

Mobile Computer Technology in Healthcare

Daniel O. Young, MD

danieloyoung@hotmail.com

Assistant Professor of Medicine

Creighton University Medical Center

March 24, 2005

Introduction

- ▶ Mary Lanning Memorial Hospital
- ▶ Financial Disclosure
- ▶ Background
- ▶ Platforms
- ▶ Devices
- ▶ Case Applications
- ▶ Interesting Features of Handheld Computers
- ▶ What is being done in healthcare elsewhere?
- ▶ Review/Comments/Questions

Educational Mission of MLMH

- ▶ Mary Lanning Memorial Hospital is a 200 bed, short-term, acute general care facility, designated as a trauma center for south central Nebraska.



- ▶ Creighton University School of Nursing
- ▶ School of Radiologic Technology

Financial Disclosure

- ▶ I have no direct financial interest in any of the companies or products I will feature or mention in today's presentation.



Background

- ▶ 1999: Medical Informatics elective
- ▶ 2000: Started Internal Medicine residency
- ▶ 2003: Started Chief Resident year in IM
- ▶ 2004: Research Faculty, Nephrology Division
- ▶ 2005: Fellow, Washington University

Mobile Computer Technology

- ▶ We've been using "handheld devices" in healthcare for a long time
- ▶ Examples: phones, glucometers, stethoscopes, otoscopes, ophthalmoscopes, etc.
- ▶ Handheld computer use is relatively "new" to clinical medicine (mid-90s)

Platforms

▶ Palm OS

- PalmSource
- Most popular and prevalent software for handhelds and smartphones in the world today



▶ Windows CE/Pocket PC

- Microsoft Corp.
- Used in Pocket PCs, portable media centers, and smartphones.



- Overview**
- Features and Benefits
- Downloads
- Why Palm OS?
- Palm OS Garnet
- Palm OS Cobalt 6.1
- PalmSource Mail for Blackberry Connect
- Mobile Mail 5.2
- WiFi

- Related links:
- China MobileSoft Acquisition
 - PalmSource Installer (PDF: 224 KB)
 - PalmSource Web Browser 3.0 (PDF: 208 KB)
 - Security and Palm OS (PDF: 420 KB)



Palm OS

The world's most popular handhelds and smartphones are powered by Palm OS.

Palm OS
Since the introduction of the first Palm Pilot in 1996, the Palm OS platform has defined the trends and expectations for mobile computing - from the way people use handhelds as personal organizers to the use of mobile information devices as essential business tools, and even the ability to access the Internet or a central corporate database via a wireless connection.

Downloads



[Click here](#) to update your Palm OS or Palm Desktop

Why Palm Powered?



Palm OS is the world's most popular software for handhelds and smartphones

[Why Palm OS?](#)

Palm OS 5, which has been available to customers for years, supports ARM®-compliant processors. [Palm OS Garnet](#) is an enhanced version of Palm OS 5 and provides features such as dynamic input area, improved network communication, and support for a broad range of screen resolutions including QVGA.

[Palm OS Cobalt 6.1](#) is the next generation of Palm OS. It will enable the creation of new categories of devices for the communications, enterprise, education and entertainment markets. Palm OS Cobalt 6.1 provides integrated telephony features, support for WiFi and Bluetooth, and enhancements to the user interface.

As with previous versions of Palm OS, Palm OS Garnet and Palm OS Cobalt retain application compatibility with existing 68K-based applications.

- What is Windows Mobile? ▶
- Devices ▶
- Downloads ▶
- Help and How To ▶
- Communities ▶
- News and Events ▶
- Partner Offers ▶
- For Developers ▶
- For Business ▶
- For Mobile Operators ▶
- For Press and Analysts ▶
- Windows Family ▶

Welcome to Windows Mobile



Download Great Software



Windows Mobile software delivers the familiar Windows experience on a mobile device.



[See All Devices](#)



Microsoft

Mobile's Going Places.

We've got the Roadmap. Register Today.

