

Diabetes Information Technology & WebWatch

Database Programs for Use with Blood Glucose Meters

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

IN THE LAST “Diabetes Information Technology & WebWatch” column,¹ a range of computer programs that support the electronic transfer of data from patient blood glucose (BG) meters to personal computers were reviewed. In this column various issues surrounding the use of such programs are discussed.

Recently there has been a substantial increase in the availability of database and data transfer computer programs for use by diabetic patients. Any search on the Web produces a vast selection of software—much of it with similar functions. In the last column, only freeware and shareware programs were highlighted. However, there are also a wide variety of commercial programs available for purchase on the Web. For the most part these all do much the same thing, although the quality of the applications can vary substantially.

Incidentally it does not always necessarily follow that commercial applications are actually better than freeware or shareware offerings. Many of the latter are of a very high quality having been written by motivated patients with diabetes (or relatives of patients). Often the programs’ authors have a keen personal interest in the subject, and therefore a very clear idea of what practical features such software should offer.

FEATURES

Database programs, such as those highlighted in the last issue,¹ generally can download data from BG meters to home computers and can graph and summarize the results (Fig. 1). Motivated and interested patients are then able to print out these graphs and take them to their clinic appointment. The belief underlying the use of software like this is the recognition that in the limited time available for most routine clinical diabetes consultations there is simply not the time for a physician to properly review all the BG data that a patient may have collected. By contrast, the hope is that perhaps by summarizing the data beforehand in graphical or tabular form the physician may be able to make better clinical use of the data.

While this approach is intuitively appealing and offers dedicated patients some “rewards” for all the pain of collecting BG data, it needs to be recognized that there remains an absolute paucity of validation data in the literature showing a benefit from the use of such computer programs. Also, it is still unclear what is the optimum way to present the data collected.

For example, do physicians benefit most from graphs or tables of BG data? Or would it be better for the computer simply to highlight untoward or unexplained events such as hypoglycemic and hyperglycemic episodes? Much further research is needed in this area.

In addition, any physician who is brought a range of charts and graphs by different patients may not necessarily find it easy to assimilate the different formats from multiple sources. Furthermore, if patients turn to their physicians for guidance about which software to use their doctors may be uncertain how to advise them.

