The Choice of Microcomputer Software for Infection Control

David R. Reagan, MD, PhD

The major charge of hospital epidemiologists and infection control practitioners is to identify important nosocomial infections, apply relevant and timely infection control measures and subsequently evaluate the efficacy of the interventions. This routinely involves the collection and rapid, accurate analysis of large volumes of data in a repetitive fashion. Computers appear to be attractive aids to such tasks. However, the substantial initial costs of microcomputer systems and software, the limited "user friendliness" of the operating system and other software and perhaps a lingering element of uneasiness about "hands-on" computer use have limited application of computer-based resources in many hospitals.

Currently, two prominent microcomputer-based packages available for hospital epidemiology are NOSO-3 (Epi Systematics, Inc., Ft. Meyers, Florida) and AICE (ICPA, Inc., Austin, Texas). In this issue of *Infection Control and Hospital Epidemiology*, LaHaise has addressed the important practical issue of choosing between these packages for routine infection control functions involving a moderate-sized database. Program speed, user friendliness and accuracy were three key issues in preferring the AICE software package. A few additional points may provide further perspective.

Any use of a computer system involves interaction between a person, a computer system (hardware) and a program (software). In general, the hardware must be capable of running the software efficiently, be reliable and be easy to use and maintain. The software must be capable of performing the desired tasks accurately with a minimal amount of user input (and frustration). In short, use of the combination of computer hardware and software must accurately accomplish the desired task with a reasonable amount of effort. Additionally, the benefit achieved must at least offset the combined costs of acquisition and training for the system.

Hardware and software present different limitations, however. For IBM (International Business Machines Corporation, Atlanta, Georgia) and compatible hardware systems, a primary limitation may be the speed at which software runs. The problem of relatively slow software may be offset by purchasing faster (newer technology) hardware. A primary advantage of a higher purchase price is increased speed and, perhaps, reliability. For example, an additional outlay of $1,000 to $1,500 in initial purchase price can improve performance five- to ten-fold over the IBM XT used in the current study. Existing systems can achieve significantly increased performance through hardware upgrades costing from $300 to $1,000.

Software limitations are more difficult to circumvent. Increased ease of use is usually achieved at the cost of decreased flexibility and program capability (or power). Those programs that provide limited options can frequently do so in a simpler and more efficient way. Programs that require more user input into each detail of data manipulation are usually more time-consuming and tedious to learn and use, but provide more flexibility and powerful data manipulation. Each of these programming approaches has its benefits and liabilities. A more rigidly structured but "user friendly" program may limit the number of variables, types of analyses or time periods to be analyzed. On the other hand, an extremely powerful and flexible program may be worth little to the average user if it is so cumbersome to use that most people never realize the program's potential. AICE may fall into

From the Program of Epidemiology, Division of Internal Medicine, The University of Iowa Hospitals and Clinics, Iowa City, Iowa.

Address reprint requests to David R. Reagan, PhD, MD, Program of Epidemiology, C41 GH, University of Iowa Hospitals and Clinics, Iowa City, IA 52242.

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the former (user friendly) category, and NOSO- may fall into the latter (powerful and flexible) one. To further complicate comparisons, software versions frequently change. For example, Epi Systematics, Inc. has now purchased NOSO- and made Version 3.0 available.

Prior to the purchase of hardware or software, each user should carefully outline the specific procedures that are needed (or whose need can reasonably be projected). The ease of use and operational speed are very important secondary factors. An informed choice is then possible between very different software packages.

The installation and use of microcomputer-based databases for infection control should not impart a lasting sense of accomplishment, however. Numbers and graphs by themselves do not guarantee lower infection rates. Optimal methods of data manipulation and feedback (such as surgeon-specific infection rates) are still being proposed and tested. Moreover, careful assessment of the significant investment of time and economic resources in any microcomputer-based software is needed. The thoughtful and practical analysis of the application of software products to specific infection control objectives, as undertaken by LaHaise, should be used in diverse settings and extended to other software packages. Software developers should be congratulated on great progress to date, but encouraged not only to make improvements to existing packages (in cost, ease of use, flexibility/power and efficiency), but also to facilitate development of new products. Lastly, the overlap of infection control software with quality assurance objectives deserves further study.