This issue of CIN Plus focuses on the personal digital assistant (PDA), a handheld computer rapidly finding a place in both education and healthcare. Three articles address this issue, one from education, one from practice, and one that explains the Blackberry. This article addresses the nursing-PDA electronic mailing list, with its focus on the use of mobile informatics in nursing. From this list you can get answers to questions about PDAs. Started September 1, 2000, the list currently has more than 1600 members.

Electronic mailing lists, sometimes called Listservs after the original program that made them possible, comprise a network of people interested in a given topic who share questions, answers, and thoughts about the topic via e-mail. This is made possible by the use of special software on a server that accepts e-mail messages and sends them on to those who subscribe to the list. Subscriptions are free and open to anyone interested in the topic of the list. The options available, known as preferences (eg, having all messages for each day sent separately or in a batch or unsubscribing) are determined by the program used to administer the mailing list.

Listserves have two addresses, one for sending a message to all the members, called posting to the list, and another for administrative tasks such as subscribing, changing one’s preferences, or unsubscribing. To subscribe, you go to the address for the list (for a list of nursing electronic mailing lists see http://nursing.buffalo.edu/mccarty/nursing_discussion_forums.html). For the Nursing-PDA list, the administrative address is http://www.pdacortex.com/nursing_pdas_listserv.htm. There you will be asked to enter information such as the e-mail address to which you want the group messages sent (Figure 1). You also will be asked to create a password that allows you access to the preferences section of the administrative software. Once you subscribe at the Web site, the electronic mailing list software will send you a request to reconfirm your subscription by returning an e-mail to the address you entered when you subscribed. Once a confirmation has been received by the administrative software, you will receive another e-mail message welcoming you to the list and providing important information such as the address to use when posting to the list and how to access your account. Save this information. Electronic mailing lists are run by volunteers—there is no payment for this job. It is a labor of love and sometimes of frustration when subscribers do not take responsibility for their subscriptions. You will sometimes see requests from irresponsible subscribers to change the preferences of a subscription. These subscribers have not bothered to read or save the information received when they first

---

**Key Points:**
- Mobile Computing
- E-mail Networks
- Listserv Etiquette
which is considered good etiquette, you may wish to “code” it to prevent spiders from stealing it to use for spammers. For example, if your e-mail address is Jhull@nursing.net, you may wish to use Jhulll__at__nursing.net or some such variation that avoids using the @ symbol.

• Use your e-mail software to correct spelling! This can be as automatic as with a word processor. For help doing this see http://dlthede.net/Informatics/Chap04/EmailSpellingCheck.htm.

• If you are sending an attachment, first check the policies of the list. Some will not permit attachments.

• Use appropriate capitalization. All caps indicates shouting; all lower case is too informal for most e-mails and all list posts.

• Use full sentences and appropriate grammar.

• Use acronyms sparingly. In an electronic mailing list, readers are from all over the world. They will not understand alphabet soup. In each e-mail, identify the full meaning of any acronym you use.

• Use plain text and black and white. Some subscribers will not be able to receive messages that are not plain text.

• Check the address line before posting. Some mailing lists are set so that if you use the “Reply” function, your post will go only to the person who posted the original message. In this case, you exclude the rest of the list from the discussion. For others, the “Reply All” may send the message both to the original poster and the list. Thus the original poster receives the message twice. You can delete a reply address from the address line when creating an e-mail message.

• If you see a message from a friend and want to reply only to that friend, be sure the address bar has only that address in it. Once you send a message to the list, all subscribers see it, and it will be archived.

• If your e-mail software is set to include the previous message automatically when you reply, it is usually a good idea to edit the prior message. Leave it in the originator’s name, but delete all but the information needed to clarify your message. E-mail messages

FIGURE 1. Nursing-PDA Listserv Subscription Screen.

subscribed. They take up time for the list’s unpaid administrator, who must manually unsubscribe the individual, and the other subscribers who get the message. For a more detailed description of electronic e-mail lists, see http://en.wikipedia.org/wiki/Electronic_mailing_list.

Once subscribed, you will receive all the correspondence between group members. This means that at your convenience, you can read conversations about a topic of interest to you as well as ask questions of the group or contribute to a discussion. Because the lists have members all over the world, these messages offer many perspectives on an issue. On a list such as Nursing-PDA, you will see questions and answers about the various brands of mobile computers, information that would be difficult to learn any other way, and sometimes other topics pertinent to nursing.

Messages posted to the group are usually archived by the list software. Using the information in the e-mail welcome message, you can access these archives in case you need to refresh your memory of the information that has been shared.

Archives are organized by threads, that is, by the subject line in an e-mail message. Thus the original post on a topic, followed by all the replies that used this subject line will be located in one place. How well this works depends on members keeping the same subject line for the same topic and introducing a new subject line when initiating a message on a different topic. Some of the topics recently addressed by the Nursing-PDA list were medical records on PDAs, handling of files on a PDA, and opinions about the various PDA brands.

Besides following the information in the welcome message, Listserv etiquette is similar to that for regular e-mail. Some principles to follow are these:

• Be sure your subject line is pertinent to the topic.

• Sign your posts. It is easy to set your e-mail software so that it automatically adds a signature to each e-mail you send. If you have not yet done this, see http://dlthede.net/Informatics/Chap04/Signatures.htm. If you add your e-mail address to your signature,
that include all posts on a topic get very unwieldy and very large!

• Think before you click the “Send” button! Reread and be sure the information is what you want the whole world to see. Incidentally, this is a good idea for private e-mail too—it is too easily forwarded or found in an investigation. Leave no e-mail trail for confidential discussions.

Good networking!

Linda Q. Thede, PhD, RN-BC, is the Editor of CIN Plus.