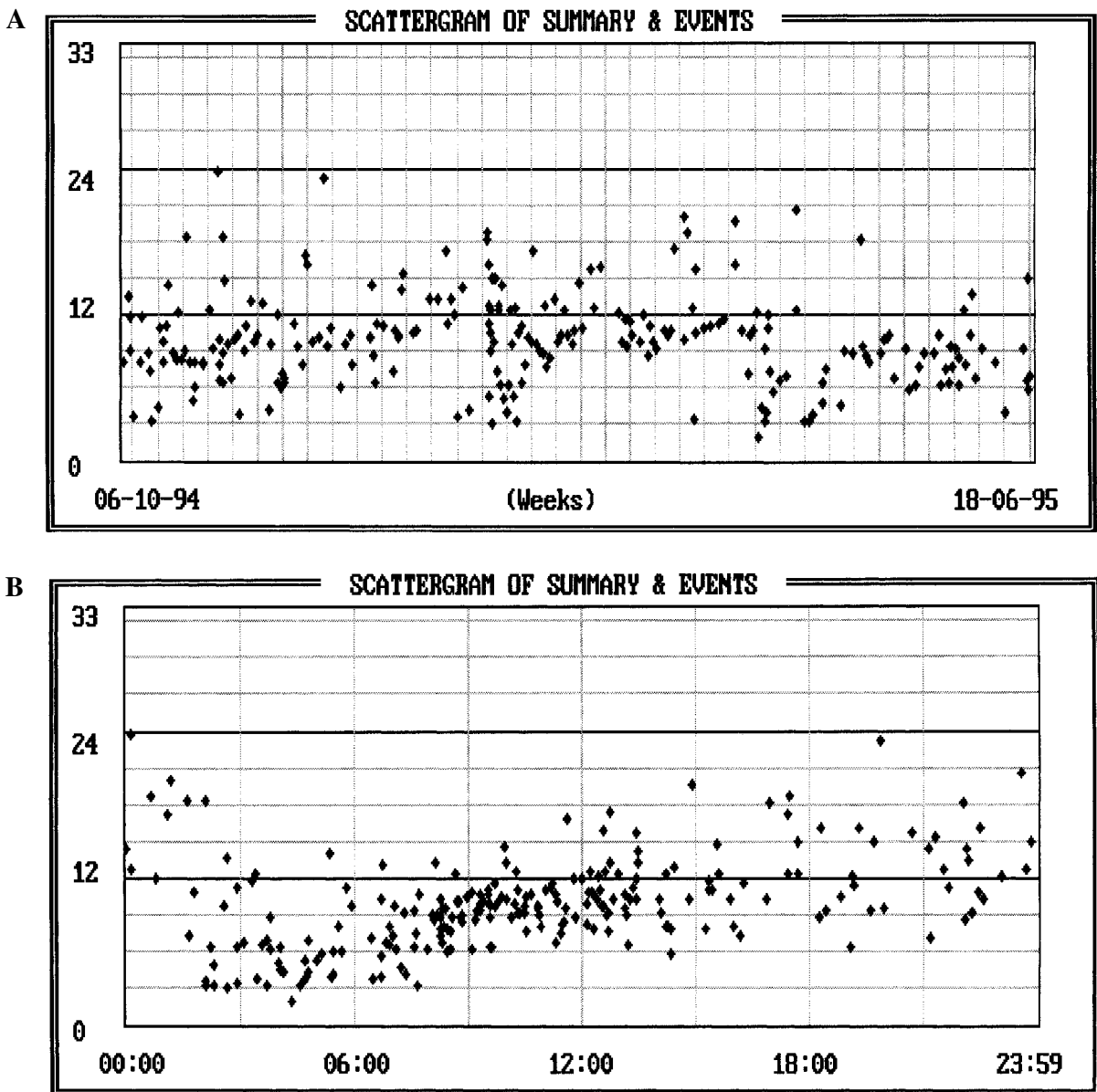


FIG. 1. A: Scatter plot of home monitoring blood glucose data (in mmol/L) downloaded from a Lifescan One Touch II blood glucose meter by a patient with insulin-dependent (type 1) diabetes over a 8½-month period, and displayed using the Blood Glucose Monitor v1.1 software from Vigora Inc. (Washington State). B: Same data as shown in (A) displayed by time of day enabling possible daily patterns or trends to be identified, such as a tendency toward relatively low blood glucose levels in the early morning (between 2 A.M. and 5 A.M.). Reproduced from Lehmann and Deutsch² with kind permission from *Medical Informatics* © Taylor & Francis.

STANDARDS

Clearly the adoption of some standards could help. With standards in place, regardless of which BG meter patients have, physicians could then recommend a program or graphical format with which they are most familiar or comfortable. BG meter manufacturers could also play an important role here. Data display and manipulation software should be able to work with a wide range of BG meters. However, at present a lot of software programs only accept data from selected BG meters.

It is clear that commercial pressures sometimes prevail and limit patients to a given manufacturer's meter, software and supplies. However, while the manufacturer's idea may be to only

provide “added value” from their software to their own specific meter users, this approach does not speed the development of open access systems for truly widespread application.

In this respect the rapid expansion of computing technology over the past decade has repeatedly highlighted the importance of compatibility issues. Closed access systems have frequently been found restrictive and have eventually been forced to give way to open architecture systems. Unfortunately this does not appear to be happening routinely with diabetes-computing software.

As we approach the new millenium, the diabetes community has a responsibility not to duplicate effort and reinvent computer-based tools in a multitude of slightly different (but nevertheless similar) forms. Rather the aim should be to collaborate and construct integrated (or at least open-access) systems. Building such compatible software is a realistic goal that may well help to ensure that computerized storage, display, and analysis of BG data moves from being something for the highly motivated and dedicated to something much more widely applied.

Starting with standards for the electronic transfer and communication of BG data could also provide a useful foundation for other aspects of the computerization of diabetes care. In this respect, if there was an agreed upon format for reading BG data from a meter, all software could be configured to handle this.

The imaging sciences have been here before. Computers and information technology are an integral part of radiology and imaging (and have been so for many years). However, most imaging systems in the past used to apply dedicated (proprietary) image formats for storing datasets. Most of these remained incompatible, until eventually an open access international standard between all major manufacturers was agreed. This now permits the transfer of magnetic resonance imaging, computed tomography, nuclear medicine, and other images between different hardware platforms. If this can be managed with large, complex three-dimensional images and datasets, it should also be possible with relatively low-volume BG data for clinical diabetes care.

FURTHER TOPICS

In the next “Diabetes Information Technology & WebWatch” 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.

If you would like to suggest further topics or Web sites for future “Diabetes Information Technology & WebWatch” columns, please email information—with a brief description of the site—to Dr. E.D. Lehmann: aida@globalnet.co.uk (please write *Diabetes WebWatch* in the subject line). You can also fax information to: (650) 697-0729, quoting *Diabetes Information Technology & WebWatch*.

REFERENCES

1. Lehmann ED: Database software for use with blood glucose meters. *Diabetes Technol Ther* 1999;1:229–232.
2. Lehmann ED, Deutsch T: Application of computers in diabetes care—A review. I. Computers for data collection and interpretation. *Medical Informatics* 1995;20:281–302.

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: www.users.globalnet.co.uk/~aida