Microsoft **MEDC** Mobile & Embedded DevCon 2005

New from Windows Mobile



[ActiveSync 3.8 Now Available in 23 Languages](#)

Microsoft ActiveSync 3.8 is the latest synchronization software for Windows Mobile-based Pocket PCs and Smartphones. Download it today!

[Voice Command Now Available in the United Kingdom, France, and Germany](#)



Transform your Pocket PC or Pocket PC Phone Edition into a virtual interactive personal assistant by enabling effortless, hands-free management of a range of functionalities.

[Register Now for Microsoft Mobile & Embedded DevCon \(MEDC\) 2005](#)



May 9-12, 2005 Las Vegas, NV
Attend the premier developer event with the latest Microsoft Windows Mobile & Embedded technologies.

Featured Reseller

Shop at [Amazon.com](#) to find the latest Windows Mobile-

Already a Windows Mobile Owner?

- [Find software downloads](#)
- [Configure your device](#)
- [Shop for accessories](#)
- [Join a community](#)

Tips and Tricks

[Sync Up With Your Desktop](#)

ActiveSync is designed to help you get the most from your Windows Mobile-based device. Learn some of the basics about syncing and where to find more information about ActiveSync.

[4 Ways to Store Your Data](#)

Wondering how to store your music, Word files and extra programs? This Tips for Mobile beginner column covers types of storage, how to transfer your files from one storage medium to another, and where to buy storage for your Windows Mobile-based device.

[Personalize Your Device](#)



Make your device unique - just like you. Change the home screen with a theme, add a ringtone that matches your best friend's personality, or show off a picture of your dog.

[Sending E-mail on Your Smartphone or Pocket PC Phone](#)

I've got two new devices - a Smartphone and a

PDA Manufacturers (March 2005)

- ▶ Palm Devices
 - **palmOne**



- ▶ Pocket PC Devices
 - ASUS
 - **Dell**
 - HP (Compaq)



Case Demonstrations of Select Types of Applications

- ▶ Although I will feature my favorites, my focus is on the type of software being demonstrated and its educational use.
- ▶ I will be using a piece of software called **Pocket Controller** to replicate my handheld's screen on my laptop for viewing.

A word about medical software for handheld computers...

▶ Freeware

- As the name implies
- ePocrates Rx, Archimedes, many others
- More prevalent for the Palm OS

▶ Shareware/Commercial

- Will ask for or require a fee for use of the app
- Griffith's 5 Minute Clinical Consult, many others
- Equally prevalent between Palm OS & Pocket PC

CASE #1



CASE #1

- ▶ An order was placed to deliver an antibiotic to an elderly woman admitted for urosepsis.
- ▶ Prior to administering the (oral) antibiotic, the patient's daughter asks if it will interact with any of the patient's other medications.
- ▶ ABX: Levofloxacin
Meds: HCTZ, Ramipril, Tums

ePocrates Rx

Free Drug Reference for
Palm and Pocket PC devices
(CASE #1)



CASE #1

- ▶ Resolution: A call is placed to the ordering healthcare practitioner changing the order to avoid any potential medication errors.

Site Directory



Login for eFacts

About eFacts Online

Product Information

Facts and Comparisons

Reference Products

Product Support

PDA Products

Licensing



Medi-Span Website

Medi-Span Database
Products

Medi-Span News

Drug News

News

FDA Information

New Approvals

Special Features

Drug News Update

Medication Guide for
Antidepressants

Drug Information

DrugfactsPlus

Formulary Monograph
Service

Community

Hospital Pharmacy

Advances in Pharmacy

ImmunoFacts

Links

The F.I.X.

Press Releases

Trade Shows

**Customer
Information**

Customer Support

Company

Site Registration

Career Opportunities

Wolters Kluwer Health
Scholarship

Great Products for Your PDA!

Facts & Comparisons Products

The following products are available for both PalmOS and WinCE/PocketPC devices.