Personal Digital Assistants for Classroom and Clinical Use

Kay Hodson Carlton, EdD, RN, FAAN
Nancy Dillard, DNS, RN
Brandon R. Campbell, BA
Nancy A. Baker, MS

Key Points:
• Partnerships for Mobile Computing
• Planning for PDA Integration
• Standardization of Tools and Software

PERSONAL DIGITAL ASSISTANTS IN THE CLASSROOM AND CLINICAL AREAS

The personal digital assistant (PDA), or small mobile handheld device that provides computing, information storage, and retrieval of information tasks, has become a tool that can provide clinical nurses with instant information. Recognizing their value in clinical care, Ball State University (BSU) has implemented a program that introduces students to the potential of these devices for assisting the nurse at the point of care in accessing current information pertinent to patient care.

BACKGROUND INFORMATION ON BSU AND THE NURSING PROGRAM

Ball State University, Munice, IN (www.bsu.edu) is one of six state-supported institutions of higher education in Indiana. With a total enrollment of approximately 20000 students, BSU has 172 major and minor areas of study in the arts, sciences, and humanities. The School of Nursing (www.bsu.edu/nursing) has approximately 1400 students enrolled in undergraduate and graduate courses. Tracks of the baccalaureate program include basic baccalaureate, licensed practical nurse (LPN) transition, second baccalaureate, and registered nurse (RN) to bachelor of science (BS) degrees in nursing. The Ball State School of Nursing offers a master of science (MS) degree entirely online. Students may choose from three different concentration tracks: leadership (educator or administrator), clinical nurse specialist (adult), and nurse practitioner (adult or family). There also is a RN to MS option and a post–master’s certificate program.

PDA PROJECT BEGINNINGS: PARTNERSHIP IN ACTION

The PDA project began in 2005 as a partnership between BSU’s School of Nursing (http://www.bsu.edu/nursing) and University Computing Services (UCS) (http://www.bsu.edu/ucs). Seeking out new ways to engage students and develop skills essential in the workplace, the nursing education program requested the assistance of UCS to develop and deploy a mobile solution that could be used across all of its undergraduate and graduate classes. Initial project requirements included the following instructional resources: viewing text and video on mobile devices, Internet browsing, nursing medical resources, Web-based survey and quizzing, and a discussion forum.

The current network infrastructure on campus played a major role in the project. UCS provides and manages wireless network access in all major academic and administrative buildings on campus as well as in common areas of residence halls and student residence hall rooms. To provide a model that could capitalize on the wireless network infrastructure and be easily maintained and replicated in other academic programs, UCS established the following additional guidelines for the project: Microsoft Mobile 5 operating system on handheld devices (Microsoft, Redmond, WA), use of university departmental server for data storage, Microsoft SharePoint Services as a repository for text and video clips, and WiFi connectivity.

Once project approval was obtained through the University Information Technology Office, the initial partnership quickly expanded to include additional campus entities including University Teleplex (http://www.bsu.edu/teleplex), University Libraries (http://www.bsu.edu/library/), and several external partners including NuSoft Solutions, Inc., Troy, MI (http://www.
PREPARATION FOR SUMMER PILOT TESTING OF THE PDA PROJECT

The project implementation team conducted agenda-driven, on-site, and/or electronic weekly meetings during the fall 2005 and spring 2006 semesters. That summer, we did pilot testing with student users, and in the fall 2006 semester we made PDAs mandatory for beginning sophomore-level clinical courses. The core membership of the implementation team included the Baccalaureate Associate Director, Baccalaureate Curriculum Committee faculty representatives, the Learning Resource Center faculty and staff, and UCS representatives. Others attending planning meetings at various times during this period included additional school administrators, undergraduate and graduate nursing faculty, library services instructional faculty, a variety of technical support personnel from the UCS, Teleplex video producers and technicians, and external partner representatives from NuSoft Solutions, Microsoft, Hewlett Packard, Micromedex, and one of our major clinical sites, Cardinal Health Care Systems.

A review of the literature, conversations with other schools implementing mobile devices, curriculum concepts of information and healthcare technology, and evidence-based practice drove the program’s ideas for use of the mobile devices in the classroom, campus laboratory, and clinical settings. The department’s vision was that through the use of PDAs, students would have a variety of learning tools at their fingertips including electronic references, online databases, classroom activities, interactive case studies, and online quizzes. Interactive case studies were designed to use a variety of multimedia, including short video clips and high-resolution images. In turn, the mobile device would become a clinical practice tool for the student and faculty, enabling information to be accessible at the point of care. Deployment of the technology was planned in a sequential manner, with PDA incorporation in the first sophomore-level clinical courses serving as a model for future courses at the junior and senior levels, and in the graduate and RN to BS degree programs.

A number of project design and development processes occurred simultaneously during this preparation period. The nursing implementation team worked with the UCS and NuSoft Solutions, Inc. to create a custom software application that allowed students wireless viewing of case videos, content notes/questions, digital images, a discussion area, and other course materials on their PDAs or other mobile devices. Microsoft Share Point served as the backbone for data access and storage. A UCS consultant also began development of an interactive quiz/survey tool to foster student interaction and stimulate interest in the classroom setting.

A number of activities related to the PDA software and hardware were undertaken. The nursing implementation team worked with Teleplex personnel to repurpose case study video clips for PDA use. They also began the production of additional faculty-authored case study video and learning activities for pilot testing and use in the beginning clinical courses in the fall 2006 semester. Another task involved working with the University Libraries staff to use the mobile site interfaces already established and to ensure PDA access to commercially acquired video-streamed products.

