

Access to Healthcare Resources for PDAs

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This poster explores the inroads that have been made toward PDA use in the clinical setting, as well as some of the barriers that still exist. PDAs have been around since the late 1990's, but advances in technology, within the past two years, have made these devices much more functional and affordable. This poster looks at some of the clinical applications developed within the Johns Hopkins Medical Institutions. It also explores one clinical department's use of PDAs for information resources. The results of this investigation produced, not only conclusions about current PDA use, but also opportunities for new services and collaboration with existing projects.

SELECTED PDA MILESTONES 1996 – 2002

- 1996** -Pilot 1000™ and Pilot 5000™ organizers introduced.
- 1997** -PC Computing's MVP "Usability Achievement of the Year" Award goes to Pilot 1000!
-PalmPilot™ Professional and PalmPilot™ Personal Edition models introduced.
-Palm begins licensing its Palm OS® Platform.
- 1998** -Palm launches the Palm™ III organizer, the 3rd generation of the industry-leading PalmPilot™.
-Handspring licenses Palm OS® platform.
-3,595 developers creating software for the Palm OS® Platform.
- 1999** -Palm introduces the Palm™ VII connected organizer to the world and delivers wireless access to the Internet, with Palm.Net service.
-Palm introduces the Palm™ IIIe handheld.
-Palm™ Vx organizer and Palm IIIe Special Edition organizer introduced.
-Nokia, the world's leader in mobile phone technology, licenses the Palm OS® platform.
- 2000** -Palm, Inc. launches the Palm™ IIIc color handheld and the expandable Palm™ IIIxe handheld, plus the Palm™ Portable Keyboard.
-Palm sets the pace with enhanced wireless Palm™ VIIx handheld.
-100,000 Palm OS® developers
-Palm and IBM join forces to deliver mobile e-Business solutions.
- 2001** -140,000 Developers!
-Palm ventures invests in leading healthcare handheld clinical services called ePhysician, a health-technology company based in Mountain View, Calif.
-Palm's new m105 handheld adds memory, email and internet connectivity.
-New sleek Palm m500 and m505 handhelds add expansion, mobile connectivity and color.
-The University of South Dakota is first in U.S. to require Palm Handhelds for 1st-year students.
-Palm awards mobile medicine grants to 17 U.S. universities and teaching hospitals.
- 2002** -Palm Powered Devices: 20 Million Sold
-Palm i705 Handheld Debuts: Only secure, integrated wireless, e-mail solution with web access.
-New Palm m130 and m515 Handhelds add spring color to 2002 product lineup.
-Palm delivers wireless connectivity in the United States with the Palm Bluetooth card.
-Compaq's iPAQ H3635 Pocket PC debuts.
-PubMed Clinical Queries on the PDA (<http://cim.usuhs.mil/pubmed>)
-BioMedNet Evaluated MEDLINE – 1.0 lets you search all 10 million records of MEDLINE. (<http://uk.mobile.yahoo.com/001228/2/20es.html>)

Sources <http://www.palm.com/about/corporate/timeline.html>

Johns Hopkins Medical Institution's PDA Applications

Application: **Point Of Care Information Technology (POC-IT) Antibiotic (ABX) Guide**

Application developed internally by The Johns Hopkins University, School of Medicine, Department of Medicine, Division of Infectious Diseases in conjunction with partners & sponsors

The Antibiotic Guide is a "decision support tool" intended to provide clinicians with concise, digested, timely information about the diagnosis and treatment of infectious diseases. The information is arranged so that it is clinically useful at the point of care.

Records are based on the literature, combined with the authors' experience. There are approximately 30 authors, and the editorial process includes 10-15 editors.

The project started in late 1999, and the Web site was launched in August 2000.

Versions were released for the Pocket-PC in April 2001, and in May the first Palm version was released. A version for Blackberry is in progress and due to be released soon.

Number of downloads: 88,000 *40-45% are Prescribers (physicians, nurse practitioners, & Physician Assistants)*

Devices used: Palm & iPac Blackberry to be released soon

The success of this project is attributed to

- Clear goals and objectives
- Affiliation with a major academic institution
- Good organization

Lessons learned:

- Learnt how to appeal to physicians, and deliver information in the healthcare field
 - Strength is delivering information at the point of care
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Application: **Mdanywhere** - Application developed internally by Hopkins Technology Incubator

A PDA is used for physician charge capture (entering CPTs, modifiers and diagnosis) and prescriptions. Prescriptions are printed and sent to the EPR (Electronic Patient Record) System at the Johns Hopkins Hospital.)