Antidotes-FactCheck

Provides pharmacists with a quick reference to agents that neutralize poisons or counteract their effects. [Click here](#) for more information.

Cancer Chemo Regimens-FactCheck

A unique chemotherapy reference that provides dosing, administration, dose schedule, and total dose cycle with the primary literature reference for each combination regimen. [Click here](#) for more information.

Diabetes Care-FactCheck

Important information on diabetes management and treatment has never been easier to access. Now, you can download this valuable information to your handheld device and refer to it continuously throughout the day. [Click here](#) for more information.

IV Push Rates-FactCheck

Provides administration information in adults for agents to be given by rapid administration as a resource to reduce medication errors. This includes the drug name/indication, adult dose, infusion rate, dilution/final concentrations, and the adverse effects from too rapid administration. [Click here](#) for more information.

Skyscape Products

The following products are powered by Skyscape's smARTlink™ technology, these applications are available for both PalmOS and WinCE/PocketPC devices.

HerbalIx™ (Drug Interaction Facts: Herbal Supplements & Food)

Organized by herbal product, Drug Interaction Facts: Herbal Supplements and Food allows the health professional to answer consumers' questions regarding safety issues concerning possible drug-herb and drug-food interactions. [Click here](#) for more information.

A2zDrugs™ (A to Z Drug Facts)

A2zDrugs™ is the handheld version of A To Z Drug Facts, the easy-to-use drug guide with the latest FDA approvals, indications, dosages, side effects, and patient care considerations. [Click here](#) for more information.

iFacts™ (Drug Interaction Facts)

iFacts™ is the handheld version of Drug Interaction Facts, a best selling drug interaction analyzer covering thousands of brand and generic drugs. [Click here](#) for more information.

SPECIAL OFFER!

Buy both A2zDrugs™ and iFacts™ together and save \$12.90 off the regular price! [Click here](#) to find out more.

GNP3™ (Guide to Popular Natural Products, 3rd Edition)

Guide to Popular Natural Products includes 125 informative monographs

CASE #2



CASE #2

- ▶ A radiologist technician student is given an assignment to image an elderly gentleman with a suspected vertebral body fracture.
- ▶ The patient tells the student that he might have a disease called multiple myeloma.
- ▶ The student is interested in learning more about multiple myeloma while the films are being developed and read.

Griffith's 5 Minute Clinical Consult

General Medical Reference
(CASE #2)



CASE #2

- ▶ Resolution: After viewing plain films, an MRI is ordered to further delineate whether the compression fracture is a result of his suspected myeloma or just a benign compression fracture.

[Store Home](#)

[Checkout](#)

[Your Profile](#)

[PDA Fullfillment Center](#)

Search:

Categories

[PDA eBooks](#)

PDA eBooks

eMedicine textbooks are updated 24/7 by authors and editors. In the future, we will allow you to download the most current version of a purchased PDA text and update it as often as you like for an entire year. Until this option is available, we are offering our eBooks at introductory pricing.

Description	Price	Buy
eMedicine 65-volume PDA Download Collection	99.00	Add
eMedicine Dermatology eBook	49.00	Add
eMedicine Emergency Medicine PDA eBook	79.00	Add
eMedicine Neurology PDA eBook	49.00	Add
eMedicine Ophthalmology PDA eBook	49.00	Add
eMedicine Otolaryngology/Facial Plastic PDA eBook	49.00	Add
eMedicine Pediatrics eBook	79.00	Add
eMedicine Physical Medicine and Rehab PDA eBook	49.00	Add
eMedicine Plastic Surgery PDA eBook	49.00	Add
eMedicine Sports Medicine PDA eBook	49.00	Add
eResidency SkillStat	19.95	Add

© eMedicine.com, Inc., 2005

eMedicine.com, Inc., 1004 Farnam Street, Suite 300 Omaha, Nebraska 68102
Toll-Free Phone: 1-866-EMED-DOC or 315.413.0661
For technical support E-Mail please click [here](#).