The team reviewed the syllabi of all the undergraduate courses and identified nursing reference sources; medical dictionary, drug guide, lab and diagnostic tests, diagnoses, interventions, and rationale required throughout the program. This review, performed in conjunction with members from the Baccalaureate Curriculum Committee, guided the selection of specific nursing references requested from Skyscape for faculty and staff preview. Once the references were approved by the faculty, details related to the Skyscape/University partnership were negotiated including student purchase price, software handling agreements, Skyscape Web page setup for student reference software purchase, and the role of the Nursing Learning Resource Center [LRC] in the support of software handling and student technical support.

Similar deliberation occurred with the selection of the mobile device hardware. After our PDA curriculum applications had been approved by faculty and administrators, UCS personnel negotiated a purchase price for the University.

Technology support issues were a major factor in our decision to standardize the mobile device selection. The current model required is the iPAQ hx2790 with the Windows Mobile 5.0 operating system. The PDA is purchased at discounted rates by the students and the School of Nursing through a partnership with Hewlett Packard. We also finalized arrangements with the UCS Computer Showcase Center to stock and handle the student purchase of the mobile devices. The Computer Showcase Center is a University owned and operated technology center that features digital cameras, personal computers, laptops, printers, scanners, and other technology-related items (http://www.bsu.edu/web/ucs/showcase/). Other UCS staff initiated the development of Tech Clips (interactive Web-based tutorials; http://www.bsu.edu/...
SUMMER 2006 PILOT TEST

Weekly meetings of the project implementation team continued during the summer of 2006. In addition, pilot testing of PDA use was completed with the collection of qualitative and quantitative data for two different groups of baccalaureate nursing students. The School of Nursing provided PDAs to faculty and students for use during the pilot-testing period. Students were required to return the devices afterward. These devices then were redistributed to other faculty in the nursing program.

Each pilot group met 2 to 3 hours weekly for a 4-week period. Interview questions were discussed in small focus groups facilitated by faculty of the fall courses and project team members.

The first pilot test consisted of five students who had completed sophomore clinical nursing courses. Activities for the four sessions included PDA overview, use of the nursing references with case studies across clinical content areas, directed learning activities, use of the NuSoft custom mobile interface, use of Tech Clips, and use of the library mobile interface. Each faculty-facilitated session concluded with debriefing and focus group discussion. A quantitative evaluation tool adapted from questions/items identified as important criteria in previous PDA research also was used.

The second pilot test consisted of nine students who also were enrolled in a summer session junior level, second adult health clinical course. These students tested PDA use in the both the clinical setting and the classroom case study environment with the use of reference tools and learning activities. Once again, these students offered suggestions for use of the NuSoft custom mobile interface, Tech Clips for PDA orientation, and the library mobile interface. Each session concluded with debriefing and a focus group discussion. Student and faculty suggestions from the pilot testing were subsequently incorporated into the project planning. For example, based on the results of the pilot testing, a pathophysiology resource was added to the original software configuration.

During the testing, the cost of the PDA was often mentioned by our students as a concern. However, because there was no need to purchase the hard copies of the medical references, the cost was not as great as first perceived by the students. Portability of information and flexibility of uses were other factors that contributed to the decision to integrate PDAs into the course curriculum.

SUMMER 2006 PILOT TESTING: SURVEY RESULTS

At completion of the pilot tests, the students were asked their opinions on a number of PDA-related issues. When asked how the PDA could be used in a clinical setting, one student replied: “It would supplement the care plan. It would make it easier to study and prep.” Another student favored the PDA’s easy access to information about new drugs and lab results. A further comment concerned relief of the stress associated with preparing care plans because less time was required.

Case studies are an important part of the pedagogy in the nursing program at BSU. When asked how the PDA aided in completing an assigned case study, one student reported that “the drug guide, lab test, and disease programs helped provide the information to perform the evaluations.” Another student reported that the students were able to look up information quickly without having to search through several books. Unfortunately, technology sometimes got in the way. One student reported that the device kept freezing up and had to be restarted.

Students also recognized the fact that the PDA could be beneficial outside the classroom or clinical setting. All the students surveyed said that they would use the PDA for personal activities. Some students even stated they would recommend the PDA to others, even those not in the nursing program. When asked what they liked best about the PDA, students responded that they liked the convenience of instant access to medical information and the portability provided by the devices. Limited battery life was consistently at the top of the dislike list. Some of our questions dealt with hardware and software cost. It is very interesting to note that although the pilot students expressed uncertainty about the affordability of the device by sophomore students, they overwhelming thought that PDAs should be used in the BSU nursing program.

BEGINNING IMPLEMENTATION: SOPHOMORE LEVEL

Beginning with the fall 2006 semester, all 84 incoming sophomore students enrolled in the Physical Assessment and Basic Foundations courses of the basic baccalaureate program were required to purchase the PDA hardware and software before the first day of the semester. Announcements and informational letter were mailed to each entering student several weeks before the semester. The letter included the software requirements (Table 1), steps for completion of the
software purchase transaction, directions for the School of Nursing LRC setup and support of the hardware and software, directions for the purchase of the PDA hardware from the UCS Showcase Center, and instructions for class and program use of the PDA. The students were required to report to the LRC to receive their Skyscape reference software and custom software developed by NuSoft Solutions.

During the first day of class, the students received an orientation on how to use the PDA hardware and software from the School of Nursing information technology (IT) staff. The orientation consisted of four 45-minute sessions, each accommodating approximately 20 students. The Technology Specialist covered such topics as device features, WiFi operation, NuSoft video download software, the mobile interface, and Skyscape reference information, then answered questions as each student completed the UCS-developed Tech Clips (http://www.bsu.edu/techclips/pocketpc.htm). Similar orientation sessions were conducted with sophomore-level faculty when the PDA hardware and software were distributed to them before the start of the semester. The School of Nursing IT staff continued to provide individualized technical support for both students and faculty throughout the semester. The project implementation team continued to conduct weekly meetings as the sophomore class faculty incorporated the PDAs into courses and clinical materials as a template for future courses at the junior and senior levels in the baccalaureate program.

