(continued from page 404)

Sharon LaHaise, RN, PhD, was asked to respond to this letter.

In regard to the design flaw in NOSO-3 (Epi-Systematics, Inc., Ft. Myers, Florida), not only is the NOSO-3 manual "not helpful," as Ms Walsh points out, but it is actually misleading. How are beginning infection control practitioners (ICPs) going to set up a surveillance computer file after reading in the manual "Only one demographic record is stored per patient"?[1]

Alternatively, even if ICPs figure out on their own, as Ms Walsh did, that this recommended strategy produces computational errors and decide to enter one record per admission, what would they do when analyzing operations by, say, service or diagnosis related group (DRG)? Whenever there are instances where a patient had more than one operation performed by different services during one admission (or any number of other similar real-life situations), computational errors will be produced by the per-admission data structure as well.

The basic problem is that a hierarchical data structure like that of NOSO-3 is extremely difficult to analyze accurately, and the analytic algorithms in NOSO-3 are not sophisticated enough to handle the hierarchical structure without errors. Simply going to another level of the hierarchy, as Ms Walsh did, does not solve the basic problem.

Ms Walsh's final comment points out the most dangerous implications of the design flaws in NOSO-3—that is, the subtle nature of the errors that result. In most analyses, the errors are of relatively small magnitude and would not be noticed. In fact, we only discovered the problem when we compared results with those from AICE (ICPA, Inc., Austin, Texas) and found different results on the same analysis of the same data base. Only by comparing both programs to SAS (SAS Institute, Inc., Carey, North Carolina) could we determine which one was giving erroneous results. That the errors were of small magnitude, however, does not mean that they will always be unimportant.

Unless NOSO-3 users have compared their results with those from another software program on an identical set of data, it appears likely from our findings that their reports all along would have been sprinkled with errors of which they were never aware. The insidious nature of this error problem is one of the reasons we decided to publish the results of our comparison.

Sharon LaHaise, RN, PhD
Pomona, California

REFERENCE

1. *NOSO-3* Users Manual Version 2.2. 4th ed. Lafayette, La; Episystems, Inc.; 1988.

To the Editor:

Dr. LaHaise is to be commended for her objective evaluation of the proprietary infection control software packages.[1] I "inherited" NOSO-3 (Epi-Systematics, Inc., Ft. Myers, Florida) upon assuming the infection control responsibilities at the Buffalo General Hospital, a 700-bed tertiary care hospital. Dr. LaHaise has quantified what I and other colleagues had discovered-namely that NOSO-3 is cumbersome and time-consuming to operate. For example, to generate a summary report for 1988, it was necessary to move through several menus and field screens, and it then took the program 19 minutes and 56 seconds to create the necessary data set. We run the program on an IBM PC AT (International Business Machines Corp., Atlanta, Georgia).

Along with Dr. LaHaise's recommendation that the AICE (ICPA, Inc., Austin, Texas) software is more functional and accurate, I offer the following suggestion. Any infection control department that is planning a computer/software purchase should consider the use of standard integrated data-base/spreadsheet/word processing programs that are available either for Apple II/Macintosh (Apple Computer, Inc., Cupertino, California) or IBM computers. Several such programs are available ***(PC Magazine;*** December 26, 1989), often priced under $200, are easy to learn and are adaptable to all routine infection control tasks. Most include graphics capability. If statistical analysis is required beyond the level of rate calculation, there are inexpensive and "user friendly" statistical programs available.[2,3]

Because the word processor, graphics and statistics modules of NOSO-3 are rudimentary, all of the above software will be more than adequate for infection control applications. They also will be useful for other tasks, particularly in departments where there are ongoing research or quality assurance projects. The cost of a computer, particularly an IBM "clone," and generic software will be far less than the proprietary infection control software package. It must be remembered that a computer and software, including customized software, do not by themselves maximize efficiency, improve compliance with standards or mitigate "bean counting." Knowledge of standards, thoughtful analysis of needs and selected data manipulation are the basis of a good infection control program.

John A. Sellick, Jr., DO
Buffalo, New York

REFERENCES

1. LaHaise S. A comparison of infection control software for use by hospital epidemiologists in meeting the new JCAHO standards. *Infect Control Hosp Epidemiol.* 1990;11:185-190.
2. *App Stats and Graphs.* Tulsa, Okla: StatSoft.
3. Galntz SA. *Primer of Biostatistics: The Program.* Hightstown, NJ: McGraw-Hill Information Services Co.

