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Polly A. Hulme

South Dakota State University, polly.hulme@sdstate.edu

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Computerized Patient Records and NP Practice

Computer-based patient records (CPRs) are becoming increasingly common in ambulatory settings. The advantages of computer-based patient records over paper records are multiple: they save space and time, help health care providers improve patient care, and provide clinical and managerial information quickly. Currently, however, this software is based on the medical model.

The software for computer-based patient records was developed about 25 years ago in academic health care settings, but was never disseminated extensively into other types of ambulatory settings. Now, however, with the advent of more powerful personal computers (PCs), this innovation is commercially available for smaller ambulatory practices.

While advanced practice nurses (APNs) can use this software as readily as physicians, they also have a perfect opportunity to add the nursing data that differentiate their practices from that of physicians. The addition of standardized nursing data to computer-based patient record software would help APNs integrate nursing diagnoses, interventions, and outcomes into their management plan; and facilitate research on advanced practice nursing. Software vendors need to be encouraged to fully integrate standardized nursing data into CPR software so APNs can fully document their practice, improve patient care, and facilitate nursing research.

Improved Capabilities

Most CPR software programs use a database format to collect the data into files and a database management system to manage and access the data. The more powerful PCs allow the storage and management of the large amounts of data needed for CPRs

in; the entry is then automatically coded for storage. Coded data save storage space and render the data ready for statistical analysis.

Data can also be entered using free text. Free text is the usual mode of organizing data for providers. However, the major disadvantage of free text is the difficulty of retrieving data across records. Although some free text is unavoidable, a CPR completely in free text is merely an "electronic piece of paper" with little improvement over the paper record. In contrast, CPRs that have at least some structure have numerous advantages over paper records.

Advantages of CPRs

There are four major advantages of CPRs: they save space, save time, improve patient care, and serve as information systems. A single hard disk holds thousands of records and takes up only a few inches of space. The tapes used for daily backup take up about the same amount of space.

Time can be saved in many ways. For example, completed encounter forms, physical examinations, and other customized reports can be quickly generated, as well as flow sheets or laboratory reports. Telephone consultations can be done instantaneously since the provider always has the chart on hand. Workstations in multiple sites, including the examining rooms, allow instant retrieval and entry into patient records. Some programs will automatically place a prescription on the medication list, progress note, and on the prescription blank itself with only one entry. Key word searches can be used to find notes on an old problem. And at least one piece of available software allows patients to type their own health histories into the computer using a multiple choice format. The computer then assimilates the data into a narrative form that can be

the user as information. There are several levels of information systems used in health care. At the patient level are clinical information systems. The CPR is a clinical information system, because it aids in the management and documentation of patient care. At the administrative level, management information systems help administrators manage the delivery of health care. Quality assessment and improvement (QAI) programs are an example of the use of this type of information. Good CPR software will elicit data for both clinical and management information systems. Research can be conducted using information from either level.

Clinical information systems can be further divided into hospital and ambulatory systems. Nursing information systems, which help nurses manage and document patient care, are increasingly evident in hospital systems, but not so in ambulatory systems. The absence of nursing information in ambulatory clinical information systems is particularly detrimental for APNs during periods of potential health care reform, since information from aggregated information systems is what often drives public policy at the local, state, and federal levels. With the increasing use of CPRs in ambulatory settings, however, APNs have an ideal chance to document the advanced nursing care they provide patients.

Examples of CPR Software

The earliest CPRs were developed almost 25 years ago in academic centers, but their dissemination to ambulatory settings outside large health maintenance organizations (HMOs) and academic settings has been disappointingly slow. Three well known early systems still in use are the Computer Stored Ambulatory Records System (COSTAR) developed at Harvard University. The

ized nursing data to computer-based patient record software would help APNs integrate nursing diagnoses, interventions, and outcomes into their management plan; and facilitate research on advanced practice nursing. Software vendors need to be encouraged to fully integrate standardized nursing data into CPR software so APNs can fully document their practice, improve patient care, and facilitate nursing research.