The School of Nursing LRC personnel worked with the course faculty responsible for the lecture sessions to establish the NuSoft mobile interface for the PDA (Figure 1). Similar to a course management system, each course was established with a Web address home page. At the class mobile home page site, students and faculty had access to a variety of course materials including shared documents of cases studies, questions, digital images, library resources, announcements, contacts, events, links, Web sites used as reference for homework or in-class question and answer, and an asynchronous discussion area.

These links served to create more active student involvement in lectures and fostered the acquisition of communication, nursing process, and teaching and learning skills. Faculty and students believed that using the PDA to view case studies, videos, and various medical and nursing care information was successful in orienting students to PDA use for the next clinical course, and in providing information about assessments or basic concepts. The PDA enabled the faculty to use group or individual activities in a moderate-sized classroom setting. For example, during each weekly large lecture session in the Physical Assessment class, IT staff from the Learning Resource Center collaborated with the faculty to facilitate incorporation of PDA technology. The short client case study videos and digital images of different physical assessment skills were used as a basis for student questioning and clinical decision-making skill enhancement.

Early in the semester, the IT support staff walked the students through an activity using an overhead camera and projector. This activity consisted of showing the students how to navigate the NuSoft mobile home page for

---

**Table 1. PDA Software Requirements for Sophomore Classes**

<table>
<thead>
<tr>
<th>Software Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taber's Cyclopedic Medical Dictionary (Special Mobile/Desktop Bundle)</td>
</tr>
<tr>
<td>Davis's Drug Guide for Nurses (Special Mobile/Desktop Bundle)</td>
</tr>
<tr>
<td>Nurse's Pocket Guide: Diagnoses, Interventions, and Rationales (Special Mobile/Desktop Bundle)</td>
</tr>
<tr>
<td>Nurse's Manual of Laboratory and Diagnostic Tests (Special Mobile/Desktop Bundle)</td>
</tr>
<tr>
<td>Diseases and Disorders: A Nursing Therapeutics Manual (Special Mobile/Desktop Bundle)</td>
</tr>
<tr>
<td>International Classification of Diseases, Clinical Modification ART Beat with Med Watch and CDC Spotlights channels</td>
</tr>
<tr>
<td>Archimedes Medical Calculator</td>
</tr>
<tr>
<td>1 GB SD card</td>
</tr>
</tbody>
</table>

---

**FIGURE 1. Screen Capture of the NuSoft Mobile Interface.**
their course and how to access the Skyscape mobile reference tools. Additional support staff was available to assist students with technical problems and questions during the instruction. To ensure that the student was using the PDA effectively, the faculty developed handouts related to the case videos, adding terminology, disease processes, medications, and nursing diagnoses in question form for the students to complete during the class session using the PDA software. The class activity required approximately 40 minutes.

As the semester progressed, and the students became more familiar with their PDAs and the software, the handouts often were given as homework to be done outside the classroom setting. At the beginning of the semester, when students and faculty were learning to use the PDA, three IT staff were needed in the classroom for the class activities. However, by the end of the semester, only one IT staff was in the classroom and rarely needed. Students also used the software in the clinical setting to retrieve medical diagnoses, assessment findings, drug information, and nursing diagnoses and interventions.

FIRST SEMESTER EVALUATIONS

At the end of the fall 2006 semester, the students were given an opportunity to complete a survey on PDA use in their sophomore lecture and clinical courses. Of the students surveyed, 73% felt that the PDA with clinical decision support tools increased their classroom and clinical productivity. Of these students, 60% felt that their productivity increased by 50% or more. When asked whether they could observe any educational advantage from having a PDA with clinical decision support tools over fellow students without a PDA, 85% of the students replied “yes.” The greatest benefits reported were portability of information and time savings.

The students put their PDAs to good use. Most of the surveyed students reported that they used the PDA from one to five times per day, primarily to look up information during class or in clinical settings. It is also interesting to note that more than 95% of the students surveyed reported that they would likely continue to use their PDA after graduation.

BENEFITS TO FACULTY

Faculty found the PDAs very helpful in engaging students. Equipped with wireless access and an assessment tool developed in-house, these devices can function as a “student response system.” Faculty can quickly assess student knowledge and refine their lectures accordingly. Questions posed to the students can be associated with a variety of media, including still images as well as video and audio streams. Another benefit will be a series of 20 to 25 patient case scenarios when they are videotaped and ready for students to view on their PDAs. This will make it easier for faculty to incorporate a video clip into the class because all the students will have it right in front of them on their PDAs.

PLANNING FOR THE FUTURE

Based on the successful pilot and beta testing of the technology, the collaborative partnership approach to the integration of mobile device technology in the curriculum will continue at Ball State University. There will be a continued requirement that each beginning nursing student acquire the specified hardware and software for use in the classroom, simulation laboratory, and clinical agency. In addition to the current sophomore curriculum, the devices will be used in subsequent courses in the undergraduate and graduate programs. Implementation began in the graduate program during the spring 2007 semester, and is planned to begin with the RN to BS program during the fall 2008 semester. Within a few years, every Ball State nursing student and faculty member will have a PDA in hand.

