

# Put a PDA in your practice for easy access to current medical information

Rapidly growing medical knowledge demands that PAs and educators be familiar with the latest equipment and software and that students learn to use these tools early.



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In order to keep up with the increasing base of medical knowledge, PAs must practice lifelong learning. Consider that the National Library of Medicine (NLM) added more than 670,000 new medical articles published in 2007<sup>1</sup> and the FDA approved 127 new drugs between 2000 and 2006.<sup>2</sup> In addition, the Institute of Medicine (IOM) estimates that at least 1.5 million preventable adverse drug reactions occur in the United States each year. According to the IOM, prescription drugs, herbal treatments, and OTC medications are changing so rapidly that clinicians cannot keep up; they need accessible electronic information.<sup>3</sup> To keep their certification, PAs must pass the National Commission on Certification of Physician Assistants (NCCPA) Recertification Examination every 6 years. Educational options include reading journals, textbooks, and review books; attending continuing medical education programs; consulting with colleagues; and doing individual medical information research.

PAs need access to information that is convenient, current, authoritative, and evidence-based. Printed textbooks usually require a year of processing, and their contents may be out-

dated by the time they are published. Colleagues may be behind in their medical knowledge base depending on how they keep up. The Internet provides electronic text that is continually updated, but not every patient care setting will have access. CME programs are costly to attend and take time away from practice. The ideal information tool should contain quick, portable, updated, authoritative content available in any clinical setting. Personal digital assistants (PDAs) are convenient reference tools that help clinicians keep up with new treatments, practice lifelong learning, reduce medical errors, and prepare for recertification examinations.<sup>4</sup>

Cell phones are now a part of daily life and reside on your belt clip or in your pocket for instant access. Cell phone/PDA combination devices, or smartphones, offer wireless Internet connectivity and increased digital storage capacity to allow users to carry the equivalent of 30 medical textbooks in their pocket. Some PDA products contain information that has been deemed by medical professionals to be based on the best evidence and make clinical recommendations at the bedside. With these products immediately accessible by PDA, PAs can do fast lookups in the time it takes to review the chart before seeing the patient, as the patient undresses for the physical examination, after the examination while the patient dresses, and when formulating the medical record notes and plan.

## EQUIPMENT

Continuous lookups are possible only if the PDA resources are convenient and fast. A PDA in the pocket or on the belt offers this convenience, encouraging frequent lookups, updated practice habits, and continuous lifelong learning. The best PDA choice is the one you are willing to carry on your person wherever you go. Having a cell phone/PDA combination encourages use and increases the likelihood that it will be carried throughout the day. The cell phone offers Internet data connectivity anywhere there is cell service, a great advantage over requiring Wi-Fi accessibility. The ideal PDA device will operate as a cell phone and connect to Wi-Fi networks when they are available.

Several cell phone/PDA operating systems exist, including those for the Palm, Windows Mobile, RIM Blackberry, and Apple iPhone. The operating systems with the most medical applications were available through Palm and Windows Mobile, but Palm is moving to a new platform, leaving Win-

dows Mobile as the best choice.<sup>5,6</sup> Find the cell phone provider that best meets your needs; then review that provider's Windows Mobile smartphones to make your choice.

### DAILY QUESTIONS

Evaluation of patients should generate clinical questions continually. What is the differential diagnosis for this chief complaint? What are the best diagnostic tests? What is the best therapy? Are there any possible adverse drug interactions with the medications or herbal supplements the patient is already taking? You may see an unfamiliar disease on the patient's problem list. What are the implications for the current complaint, how will it affect treatment of the disease, and vice versa? What ICD-9 diagnosis code should you put on the billing document? How much will the prescription cost the patient? Is the medication covered by the patient's insurance plan, or will he or she be charged full price because the drug is not on the formulary? The cell phone/PDA is the most convenient and fastest way to obtain the needed answers at the point of care. Ideally, the PDA program should be quick, easy to use, easy to keep updated, and reasonably priced. The content should be authoritative and current, and it should offer the most information for the broadest number of patients and diseases.

The three types of PDA references to consider using are integrated software, electronic textbooks, and Internet databases. **Integrated software** is a multifunction suite of applications within a single program that offers diagnostic and therapeutic information. There are several PDA **electronic textbook** editions of the major medical best-sellers. If you buy all your textbooks from the same company, there is some limited interlinking. **Internet databases** offer access to the NLM, online textbooks, and clinical guidelines. These require Internet access via a cell phone service or a Wi-Fi environment.

