Computers in Family Practice

Editor: Roger A. Rosenblatt, MD, MPH

A Computer System for Practice Management and Patient Care in One Family Practice

Martin L. Proudfoot, MD
Edmonds, Washington

The following paper describes an in-house microcomputer system designed and implemented by a private family physician in a small group practice in Edmonds, Washington. Although someone without Dr. Proudfoot's background in computer science would be unlikely to replicate this system, his experience does demonstrate the feasibility of using small computer systems as efficient management and patient care tools in an average office setting.

Roger A. Rosenblatt, Editor

The primary stimulus for acquiring a computer system in a three-physician private practice was to improve office efficiency. A point had been reached at which more personnel were needed to execute accounting control measures and provide management reports. The options were to hire additional clerks or purchase a computer, and the decision was made to computerize.

Goals of Computerization

The objective of installing a computer system was to obtain more accurate and reliable accounting information and medical records in less time than is required with a manual system. It was expected that the computer would produce a transaction ledger, deposit slip, and third-party insurance forms on a daily basis, allowing control of daily cash flow and producing an audit trail. There was also a need for various management summaries

Requests for reprints should be addressed to Dr. Martin L. Proudfoot, 21616 76th Avenue West, Suite 110, Edmonds, WA 98020.

and better medical records. The content and organization of each patient's medical record was to be improved by use of a word processor supported by the computer. The system had to be simple enough to be used by the current office staff, who had no computer experience, reliable enough to be in use continually without data loss, and inexpensive enough to be purchased for less than three years' salary of a bookkeeper.

Methods

Hardware and Software

The accounting software was created by the author. After the software design was outlined, a hardware microcomputer system was selected that met the specifications of the software. The equipment purchased was a single-chip microcomputer created for business use (Altos Computer). The computer supports three video display terminals (VDTs), two printers, a fixed-disk storage device with the capacity of 10 million characters, and a disk drive for a removable flexible disk. The VDTs include a cathode-ray display, typewriter keyboard, and a calculator-type numerical pad. A high-speed dot-matrix printer and a letter-quality printer were obtained. The system runs under the multiuser version (MP/M) of the industry-standard microcomputer operating system (CP/M, control program for microcomputers). The accounting software was written in a compiled BASIC language (Microsoft). The word processor (Palantir) is a commercial product modified for this system by the author. The retail price of the hardware, operating system, and high-level languages (exclusive of the accounting software and end-user support provided by the author) was approximately $17,000, or $5,700 per physician.

The physicians practice in an office cost-sharing arrangement with independent practices and billing. Each physician's receptionist-bookkeeper has a VDT at the physician's front window. Transactions are posted on the terminal by the bookkeeper from a computer-coded encounter form at the time of the visit.

A simplified scheme for coding diagnoses and procedures was devised utilizing data on the content of family practice from the Virginia study.[1] This internal code allows common diagnoses and procedures to be entered quickly with one or two digits rather than the five-digit ICDA and CPT codes, although these codes are available from the computer memory.

Each serially numbered encounter form is tracked by the computer, and the clerk is alerted to missing forms. Posting credits from multiple account vouchers from the major third-party insurers is done with ease on the computer. At the end of the day, the computer prints a daily ledger, a deposit slip, and an appropriate insurance form for each patient with private or government third-party coverage. The insurance forms are mailed the next day. A backup copy of the accounting data is made daily on removable disks. Four copies of the data are stored on removable disks, one of which is kept off the premises.

Accounting records are available for two years by patient's name or account number at any time at each terminal. Monthly billing statements are itemized with ICDA code, CPT code, and description as well as with detail of aged account balances and a rebilling fee on overdue accounts. Management reports, created on a monthly or semimonthly basis, include listings of delinquent accounts, productivity reports, diagnosis tallies, and accounts receivable analysis by third-party insurer and aged account balance.

The word processor can be used at each terminal. Chart notes are transcribed from the physician's dictation. Prototype forms for complete examinations and common problems have been designed by the author. On the computer the typist calls up the appropriate form, which includes normal or negative findings, and modifies it on the display screen with the dictated history and abnormal findings. The records are printed on the letter-quality printer. At this time the medical record is not stored in the computer, but is recorded in printed form in the patient chart.

The accounting software was written over an eight-month period, and was installed with the computer in June 1980. Because data presented here are derived from the author's private practice, not from the other two physicians using the computer system, descriptions of the effect of computerization for all three physicians are extrapolated from the author's data. The computer

is compared with a pegboard device, which was replaced by the computer.

Results

Time spent on accounting has changed significantly. Prior to implementing the computer system, one physician kept a bookkeeper busy 8 to 9 hours daily. The detail of the transactions was minimal, inasmuch as the ICDA codes, CPT codes, and descriptions were not documented on ledgers. Insurance forms for major governmental third-party payers were prepared by hand, and private insurance forms were filled out by the patients. The manual system included virtually no audit trails, no management reports were available, and it was not uncommon for the ledger totals and individual account totals to be out of balance by hundreds of dollars.

Utilizing the computer, the accounting, which includes posting charges and payments and printing the daily ledger, deposit slip, and all insurance forms, is done in two hours a day. Complete CPT and ICDA documentation is made for every transaction. The ledger totals and individual account totals are in balance, correct to the penny.

The accounts receivable have decreased remarkably. In the first three months of 1980 (prior to computerization), the ratio of the accounts receivable to monthly productivity averaged 2.37 to 1.0, or an accounts receivable total equal to 73 days' productivity. In the first three months of 1983, the same ratio averaged 1.84 to 1.0, or 55 days' productivity. The net effect of the computer on the accounts receivable is a decrease of 23 percent, which amounts to a permanent reduction in the accounts receivable of $7,000 per physician, or $21,000 for all three physicians.

The services of two part-time bookkeepers were no longer required after installing the computer. It is estimated that a third part-time bookkeeper would have been needed had the computer not been implemented. The computer system requires the support of only 1.5 bookkeepers for three physicians in addition to providing information not available from the manual system.

By using the word processor, the medical record is typed faster and more neatly. Dictation time is reduced by using the standardized notes. The prototype forms provide the physician with a protocol for dealing with identified common problems, and the capability of the word processor to move text from page to page allows a typed master problem list for each patient's chart, thereby providing better organization of the medical record than was previously available.

To compare the computer expenses with those of a pegboard, an estimated value of $10,000 is placed on the programming services and end-user support provided without charge by the author. The cost of the machinery alone was $17,000. Hence, the total cost of the system is $27,000. The salary and benefits of 1.5 bookkeepers, who were no longer needed, total about $18,000 a year. The permanent reduction in accounts receivable was $21,000. Therefore, compared with its $27,000 expense, the benefit value of the computer in the first year was $39,000. Hence, in this setting, the computer paid for itself in less than one year.

Conclusions

Office overhead in personnel salaries and outstanding accounts receivable can be reduced by the use of the computer. Thus, the cost of medical care may be reduced. The word processor facilitates greater organization of the medical record, allowing it to be used more efficiency by physicians and office staff. The in-house business microcomputer is a cost-effective tool for this private family practice. Based on this experience, the computer is likely to become an integral part of other private practices in the foreseeable future.

Reference

1. Marsland DW, Wood M, Mayo F: A data bank for patient care, curriculum, and research in family practice: 526,196 patient problems. J Fam Pract 3:25, 1976