licenses, which are common for e-journals and online databases, are not so popular with PDA publishers at present. This model of PDA licensing allows, for a fixed annual fee, as many downloads as required for a particular site. Some publishers encode into their software an expiry date that deletes the content after the contract period. PEPID (<http://www.pepid.com>) and Infotriever (<http://www.infopoems.com>) are two examples of PDA products that currently offer institutional licenses for libraries. The University of Alberta has an institutional subscription PEPID (Portable Emergency and Primary Care Information and is currently trialling Landes Bioscience Handbooks for PDAs.

5. Electronic loaning with due dates

This licensing model is perhaps the most familiar to traditional library operations. Content is 'borrowed' from the library ie downloaded for a set period of time to a PC, Laptop or PDA. It is then 'returned' to the library ie removed from the device via expiry date at the end of the borrowing period. The Cleveland Public Library is trialling a product by a company called "Overdrive" (<http://www.overdrive.com>) who are developing software to check out content that expires after the loan period.

The process and selection criteria for libraries choosing PDA content should, in theory, be the same as it is for print and other electronic materials. Due to the nature of handheld technology there are a few issues to consider such as:

- Operating Systems - What platforms are supported?
- Content – Is Harrison's-in-Print the same as Harrison's-Online and the same as Harrison's-On-Hand?
- Costs - Is there an annual subscription fee or a one off payment?
- Expiry dates - Does the software expire after a certain time period?
- Format for downloads - Can the software be purchased on CD-Rom or does it have to be downloaded from the Internet?
- IT issues - What problems are likely to be encountered installing and updating software from the Internet due to institutional firewalls?
- Additional hardware and software - Is adjunct software or hardware required for a program to operate?

PDAs at the Hollywood Private Hospital Library

Having visited libraries in the USA and Canada and observed what they are doing with PDAs, I would like to report on what I am doing in my own library in Australia. Managing a small medical library service with only two staff, I am conscious of the time commitment required to support PDAs on a large scale like the libraries I visited in North America. Prior to the study visit, I considered budgeting for and purchasing several PDAs and loading clinical content on them to circulate to clients. After talking to the librarians in Peoria about the huge time commitment this requires and the need to update hardware every 2-3 years I

have altered my thinking on this type of PDA service. I have to be realistic about the services I can offer at my library with the current budget and IT environment.

In the survey of doctors conducted in February 2003, I asked the question “Which PDA services would you like the Hollywood Private Hospital Library to provide in the future”. Responses to the question are listed below:

Possible future library service	Number of Responses
PDA subscription to MIMS	55
PDA subscription to Therapeutic Guidelines	43
PDA training and information sessions	34
Consultations re: buying PDAs & related software	29
Loaning of PDA Medical textbooks	26
Facilitating a PDA interest group within the hospital	11

Subscriptions to PDA content

A PDA subscription to MIMS and Therapeutic Guidelines were the two most popular responses to this question. MIMS is a popular drug handbook that contains medication descriptions, contraindications, precautions and drug interactions. The Hollywood Private Hospital Library subscribes to the bi-monthly updated print copies of MIMS well as a networked CD-Rom, called E-MIMS, for the hospital wards. I assumed (very wrongly) that the producers of MIMS would provide an institutional subscription for their PDA MIMS product or at least a discounted rate for our clinical staff, considering we subscribe to both their print and CD-Rom products. At the time of writing, no institutional subscriptions to MIMS on PDA were available. MIMS is available for individuals to download to Palm or PocketPC for a yearly subscription of \$165. It is also available on a seven-day trial period, after which the software expires.

Therapeutic Guidelines “are disease-oriented guidelines for prescribing and give clear, practical and succinct recommendations for therapy”. According to the Therapeutic Guidelines website, (<http://www.tg.com.au/home/index.html>) their Antibiotic Guidelines “is scheduled for release in January 2004 for Palm and Java enabled platforms such as PocketPC”. As at December 2003, there was no indication of site licensing for this product.