Sharon LaHaise, RN, PhD, was asked to respond to this letter.

While it is true that functions performed by infection control software could be duplicated by

(continued on page 410)

(continued from page 408)
"standard integrated data-base/spreadsheet/word processing programs," one would have to question the wisdom, in terms of people-hours, amount of user frustration and quality of output, demonstrated by such a decision. Generic data-base/spreadsheet software, which would generate basic rates and graphs, is not designed to accommodate epidemiologic analyses and reporting.

How many infection control practitioners would have the specific knowledge required to customize a standard data-base/spreadsheet program to fit their needs as well as a commercial product already developed and on the market? An infection control department would either have to have access to a computer programmer or have personnel extremely knowledgeable in programming before it could justify the time expended to both program and learn an infection control software system "built" from a generic data-base/spreadsheet program.

In addition, consider the number of applications an ICP would have to master if he or she wanted to perform statistical operations beyond the scope of rate calculation. Why learn a data-base/spreadsheet program and a statistics package (file compatability is an important detail to consider when switching between software applications) when there are infection control software packages available that combine features of both?

In most hospitals today, time is money, and it would seem that an infection control department would be "re-inventing the wheel" if it chose to bypass ready-developed software in favor of starting from scratch and creating its own program. While standard data-base/spreadsheet programs may appear to be more cost-effective, it is important to think of long-term costs, such as people-hours required to set up and run the program, technical support from the software company (that may lack the infection control department's specific expertise) and how well the program will continue to serve the department, long after the department programmer has gone.

Sharon LaHaise, RN, PhD
Pomona, California

Semi-Automated Infection Control Surveillance in a Veterans' Administration Medical Center

To the Editor:

The practice of hospital epidemiology and infection control in the long-term care setting can be greatly facilitated by abbreviated, cost-saving surveillance techniques. Traditional "gold standard" total hospital surveillance has become highly resource-consuming, particularly in the milieu of staffing shortages. Microbiologic-based abbreviated techniques have been demonstrated in the literature is as being effective methods for collecting necessary infection data. We illustrate a new variation of the microbiology laboratory's ongoing role as a critical component of the hospital infection control program, in the chronic as well as the acute care setting.

At our institution, a 600-bed veterans' administration medical center (VAMC) with predominantly long-term care and neuropsychiatric services, microbiologic epidemiology reports are available through the VAMC systemwide decentralized hospital computer program (DHCP). Specifically, urinary tract infections (UTI), methicillin-resistant *Staphylococcus aureus* (MRSA) isolates and bacteremias are tracked by using the "Infection Control Survey" menu of the DHCP laboratory package.

The indications for microbiologic sampling at our VAMC are problem-oriented, based upon symptomatic needs of the patients. To date, there are no culture protocols that would skew the accumulation of line-item culture data. One inherent difficulty with this approach is the generic exclusion of nonbacterial infectious agents. Most of these pathogens are associated with viral upper respiratory and gastrointestinal syndromes. However, specialized extramural reference laboratories are occasionally needed for mycobacteria and other low-prevalence microorganisms.

Although one can elect to directly use individual isolate line-item entries for subsequent rate data calculations, it is more clinically appropriate to couple such line-items with focused chart reviews. In this manner, approved surveillance definitions can be applied to assess whether or not a given isolate represents either true infection or colonization. Furthermore, important supplemental data, such as antibiotic use, can be included, thus enabling ready referral of the data to other committees and/or clinical services.

Any surveillance system must be user-friendly; therefore, automated approaches should be correspondingly accessible to infection control staff with varying degrees of computer experience. The system developed at our VAMC depends upon standard "templates" to which further detail is added. These templates represent the actual reports that are generated from the laboratory system using a few simple commands. Any facility with access to DHCP, or a similar type of total hospital system, can certainly choose to program in additional features, using pharmacy, patient information, etc. data bases.

Figure 1 illustrates a line-itemization of urine culture isolates, by collection date, from a fictitious long-term care ward, with added chart review data. Three major points of epidemiol-