For online CME please check out our [CME Store](#)

CASE #3



CASE #3

- ▶ A nursing student is completing work in the Oncology clinic and reviewing some initial chemotherapy orders for a patient with colon cancer.
- ▶ The student sees BSA listed as a parameter used to calculate the doses prescribed and is interested in learning more about calculating body surface area.

Archimedes

Free Medical Calculator
(CASE #3)





CASE #3

- ▶ Resolution: The chemotherapy regimen was corrected for the appropriate BSA.



Medical Software Bundles

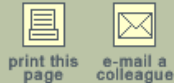
▶ ePocrates

- Rx – Free drug reference
- Dx – Griffith's 5 Minute Clinical Consult
- Lab – Reference lab information
- Formulary – Formulary information

▶ Merck Medicus Mobile

- <http://www.merckmedicus.com>
- See next slide

WHAT'S NEW on MerckMedicus



WIRELESS ACCESS TO CURRENT MEDICAL RESOURCES



If you are able to browse the internet from your PDA, Smartphone or Blackberry, then you can access resources found on MerckMedicus directly from your handheld device

Use your wireless connection to extend your access to current medical resources from the palm of your hand, including:

- [The Merck Manual, 17th Edition](#)
- [Pocket Guide to Diagnostic Tests](#)
- [MEDLINE Journal Abstracts](#)
- [Reuters Medical News](#)
- [The wireless Personal Search Assistant](#)

with more features on the way...

To help you stay ahead of the curve, wireless technology allows you to search resources on the internet, returning the results directly to your handheld device.

If you are a registered user of MerckMedicus and can browse the internet from your PDA, Smartphone or Blackberry, then you're ready to go wireless! Just type in [www.merckmedicus.com](#) into your handheld browser and use your MerckMedicus user name and password to gain 24-hour access free of advertising and no access fees. There's nothing new to download or remember!

If you are not a registered MerckMedicus user, just click on [Register Now](#) or "Register" at the top of this page. Once registered, use your device to access [www.merckmedicus.com](#) and begin to get the information you need.

[Explore >](#)

PRESENTATION RESOURCES CENTER

SEARCH

MerckMedicus

All of MerckMedicus

[Advanced Search](#)
[Search Tips](#)

Earn AMA CME Credits for Search

MEDLINE by PubMed

MEDICAL RESOURCES

- > [Textbooks](#)
- > [Journals](#)
- > [Mobile MerckMedicus](#)
- > [MD Consult — MerckMedicus ed.](#)
- > [Harrison's Online](#)
- > [The Merck Manual, 17th ed.](#)
- > [Best Practice of Medicine](#)
- > [Drug References](#)
- > [CME Course Credits](#)

PATIENT RESOURCES

- > [HealthMapsSM](#)
- > [Patient Handouts](#)

CLINICAL TOOLS

- > [DXplain®](#)
- > [TheraDoc®](#)

MY FOLDER

Merck Medicus

Mobile Version featured
(Wireless Version also recently released)



A word about the use of portable medical information...

- ▶ I never advocate for the information stored on any type of computer to be used as a substitute for clinical judgment.
- ▶ The practice of medicine is a balance between science, clinical judgment, and practicality.
 - Mobile computer technology can assist all 3.

Interesting Features of PDAs

- ▶ Phone capabilities:
 - CDMA or GSM/GPRS
 - SMS/MMS messaging
- ▶ Wireless capabilities:
 - Wi-Fi (802.11b)
 - Bluetooth
- ▶ MP3 Player/Portable Media Device
- ▶ Camera functionality
- ▶ Video capability
- ▶ Biometric security (iPaq 5455)

products

- Zire handhelds >
- Tungsten handhelds >
- Treo smartphones >
- accessories >
- industry solutions >
- compare & select >
- product basics >
- special offers >
- where to buy >
- factory outlet

search palmOne:

Products

for:

start search

- palmOne pays back
- product registration
- free newsletters
- glossary of terms

Audi
THE A4
SUM OF THE PARTS
CHALLENGE
*CLICK TO COLLECT
PART 6:
Audi
Navigation
plus

A handy pocket
guide full of
timesaving tips
and techniques

< Home < Products < Treo Smartphones

Treo™ 650

- Video
- Tour
- Photos photo gallery

- Overview
- Details
- Email
- Plans
- Add-ons
- Reviews

NEW So much more than just talk.



starting at ¹
\$449 USD **buy now** 800-881-7256

[When will my order arrive?](#)

Phone, email,³ web,³
organizer & camera.