Number of users: 21

Devices used: iPac and wireless. Data can be entered on the Web, or from a wireless PDA.

Lessons learned:

- It was an expensive pilot project.
 - Wireless adds real value to the PDA
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Application: **Patient Keeper** - Commercial product

A PDA is used for physician charge capture (entering CPTs, modifiers and diagnosis). This system is also used to enter hospital charges for Respiratory Therapy. These charges are then sent to Keane via an existing interface.

Number of users: 50 user pilot. The pilot was completed and the system is still used by Respiratory Therapy.

Device used: Palm

Goals: There is a 6 month agreement to continue with this project. Their goal is to include a broader set of users.

Lessons learned:

- Everyone in the department already had a PDA, so training was easy
- There were no losses or breakage
- Biggest problems were syncing and batteries

Application: **EPR (Electronic Patient Record) Mobile Labs** - Developed internally

Lab data is presented to a user via the 802.11b network using a user defined template. The IPAC accesses the Johns Hopkins Hospital network via AP's located in different areas throughout the hospital. Users connect using SSL to the Intranet, via a known IP.

Number of users: Pilot started with 10 users, currently 5-8 users. The project is on hold as department relocates.

Device used: iPac

Goals: Hope to expand to 50 users in Cardiac Surgery and Emergency medicine. Improve security of data, as all devices are wireless.

Lessons learned:

- Hardest part is this project is getting a department to agree on 2 or 3 data views.
 - Data security is a huge issue when using wireless technology.
 - No real support issues
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Application: **Resident Surgery Log** - Developed internally

Residents were issued Palm IIIs. Application permits resident to record surgical experience using RRC categories and a point-and-click interface. Hot-sync synchronizes Palm data with a SQL-Server central data base. Residents can either use the Palm application or alternatively can enter data using a Web interface.

Number of users: 24 users in production

Device used: Palm III

Goals: None – The Resident Review Commission has a new system, so this project was discontinued.

Lessons learned:

- Support issues were rare with Palms
 - Very popular with Residents because it was easy to use
 - Hot sync was conditional on connection to the Web site so only 1/3 of residents used it.
 - Hot sync problems were complex because it relied on a connection to the SQL database and every synch had to be supervised.
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Application: **On-call inquiry** - Developed internally by Department of Ophthalmology

This is a Palm Query Application (PQA). Users with Palm VIs and Palm.net accounts can wirelessly inquire as to the current on-call physician for various divisions. The PQA queries a modified version of the Web application which is part of the Wilmer Intranet.

Devices used: Palm VII or i705

Goals: Waiting for 802.11B wireless computing to get cheaper. Hopefully within a year, it will be widely implemented.

Lessons learned:

- Palm.Net is both costly and slow – 802.11B is definitely preferred route
 - More support issues on the iPac than Palm
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Results Summary

- **Palm is intuitive and easier to use than the iPac**
 - **More computer-savvy, technical users tend to prefer iPac over Palm**
 - **More support issues with iPacs than Palm devices**
 - **HotSync can be cumbersome when used for mission-critical applications**
 - **PDA applications are much more useful when they connected wirelessly BUT data security issues**
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**The Johns Hopkins Medical Institutions
Grand Rounds, September 18th, 2002**

Participants: Out of a possible 100 doctors, nurses, fellows, residents and other healthcare professionals 25 people participated in the survey:

Faculty - 17
Fellows - 3
Residents - 3
Interns - 2

Their comfort level with using a PDA:

Excellent - 6
Good - 10
Somewhat - 5
*Not at all - 4

**Those who responded they were not familiar with a PDA, also indicated their they were uncertain about the quality of resources, had no time to investigate the quality of resources, or did not see this technology as useful in clinical practice.*

Factors stopping them from using PDAs for information resources:

Unawareness they exist - 4
Lack of access to required technical devices – 5
Screens are too small/hard to read and use - 3
Cost of resources - 4
Uncertain about the quality of resources - 6
No time to investigate technology or quality of resources - 6
Do not see technology as useful in a clinical practice - 1

If a online forum was created to evaluate resources they would:

Use it before purchasing PDA software?	Yes 17	No 0	Maybe 8
Add opinions on software to the forum?	Yes 8	No 1	Maybe 12

The following rating scale was used by participants to evaluate the popularity and use of various information resources.

