Clinical Computing

Use of Personal Digital Assistants in Consultation Psychiatry

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Providing consultation services at a medical center requires mobility, efficiency, and accurate communication between providers. At a large academic medical center, the patients seen for psychiatric consultation may be hospitalized on various floors and even in several different buildings. Most psychiatric departments have a home base of operation where consultation requests are received by telephone, fax, or mail. Consequently, physicians on the consultation service either must be available by pager or must frequently walk from their home base to the patient's bedside.

In this column we describe how the consultation service at the University of California, Davis (UC Davis) Medical Center has used Palm personal digital assistants to facilitate the provision of care. We have found these devices to be useful for a variety of purposes, including electronic sign-out, documentation, provision of medication information, and storage of reference materials.

Background
The UC Davis Medical Center is a 400-bed teaching hospital that serves as a tertiary interdisciplinary care center for numerous patients in the greater Sacramento area and northern California. The consultation service comprises three teams: two teams assess primarily adults, and one team assesses children. Each team consists of attending physicians, clinical psychologists, a psychiatric resident, two or three medical students, and a clinical nurse specialist.

During the regular work week, consultation requests are fielded by administrative staff, who alert team members by pager. The resident gives the attending physician an update on the case before evaluation.

Sign-out
Problem
During the evenings and on weekends, the consultation service is staffed by residents and on-call faculty. Requests for consultations are paged directly to the resident on call. The resident and the faculty member evaluate the patient and also follow up on patients seen during the standard work week. In the past, this weekend sign-out was performed by using a clipboard with sheets of paper containing information for the resident on call. Although this system worked, it was barely adequate. For one thing, the handwriting of many residents and attending physicians was difficult to decipher. Another problem was that there was often confusion about which patients had been seen and what care each patient needed to receive from residents on call on the weekends. With multiple sheets of paper being used to track the patients, this information was at risk of being lost.

Solution
As with the electronic sign-out process at the Sacramento County Mental Health Center, which has been described previously (1), the clipboard system was replaced with the use of personal digital assistants. Physicians on the consultation service transmit work requests into the sign-out personal digital assistant. The resident on call carries this personal digital assistant while working during the weekend.

The "to-do" feature of the personal digital assistant is used to organize information relevant to the work requests. Tasks to be carried out on Saturday, Sunday, or both are clearly delineated with numerical designations. A standard form is used to identify the patient, the patient's room number, the diagnosis, medications, information about the physician making the request, and the work required. The weekend resident makes a short note to indicate what care has been provided.

This system has many advantages. One is the replacement of handwriting with machine-generated text, which means that all relevant information will be legible. Another advantage is that rather than having to wait for a sign-out meeting, members of the weekday team can sign-out at their convenience. The to-do feature provides the organizational framework for separately listing the duties of the resident on call each day of the weekend. Finally, the fact that the weekend resident updates the list with actions taken allows the regular weekday team to prioritize its Monday activities in light of the new consultations.

Documentation
Problem
Consultation documentation is typically handwritten, both in the progress section of the patient's chart and

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on the consultation form. The legibility and comprehensibility of this information varies, depending on the handwriting and writing skills of the individual consultant. The accuracy of transmitted data has been raised as a concern by the Joint Commission on the Accreditation of Healthcare Organizations (2). When the chart is not legible or comprehensible, the physician who requested the consultation must page the psychiatrist to ascertain the relevant information. In some cases it is not clear which physician conducted the consultation, and administrative staff must be contacted.

Although computer workstations are available throughout the hospital, they are effectively only dummy terminals for gaining access to the hospital mainframe computer systems; they do not have word-processing capability for generating documentation.

Solution

Each physician on the consultation service was provided with a Palm personal digital assistant. Using the Palm Portable Keyboard, developed by Thinkoutside, and the text-editing software SmartDoc, the physicians enter text into the personal digital assistant. The keyboard is similar in size and shape to the Palm personal digital assistant when folded up but expands to a full-size keyboard and is comfortable to use. In addition, SmartDoc allows the creation of documentation templates. The software includes key headers such as social history and mental status examination, which has facilitated documentation of consultations. Such boilerplate text reduces the amount of typing necessary to document the consultation.

The hospital does not have infrared-capable printers that would allow physicians to print from their personal digital assistants. However, one of the consulting psychiatrists carries a Canon Bubble Jet printer, which weighs about five pounds, so that consultation notes can be printed out at the nurses' station and inserted into the patient's chart.

Mobile information
Problem

Although terminals that provide access to Internet-based health information are available throughout the hospital, access is sometimes limited by the number of physicians needing to use them at a given time. Traditionally, many physicians have carried pocket-size versions of reference material, such as the *DSM-IV,* as well as medication handbooks and guides, such as *The Concise Guide to Consultation Psychiatry* (3). Although these traditional sources of information have their merits, access and portability are limited.