Websites with PDA links

Provision of a website with links to PDA resources was the third most popular response to the survey. This is certainly an achievable and relatively cheap service that libraries can provide to their clients. There are a number of very useful websites produced by medical libraries that I’ve included at the end of this paper. I have included URLs to PDA resources in the library’s quarterly newsletter and a few links from our library’s website.

Training and consultations

Training sessions and consultations were the next most popular requested service that doctors indicated they would utilise if offered by the library. I have given a number of presentations to clinicians and hospital administrative staff since my return from North America. I gave a PDA presentation at the Hospital’s Clinical Meeting – a lunchtime lecture that is attended by clinicians from various specialties. The presentation covered: the basic functions of a PDA, the difference between Palm and PocketPC operating systems, what to consider when purchasing a PDA and a demonstration of several clinical programs. I used Margi Presenter to

project PowerPoint slides from my PDA and used the Margi Mirror function to display the PDA screen via a projector. I downloaded the seven-day trial of MIMS to demonstrate what the screen looks like and demonstrated MedCalc, a medical calculator which would be appropriate to the clinicians attending the lecture. There was a record number of participants at this lunchtime lecture, indicating much interest in the topic. I received a number of telephone calls from doctors advising they could not make the lecture but would like to meet with me to discuss PDAs. One-on-one consultations with clinicians have been a welcomed service and have increased the library's visibility and value within the hospital. These are good opportunities to not only share my PDA knowledge with clinicians, but to promote the library's electronic online resources that they may not be aware of.

Loaning medical e-books on PDA expansion cards

In the survey conducted earlier this year, I asked doctors what medical textbooks they would mostly likely wish to borrow from the library in PDA format. Harrison's Textbook of Internal Medicine was the most popular title, followed by: Griffith's 5 Minute Clinical Consult, Emergency Handbook and then Oxford Clinical Handbook. The University of Alberta's initiative of circulating textbooks on PDA expansion cards really appealed to me. It allowed the circulation of textbooks in PDA-format without the hassles of loading content via the synchronisation process. It also demonstrates catering for clients who are PDA savvy.

Whilst in Edmonton I used Harrison's Textbook of Internal Medicine on my own PDA, which worked wonderfully. I inserted the card into the PDA and the contents of the book appeared straight away. I was so impressed that I asked for a sample of the packaging they used at the John W Scott Health Sciences library, in anticipation of using something similar in my library. On my return to Australia I purchased Griffith's 5 Minute Clinical Consult on the universal PDA expansion card from the Australian distributors for Franklin Publishers.

Unfortunately my enthusiasm to promote this new format of e-book was thwarted by technical problems and lack of vendor support. Despite documentation that came with the expansion card that stated supported devices were Palm (Tungsten T, m500, 515 and Handsprings) and Pocket PC devices (OPAQ, Toshiba, Dell) I could not get the card to work on my Tungsten T. Instead of the e-book's contents appearing, the operating system's preferences screen appeared. The same thing happened on a colleague's PDA. When I telephoned the distributors for assistance, they advised me that I was the first person in Australia to have purchased this product and that and they needed to e-mail the US for an answer. The eventual e-mail response from the Franklin Publishers in the US was not very helpful - essentially they said I had been sent a faulty card so I ordered a second card. I do not know what happens when these cards cross the equator but the second card did not work either. I asked several doctors to try out the e-book on their IPAQ and Palm 515 (testing both operating systems) and the second e-book sent would not work on either device. Telephone calls to the Australian distributors and e-mails to the US head office resulted in returning the product for a refund. It was a very time-consuming process and I did not persist with trying a third card. It was a very disheartening experience and highlighted to me the frustrations of having no local telephone support for the product in Australia.