• SAVE Get these special offers when you [buy direct](#) from palmOne!

- [Free Express Shipping](#) on all Treo 650 smartphone orders [details](#)
- [Free Express Weather](#): palmOne exclusive (\$19.99 value) [details](#)
- [\\$100 off](#) with 1-year Audible service. [details](#)
- [Sprint](#): Now as low as \$449 after \$150 Sprint rebate. [details](#)

Upgrading to a
Treo 650 smartphone?
[Learn more....](#)



**A Smarter
Mobile Phone**

Get all you need, all in one.

The Treo™ 650 smartphone from palmOne makes it easier than ever to stay connected. It simplifies your life by combining a compact mobile phone with email,³ an organizer, messaging, and web access.³ There's also Bluetooth® technology so you can connect wirelessly to other Bluetooth devices. Not to mention an MP3 player,² a digital camera that captures video, and a vibrant color screen that brings everything to life – all in a device that's still small enough to fit in your pocket. Seems like Treo smartphones just keep getting smarter.

Already a Treo 600 owner and want to know [what's new?](#)

Pick up a smarter phone.

The Treo 650 smartphone looks and feels just like a [phone](#), but it's so much more. Carry thousands of business and personal phone numbers with you, and dial any of them by name from your contacts list. Or enter a name or number on the QWERTY keyboard. There's even an on-screen dial pad. speakerphone, speed dial,

Dell recommends Microsoft® Windows® XP Professional

[E-mail page](#) | [Printable Version](#)
[BACK TO: USA > Home & Home Office > New Dell Handhelds > Compare New Dell Handhelds](#)

Axim™ X50v Details



Customize Your Ideal Axim

- Choose from our entire set of features and options
- Prices starting at \$499

[Customize It](#)

SPECIAL OFFERS - Click for details.

- **15% Off Dell Axim Handhelds!**
With purchase of select Axim Handhelds and software game pack. Limited time offer. [Offer Details](#)
- **FREE Shipping on ANY Dell Axim Handheld!**
[Offer Details](#)


**Purchase today,
Pay in June!¹**


For well qualified customers. Limited Time Offer!

[Product Highlights](#)[Product Views](#)[Tech Specs](#)

The Dell Axim™ X50v is the ultimate handheld device that delivers performance, connectivity and a brilliant VGA display at an affordable price.

- Microsoft® Windows Mobile™ 2003 Second Edition operating system with Windows Media Player 10 Mobile
- Powered by the Intel® XScale™ PXA270 Processor at 624MHz
- Brilliant 3.7" color TFT VGA display with 640x480 resolution
- Integrated Intel® 2700G multimedia accelerator with 16MB video memory
- Integrated 802.11b and Bluetooth™ Wireless Technologies
- Packed with 64MB SDRAM and 128MB Intel StrataFlash® ROM
- Integrated CompactFlash Type II and Secure Digital / SDIO Now! / MMC card slots provide flexible expansion
- VGA-Out Support with optional VGA Presentation Bundle
- Removable Primary Battery with optional High Capacity Battery
- 3.5mm Headphone / Headset Jack for Headsets to support VoIP and voice recognition applications
- Built-in microphone and speaker for easy recording on the go
- USB Cradle including Battery Charging Slot
- Sleek, stylish design

360° Product View


[Interactive Axim X50 Tour](#)
[More Details](#)

Awards


Dell's Axim X50v Handheld wins the Best of DigitalLife Award 2004.
[More Details](#)
[BACK TO: USA > Home & Home Office > New Dell Handhelds > Compare New Dell Handhelds](#)

What else is being done with PDAs?

