statement made by LaHaise that the readmission causes a loss of data such as service, admission date, etc., indicates the author's lack of understanding of the underlying data-base structure of NOSO-3. In addition, that "no analyses of such important factors. . . can be trusted to be accurate in analyses with NOSO-3" is incorrect.

NOSO-3 3 possesses the ability to help ICPs meet the new Joint Commission on Accreditation of Healthcare Organizations (JCAHO) standards. Focused infection studies, patient outcome information, rates stratified by infection risk and physician-specific rates are integral functions performed with the power of NOSO-3. The choice of which program best satisfies the needs of the hospital infection control program rests with the user.

Stephen Zellner, MD;
Nancy Polley, RN, MS, CIC
Fort Myers, Florida

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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. Reagan DR. The choice of microcomputer software for infection control. *Infect Control Hosp Epidemiol.* 1990;11:178-179.

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

The representatives of Epi-Systematics, Inc. (Ft. Myers, Florida), distributors of NOSO-3, raised seven issues in response to our study comparing software for meeting the new standards required by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO). First, they stated, without citing specific flaws in the design, that our comparison was not done scientifically. Following a specific protocol, we used a large clinical data base of the type needed for JCAHO reports, loaded an identical version of it into both software systems according to the companies' written instructions, consulted the companies frequently, performed the identical analyses repeatedly in both, measured the processing times with an accurate stopwatch and compared the results to an acknowledged statistical software package (SAS, SAS Institute, Inc., Cary, North Carolina) to assess accuracy. The scientific merits of the study stand on their own.

Second, they allege that the timings were incorrect, citing the experience of their own staff and unnamed "users" without numerical data. Without executing the same analyses on the same data base, it would be impossible to make valid comparisons. The only way the speed of NOSO-3 could have compared more favorably is if they were using small data sets used in the past for line listings, but these will not be sufficient to satisfy the new JCAHO standards.

Third, they suggest that there must be a trade-off between speed and analytic power and flexibility. While possibly true for collecting large numbers of variables on infections as we did in the past, it is not true for the types of focused analyses that will be needed for meeting the new JCAHO requirements. For performing epidemiologic analysis of surgeon-specific rates and the like, AICE (ICPA, Inc., Austin, Texas) was both faster and more efficient and flexible.

Fourth, they claimed that NOSO-3 was more efficient, based on their own "loose" definition of "efficiency" as "the ratio of data content per bytes of computer storage." This definition begs the question. Infection control practitioners (ICPs) are unlikely to care about computer science definitions; they want to be able to perform the JCAHO-mandated analyses with the least expenditure of time in data input and analysis, and with complete accuracy.

Fourth, regarding the underlying design models of AICE and NOS-3, they were correct in identifying AICE as a relational data base and NOSO-3 as a hierarchical one, but this distinction misses the point made in our article. We found that NOSO-3 resembled dBASE (Ashton-Tate, Torrance, California), not in its data structure, but in its analytic strategy. NOSO-3, like dBASE, analyzes data by counting one field at a time, storing the counts and then combining them into a rate, all in separate, time-consuming steps. AICE, like SAS and other statistical software, does the entire calculation in one step. This difference accounts for AICE's greater speed of calculating. Besides making NOSO-3 slower, the hierarchical structure also accounts for the computational errors found.

Sixth, they charged that we used their product incorrectly by setting it up with one demographic record per patient. They suggested instead that we should have entered one demographic record per admission. And yet, page A-l of the description of the data base in the NOSO-3 user's manual clearly states, "Only one demographic record is stored per patient." Even if we had violated the manual's instructions, as they suggest, computational errors would still have occurred in almost all analyses because of apparent malfunctions in NOSO-3's mechanism for linking the hierarchical files and on surgical analyses whenever a patient has operations on more than one service, etc., as noted in the article.

Seventh, the speed of operation and data manipulation was a focus of the article because time/cost analysis (the cost associated with personnel hours to accomplish a task) is of primary concern to the effective management and operation of a department. If each analysis is so time consuming or complex, further analytical investigations are discouraged, and productive time is compromised.

