De RSNA News*

PDAs Offer mobility to busy radiologists

*Resúmenes enviados y publicados con autorización de la RSNA.

If you've put off buying a handheld computer until displays and networking capabilities are improved, you may be depriving yourself of other features that can streamline your daily activities, according to an article in the July-August issue of RadioGraphics.

Lead author Adam E. Flanders, M.D., a professor of neuroradiology at Thomas Jefferson University Hospital in Philadelphia, says radiologists are discovering the value of personal digital assistants (PDAs) for personal information management.

"You can carry all your contacts, appointments, research data, memos and a reference library with you at all times," says Dr. Flanders, a member of the RSNA Electronic Communications Committee (ECC).

Dr. Flanders points out that PDAs certainly are familiar to residents, who use them to better coordinate clinical schedules, maintain procedure logs and use a repository of teaching/reference material. "Reference material stored on a PDA has become the preferred method for residents to take notes on the run and to maintain lists of differential diagnoses instead of carrying a cumbersome handbook or textbook," he says.

"Of course, the best sources of information for the practicing radiologist can usually be found right in the reading room where there is ready access to an array of information systems," concedes Dr. Flanders. "But today's radiologist has additional responsibilities that require him or her to be in a number of places besides the reading room or the office. Radiologists want to be responsive to the needs of the patients and clinicians."

Often, in order to meet these needs, radiologists must have access to information that is not readily accessible from outside the office or reading room environment. "For example, if you get paged by a clinician who wants to know where his patient is in the workflow queue, you could get the answer from your PDA in far less time than it would take to make the additional phone calls it would nor mally require to get the answer," says Dr. Flanders.

Screen shot of a midline sagittal T1weighted image of the brain displayed on a higher resolution PDA. © RSNA 2003. Photos and charts printed with permission. (RadioGraphics 2003; 23:10351047)

Workflow monitoring and maintenance may be the most compelling future PDA application for radiology. "As radiology practices continue to expand, not only is there an impetus to tightly integrate workflow with resources, but also to have this information readily available. A wireless handheld device that monitors the clinical schedule and modality work list has potential value to the 'mobile' radiologist," the authors write in RadioGraphics.

Dr. Flanders adds that mobile access to patient, workflow and clinical data is valuable only if it is relevant to how you practice—if electronic data delivery saves you more time than conventional means, and if the data are presented in a concise and understandable format.

A conventional film on a light box (left) eventually will be replaced with the PDA driving a wallmounted digital flat panel (right) for image display. The appliance is mounted in a hospital corridor and the user controls the display from a wireless PDA, which contains a list of relevant patients. The display is connected to the hospital imaging network. The user can review an imaging study by selecting it on the handheld device. (Courtesy of Osman Ratib, M.D., Ph.D., University of California, Los Angeles) Diagram illustrates the flow of image data that occurs when DICOM images from a PACS are converted to a handheld format. (Courtesy of C. F. Beaulieu, M.D., Ph.D., University of California, Los Angeles

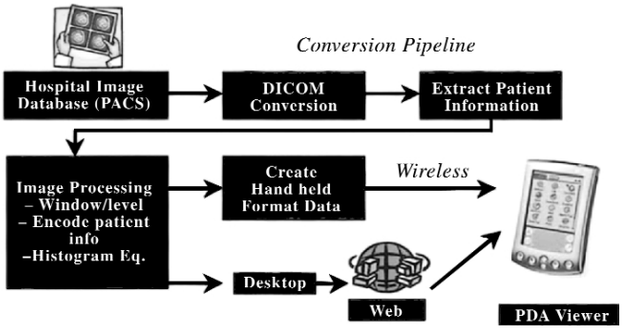


Diagram illustrates the flow of image data that occurs when DICOM images from a PACS are converted to a handheld format. (Courtesy of C.F. Beaulieu, M.D., Ph.D., Stanford University).

"This activity basically involves getting many information systems to talk to each other, share key pieces of information and analyze/summarize parameters that you might need to help you understand how your practice is running on a given day," says Dr. Flanders. "In these and other ways, radiologists can monitor the metrics of their practices and have unlimited access to the kind of information normally available at the desktop."

An infoRAD exhibit at RSNA 2002 demonstrated active wireless transmission of a modality work list from a RIS/PACS to a handheld device with subsequent initiation of a query retrieve by the handheld unit to a PACS archive. "In addition," says Dr. Flanders, "they were able to show that PACS workflow could be remotely monitored on a handheld device."

Physicians are looking for more creative ways to use their PDAs, often taking cues from businesses that do everything from monitor inventory to track the progress of a package being sent from Beijing to St. Louis. "In the same fashion, a radiologist with a Web-enabled PDA can track a patient's progress," says Dr. Flanders. "Did he arrive at the hospital on time? Did he get on the scanner? What did his script say? Was he protocoled properly? Are we doing the appropriate study to match the clinical problem?"