Solution

The physicians have been provided with new reference materials in the form of software for their personal digital assistants. We use ePocrates qRx (4), an excellent source of medication information. Although this reference is not comprehensive, it includes pertinent information such as dosage, indication, side effects, and drug interactions. A particularly useful feature is the MultiChek function, which allows a list of medications to be entered and checked for possible drug interactions. In particular, the ability to add and remove medications from the list enhances the physician's ability to assess potential drug interactions. This feature allows the consultant to provide quick and judicious recommendations to the requesting physician.

The codes and criteria contained in *DSM-IV* are essential to the practice of psychiatry. We have entered the numerical codes into MobileDB, a portable database that can help identify a diagnosis on the basis of a specific code. In addition, the codes have been entered and organized by diagnostic category. Once a diagnosis is established, the appropriate code can be found by searching the memo pad feature of the personal digital assistant. The physicians were also provided with the most commonly used *DSM-IV* criteria. Text from *DSM-IV* was scanned and converted with optical character recognition software.

Referral to follow-up care is another function of the psychiatric consultant. A list of local mental health clinics and community resources in the greater Sacramento area is provided through the address book feature of the personal digital assistant. This

feature provides consultants with frequently requested information that can be printed out for the patient or the requesting physician.

Discussion and conclusions

The multiple capabilities of personal digital assistants, combined with their portability, make them ideal for use in consultation work. Although synchronous or face-to-face transmission of information is superior, the ability to sign-out electronically is clearly beneficial when on-call schedules prohibit such transmission. Personal digital assistants can also store multiple sources of reference information and can be used to print documents. In addition, they are smaller and lighter than laptop computers.

The privacy and confidentiality of information is an issue of concern with the use of personal digital assistants. The Health Insurance Portability and Accountability Act of 1996 (5) mandates the security of health-related information, especially by any entity that deals with or conducts electronic transactions.

Security of the personal digital assistants at the UC Davis department of psychiatry is addressed through the use of secure encryption and password authentication. We use movianCrypt, which stores confidential information in encrypted text. This software package requires a password to enable the personal digital assistant to be turned on as well as to transmit information to a desktop computer. These features ensure that there is no unauthorized access to confidential information but do not slow down authorized users.

The UC Davis department of psychiatry plans to extend the capabilities of the personal digital assistant in the future. Billing documentation will be generated through the use of forms on the personal digital assistant, allowing clinicians to enter relevant information at the point of care without having to carry paper forms. These records will also serve as the patient encounter documentation required by the residency review committee from our residents. In addition, network access to a centralized

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server will allow clinicians to submit billing documents without having to return to the central office.

Plans also include developing the capacity to send wireless requests to the consultation team, which would eliminate the need to page the physician and simultaneously serve as the consultation request log. Our ultimate goal is to have a secure Web portal for information access (6) and exchange through personal digital assistants.

The use of personal digital assistants is revolutionizing the use of computers in the delivery of health care. In a recent column, Grasso and Genest (7) described the use of a personal digital assistant in reducing medication error rates. Patients are also using personal digital assistants to monitor their health and report clinical data (8). In addition, the ability of a portable device to provide reference information and documentation is important to physicians. It has taken time for the use of personal digital assistants to reach mainstream health care practice, and physicians are finally beginning to join the hand-held computer revolution (9). Although there continue to be difficulties with connections to current hospital information systems and to different personal digital assistant sys-

tems, integration and connectivity will be the final—and possibly the most important—benefit of using personal digital assistants in health care. ♦

References

1. Luo JS, Hales RE, Hilty DM, et al: Electronic sign-out with personal digital assistants. Psychiatric Services 52:173–174, 2001

2. Revisions to Joint Commission Standards in Support of Patient Safety and Medical/Health Care Error Reduction. Available at www.jcaho.org/standard/fr_ptsafety.html

3. Rundell JR, Wise MG: Concise Guide to Consultation Psychiatry, 3rd ed. Washington, DC, American Psychiatric Press, 2000

4. ePocrates qRx 4.0: new media review. JAMA 286:229–232, 2001

5. Health Insurance Portability and Accountability Act. Available at http://aspe.hhs.gov/admnsimp/index.htm

6. Duncan RG, Shabot MM: Secure remote access to a clinical data repository using a wireless personal digital assistant (PDA). Proceedings of the American Medical Informatics Association Symposium, pp 210–214, 2000

7. Grasso BC, Genest R: Use of a personal digital assistant in reducing medication error rates. Psychiatric Services 52:883–884, 886, 2001

8. Szynal D: PDAs come in handy. Health Data Management 9(8):18–20, 2001

9. Chin T: Tap class. American Medical News, June 11, 2001, pp 27,28