Improved Capabilities

Most CPR software programs use a database format to collect the data into files and a database management system to manage and access the data. The more powerful PCs allow the storage and management of the large amounts of data needed for CPRs, allowing smaller practices to take advantage of the software technology.

Another technological advance is local area network (LAN) software, which electronically links a number of computers to the PC with the CPR software and data (called the "file-server"). Thus, multiple users in a practice setting can share data, software, and even printers. Additionally, modems can be used to access records when outside the usual care setting. Security measures, such as the use of passwords, help to prevent unauthorized access to the system.

Data are entered as much as possible on templates in coded form. A template designates certain areas of each record for specific data, such as the problem list. By structuring the data, the computer can more easily retrieve data within and across records. The use of coded data facilitates data entry, storage, and analysis. Vocabulary is standardized to allow a common understanding among the multiple users of the program. There usually is no need to memorize codes, since many programs have text prompts to choose from, or allow the standardized text to be typed

For example, completed encounter forms, physical examinations, and other customized reports can be quickly generated, as well as flow sheets or laboratory reports. Telephone consultations can be done instantaneously since the provider always has the chart on hand. Workstations in multiple sites, including the examining rooms, allow instant retrieval and entry into patient records. Some programs will automatically place a prescription on the medication list, progress note, and on the prescription blank itself with only one entry. Key word searches can be used to find notes on an old problem. And at least one piece of available software allows patients to type their own health histories into the computer using a multiple choice format. The computer then assimilates the data into a narrative form that can be reviewed and corrected with the patient.

CPRs can improve patient care in multiple ways. For example, individualized patient instruction sheets, reports on delinquent tests for the entire practice, and family linked medical records can all aid in providing better patient care. Before consulting with a patient, the provider can reformat information from the patient record to address the current problem or to create a patient summary. Decision making is enhanced by the more structured CPRs, because the data entry template prompts the gathering of complete data, which then will be available when needed. Further, decision support in the form of provider reminders of preventive care and other alerts, such as drug incompatibility, is available in many CPRs. Individualized patient reminder letters can be generated from this programming as well. This is accomplished by programming rules into the software that electronically determine when reminders or alerts are issued.

Finally, CPRs are ideal information systems. Data, in uninterpreted form, such as an ICD-10 code, is organized and interpreted to convey meaning to

potential health care reform, since information from aggregated information systems is what often drives public policy at the local, state, and federal levels. With the increasing use of CPRs in ambulatory settings, however, APNs have an ideal chance to document the advanced nursing care they provide patients.

Examples of CPR Software

The earliest CPRs were developed almost 25 years ago in academic centers, but their dissemination to ambulatory settings outside large health maintenance organizations (HMOs) and academic settings has been disappointingly slow. Three well known early systems still in use are the Computer Stored Ambulatory Records System (COSTAR) developed at Harvard University, The Medical Record (TMR) developed at Duke University, and the Regenrief Medical Information System (RMIS) developed at the University of Indiana. The RMIS, which is the least widespread, was one of the first programs to include a computerized medical knowledge base.

A new program, the Intelligent Medical Record-Entry (IMR-E), has been recently developed by a team called MEDAS, whose members come from several universities. Unlike the other programs, data can only be entered by providers. The IMR-E's data entry is the most structured of the academic programs, but it is also the most user friendly, since it uses icons and a graphical user interface.

Lately, CPR software has been introduced by commercial software companies, who already have a market with clinics and private practices. Many of these ambulatory settings have long employed "office practice management" software to handle billing and accounting functions. With more powerful PCs available, a logical extension of this business has been to add CPR modules to billing

*Please see **Patient Records** page 5*

Continued from page 4

Patient Records

systems. However, these CPR modules sometimes contain little structure with few coding requirements. Further, many are developed by financial or computer experts who do not have the clinical background necessary to structure a CPR adequately into a time saving tool. Some commercial CPR modules, therefore, are merely "electronic pieces of paper" that only save space, with little capacity for generating clinical and managerial information.