Moreover, wireless, handheld computing can be of great help to the department's PACS administrator who can use his or her PDA to remotely monitor the "health" of various information systems and network traffic in the department.

Some of the most practical and diverse uses of PDAs in radiology are database applications. "There are both commercial and shareware database utilities that allow the user to develop customizable databases with specific fields and content," he says. "The fields are populated with data via a form that is displayed on the handheld computer. Field types can be specified during the design of the database to allow for free text entry or pulldown lists. Uses include maintaining patient lists, teaching files, research data collection or procedure logs."

"For example, clinical research in radiology often involves recording specific imaging findings in a database," Dr. Flanders explains. "One or more investigators can carry the entire database on their PDA and add data when it's convenient. In addition, password-protected PDAentered data are more 'secure' than traditional paper data entry forms. All of the data are kept up to date by regularly synchronizing the PDA data with the desktop computer."

For the future, the authors predict increasing focus on handheld portable offices: "The combination of high bandwidth, inexpensive and secure wireless networking protocols and highresolution, flatpanel touchscreen (tablet) computers has the potential to keep a radiologist perpetually 'connected' to the office. The introduction of tablet PCs with high resolution displays and high speed, reliable and secure wireless networking would suggest that the portable radiologist office is one step closer to reality."

Mobile Computing Pavilion at RSNA 2003

Under guidance from the ECC, RSNA 2003 will feature a Mobile Computing Pavilion.

The Pavilion will be located near Publishers Row in the South Building, Hall A. It will feature companies that exhibit products and services in the mobile computing market, as well as a theater where speakers will give peer-reviewed educational presentations throughout the week.

Topics include:
- device
- security
- communication protocols
- presentation protocols
- programming languages
- healthcare applications
- healthcare efficacy

In addition, registrants will enjoy the handson experience of the devices and applications presented by Mobile Computing exhibitors.

Radiologists can monitor the metrics of their practices and have unlimited access to the kind of information normally viewed at the desktop.
—Adam E. Flanders, M.D.

Making the most of the internet

The Internet is now a vital part of life for radiologists and other medical professionals. From signing reports, protocoling studies and finding a patient's clinical history, to answering tough clinical questions, performing research and communicating with others, medical professionals can take advantage of many Internet related services and information.

Katarzyna J. Macura, M.D., Ph.D., an assistant professor in the Russell H. Morgan Department of Radiology and Radiological Science at the Johns Hopkins Medical Institutions in Baltimore, began using the Internet back in 1992. She says email and the World Wide Web are both deeply embedded in her life and work. "I cannot envision either professional or private life without it," she says.

Johns Hopkins resident Heather M. Seymour, M.D., was introduced to the Internet in the mild 1990s by her husband, a Java programmer. "He said that it would revolutionize the way we live," she says. "Of course, I did not believe him and now I hear, 'I told you so.'"

She first used the Internet in 1995 during her first year of medical school to receive her grades via email. By her second and third years, Dr. Seymour was using learning modules on the Web. Now, she says she can't live without the Internet. "We have DSL and wireless at home so the Internet is always 'on.' Family arguments are frequently solved with Google," she explains. "I currently use the Internet for routine communication with family, friends and colleagues—and of course shopping."

Dr. Seymour says the hospital's text paging system is Web-based and there are a number of other Internet-related applications. "We use a RAD Assistant site in our department that interfaces with the hospital information system to provide comprehensive patient data in a rapidly accessible radiologist friendly format," she explained. "Our radiology information system now has a Web-based report sign off as well. And our MRI fellow this year, Bob Peters, has been working on a Hopkins Body MR site which has detailed information on all the protocols that we use in our department.

How Radiologists Use the Internet

Many physicians conducting research will start with MEDLINE (medline.cos. com), according to Dr. Seymour. "Abstracts and some fulltext articles can be downloaded immediately from the Web—saving hours of searching through the library and photocopying references," she says.

Dr. Macura suggests radiologists should use the Internet to read journals, do literature searches, and view the news, events and scientific programs offered by many radiologic organizations. She also advocates taking advantage of online

course registrations, direct access to libraries, online CME and discussion forums.

Dr. Seymour says she has found a number of sites especially useful in her medical education and as a resident. "We are lucky to have Elliot Fishman, M.D., at our institution," she says. "His site CTisus.com was one of the first radiology sites I ever visited. The case files on the site number in the thousands in all organ systems below the neck. There are tutorials, lectures, quizzes and journal reviews. It is absolutely the most comprehensive site on the Web in any particular subject."

"Wheeless' ortho text (orthou.net) got me through my three years of ER call," she recalls. "Every fracture, joint derangement or other ortho problem is outlined on the site with diagrams and especially radiographs. The site also offers suggestions of additional radiographic views to help the surgeons plan their management."