All of the claims of superiority by Epi-Systematics, Inc., regarding their product appear to be subjective. As for AICE, data can

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be stored for more than 12 months, and fields can be easily redefined or created by entering codes without thumbing through a manual's appendix. Separate monitoring files can be designed for different objectives, including noninfectious sentinel events, risk analysis and acquired immunodeficiency syndrome (AIDS) registries. The only limitation is the limit of one's mind, imagination and creativity.

Sharon LaHaise, RN, PhD
Pomona, California

To the Editor:

Concerning the editorial "Choice of Microcomputer Software in Infection Control" (1990;11:178-179), I found it interesting and informative. However, it refers to two specific software packages available. I would like to make your readers aware of another software package called BOSS (Bug Oriented Surveillance System, Ardmore, Pennsylvania). This infection control software package is excellent. It most definitely meets the criteria of program speed, user friendliness and accuracy. It is a major asset in helping any hospital meet accreditation standards as set by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) in the area of epidemiology. This program was written by Dr. Maryanne McGuckin, 115 E. Athens Ave., Ardmore, PA 19903.

Mary Lou Kaufman, RN
New Castle, Delaware

To the Editor:

Other software programs currently exist on the market that more than adequately address the new Joint Commission on Accreditation of Healthcare Organizations (JCAHO) standards. I would like to discuss one such program.

In 1987, as the nurse administrator at a 380-bed community hospital in southern New Jersey, I was, and still am, responsible for our hospital's infection control program. At that time, I felt it necessary to either hire an additional full-time employee or computerize the infection control department.

After a thorough analysis, I elected to computerize the department. I, along with our infection control practitioner (ICP), evaluated numerous software programs, and we elected to purchase BOSS (Bug Oriented Surveillance System, Ardmore, Pennsylvania). BOSS was developed by Dr. Maryanne B. McGuckin. This software program is based upon the McGuckin Method of Surveillance, developed by Dr. McGuckin in the late 1970s.

This particular surveillance methodology is based on current reports from antimicrobial susceptibility testing or microbiology isolate reports. Monitoring of specific bacterial species of a particular institution's nursing units is accomplished for a 26-week period. Distribution of the number of organisms isolated during this period is divided into fifths, or quintiles. The threshold for each bacterial species is set between the fourth and fifth quintile.

When the threshold is exceeded, an epidemiologic investigation is conducted to ascertain if the outbreak is nosocomial or community-acquired. McGuckin's BOSS computerized system can accommodate 30 different nursing units. Each nursing unit can list 15 different pieces of microorganism isolate data. The different isolates per unit are tracked daily during this initial 26-week period. After the 26th week of data collection, the computer calculates a threshold for the respective organism and unit. When further data are entered, should the number of positive isolates exceed the established threshold, two asterisks are noted in the last column listing, alerting the user to a potential problem that warrants further investigation. The calculations occur daily when the data are entered. Reports can be generated at any time.

The efficiency of this system is that less than one hour per day is spent entering data, and the review is prospective, not retrospective. Thus, problem identification occurs immediately, and appropriate investigation and intervention can be accomplished. Another key aspect of this system is that the entire inpatient hospital population can be monitored consistently. Thus, all patients who are at risk of developing a nosocomial infection are monitored on a daily basis. This system also is extremely user-friendly. Our ICP, who was not computer literate, learned this system in a very short time.

In the fall of 1990, we will update our BOSS system with McGuckin's SWIR (surgical wound infection report) software system. This additional software tracks all surgeons by name and/or code number. This system classifies all surgeries according to the Centers for Disease Control's (CDC's) four surgical wound classifications. The reports from this system also generate the percentage of surgery for each surgeon by the appropriate wound classification.

In April, 1990, our institution was surveyed by JCAHO. I am happy to report that we received a perfect evaluation on our infection control program. There were no contingencies nor any recommendations. In fact, we were complimented by the JCAHO nurse surveyor on having a "sophisticated infection control program." In her words, 'Your system really does what all good quality assurance systems should do." I know that this excellent review is a direct consequence of being computerized on McGuckin's BOSS and SWIR software systems. However, good reviews from accrediting agencies are not the only important factor. I know that we really are affecting patient care positively and truly preventing nosocomial infections, which is the primary goal of any good infection control program.

Al Rundio, Jr., RN, PhD, CIC
Somers Point, New Jersey