Two popular commercial software CPRs that do function as information systems are Practice Partner Patient Records (PPPR) published by Physician Micro Systems, Inc., in Seattle, Washington, and Medical Manager (MM) published by Systems Plus, Inc., in Mountain View, California. PPPR contains all the elements found in paper charts, including the problem list, progress notes, vital signs, medical history, social history, family history, the medication list, immunizations, health maintenance, and laboratory results. When a progress note is entered, all parts of the chart are automatically updated. PPPR can generate chart summaries; progress notes by visit or problem; flowcharts of laboratory values, vital signs, and medications; and preventive measures due for each patient. Laboratory values from outside the practice can be automatically loaded by modem and recorded in the correct section of the record. Letters and consultation reports can also be entered by merely using an optical scanner. MM has similar features, plus a newly developed Data Merge Language, which allows sharing data with a hospital computer.

Cost-Benefits

The costs of CPR software and the hardware necessary to support it are still substantial. Installation and operating

the medical model of patient care, which is generally disease oriented. APNs can and do use this software to document their care, but it only partially captures their own model of patient care, which is individual, family, and community oriented rather than disease oriented.

The management of acute and chronic health problems by APNs involves not only diagnosis of diseases, but also the diagnosis of individual, family, or community responses to these health problems. Likewise, the treatment of health problems does not stop with medical prescription, but also in-

cludes symptom control, counseling, teaching, and case management, all of which have been considered nursing interventions. And finally, documentation of the impact of APN care is not complete without the measurement of outcomes. Health status, functional status, quality of life, and patient preferences are all examples of outcomes consistent with nursing, whereas morbidity, mortality, and clinical indicators are outcomes closely tied to the medical model. Health promotion, health maintenance, and prevention are additional APN activities that can more readily be

described using nursing rather than medical diagnoses, interventions, and outcomes.

The addition of nursing diagnoses, interventions, and outcomes to CPR software would not only better capture the APN's unique model of patient care, but would also provide a wealth of much needed data on APN practice that could address numerous research questions. For example, this data could help substantiate and differentiate the practice of APNs from physicians in a quantitative

*Please see **Patient Records** page 13*

chart are automatically updated. PPRP can generate chart summaries; progress notes by visit or problem; flowcharts of laboratory values, vital signs, and medications; and preventive measures due for each patient. Laboratory values from outside the practice can be automatically loaded by modem and recorded in the correct section of the record. Letters and consultation reports can also be entered by merely using an optical scanner. MM has similar features, plus a newly developed Data Merge Language, which allows sharing data with a hospital computer.

Cost-Benefits

The costs of CPR software and the hardware necessary to support it are still substantial. Installation and operating costs are additional costs to be considered. As mentioned above, the benefits of CPRs to be weighed against costs include savings in space and time, improved patient care, and the contributions of an information system that can be used for managing patient care, QAI, and research.

Costs can be compensated somewhat by decreased expenditures for medical records personnel, paper supplies, and space, and by improved accounts receivable from computerized billing. Costs can also be lowered if providers enter their own data. Choosing hardware, software, and vendors carefully is another method of keeping costs down by avoiding purchase of an inadequate, unnecessary, or already obsolete system. The American Nurses Association has published an excellent booklet on choosing a system entitled "Computer Design Criteria: For Systems That Support the Nursing Process" by Zielstorff, McHugh, and Clinton. Additionally, the journal *M.D. Computing* often has good articles on the subject.

Adding Nursing Data to CPRs

All of the available CPR software for use in ambulatory settings are based on

Continued from page 5

Patient Records

way. Until now, these differences have been difficult to describe without relying on qualitative descriptors. CPRs containing nursing diagnoses, interventions, and outcomes would also expedite the study of access, cost-effectiveness, quality, and productivity of APNs. While many studies were done on these subjects in the 1970s and early 1980s, far fewer are being conducted now. Specifically, access could be studied by examining the zip codes and insurance status of patients being seen in the practice. Cost-effectiveness could be studied by looking at the prescribing habits, laboratory use, patient follow-up, clinic revisit rate, and revenue generated by various types of providers. Quality studies could address selected patient outcomes and satisfaction. Patient satisfaction could be directly entered into the computer by patients at each visit to track changes over time. Productivity could be measured by using a tool recently developed by APNs that uses a computer program to link the total time spent with patients of various levels of complexity to patient billing (see *The Nurse Practitioner* 1992;17(4):50,52,55). APNs could be studied across practices as well as within, for access, cost-effectiveness, quality, and productivity. The ability to influence health policy at all levels is an achievable goal with this type of research.