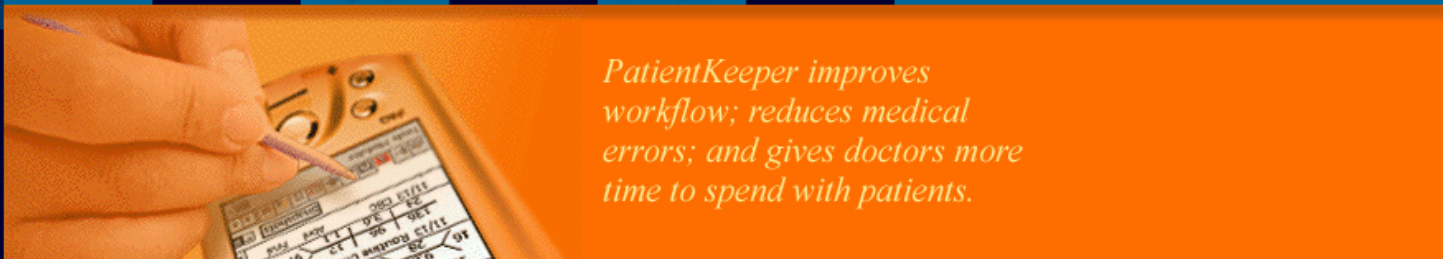
▶ Large scale

- Patient Keeper
- <http://www.patientkeeper.com>

▶ Small scale

- Project LARA at CUMC
- <http://pathology.creighton.edu/lara>

- Home
- Company
- News / Events
- Products
- Success Stories
- Partners
- Developers
- Support
- Document Center
- Contact Us
- PK Personal



PatientKeeper improves workflow; reduces medical errors; and gives doctors more time to spend with patients.

The Power of Mobile Solutions

Now clinicians can access and manage essential information - anywhere, anytime, across disparate information systems. >> [LEARN MORE](#)

Latest News

The Department of Medicine at Mount Sinai School of Medicine Selects PatientKeeper's Mobile Charge Capture Solution

>> [LEARN MORE](#)

In the News

CNBC featured PatientKeeper, Dr. David Brailer, and the University of Kansas Medical Center

>> [LEARN MORE](#)

Success Stories

Wireless By Design

Health Management Technology January 2005 Cover Story

>> [LEARN MORE](#)

PatientKeeper Products

PatientKeeper has invested in infrastructure and application development to deliver integrated solutions that support care teams in a single hospital or across an entire healthcare system.

Enterprise Solutions

Clinical Results

Bring clinical information to the point of care - improve patient safety, simplify workflow, and increase physician and nurse job satisfaction.

Clinical Desktop

Access essential patient information from any wireless tablet or desktop computer - save time, enhance patient care, aggregate data from multiple sources.

Charge Capture

Capture professional services as delivered - increase revenue, improve billing accuracy, and streamline the billing process for clinicians and billing staff.

Mobile Dictation

Record dictation at any time, from any location on a PDA - remove errors, streamline workflow, and share patient information with the care team quickly.

ePrescription

Create legible prescriptions on a PDA and forwarded directly to the pharmacy - save time, improve formulary compliance, and enhance patient safety.

Reference Library

Access medical references in the context of a specific patient's relevant data to support clinical decision-making.

PatientKeeper Platform™

Designed specifically for healthcare environments, the PatientKeeper Platform provides an open, extensible infrastructure for integrating, managing, developing, and deploying mobile healthcare applications.

[Learn More](#)

Dear Creighton doctors:
There's someone
we'd like you to meet.



LARA Home Page

Help and Technical Support

Frequently Asked Questions

Supported Devices

LARA (Live Anywhere Record Access) is a system developed by the Creighton University Department of Pathology that connects wireless enabled handheld devices to the hospital's information systems. LARA gives Creighton physicians easy access to their patients' information anywhere in the hospital without delays.



