With characteristic wisdom and foresight, Clement J. McDonald, M.D., et al presented excellent advice to the medical profession in general and the AMA specifically. As one of the real pioneers in using the computer in clinical practice, he is uniquely aware of the possible barriers to full utilization of this new technology. Heeding his counsel will help avoid repeating the gross mistakes of past incompatibilities that have retarded or severely limited the potential of several technological modalities (e.g., videotape, videodisc, and computer software). Perhaps this article will provoke the discussions that will result in appropriate actions. (Editor's Note)

GROCERS, PHYSICIANS, AND ELECTRONIC DATA PROCESSING

by

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Computers now control automobile carburetion, recognize groceries at the checkout counter, and play masters' level chess. We are beginning to see medical practice computers that assist billing, scheduling, and other mundane administrative functions. However, by maintaining part or all of a computerized record, the computer can assist many clinical functions as well.(1-5) The computer can speed access to the medical record by providing a display in the time it takes to press a few keys. It can increase availability: no more lost records and inquiry of the office medical record is possible from outside the office by telephone using a lightweight portable terminal or voice response unit. It can speed the assimilation of patients' data by producing clear, flowsheet reports -- formats shown to improve speed and accuracy of data review.(6) There is some evidence that these benefits improve physicians' decisions.(7)

Computers can scour their electronic medical records for problems that physicians have overlooked. Such systems have improved the dosing of cancer chemotherapy,(8) reduced the number of nontreated streptococcal sore throat,(3) and improved a large class of preventive and management decisions.(9-10) Computerized medical records provide special power for summarizing the accumulated experience of a practice with respect to a given disease or treatment. Such systems have already contributed to current policies of the use of cardiac care in intensive care units.(11-12)

While there is no doubt that computers can assist clinical care, economic factors are delaying the realization of this potential. Hardware costs have been a barrier, but no longer. The hardware needed to store core medical records for 1500 patients -- including a 16-bit microcomputer, 10 million characters of high speed disk storage and a matrix printer -- has a retail cost of $10,000. Software costs are another barrier, but because developers can trade off hardware costs for software development costs, and because development costs of software can be spread over a greater number of unit sales when hardware costs are low, these too will decline. The one cost that will not automatically decline with time is the cost of entering patient data, i.e., consultant notes, laboratory results, etc. The yearly secretarial costs of entering such information could easily exceed the cost of the hardware needed to store it.

The way to avoid entry costs is to take advantage of another modern trend. Increasingly, commercial and hospital laboratories report their results by computer. The same is true of radiologists and specialty consultants who use word processors -- another kind of computer. The cost of entry of most diagnostic studies could be eliminated if the computers that generate these reports could talk to an office practice computer by telephone. Some large clinical laboratories already use the telephone to transmit results to printers within the office of their bigger customers. However, sending results to a medical computer requires conventions about the format and content of the message being transmitted and no such conventions exist.

Grocers provide an instructive lesson. In 1970, they established an ad hoc committee to develop the Universal Product Code (UPC).(13) At the time they started, there was no immediate use for these codes since the computerized checkout counter was a decade in the future. By the end of 1975, the UPC code appeared on nearly 80% of grocery packages, and by the end of the decade, machines to read them began to appear. We need similar labels for our informational goods to facilitate future use of computerized record systems in medicine.

We are not pleading for better diagnostic codes, nor for standardization of computerized record systems. What we need is a set of standards for transmitting clinical information between producers and users of medical data. The standards must address six components, the practice requesting the information; the identity of the patient; and the identity, date, time, and results of the clinical observation. Decisions must be made about the kinds of packets used to send these items of information, the order in which the various components are transmitted, and the manner in which the components are coded. For example, should a date be recorded as day-week-month, or as the number of days from a fixed reference point. How will we identify the practice? Since results will have to be sent by telephone, perhaps the practice telephone number would do. What about the patient identifier? The easiest solution would be to use the identifier employed by the physician who ordered a test or consultation, i.e., the current chart number. Existing codes, such as CPT4 could be used to identify individual observations or diagnostic studies. Initially, diagnostic results could be transmitted as character text. Such a format would accommodate both numeric and narrative results and avoid costs and difficulty of negotiating consensus about result codes.

If properly conceived, transmission standards could be implemented without necessitating changes in the way physicians run their practices. Nor would they impose limits on how the physician could use and how long they could retain such data. Yet they provide a means of circumventing what otherwise could be onerous data entry costs.

Such standards should be of greatest interest to physicians in solo and small group practices. Without the ability to obtain diagnostic information rapidly and at low expense, they may be at a practical and economic disadvantage to large, multi-specialty institutions that can develop in-house information systems without the need for external standards.

The AMA has had the foresight to develop AMA/NET, a communication network for physicians. Medical computers could also communicate with one another over the AMA/NET if appropriate transmission standards were available. It would seem appropriate for the AMA to take the lead in developing such standards in conjunction with practitioners, data producing specialties, and manufacturers.

One might argue there are really too few computerized medical record systems to matter so what is the need. We'll let the grocers answer that one.

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Commentary: "Future Directions for CME"

It's easy to be a futurist. Witness all the self-confessed prophets on TV, our national love affair with astrology, what Nobel laureate economists have to say. Who checks on their batting averages? For the public has a short memory, recognizing only the hits, not the errors. What's difficult is planning for organized, productive change at a time of rapidly developing concepts and technology.

Such is the challenge of "Future Directions for Medical Education," adopted 15 June 1982, a report of the AMA's Council on Medical Education. This compact booklet took something over 3 years, 6 Task Forces, and 80 noted experts to develop, so its 36 recommendations bear thoughtful attention by all medical educators. But it's the two proposals on CME (29-30, pp34-35) that beg our special scrutiny.