Standardizing Nursing Data

If nursing data is to be programmed into CPR software used in ambulatory settings, it is essential to use standardized nursing data that have been classified into an acceptable taxonomy. Examples of standardized medical and

psychological data classification systems are the CPT, ICD-10, and DSM-IV codes. The American Nurses' Association (ANA), since 1980, has been actively promoting and developing a classification system which despite considerable progress is still far from complete. The ANA believes that only by naming what nurses do and assigning a computer code to that name, will nurses be directly reimbursed and recognized as a profession with unique skills and knowledge.

Standardized nursing data classification systems currently accepted by the ANA are NANDA (North American Nursing Diagnosis Association), NIC (Nursing Interventions Classification System), the Home Health Care Classification System from Georgetown University, and the Omaha System for Home Health Care. Standardized nursing outcomes are in the process of being developed by the Nursing-Sensitive Outcomes Classification Research Team (NOC) at the University of Iowa College of Nursing. Much work remains, especially in integrating the diagnosis, intervention, and outcome classification systems. However, the use of these systems now to document nursing care is crucial.

Commercial software companies and vendors need to know their CPR software for ambulatory settings is not adequate for APNs. Some vendors state there is ample flexibility in their product to add nursing data as the customer sees fit. However, this is not an adequate response. Standardized nursing data classification systems, particularly NANDA, NIC, and the eventual nursing outcomes classifications, should be programmed directly into the software so APNs can quickly document their activities in a standardized format with-

out having to enter them word by word. This is being done for nursing care planning in hospital systems, but the requirements of APNs are different. Nursing diagnoses, interventions, and outcomes need to be completely integrated with the medical management format. In other words, where medical diagnoses are to be entered, there should be space for nursing diagnoses. Likewise, nursing interventions should be entered as part of the management plan. Nursing outcomes are not always evident in ambulatory settings, but could be entered in a follow-up note.

All entries should have their own structure and location, yet have links to all other entries in the record, so a particular patient's nursing interventions, for example, could be linked to his or her nursing diagnosis and medical diagnosis. Summary sheets and encounter sheets would all need to include pertinent nursing data along with medical data. On the other hand, nursing data should be retrievable by itself. With such a CPR, APNs would find a valuable tool that not only saves space and time and improves patient care, but also serves as an information system that efficiently documents all aspects of their unique practice.

CPRs are becoming increasingly more affordable in all types of ambulatory health care settings. However, CPRs in their present form are based on the medical model. The integration of standardized nursing data into the medical management format of CPR software would allow APNs to take full advantage of the technology to completely document their practice, and in the process to improve patient care and facilitate research. ♦

Polly A. Hulme, MSN, ARNP
Iowa City, Iowa

Benefits From the Use of CPRs

According to a report in the February 6, 1995, *American Medical News*, a number of insurers are offering reduced professional liability premiums to physicians who use certain medical record systems. The reductions range from 2%–5%. The rationale behind such reductions is that many malpractice suits are won or lost on the quality and content of patient records. In addition, electronic record systems provide reminders to help providers give comprehensive care, warn of drug interactions, and monitor follow-up and patient compliance. ♦

Continued from page 7

Association News

eligibility criteria for certification as a gerontological nurse practitioner. Gerontological nurse practitioner candidates will need to have completed master's degrees in a gerontological nurse practitioner program. In 1995, master's degrees from adult and family nurse practitioner programs and certifications from gerontological, adult, or family nurse practitioner programs will remain acceptable. Currently certified gerontological nurse practitioners will not need to meet the new requirement, provided they apply for recertification before their current certification expires. ♦

Oncology Nursing Month Announced

The Oncology Nursing Society has announced that April 25–May 31, 1995 is Oncology Nursing Month. For a free promotional guide or further information, contact: Oncology Nursing Society, 501 Holiday Dr., Pittsburgh, PA 15220; (412) 921-7373 or fax (412) 921-6565. ♦