Just as a number of project design and development processes occurred simultaneously during the initial preparation period, a number of collaboratively supported processes continue to occur with further evolution of the project throughout all academic programs at the School of Nursing. The nursing implementation team (faculty, administrators, and LRC personnel) collaboration with UCS, Teleplex, University Libraries, and external partners continues to refine and enhance custom software applications. For example, development and testing of the interactive quiz/survey tool is continuing. The tool was pilot tested with more than 100 students during the spring 2007 semester. The nursing implementation team also continues to work with Teleplex personnel to produce additional case study video and learning activities for pilot testing and use in subsequent baccalaureate and graduate courses. Work continues with the University Libraries staff to use mobile site interfaces and databases as evidence-based practice resources. There will also be a preview of additional medical/nursing resources and comparison of resources across companies and services as well as subsequent review by the respective program curriculum committees as the project expands into the upper division nursing courses of the baccalaureate program, the RN to BS program, and the specialty areas of the graduate program.

It is anticipated that the nursing program’s partnership with UCS and external hardware partners will support future purchase recommendations, including the need for equipment standardization and updates as well as provision of technical support for both students and faculty. There has also been incorporation of PDA technology
requests with our annual technology hardware and software academic program plan, as well as development of a hardware and software replacement plan for faculty. Training for the first sophomore-level course was completed during the fall 2006 term, and plans are in place to move through the rest of the curriculum at the baccalaureate and master’s levels. Sonic Foundry’s MediaSite (for the recording of instructional orientation to the PDA; http://www.sonicfoundry.com/mediasite) will be used for both on-campus and online students, and for faculty development. It is planned that these recordings will be reusable learning objects for further faculty and student development. Continued follow-up evaluation of students and faculty will be done to ensure the viability of the PDA technology deployment, and to provide guidance for continued evolution of the project.

Kay Hodson Carlton, EdD, RN, FAAN, is coordinator of Educational Resources and Extended Education, School of Nursing, Ball State University, Muncie, IN.

Nancy Dillard, DNS, RN, Baccalaureate Program, School of Nursing, Ball State University, Muncie, IN.

Brandon R. Campbell, BA, Technology Services, School of Nursing, Ball State University, Muncie, IN.

Nancy A. Baker, MS, Academic Support, University Computing Services, Ball State University, Muncie, IN.

Don’t Go To Work Without Your Backup Brain!
Edward A. Stern, RN

A SIMPLE START

The obvious first choice is simply keeping track of your calendar and contacts (Figure 1). The internal calendar and contact feature makes that easy. You have the ability to synchronize your PDA with any number of computer-based calendars and contact programs. If you use an e-mail client such as Microsoft Outlook (Microsoft, Redmond, WA) or a Web mail account such as Yahoo mail (Yahoo, Sunnydale, CA) or just want to use the PDA’s own computer calendar and contact program, you will have an electronic copy of your information on your PDA and your home computer. With the right tools, you can even share that calendar with your family and friends over the Web. Synchronize your PDA with your Web mail account, and you can instantly have your calendar available to everyone or people you choose. (Don’t worry about privacy; you can just set Yahoo to show “busy” on the
Web page instead of “sleeping off a night shift.”) The next time your friends want to know when you are off, just tell them to check your Web calendar.

What about tools to help you with your productivity at work? As a nurse, you always have a few hundred tasks to accomplish in any given minute. We all pride ourselves on our ability to multitask, but we also never turn down a little help. What if you had someone who followed you around and reminded you that it’s time to bring Mr. Smith for a computed tomography (CT) scan, or that Ms. Williams needs blood drawn for a new complete blood count at the top of the hour. That is what BugMe! Notepad (Electric Pocket Ltd, Wye Valley, UK; www.electricpocket.com) is designed to do. Think of it as a sticky note with an alarm clock built into each note. All you need to do is start up the program, write something like “CT Rm 4 @ 1630” on the screen (Figure 2), and set the alarm, and it will ring, popping up the note when the alarm goes off. You can even set it to be really annoying and keep ringing till you hit the “snooze” button. Set as many reminders during your shift as you wish. Now you can get bugged by BugMe instead of the call bell and your phone, and have no more sticky notes on your charts, tape on your scrubs, or string around your finger. With such a simple tool to help you be more efficient, who knows what it could even help improve patient satisfaction scores.

What about the real clinical tools you can use on your PDA? That’s really where a PDA in the clinical setting can shine. Sooner or later most of us want a little help with our job. Think about how a series of references at your fingertips would help you do your job smarter and safer.

Each of us relies on a basic nursing foundation, and then we build on that according to our specialty. The good news is that no matter what your clinical specialty, there are a few clinical references you can put on your PDA. Sooner or later all of us consider looking something up during our shifts. Sometimes we do it, and sometimes we don’t. Typically, reason has something to do with the lack of ease with which we can get the information. But with a PDA, you can carry drug references, medical encyclopedias, lab reference manuals, clinical specialty sources (eg, oncology, critical care, emergency, obstetrics, geriatrics) and so much more in your pocket, on your waist, or wherever you put it.

So where do you start? Most nurses start with a drug reference such as the free version of Epocrates RX or Davis Drug Guide for Nurses (available from any number of vendors). The problem is that we tend always to need more than just the drug reference. The other option is to buy multiple references from one (or many) different vendors. A company such as Skyscape, Marlborough, MA, offers a large list of reference texts. Many of the printed books you use currently can be purchased for your PDA through a company such as Skyscape, and they typically cost a little less than the printed edition (and are updated on a quarterly schedule—usually).

Most nurses prefer to buy a product that is fully integrated with a variety of data and features and one that meets a variety of clinical information needs based on their clinical specialty. Some vendors try to accomplish this by providing a common menu for multiple references or by cross-referencing the content of one reference book with another. PEPID (PEPID Medical Information Services, Inc, Chicago, IL) has a diverse content product and has content focused on specific specialties (Figure 3). The PEPID service has an annual subscription cost dependent on specialty. Because we ultimately want and need more than just a drug reference, PEPID has drug references with nursing considerations,
such as Taber’s (Figure 4). If you are someone who likes to dig into the details, maybe you want a lab reference, a copy of the *5-Minute Clinical Consult*, or some of your favorite critical care texts. Just about any printed reference book you could use in the clinical care process is already available in PDA form. Some, however, do not include all the images, or they format the book in a plain format. A few companies specialize in offering them in a variety of layouts. The good news is that all these companies let you download and install them in “trial mode” for a specified period so you can see whether you want to buy them. Although the trial download includes the entire text, it may lock you out of specific content until you buy and register the company’s product.