Rating	*Frequency of Use (Mark Only Those You "LIKE")
– Never heard of it (leave blank)	D – Daily
H - Heard of it	W - Weekly
L – LIKE it*	M - Monthly
T – Tried it once or twice	O – Occasionally
D – Don't Like	N - Never

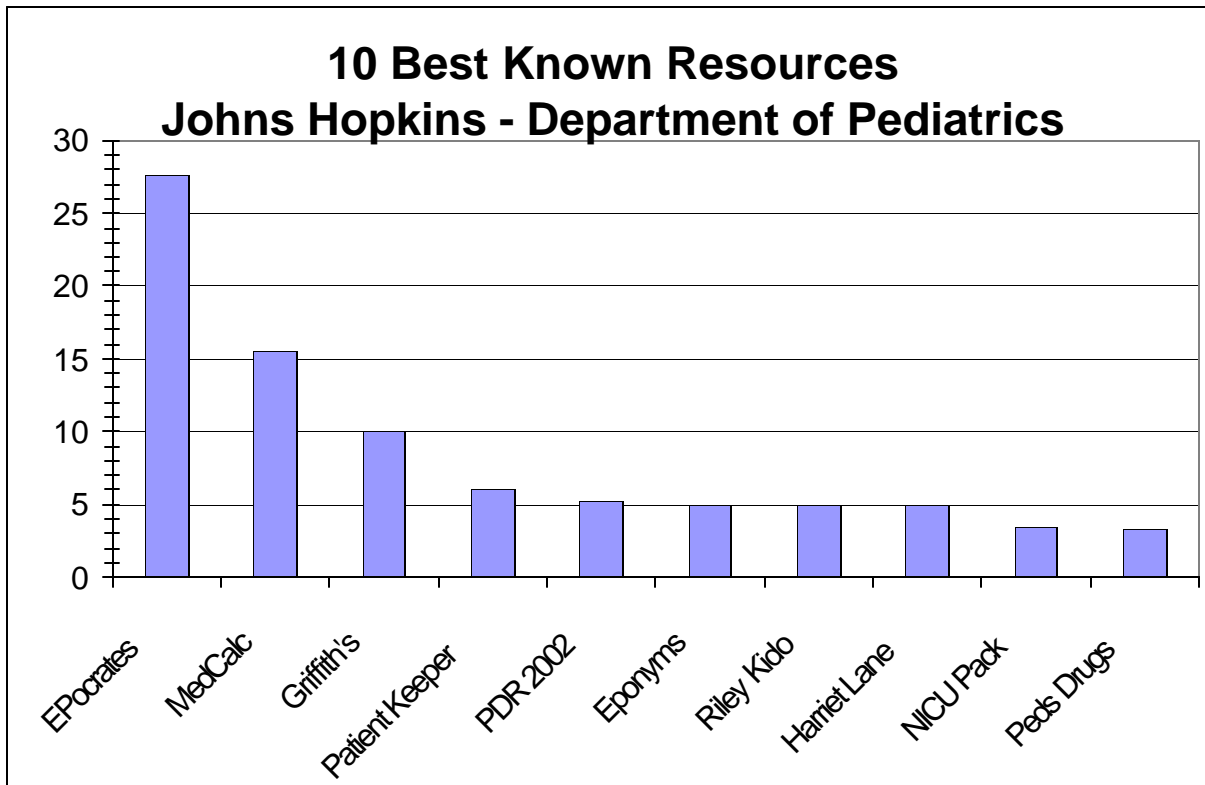
The results from the survey were assigned a weighted scores:

Daily use - 3
Weekly use - 2
Monthly use - 1
Occasional use or Tried - .5
Heard of - .25

On the next page is a list of the resources provided. The top 10 most popular resources using this weighted scale are highlighted in **gold**. Other resources that were ranked in the survey are noted in **light yellow**.