### INTEGRATED PROGRAMS

The two main integrated programs to consider are Epocrates Essentials and PEPID (Portable Emergency and Primary Care Information Database). Both programs cost about the same and offer much of the same information in a quick, efficient manner. The programs provide disease information

linked to pharmacology and laboratory information. Links to medical calculators are available when needed. Both products provide a drug-drug interaction program to avoid adverse reactions. In addition, both offer a subscription service for 1 or more years, seamlessly updating your PDA with the latest information as long as you sync with an Internet-connected personal computer or enable wireless syncing through your cell phone service connection. Both products work well when there is no Internet connectivity because the content is stored and updated on the PDA.

Differences between the two programs should be evaluated by each user. Epocrates includes a differential diagnosis generator based on symptoms and signs, insurance formularies in the drug database, CME credits, a laboratory reference with normal values, and an infectious disease treatment guide. The disease section is based on the 5-Minute Clinical Consult. PEPID provides diagrams, more extensive pharmacology information, many more medical calculators, and evidence-based pearls integrated within the disease text. The disease sections are written by PEPID authors and targeted to emergency and critical care. If money and memory space are not concerns, having both products on your PDA may be an excellent solution. Web links to all the programs discussed here and others are provided in Table 1 (see page 42).

### ELECTRONIC TEXTBOOKS

Evidence-based medicine products currently on the market include UpToDate, Essential Evidence Plus (formerly known as InfoRetriever), Clinical Evidence, and DynaMed. Content experts review the latest clinical studies, provide appraised evidence, write recommendations, and offer a subscription to continuous updates of common medical topics. These texts are stored on the PDA for access whenever wireless service is unavailable and updated when you do have service. UpToDate is the exception; it is updated by a quarterly DVD that is sent by mail and must be manually installed on a dedicated 2 GB memory card.

A number of excellent reference tools offer several books in one suite and are available without charge, including MerckMedicus and Thomson's Clinical Xpert. MerckMedicus provides these e-books: *Harrison's Practice, Pocket*

### KEY POINTS

- The best PDA choice is the one you are willing to carry on your person wherever you go. Having a cell phone/PDA combination, or smartphone, encourages use and increases the likelihood that it will be carried throughout the day. The cell phone offers Internet data connectivity anywhere there is cell service, a great advantage over requiring Wi-Fi accessibility. Find the cell phone provider that best meets your needs; then review that provider's Windows Mobile smartphones to make your choice.
- PDA programs, whether they are texts or Internet databases, should be quick, easy to use, easy to keep updated, and reasonably priced. The content should be authoritative and current, and it should offer the most information for the broadest number of patients and diseases.
- Each user should determine which company has the titles most personally applicable so he or she can use the same "reader program" and have partial text-linking between books. This functionality will allow the user to read related topics quickly without leaving one book and opening another.
- To review for a National Commission on Certification of Physician Assistants examination, use Epocrates-Dx, PEPID, MerckMedicus, *Harrison's Practice*, or *The Merck Manual* to generate a list of topics, and check off each topic until you complete the list. Each topic can be covered in a few minutes using a portable resource and a method that offers a comprehensive board review.

**TABLE 1. PDA Links**

Product	Category/Web URL	Notes
ACP PIER (Physician's Information and Education Resource, produced by the American College of Physicians)	EBM textbook www.statref.com	EBM articles from the American College of Physicians-Adult Medicine
Adobe reader	PDA text tool www.adobe.com	Free PDA program to store and read PDF files on your PDA
Andrew Yee's Medical Eponyms for the Palm OS	Textbook http://eponyms.net/eponyms.htm	Free eponym reference
Avantgo	PDA text tool www.avantgo.com	Web clipping tool to copy Web page references to your PDA
CDC 2004 STD Treatment Guides	Guidelines www.cdcnpin.org/scripts/std/pda.asp	Free
Clinical Evidence	EBM textbook www.clinicalevidence.com	EBM summaries by the BMJ Publishing Group
Clinical History and Physical Exam	Reference www.clinicalexam.com/	A list of the medical history question and physical examination parts by body system
Clinical Xpert	Free textbook bundle www.thomsonclinicalxpert.com	Drug, clinical, laboratory, toxicology, herbal references
Diagnosaurus	Textbook http://books.mcgraw-hill.com/medical/diagnosaurus/index.html	Free differential diagnosis reference
Documents to go	PDA text tool www.dataviz.com	Read and store Word, PPT, and Excel documents on the PDA; Standard with Palm PDAs and smartphones
Dynamed	EBM textbook www.ebscohost.com/dynamed	AAPA member discount at AAPA store (www.aapa.org/cme/dynamed.html) PDA and Web versions
Emory PA Board Review PDA video for iPhone, iPod Touch, and Windows Mobile PDA	PDA video files on multiple medical topics http://emorypa.org/electronic_board_review_2009.htm	30 hours Cat I CME PA Board Review for PC, Mac, PDA, and audio players Palm-based mnemonics as a free download
Allan Platt's Differential Diagnosis Mnemonics		
Epocrates Essentials	Integrated product www.epocrates.com	Drug, clinical, laboratory, infectious disease information; tables; calculations; differential diagnosis calculator; CME
Essential Evidence Plus	EBM textbook bundle www.essentialevidenceplus.com	AAPA member discount at AAPA store (www.aapa.org)
Evidence-Based Medicine Calculator	References www.cebm.utoronto.ca/palm/ebmcalc/	Common formulas used to evaluate studies
Geriatrics at your fingertips	Textbook www.geriatricsatyourfingertips.org	Geriatrics guidelines, tools, pain management, drugs, clinical information
iSolo	PDA text tool www.isilo.com/index.htm	Text reader with many medical reference applications