It is worth looking at a trial version because some companies do a better job formatting for the PDA screen. Companies such as Skyscape (www.skyscape.com), Medical Wizards (www.medicalwizards.com), PDA Cortex (www.pdacortext.com), and others offer trial versions for a variety of medical reference texts in PDA format at their Web sites. As you begin to be familiar with how your PDA works, you will want to start building your PDA library.

**PDA FOR PATIENT EDUCATION**

Have you ever sat down with a patient and tried to explain the anatomy of the heart, exactly where an ischial tuberosity fracture is located, or a renal stone distal to the renal pelvis is? If you are like most nurses, you certainly cannot draw it (stick figures do not have an ischial anything). Besides, why draw it when you can let your PDA do the talking for you.

There are a variety of reference applications on the drug interaction lists, a huge list of medical calculators (from simple med math to complex critical care calculations), and a variety of pathophysiology and diagnostic content directly integrated into one application. In addition, any content PEPID adds throughout the year is included in your annual subscription at no additional cost (not always the case with other products). Because PEPID is a number of references rolled into one, it is a lot easier to operate and ultimately cheaper than buying all the materials separately. The master index can be a little daunting with all the information PEPID offers, but it is worth it to have all the information in one location.

After you have your basic application, such as PEPID or just a simple drug reference, you should start to consider other references you need to make doing your job easier. For example, perhaps you like having a comprehensive medical dictionary or encyclopedia available.
knowledge in a second. It’s hard enough to remember what you are doing in the one unit where you work, but as you are floated to other units or work in multiple hospitals, personalized information sheets will help keep you from making mistakes.

You can create templates for things such as how specific units and physicians like their charts or reports prepared, or any of their protocols (Figure 6). To create these, you can use the notes feature in the PDA or create the file on your computer and save it as either a Microsoft Word or Adobe PDF file (Adobe Systems, San Jose, CA), which can be imported to your PDA. Other sources of information that you can place on your PDA include hospital phone directories, highlights of internal policies and procedures, and hospital or other clinical guidelines. Some hospitals are putting their policy and guidelines documents on their network which, if the hospital and your PDA have wireless Internet access, can be accessed on your PDA while you are at work.

Essentially, the options of what you can put on your PDA are endless. It takes only a bit of creativity and research to find some great tools on the Web. A head start for you can be found with companies such as

- **PEPID** (www.pepid.com), which offers single-source, well-integrated reference applications.
- **Skyscape** (www.skyscape.com), which has numerous individual reference books that you probably have used in print. Some have been integrated into packages with a common menu and some inline cross-references.
- **Handango**, Hurst, TX (www.handango.com), a large store with all types of nonmedical and medical applications for PDAs. This site offers the option to set up an account that specifies the model of PDA you have. Then you will be offered only applications that will work on your device.

Sites such as Handango make it possible for you to get creative with how you use your PDA. You can buy applications that will help you keep track of your work hours, your personal medical information, your diet, and a list of games to use anywhere...except at work, of course.

**EQUIPMENT SELECTION**

So, now what? You have seen that a PDA can do more than store some phone numbers and a list of drugs. Now you need to figure out what PDA device is right for you. Like any other electronic tool, there are a few choices on the market. You need to answer some simple questions as a help in making a decision.
Perhaps the first question to ask yourself is do you want a stand-alone unit (PDA only), or are you looking for a device that can be your phone, a PDA, and maybe even a device for accessing your e-mail and the Internet? Going the “PDA-only” route narrows your product choices. It’s a shrinking market segment, and the two remaining big players in the market are Palm, Sunnyvale, CA (www.palm.com) and Hewlett Packard Company, Palo Alto, CA (www.hp.com). The advantage of PDA-only is that when you are not using it, you can leave it at home. However, once their schedule, phone numbers, and the like are in it, most people start realizing that the PDA is an integral part of their daily life and end up carrying both a phone and PDA all the time.

That brings us to the integrated PDA phone or “smartphone.” The smartphone is essentially a PDA and phone combined. Because you usually buy one from your cellular carrier, you can start by determining what they offer. However, there is a catch. Some things that “act” like a smartphone will not run most of the applications on the market. For example, a Motorola Q is very small and sleek (Motorola, Schamberg, IL). It is a smartphone, but it runs a streamlined version of the Windows Mobile 5.0 operating system. Currently, it will not run many of the applications mentioned in this article. However, vendors are working to enable their applications to run on some of these newer devices.

Currently, it can be costly, not to mention bulky, to have both a phone and a PDA. At the time of writing, the PDA-only devices cost from $200 to $600. A PDA phone actually costs the same, but it is at least one less device to carry around, and the smartphone is a growing market trend.

In choosing a PDA phone, your safest bet is to go with the more mainstream products. The most common lines of products that work well with all sorts of applications are the Palm Treo (Figure 7) and some of the HP iPAQ line. If you recently upgraded your cell phone, you may have to pay a premium to upgrade again, but if you talk to the sales agent at the store, you may get some credit. For the worst case, talk to your tax person; the cost may be deductible. If you are not planning to use one of the mainstream Treo or iPAQ devices, check with the application vendors you are thinking of using to see whether they support the product before you invest in the device. One thought on the product line called the “Blackberry”—the newer models will allow you to install applications, but only a few application vendors support this type of PDA. PEPID and a few others do have versions of their applications that will work on a Blackberry, but the list currently is small.