	R	F		R	F
AAFP Children's Health Bundle			Medical MathPad 3.0 MathPad		
Asthma Doc NHLBI Freeware			Medical Wizards Clin Calculator Sharew		
Bartlett ID '02PocketBook Inf Dis Therapy			Medicalc Shareware		
Black Book Handango Shareware			MedRules Clin Prediction Rules Freeware		
Body Mass Index Calculator cbasPad			The Merck Manual: Centennial Edition		
CCS Pediatrics, Year 2002 Edition			MobilePDR Freeware		
Current Medical Therapeutics			OCM/911 (Outlines in Clinical Medicine) Bioterrorism Freeware		
Chief Complaints in Pediatrics			Obesity Guidelines Tool v 1.0		
Child Safety Guide Primary Care			On Call Floor Emergencies Gen Int Med		
Clinical Neurology FREE MobiPocket			Palm Stat Statistics Shareware		
Contraceptives			Neofax		
DDH HandEChart 1.0			Neonatal Immunity		
Differential Diagnosis Mnemonics and the Medical History Emergency			NICU Package		
DoseCalc Pediatric Dosages Shareware			Palm ACLS 2000		
EBM Calculator Statistics Freeware			PalmTox Demo		
EMedicine Sports Medicine eBook			PatientKeeper		
EPocrates Rx, Formulary, ID Freeware			Patient Tracker		
Eponyms Gen Int Med Freeware			Pediatric Advanced Life Support		
ER Acronyms DpModule			Pediatric Assessment Doc		
GCS (Glasgow Coma Scale) Freeware			Pediatric Car Seat Rules Doc		
Griffith's 5 Minute Clinical Consult			Pediatric Drugs Handbook of Pediatric Drug Therapy		
HarrietLane			Pediatric Peak Flows – Females		
Harrison's Principles of Intern Medicine			Pediatric Peak Flows – Male		
Harrison's On Hand Download requested topics Comm			PediFluids Shareware		
Immunization Guide 2.0			PediSuite (Windows Download) 3.20		
Immunization Schedule '99			Pediatric Database iSilo		
Infant Bottle Formulas Prim Care			Pediatric Development Milestones		
InfoRetriever for Palm Os Clinical Decision Rules Freeware			Prenatal Care		
InfusiCalc Infusion rate Shareware			Physician's Desk Reference 2002		
Johns Hopkins Manual of Gynecology/Obstetrics, 2 nd Ed.			Physician's Drug Handbook 9th Edition		
Johns Hopkins Antibiotic Guide Free			Pocketful of Prevention Prim Care iSilo		
JournalsToGo Selected absts to palmFree			Taber's Cyclopedic Medical Dict 19 th Ed		
KidNorms 1.0 Shareware			Redi-Reference Clinical Guidelines Gen Int Med		
KidPack 2.0 Ped Dosage Shareware			Riley Kidometer Age-based ped norms Share		
LabValues New Release Gen Int Med			STAT Growth Charts Ped Growth Share		
MedCalc Gen Int Med Freeware			Selected Topics in Peds		
Medical Data Solutions Ped Dosing			Treatment Strategies in Pediatrics Skyscape		
Others: Lexi-Comp			US Mortality Probabilities		
Hand Base			Vaccine Safety in Pregnancy		

List compiled from: ectopicbrain, Healthy PalmPilot, handheldmed, pdaMD.com, palm, sky scape



Lessons Learned

- ? The primary use for all PDAs is still Personal Information Management.
- ? Early adopters are most interested in applications that will facilitate the transfer of patient data and billing.
- ? HIPAA regulations ensure data security for patient records remain the highest priority for health care information.
- ? Clinicians are unaware of information resources available for PDAs.
- ? Clinicians do not have a method for evaluating the ease of use or quality of PDA information resources.
- ? Technology for wireless data transfer systems exists, but the high cost of installation for these systems is impeding rapid implementation throughout the Johns Hopkins Medical Institution.
- ? Opportunities exist to collaborate on product development.

Goals for the Future

- ? Provide a problem-based forum to locate and evaluate PDA information resources
- ? Collaborate with clinical departments to further develop existing projects
- ? Play an active role in encouraging wireless access for easy location and transfer of medical literature throughout the Johns Hopkins Medical Institutions.