LARA is free for any physician at Creighton University Medical Center to use. All it requires is a [supported handheld device](#). Once the device has been set up (see column at right), LARA can be used to lookup patient vital signs, laboratory results, radiology reports, medications (given and ordered), ins and outs, and more! LARA is always up to date, always available and fast.



Come join Samuel Caughron, MD, the developer of LARA, for an in-depth look at the technology and process by which the system is available. Dr. Caughron will be presenting the Pathology Grand Rounds on Creighton's LARA in the Morrison Seminar Room on Tuesday, December 7th at 12:00 Noon.

How to sign up for LARA

Step 1: Get a compatible device. Although LARA may be used for free, it requires an 802.11b (Wi-Fi) enabled handheld device. If you already own a handheld, check [our list](#) to see if your device is supported. If you do not own a handheld, Pathology recommend the [Palm Tungsten C](#) to access LARA.

Step 2. Tell us about your device. Before you can use LARA, your device will have to be activated for use on the hospital's wireless network. This requires us to collect a small amount of information (ie. the MAC address). You can either [email it to us](#) yourself, or drop your device by the Department of Pathology (Lobby Level) and we'll get everything set up for you.

Step 3: Start using LARA! After your compatible device has been activated on the network, it can be used to access LARA.

Review

- ▶ My Background
- ▶ Different Platforms: Palm versus Pocket PC
- ▶ Different Devices: Palm versus Pocket PC
 - SmartPhones and Blackberries = competitors
 - "If it's on the web, it's on my device."
- ▶ Case Applications featuring software classes
- ▶ Additional interesting PDA features
- ▶ More broadscale use of PDAs in healthcare

PERSPECTIVE

Personal Digital Educators

Personal Digital Educators

NEJM March 3, 2005

James J. Cimino, M.D., and Suzanne Bakken, R.N., D.N.Sc.

“What’s his infection sensitive to?” In 1995, getting the answer to this question required a house officer to find an unoccupied computer at the nursing station, sign on, and traverse the necessary screens to get the culture result. Armed with the answer — say, “levofloxacin” — she would ask the follow-up question: “What’s the renal dosing?” The next step would typically entail a search for a tattered copy of a drug reference manual.

In 2000, the house officer still needed to turn to the computer for the first answer, but for the second, she might have skipped the scavenger hunt and pulled out her personal digital assistant (PDA). A few quick taps and scribbles, and she had her answer.

Rapid access to prescribing information probably represents the single most visible and widespread effect of PDAs on health care today. In 2003, a survey of just one popular PDA-based drug reference found that 25 percent of U.S. physicians were using it in their practice,¹ and another survey found that when physicians had a question about antibiotics and could not get an answer from a colleague, they turned to PDA-based resources 50 percent of the time.² These trends promise to continue as students and professionals in the fields of social work

cluding personal organizers (phone and appointment books), electronic references (ranging from “cheat sheets” to textbooks), and data-collection forms. They can operate in several different modes. In “stand-alone mode,” applications are loaded onto the PDA, and the user refers to them at will. In “synchronization mode,” information — and requests for additional information — can be exchanged between the PDA and a desktop computer through a wire or an infrared link. In “wireless mode,” the PDA can maintain a continuous Internet connection, either over a cellular telephone network or with the use of wireless local area network (wi-fi) standards, allowing it to receive and send e-mail, browse the World Wide Web, and communicate with remote clinical-information systems. When the wireless connection is made through the cellular-telephone network, the PDA can usually double as a cellular telephone. These three modes of use correspond to different types of information support for health care trainees and practitioners.

In the stand-alone mode, the PDA can replace the plethora of references that accumulate in the pockets of white coats. At Columbia University, for example, medical students’ PDAs are loaded with more than 30 applications and reference sources

Comments/Questions

▶ Thank you very much for inviting me to share with you my knowledge.

▶ <http://www.danielyoung.net>

▪ **Handheld Computing Resources**

My "Department Chairs"