**TABLE 1. PDA Links (continued)**

Product	Category/Web URL	Notes
Johns Hopkins Antibiotic Guide	Reference <a href="http://hopkins-abxguide.org/">http://hopkins-abxguide.org/</a> (downloadable info available at <a href="http://www.hopkinsmedicine.org/poc-it">www.hopkinsmedicine.org/poc-it</a> )	Free infectious disease reference
Medical Mnemonics for Palm OS	Textbook <a href="http://www.medicalmnemonics.com">www.medicalmnemonics.com</a>	Free list of medical mnemonics
MeisterMed	References <a href="http://www.meistermed.com">www.meistermed.com</a>	Several references for STD, coding, dermatology, electrolytes; Need iSolo reader to view (see iSolo)
Merck Medicus Mobile	Free textbook bundle <a href="http://www.merckmedicus.com">www.merckmedicus.com</a>	Two clinical textbooks— <i>The Merck Manual</i> and <i>Harrison's Practice</i> , laboratory reference, journal abstracts
MobiPocket Reader	PDA text tool <a href="http://www.mobipocket.com/en/downloadsoft/productdetailsreader.asp">www.mobipocket.com/en/downloadsoft/productdetailsreader.asp</a>	Text reader with many medical reference applications
Monthly Prescribing Reference	Drug database <a href="http://www.empr.com/download">www.empr.com/download</a>	Dosages, indications, contraindications, adverse effects
National Guideline Clearinghouse PDA site	Guidelines <a href="http://www.guideline.gov/resources/pda.aspx">www.guideline.gov/resources/pda.aspx</a>	Free multiple guidelines (Web-based)
NIH Asthma Guidelines	Guidelines <a href="http://hp2010.nhlbihin.net/as_palm.htm">http://hp2010.nhlbihin.net/as_palm.htm</a>	
NIH Obesity Guidelines	Guidelines <a href="http://hin.nhlbi.nih.gov/obgdpalm.htm">http://hin.nhlbi.nih.gov/obgdpalm.htm</a>	
NIH Pocket AIDs Info	Guidelines <a href="http://www.aidsinfo.nih.gov/pdatools/guidelines.aspx">www.aidsinfo.nih.gov/pdatools/guidelines.aspx</a>	Need pocket Adobe reader installed (see Adobe Reader)
NLM Mobile MD on Tap	<a href="http://www.nlm.nih.gov/mobile/">www.nlm.nih.gov/mobile/</a>	A PDA program and PDA-friendly search site
Palm EKG	Reference <a href="http://emedic.com/product_ekgp_free.asp?os=ekgp">http://emedic.com/product_ekgp_free.asp?os=ekgp</a>	25 arrhythmias for review on your PDA
PDA reach	PDA demonstration program <a href="http://www.junefabrics.com/">www.junefabrics.com/</a>	Project PDA screens on a PC and Projector for teaching demonstrations
Pediatrics - The Kidometer	Reference <a href="http://www.kidometer.com/">www.kidometer.com/</a>	From the Riley Hospital Pediatric Residency—pediatric tables and references
PEPID	Integrated product <a href="http://www.pepid.com">www.pepid.com</a>	Drug, clinical, laboratory information; tables; calculations; EBM articles
Sanford Medical Guides	<a href="http://www.sanfordguide.com/">www.sanfordguide.com/</a>	Infectious disease reference
Shots 2009	References <a href="http://www.immunizationed.org/anypage.aspx?pgid=2">www.immunizationed.org/anypage.aspx?pgid=2</a>	Immunization guide
Skyscape	Multiple specialty textbooks <a href="http://www.skyscape.com">www.skyscape.com</a>	Extensive textbook titles for most specialties and primary care
Unbound Medicine	Multiple specialty textbooks <a href="http://www.unboundmedicine.com">www.unboundmedicine.com</a>	Textbook titles for most specialties and primary care
UpToDate	EBM textbook <a href="http://www.uptodate.com">www.uptodate.com</a>	Comprehensive appraised evidence textbook for PDA and Web

*Guide to Diagnostic Tests*, *The Merck Manual*, and *MEDLINE Journal Abstracts*. Thomson's Clinical Xpert was developed by the authors of Micromedex and provides extensive information on toxicology, drug-drug interactions, and alternative medicines. A laboratory results and disease reference is being developed. Also available is the free differential diagnosis textbook *Diagnosaurus* from McGraw-Hill.