There are some other advantages to going with an integrated phone PDA device. If you are willing to pay your cellular phone provider more, you can also have high-speed Internet access on your phone (Figure 8). This gives you access to e-mail and the Web from just about anywhere. That’s a nice plus for some of us who like to be “ultra in touch with the world.” If you are the type of nurse who likes to hide from the world on your day off, stay clear of this option. Web browsing over your phone does not offer the best screen layout, but it is a “nice to have” for some functions. Some folks really get hooked on their e-mail with the smartphone. In fact, the Blackberry device, which was the first in the market to have a well-integrated e-mail solution, is often called a “crackberry” for that very reason. Another advantage

**FIGURE 7.** Palm Treo Smart Phone. Used with permission

**FIGURE 8.** Internet Explorer on PDA. Used with permission.
of Internet access is that you can synchronize all your contacts and other references from the Internet and even remotely update many of your applications, all without ever connecting to your computer.

**CHOOSING AN OPERATING SYSTEM**

The next question you need to ask yourself is whether you want a PDA that is a Windows- or Palm-based operating system. Think of this as the difference between Apple’s Macintosh OS and Microsoft Windows, without the funny commercials. All the products discussed in this article are available for Palm and Windows so this is not much of an issue (although when you buy, you do need to make sure you are offered the right version, and that you download the right version—Windows or Palm). Palm used to be the only player in the market worth taking about, but the industry trend is moving away from Palm toward the Windows market.

How do you choose? Palm is easier to work with and in some cases faster. Windows is more like your home PC, offering some more advanced functions and better integration with your home PC. Either way, I strongly encourage you to get a device with a keyboard and a place for an expansion card (typically called a Secure Digital Memory or “SD” card), such as a device in the Treo line (available in Windows and Palm versions). The keyboards are small, but their use tends to be easier than learning how to use a stylus to “write” a short cut of the letter. The expansion card will enable you to store more on the device than if you just use the internal memory. It is a must if you are going to run more than one application because many of the models do not have a lot of internal storage space for these applications.

How do you decide? As you have read, a lot of options exist. Perhaps the easiest way is to ask your friends what they use and what they like. Most importantly, ask them if they will help you when you get yours. You cannot beat personal “tech support.” Help also can be obtained by joining the PDA listserv from PDA Cortex (www.rnpalm.com/nursing_pdas_listserv.htm) or by relying on the support services from the phone and application vendors mentioned in this article.

**PDA FUTURE**

Where is the PDA market going next? Product managers from the various big vendors all have big plans, but will not allow them to be announced to the public yet. However, it is safe to say that the technology is here, and we are going to start seeing some remarkable integration in the future that will benefit nurses. Already, there are vendors who offer a variety of tools for reviewing and confirming various elements of an electronic medical record for your patients on handheld devices. The next tools coming out will provide even more features. Currently, in some hospitals, you may be dragging a PC on wheels from room to room, together with your vitals monitor, your PDA, your handheld patient/drug verification device, and your in-house phone. In the near future, you will start to see more of these devices integrated. Already, some vendors are working to integrate in-house voice systems with traditional PDA features. Next, you will start to see the PDA with all the references you want link wirelessly with a vitals monitor and your patient’s electronic health record (chart), which helps you confirm the five rights, together with a medication administration record for each patient—all this in the palm of your hand. Imagine the potential!

It’s a remarkable time, and you will take the first huge step in this direction by starting to use a PDA as your personal reference tool. There are so many options open to you once you get a PDA, so do not stop with just reading this article. Get a PDA and some good applications. You will see how it can help make each part of your day easier.

Edward A. Stern, RN, is an Informatics Nurse and Lead Consultant for NothingBetter Healthcare Solutions, Kingstowne, VA.

---

**Using a Blackberry to Support Clinical Practice**

Churton Budd, RN, EMTP

**Key Points:**
- Extension of the Intranet
- Security
- Clinical Applications

When a Blackberry personal digital assistant (PDA) is mentioned, you picture a gentleman wearing a business suit in a corporate hallway, hunched over, typing with his thumbs on a little keyboard, the glow from the screen reflected off his glasses. The Blackberry, developed by Research in Motion (RIM), Toronto, Ontario, Canada, has been widely used in business channels since its release in 1999. The device allowed business users to extend their corporate e-mail, calendar, tasks,
and notes to a wireless device, thus allowing them to spend more time on the road or out of the office pursuing business opportunities and collaborating in meetings. Users became so reliant on their devices to stay connected, they were termed “crackberries,” and users became known as “corridor warriors” because they could stand in a corridor between meetings and catch up on all their e-mails, check on the next meeting, and review what tasks they still had on their list to do.

Blackberry devices use a proprietary operating system. Unlike the Palm or Windows Pocket PC, their software architecture is not open, so not many amateur programmers have written Blackberry software. Therefore, it is difficult to find as many applications available for free downloading as with its Palm and Pocket PC counterparts, let alone medical applications. That being said, however, an impressive number of professionally written programs and applications still are available for Blackberry use, and a few really good medical software applications exist.

The Blackberry devices in a corporate or institutional environment use a back-end server called the Blackberry Enterprise Server (BES). This system connects to the RIM network operations center, which in turn has connections to all of the major cellular carriers. The BES encrypts data going back and forth between itself and the Blackberry that ensures compliance with security standards such as the Health Insurance Portability and Accountability Act (HIPAA). Because transmitted data are encrypted by the BES, users can safely read and write data from behind the corporate firewall to any location that offers them a good cell phone signal.