Dr. Seymour says RadQuiz.com has consolidated many university sites into one. "It is separated into the 10 sections that are on the boards," she says. "From RadQuiz, you can access BrighamRad, which has great cases. The nuclear medicine teaching files from the Mallinckrodt Institute of Radiology are comprehensive and easy to navigate. Many fourth year residents use that heavily to study for boards. The University of Washington has great information for bone."

Dr. Seymour also recommends the MR physics (www.cis.rit.edu/htbooks/ mri) site created by Joseph Hornak, Ph.D., of the Rochester Institute of Radiology, which she says is useful for residents or practicing radiologists who are still trying to grasp MR fundamentals.

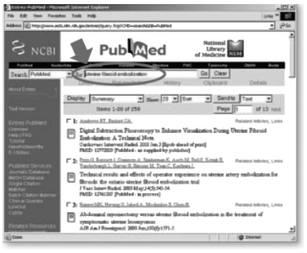
The Internet for Novices

For radiologists and other medical professionals who have had limited experience online or who may be trying the Internet for the first time, Dr. Macura recommends finding a favorite search tool that will allow quick access to the information they need.

"Try using your favorite keywords in different search engines or directories. You will see the different hits you might get with each search tool," she suggests. "Remember that using many search engines will help you get a feel for how the different kinds of services work."

"Google is a popular search engine that uses a unique ranking algorithm that is based on how many other sites link to a particular Web site," Dr. Macura explains. "The popularity ranking operates under the assumption that other Web pages would make a link to the best pages. This type of ranking usually works very well, returning quality documents. Google also offers direct searches for images that are linked to certain keywords."

Dr. Macura says radiologists can also access the National Institutes of Health (www.nih.gov) for funding opportunities and guidance, resources for diagnostic support in evaluation of difficult cases and online anatomic atlases for reference, and institutional databases and PACS for teleradiology consultations and electronic signoff for radiology reports.



Almost every radiologist has, or should have, Internet access at their immediate disposal. …It makes us better physicians.
—Heather M. Seymour, M.D.

Web-based Classes Available at RSNA 2003

- National Library of Medicine/Internet2 Tutorial 2003
- PubMed/MEDLINE for International Users
- Advanced PubMed/ MEDLINE for Research in Radiology
- Distance Learning & Literature Searching Through the RSNA Web Site
- How to Submit Work to the RSNA Journal, Radiology
- Preparing Your Manuscript for Radio Graphics and Overview of the Publication Process
- The Radiologist and the Internet: Continuous Learning While You Work
- How Your Radiology Practice Can "Work the Web"

To register, go to www.rsna.org/register.

Internet Security

Dr. Macura advises her colleagues to always remember that the Internet is a public place. "Make sure you are using secure sites while performing financial transactions and protect your identity information by providing sensitive data only to trusted sources," she emphasizes. "Remember, system administrators and operators can read email messages at local sites. Many companies consider individual's email corporate property, and are entitled to do so under the 1986 Electronic Communications Privacy Act. When we use email, we have less right to privacy than when we send physical documents via 'snail mail.'"

Dr. Seymour believes using the Internet allows radiologists to become more efficient in their chosen profession. "Almost every radiologist has, or should have, Internet access at their immediate disposal if questions arise that may alter interpretation," she says. "It makes us better physicians."

Dr. Macura concludes, "The Internet plays such an integral part of every aspect of life—from information exchange in a written form, email and digital telephony, through news, shopping, travel, banking, daily clinical practice, to research and education."

Literature searches on PubMed are easy.
•Enter a search term, such as uterine fibroid embolization. Click Go. Then click on one of the related articles.
•This article from Radiology was one of 259 results.

Teaching Files

CTisus CTisus.com
Wheeless' ortho text . . . . . orthou.net
RadQuiz . . . . . RadQuiz.com
Basics of MRI . . . . . www.cis.rit.edu/htbooks/mri
RSNA's Education Portal . . www.rsna.org/education/etoc.html

Literature Searches

MEDLINE . . . . . medline.cos.com
PubMed . . . . . www.ncbi.nlm.nih.gov/PubMed

Radiologic Organizations

RSNA . . . . . www.rsna.org
National Institutes of Health . . www.nih.gov
RSNA provides links to 90 radiologic organizations at www.rsna.org/orgs/index.html

Search Engines

Google . . . . . www.google.com
Yahoo . . . . . www.yahoo.com

Editor's Note: The October issue of RSNA News will include an article on the various search tools available through RSNA's online journals.
Editor's Note: For more information on the RSNA Image-guided Therapies media briefing, including press releases, photos and the PowerPoint presentations, go to www.rsna.org/media/briefings/2003.
Editor's Note: RSNA members and subscribers can read the full text of the RadioGraphics article at radiographics.rsnajnls.org.