Several popular specialty and general medicine textbooks have been adapted as e-books for the PDA. Each user should determine which company has the titles most personally applicable so he or she can use the same "reader program" and have partial text-linking between books. This functionality will allow the user to read related topics quickly without leaving one book and opening another. Leading companies for medical textbooks are Skyscape and Unbound Medicine. They offer PDA textbooks for most specialties and electronic updates as soon as they are available. Free trials of many titles can be obtained before subscribing. The advantage to the PDA textbook is that it is always current, and as long as you subscribe, your copy will be the latest version.

### INTERNET DATABASES

Wireless PDAs and smartphones allow instant access to the Internet and the latest published evidence using free journal search software such as PubMed, Medscape, and MerckMedicus. The NLM offers a free PDA program called MD on Tap, which searches for evidence-based articles using criteria set by the user. A PDA version of Google Search offers medical information sites and links to journal abstracts. In addition to the previously discussed subscription online texts DynaMed and UpToDate, there are free online texts, such as eMedicine. Clinical guidelines are available at [www.guidelines.gov](http://www.guidelines.gov). These databases are powerful bedside tools that allow clinicians to search for the results of the latest studies and review articles as long as there is wireless service.

Free Web clipping programs, such as Avantgo, allow Web-based text to be copied to the PDA for use when not connected to the Internet. These programs are easy to set up and allow continuous updates while the user has Internet access.

### THE PDA IN ACTION

**Patient care** A 50-year-old male presents to your emergency department with a leg infection in a gash he sustained while cutting bushes in his yard. During the intervening 3 days, the area has become red, painful, and swollen without fluctuance. The patient, who has a history of chronic atrial fibrillation, takes warfarin and long-acting diltiazem every day. He is allergic to penicillin. To manage the pain, he has been taking extra-strength acetaminophen, 2 tablets every 5 hours. He is afebrile. You do a wound culture and are considering therapy for community-acquired methicillin-resistant *Staphylococcus aureus*. You also order a CBC and prothrombin time (PT). As you await the lab results, you do a fast lookup on your PDA for the best antibiotic covered by the patient's insurance formulary and the ICD-9 code to put on the laboratory slips.

You want to use trimethoprim-sulfamethoxazole (TMP-SMX; Bactrim, Septra, generics) to treat the infection, so you enter all the patient's medications in the drug-interaction program and see that both the acetaminophen and TMP-SMX will increase the anticoagulant effect of warfarin. A quick review on atrial fibrillation using the PDA text shows that the international normalized ratio should be between 2 and 3. You know that his PT must be monitored more closely during treatment of the infection, so you tell him to see his primary care clinician in 2 days and educate him about the signs of increased bleeding.

**Board review** One approach to preparing for the NCCPA board review starts with copying the list of organs to be studied from the NCCPA Physician Assistant National Recertification Examination and Physician Assistant National Certification Examination blueprint for content at [www.nccpa.net/EX\\_samplediseases.aspx?r=panre](http://www.nccpa.net/EX_samplediseases.aspx?r=panre). This list can be stored on your PDA. As you read, using Epocrates-Dx, PEPID, MerckMedicus, *Harrison's Practice*, or *The Merck Manual*, check off each topic until you complete the list. The disease coverage in these products uses an easy-to-read format to present the main facts that often appear in board questions. These products offer quick reads that can be done during breaks, between patients, or whenever you have some downtime. Each topic can be covered in a few minutes using a portable resource and a method that offers a comprehensive board review.

### CONCLUSION

PDAs are becoming an essential clinical tool that can help clinicians engage in lifelong learning as part of their daily routine. Portable, fast access to evidence-based information using PDAs can help prevent medication errors and improve patient care. A combination cell phone/PDA allows clinicians one communication/reference device that should be readily available at the bedside. Today's practicing clinicians must be able to use these tools to keep up with the rapidly growing volume of medical knowledge. Students should be taught early in their studies how to use the tools just as they learn to use their stethoscope. Educators must become familiar with the equipment and software programs to teach the next generation of e-connected clinicians. **JAAPA**

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