

Diabetes Information Technology & WebWatch

Electronic Medical Records in Clinical Diabetes Care

ELDON D. LEHMANN, M.B. B.S., B.Sc.

IN THE LAST *Diabetes Information Technology & WebWatch* column¹ various issues surrounding the use of computer programs that link patient blood glucose meters with personal computers were discussed. In this column, issues related to the wider application of hospital-based and primary care diabetes medical record systems for health care professional use will be considered.

HOSPITAL-BASED SYSTEMS

Although paper-based medical records have served clinical medicine well for a long time, needs appear to be changing. As well as being used for routine patient care, there is a growing need to be able to regularly and rapidly access components of patient records for audit, research, and management purposes. Manually trawling through notes to retrieve such information is inefficient and prohibitively time consuming. Furthermore, if required on a frequent basis, for example, to automatically identify patients who have missed an important test or follow-up appointment, paper-based audit becomes completely impractical. Given this, in diabetes care where patient notes can grow to many volumes, and where the accuracy of the information recorded can become increasingly difficult to verify as time passes, increasing interest is focusing on the application of electronic medical records.

This interest is being driven by the fact that the digital storage of data is becoming increasingly feasible and inexpensive. A megabyte of disk storage only costs a few cents and we now have the processing power to handle large quantities of data electronically. Therefore, at last there appear to be basic computer systems powerful enough to address some of the failings of paper-based clinical record systems, as well as potentially being able to assist doctors in the provision of high-quality medical care.

Computerized databases and clinical record systems offer the promise of much greater selective medical follow-up of patients, with opportunities for improved screening and health promotion/disease prevention. This is as true for diabetes mellitus as it is for other medical conditions. Monitoring outcome measures in diabetes care, such as the degree or severity of retinopathy and microalbuminuria, also potentially offers a valuable way of improving the provision and quality of such care. For this, computer-based records for keeping track of clinical details and monitoring when patients are due for their next appointment or specialist test could be invaluable. The incorporation of structured data entry screens into such systems could also provide a useful prompt to the user (clinician) when it becomes time to recheck the patient's eyes, feet, renal function, etc. Prototype systems such as this have been described in the literature, and are being used in some dedicated centers for routine data storage.

However, various limiting factors to the widespread utilization of such applications exist. One issue remains the data itself. Unless a great deal of time and resource can be devoted to manual data entry of previous patient information (i.e., typing in whole clinic loads of data), paper-based and computerized medical record systems will need to be run in parallel for a considerable period of time. Furthermore, the computerization of diabetes medical records needs to be managed in harmony with other medical record systems. While computer records will be of use in the diabetes clinic—unless the rest of the hospital records are computerized—paper-based diabetes records will need to be kept for some considerable time to maintain compatibility with the (old) preexisting hospital-wide system of storing notes.

In addition, if for example the asthma clinic develops its own computer database system, and so does the hypertension clinic, and the obstetric clinic—it is not difficult to envisage some of the logistical problems for storage of medical records that could ensue for a hypertensive, patient with diabetes who became pregnant. To date, relatively few of these issues have been rigorously addressed. One solution might be to make patients responsible for holding their own medical records, for instance on a smart card. However, issues of data security and backup still remain to be resolved. Other alternatives that are receiving active consideration include distributed systems that could eventually see data reside on computers both at patients' homes and in hospitals, or even possibly both in primary and secondary care.

However, as patients with diabetes also have general medical and surgical problems outside the specialist remit of diabetologists/endocrinologists, it seems highly probable that diabetes electronic medical records will need to fit in with computerization of the wider health care system. In view of this, the inexorable advance toward the computerization of patient medical records—particularly in diabetes care—is likely to be a long, slow process.

This is especially the case because at present, review of the literature reveals a multitude of prototype programs that offer similar functions slightly differently but often with incompatible databases. Generally these do not permit easy data transfer and remain largely incompatible. The need for common standards to decrease the current fragmentation of existing information technology developments in the diabetes field will be of considerable importance in the years to come.

Even though many of the computer systems developed up to now have had the potential to be useful tools in many aspects of diabetes care, their utilisation by the vast majority of the health care community has been extremely limited. A survey of selected participants at a Computers and Quantitative Approaches to Diabetes Workshop held in Sydney, Australia in 1988 summed it up by saying that, "computers and related technology are unlikely to benefit diabetes management if they add more to the daily burdens of the patient and the supporting health authorities. In this day and age, the need is clearly for user-friendly and above all, simple systems. . . ."2 Unfortunately, this analysis is as true now as it was 11 years ago.

PRIMARY CARE

So where does this leave us? In order to rectify a problem it is first necessary to recognize that a problem exists. To date, numerous isolated database systems have been developed with no agreed data standards or communication protocols. Therefore systems in neighboring hospitals might be completely incompatible. The attempts to transfer diabetes care to primary care means that primary health care physicians (general practitioners) also now need to access such databases—which must cater for a much wider variety of general medical data. In most cases, at present, this is simply not possible. The growing need for integrating database records between departments (e.g., pathology, radiology, and the main clinical record) as well as between different hospitals and with primary care also needs to be fully addressed. The Internet and World

Wide Web, and hospital-based Intranets may well provide a means of achieving such integration, although security and confidentiality issues once again will need to be addressed.

CONCLUSIONS

For an electronic medical record to be successful, every user must have access to the necessary information when and where that information is needed in a user friendly and comprehensive way. However, to date it appears that this goal has not yet been reached—mainly because systems developed have not always met users' needs. The necessity of formally identifying the users' requirements before commencing systems development is often a problem, as is the lack of flexibility, integration and standards of many of today's systems.

However, it is hoped that in the next few years these hurdles can be overcome to produce integrated, easy-to-use systems that will have widespread acceptance. It would be an achievement indeed if in the 21st century—as a result of computerization—lost notes, like lost x-rays, became a relic of the past.

FURTHER TOPICS

If you would like to suggest further topics or Web sites for future *Diabetes Information Technology & WebWatch* columns, please e-mail information—with a brief description of the site/suggestion—to Dr. E.D. Lehmann: aida@globalnet.co.uk (please indicate *Diabetes WebWatch* in the subject line). You can also fax information to: (503) 218-0828, quoting *Diabetes Information Technology & WebWatch*.

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Eldon D. Lehmann, M.B. B.S., B.Sc.
Academic Department of Radiology
St. Bartholomew's Hospital
London, EC1A 7BE
United Kingdom

E-mail: aida@globalnet.co.uk

Web: <http://www.users.globalnet.co.uk/~aida>