Computers in Family Practice

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Extending Our Horizons: The Computer in Family Medicine

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What is the role of the computer in family medicine? With this issue we inaugurate a new monthly feature of *The Journal of Family Practice* designed to address this question. In this forum we will explore the applications of computer technology in all facets of the discipline of family medicine—from the education of medical students and residents to the storage and retrieval of medical records to futuristic diagnostic and research possibilities.

Why does a single technological innovation warrant this amount of attention in a journal devoted to a broad clinical discipline? It would be ludicrous, for example, to devote a monthly feature to the use of ultrasound in family practice, although ultrasound represents a highly useful technical innovation. The computer, however, differs from previous advances by virtue of its flexibility. Computers are at once both the simplest of machines—what can be more trivial than counting from one to two repetitively—and the most malleable adjunct to the human brain yet created. The computer excels because it complements our natural physiological abilities. By its tireless ability to capture, retain, and manipulate large amounts of information, it extends our human capacity in almost any direction we wish to turn. The computer frees us from some of the physiological limitations imposed by the human brain.

Family medicine is well suited to harnessing the computer. The family physician is the quintessential generalist, dealing with a wide variety of pathophysiological problems and a diverse set of patients in many settings. The family physician is a problem solver who must juggle large amounts of information rapidly and accurately and then use that information to the benefit of patients. The computer can assist in almost every phase of this endeavor as a tool to collect information from patients, to generate diagnostic probabilities, to search and file the relevant medical literature, or to improve patient follow-up and compliance. In addition, the computer can assist in managing the business and managerial aspects of practice, serve as a means of continuing medical education, and even improve communication among colleagues. Future articles in this space will illustrate all of these functions.

Despite the enormous potential of computers, we are at a rudimentary stage in the use of this new tool. The major event that makes this column a timely addition to this journal's editorial repertoire is the advent of the microcomputer, which makes computer technology accessible to all at reasonable cost. The use of microcomputers is analogous to driving automobiles. Although few of us really

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understand what goes on under the hood, we all are capable of turning on the ignition and using the car to get where we want to go. Over the next few years there will be many more places to "go" with the computer, and family physicians will wish to adapt this particular vehicle to their lives and practices.

In order to get a feeling for the potential utility of the computer in family medicine, it would be valuable to develop a taxonomy of the types of applications for which this tool has been used in the medical setting. Dozens of journals and magazines have sprung up as different groups of physicians and health care investigators apply computer technology to their particular set of problems. Even a cursory review of this literature indicates that the computer field is in such rapid flux that it is very difficult to predict the future—even the immediate future—with any assurance. In addition, such a review highlights the need for some forum in which useful computer applications can be identified. This column will be aimed at the average family physician who is curious about or intrigued with the potential for using a computer in his practice or in his home. The enthusiasts will probably turn to more technical sources.

The following is a summary of some of the tasks for which computers have been used in medical settings relevant to family medicine. This list is by no means exhaustive, but gives the flavor of the topics we intend to cover.

Patient Care

The care of patients is at the core of family medicine. In this area, computers have been used extensively in both the diagnostic and the therapeutic process. Computers can be used to collect information from and about the patient, including historical, physical, and laboratory data, and can assist in formulating efficient diagnostic strategies and generating differential diagnoses. From the therapeutic standpoint, computers have been used extensively in the hospital setting to monitor patients and even to change therapeutic regimens according to predetermined protocols. They are widely used as a tool for storing, retrieving, and communicating essential laboratory data. In the outpatient setting, computers have been used for patient education, as a tool to improve compliance through the generation of reminders about appointments or therapeutic regimens, and for the establishment of a variety of public health protocols.

Practice Management

Perhaps the most common applications of computers have been in maintaining the working environment where physicians practice. Computers have long been used to manage the accounting, billing, and financial record-keeping functions of practice. They are increasingly being used to streamline secretarial tasks, particularly typing and filing. An enormous amount of energy is being directed toward the complex problem of computerized medical record keeping, and as systems emerge that are reliable and efficient, increasingly larger segments of the medical record are being managed through computers.

Medical Education

Computer-aided instruction has been widely adapted for use in medical education. Computers are used in many schools to teach modules in specific courses and to allow students to get the feel of laboratory experiments through the use of complex physiological simulations and to get some feel of patient management through actual cases simulated by computers. The next major frontier will be in the area of continuing education. Computers can be used to organize and gain access to the medical literature, and commercially available computerized data bases are proliferating. Computers can also be used by the individual physician to learn more about new techniques or therapies or to hone diagnostic and therapeutic skills.

Research

The computer has been an indispensable research instrument since it first appeared. Not only did it relieve the drudgery of tedious numerical

manipulations, it allowed the development of a host of new statistical techniques. The slide rule vanished as hand calculators became available; these in turn are giving way to portable, programmable microcomputers. In family medicine, the computer frees the individual investigator and the individual physician from dependence on large, expensive, and complex mainframe computer systems. As it becomes feasible to record and analyze the multiple "experiments" that are part of the clinical practice of family medicine, research within the discipline will increase.

These four categories are the main areas in which this column will focus its attention. Some have feared that the advent of computers in medicine will intrude on the relationship between patient and physician and depersonalize what is an intensely human process. It is our thesis that computers will allow the family physician to concentrate on those aspects of medical care that are in the human domain and to use the computer to handle those tasks that divert the physician's attention from his central mission. We look forward to entering into a dialogue with our readers as we jointly explore this new realm.

We invite articles. We are particularly interested in descriptions of ways in which computers have stimulated creativity, freed energy, and increased productivity. The column will include reviews of new uses for computers, discussions of the use of computers in education, research, and business management, and perhaps even an occasional game or two.

Computers are liberating. They allow decentralization because they bring information—in a usable and retrievable form—to the individual. Although computers will not of themselves revolutionize family medicine, they will speed the rate of change and allow innovations in the practice of medicine that were inconceivable a few decades earlier. The computer will not replace the family physician, but it will increase his capability. We hope that you will enjoy and participate in this new era.