Another benefit of the BES is that it allows for remote management of the Blackberry devices. With the BES, an institutional information technology (IT) manager can check the status of the device: whether it is connecting, how many messages have been sent, and the overall health of the device. Remote management also includes the ability to push out security policies to lock down functionality of the device or disable insecure functions. Most institutions with a BES push a policy to require a password on the device, which really secures the device to protect patient information.

Finally, if the device is lost and a password is tried too many times, the device will wipe itself, destroying all data. Fortunately, the data are mirrored on the BES server, and another device can be brought into service in minutes. When the new device is reattached to the BES, the user’s data are pushed down to the new device as if the device had not been lost.

For the healthcare setting, the security of the Blackberry, its ability to connect through the BES behind the firewall to hospital resources, its ability to be managed remotely and fixed by IT, and its ease of use make it very attractive. Many clinicians carry a pager, a cell phone, a PDA, and possibly either an in-house wireless phone or second pager for code team, making them resemble Batman with his Bat utility belt.

The Blackberry functions well as a phone, and some models even have speakerphone capability. Most have Bluetooth capability to link to a wireless headset or some of the late model car radio systems. The PDA functionality with push e-mail and calendar means that the moment something hits your e-mail box or someone puts an item on your calendar, the Blackberry is updated to reflect that new item. E-mail attachments with Microsoft Word, Excel, PowerPoint, or Adobe PDF files can be viewed on the Blackberry (Microsoft, Redmond, WA; Adobe Systems, San Jose, CA). Some institutions have enabled instant messaging between Blackberry devices, and some have even extended instant messaging to the desktop as well. With this capability, you can instant message another clinician for a quick question or send an instant message asking that person to meet you at another place in the hospital.

About the only thing the Blackberry does not do well is paging. But consider the frustration of getting paged, not being able to respond for a few minutes, then responding only to find that whoever paged you has walked away. With the Blackberry’s cell phone, you can be called directly and answer the issue immediately if you are able to take the call.

For institutions that have a robust WiFi wireless network supporting other clinical devices, and that are concerned with the expense of providing a large number of staff with cell phones and the related auditing of the calls for what might be personal and what might be business, the Blackberry WiFi solution should be considered. With this model, the existing 802.11b network is used rather than the commercial cellular network. VoIP and data functionality can be enjoyed on a single device with no monthly charges, essentially just the investment in the mobile device and the BES.

When people are looking to choose a PDA, the lack of software titles for the Blackberry many times steers them to the Palm or Pocket PC operating systems, which have all sorts of free and for-purchase medical titles. One of the most useful items often overlooked with the Blackberry is the real-time access to the Internet and the Web browser’s ability to reach through the BES to the corporate firewall. When connected to the BES, you can clip and transform large complex Web pages down to manageable sizes for the Blackberry’s 200×320-pixel screen. This opens up a whole myriad of resources that can be used at the point of care for clinical decision making. Evidenced-based medicine Web sites, guidelines and best practice references, disease monographs, and drug information and dosing tools can be accessed online, helping to reduce medical errors. If linked to a Web-based system such as
a clinical portal, the Blackberry can be used to view the electronic medical record at the bedside. Essentially, anything that might be delivered in your healthcare institution via a Web page such as on-call schedules, the operating room schedule, phone directories, physician pager numbers, and hospital event calendars for meetings, rounds, and the like all can be accessed on the Blackberry. In contrast to other devices such as the Palm or Pocket PC, which often require the user to return to a syncing cradle and physically retrieve new data, Web-based data on the Blackberry is updated at each load or refresh of the Web page.

Many who carry a Blackberry think of the device as a status symbol; only the important people in the organization carry one. More often than not, this is due to the expense of the monthly charges for voice and data. It is arguable, however, that the Blackberry has benefits to the organization with its centralized management through the BES server, ability to view Web-based resources, and ability to access resources behind the corporate firewall over a secure encrypted network that make the Blackberry technology a worthwhile investment for a healthcare institution.

The following medical-related Web sites are useful for adding to your Blackberry bookmarks:

- **ePocrates Online** (http://www.epocrates.com/products/online/): Contains 3300 brand and generic drugs with a drug interaction checker, drug pricing, pill pictures, patient education handouts, and health insurance and Medicare Part D formularies.
- **PEPID** (http://www.pepidonline.com/): Available by specialty, the PEPID has up to 2000 medical topics; 5000 drugs including prescription, over-the-counter (OTC), and herbal medications; 250 medical calculators, all fully integrated; a drug interaction generator to cross-reference up to 50 drugs, herbal remedies, and OTC medications simultaneously; and a place to leave institutional and personal notes so as to add a note anywhere as a quick reminder or an important protocol.
- **Access Medicine** (http://www.accessmedicine.com): Provides instant answers to clinical questions from the most trusted sources and is designed for direct access to the information necessary to complete evaluations, diagnoses, and case management decisions; and for conducting research, medical education, or self-assessment and board review.
- **Up To Date** (http://www.uptodate.com/): Specifically designed to answer the clinical questions that arise in daily practice and can be used right at the point of care. The published evidence is summarized, and specific recommendations are made for patient care.
- **Web WISER** (http://webwiser.nlm.nih.gov): A system designed to assist first responders and emergency care providers in hazardous material incidents; WISER provides a wide range of information on hazardous substances including substance identification support, physical characteristics, human health information, and containment and suppression advice.

Some free worthwhile Web sites are http://Pdaportal.com (a collection of PDA-friendly Web sites; take a look at the MEDICAL category) and http://dmoz.org/Health/Medicine/-DMOZ (open directory project—medicine topics).

Churton Budd, RN, EMTP, is a Team Leader and Systems Analyst 3 in the IT Division of Clinical Informatics at the University of Toledo Medical Center, Toledo, OH.