Facilitating PDA Interest Groups

A number of librarians are facilitating face-to-face PDA user groups as forums for information sharing about handheld technology. (Morgen 2002) In my library newsletter, I called for expressions of interest from staff to establish a PDA Interest Group. I deliberately used the word 'Interest Group' as opposed to 'User Group' to be inclusive of anyone

interested in handheld technology – not just those who currently use a PDA. There were a moderate number of responses from doctors, nurses and administration staff. Identifying a suitable date and time to meet was a challenge. I have facilitated two ‘PDA Gatherings’ - one during a Friday lunch hour and the other on a Monday evening. At these informal meetings I demonstrated my knowledge of PDA and facilitated discussion about what software programs staff currently use. At the second meeting, I asked one of the surgical registrars to demonstrate to other clinicians how he uses his PDA for patient tracking. I organised for him to use Margi Presenter so that everyone could see on the projector screen – rather than crowding around a tiny PDA screen. For those staff members unable to attend the face-to-face meetings I advised them of an online PDA user group called Medical Palms set up specifically for health professionals. (www.auspug.org)

Hospital corporate staff, that cover areas of finance, administration, catering, admissions, supply and security, is one client group to which hospital libraries can market PDA services. Although I did not survey our hospital’s corporate staff on their use of PDAs earlier this year, I did give a PDA presentation to the hospital managers. A number of managers expressed interest in utilising a PDA to be able to read e-mails, schedule appointments and look up contact telephone numbers while on the run.

Wallace and Harrington (2003) surveyed the administration staff at their hospital in Florida. They suggest that “offering PDA resources, workshops and facilitating user communities for PDA users, medical libraries would be able to increase value-added services to administrators which is a group that rarely has the time or a reason to make use of the library’s traditional services.”

Conclusion

“Librarians have always been early adopters of new technology, at the forefront of effective utilisation. Patrons, whether in public, academic or special libraries rely on librarians to envision uses of new technological developments.” (Fox, 2003) This has certainly been the case at the Hollywood Private Hospital Library with the provision of online content and training and now with the provision training and knowledge about new handheld computer technology. This is supported by one doctor’s comment to the survey: “Well done for keeping abreast with these technological developments”.

As the format on which information is provided changes, from print to online to handheld computers, librarians need to keep pace - users expect us to support new technologies.

A number of authors (Morgen 2003, Wallace 2003, John 2003) provide advice for librarians on learning more about PDAs:

- Join a PDA listserv such as PDAlibraries (<http://groups.yahoo.com/group/pdlibraries/>)
- Browse library PDA websites (see a selection below)
- Talk to friends and colleagues who use PDAs.
- Purchase a PDA for library staff to become familiar with how the device functions.
- Practice downloading software onto the PDA.
- Facilitate information sharing of PDAs through face-to-face User Groups.

In an environment of increased usage of mobile technologies, there are opportunities for librarians to develop services to support clients' mobile information needs. In conclusion, PDAs represent a new technology which has its own technical idiosyncrasies, functions and

culture. PDA content, however, should be viewed by librarians as just another format from which information can be accessed and utilised.

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Online PDA bibliographies

University of Illinois Health Sciences Library – Peoria:

www.uic.edu/depts/lib/lhsp/temp/bibsub

University of Texas Health Science Center

<http://www.library.uthscsa.edu/Internet/PDAbibliography.cfm>

Virginia Commonwealth University Libraries

<http://www.library.vcu.edu/tml/bibs/pdabibliography.html>

PDA Websites developed by Libraries

University of Alberta PDA Zone

<http://www.library.ualberta.ca/pdazone>

University of Illinois Health Sciences Library PDA Headquarters

<http://www.uic.edu/depts/lib/lhsp/resources/pda/pda.shtml>

Duke University Medical Centre Library Personal Digital Assistants

<http://www.mclibrary.duke.edu/respub/guides/pda/>

PDAs for Health Care Providers – Arizona Health Sciences Library

<http://educ.ahsl.arizona.edu/pda/index.htm>

University of Connecticut

<http://library.uhc.edu/pda/>

Medical PDA Websites

HandHeldMed

<http://www.handheldmed.com/>

Handhelds for Doctors

<http://www.handheldsfordoctors.com/>

Healthy Palm Pilot

<http://www.healthypalmpilot.com/>

Medical Pocket PC

<http://www.medicalpocketpc.com/>

Palm Docs – The Physicians Online Palmtop Resource

<http://www.palmdocs.org/>

PDAMD

<http://www.pdamd.com/vertical/home.xml>