

Microcomputers: Administrative Applications

With hospitals coming under increased regulation that demands increased efficiency, The power of the microcomputer to efficiently handle more information at a constantly decreasing cost makes the idea of purchase for a nuclear medicine department very attractive.

Before buying a microcomputer, knowledge of its capabilities is essential so the best choice of both hardware and software can be made. Making a list of applications that the microcomputer is expected to perform is a good beginning. Most nuclear medicine applications fall under one of three categories: word processing, record-keeping, and generating reports from records.

Word processing is a widely-used, commercially available software application. It is most valuable for typing large documents, since making even major changes, like repositioning paragraphs, is relatively easy. When using a conventional typewriter, changing even just a few words means retyping a whole page. With word processing, however, the typist makes the corrections on the video display and the printer retypes the page. Documents which are typed repeatedly, such as monthly reports or reports of normal patient examinations, can be stored and printed on command. Mailing lists can be entered, stored, and recalled to print envelopes and labels. Merging a mailing list with a letter can produce many letters with the same body but with different inside addresses and salutations. Customized labels for other purposes can be produced quickly and cheaply.

All nuclear medicine departments spend a significant amount of time and effort recording a variety of information. Microcomputers can make record-keeping more efficient by eliminating handwritten material such as patient scan log and by easing access to filed information. With a microcomputer, the information is entered directly into the system where it is stored on disk. The software that performs this function is database management. A database, according to Robert Byers in *Everyman's Database Primer*, is "a collection of information organized and presented to serve a specific purpose." Even in a non-computerized nuclear medicine department, there are existing databases: the patient log book, the films and reports in the file room, the file of interesting cases, etc. In their usual form, these databases are not very manageable. The information is easy to store but difficult to retrieve. Use of a computer database allows easy retrieval in a wide variety of formats. For example, if the name of a study and the inpatient/outpatient status of the tested individual is entered into the computer's scan log database, the computer can automatically count the number of inpatients for any individual study. It takes very little time for the computer to search through 500 scan records at the end of the month, counting the number of scans by category. This allows for quick, accurate monthly statistics. Retrospective questions, such as identifying the number of patients sent for bone scanning over a one-year period with metastatic lesions, would not necessitate a clerk pulling 600 jackets, reading, and analyzing the reports. An hour of manipulations with the microcomputer scan log database would answer the question.

Spreadsheet analysis is another task for which commercial software is available. Statistical and financial reports can be produced in a row and column fashion so comparisons can be made. Columns and rows can be totaled; multiplication, division, subtraction, and addition can be performed. This software is most available in budget preparation and financial planning, basing computer updates on user commands.

Integrated software is the combination of database, spreadsheet, graphics, and word processing. It can take the information from one file and use it in another way. For example, spreadsheet information can be transformed into graphs. Though versatile, integrated software has its weak points. Comparison of database capabilities in integrated software packages versus a commercial software package dedicated to database should be well-evaluated before buying software primarily for database use.

When the software applications have been listed and commercial packages decided upon, the microcomputer's hardware must be evaluated. In the last two years, consumers have been bombarded with advertising. Microcomputer companies have waxed and waned. There are, however, several popular systems that have weathered the test of time and whose manufacturers provide solid support of their products. Not enough can be said about support. If the help is not there for the novice user or if the service for the equipment is not available, the microcomputer cannot be used properly.

The first criterion for hardware decision-making is the ability of the hardware to run the chosen software. Beyond that, and working from the outside in, the parts of the microcomputer can be examined for possible purchase.

The keyboard is the physical link between the user's mind and the software in the computer. Similar to that of the typewriter, the computer keyboard may have additional, special function keys. These keys do the work of several typed commands in one keystroke. When performing budget work with spreadsheets, a separate numeric keypad, similar to a calculator, can make the constant entering of numeric data more efficient.

Another factor in user comfort is the video monitor that displays the software being worked out at the moment. Monitors vary as much as keyboards do, but as nuclear medicine professionals already know, the more pixels in an image matrix, the better the quality of the image on the screen. Comparing both the resolution of the characters generated on the screen and the colors of the phosphors should help with a choice that is pleasing to the eye.

Inside the computer is the central processing unit (CPU) or chip. The more data it can handle at a time, the better. For business microcomputers, the 16-bit processor chip is the current standard, although the future indications point towards increased use of the 32-bit chip. Indeed, some microcomputers approach or even exceed the power found in the minicomputers. Microcomputers with 8-bit chips are still being sold. Because they dominated the market at the beginning, there are excellent software packages available for use. The advantage of the 8-bit microcomputer is cheaper price, but it is slower and usually comes with only 64K memory.

Memory is the place where the operating system is "loaded" to make the computer usable. Memory capacity is measured in kilobytes, with 128K or more standard for business micros. The applications software and the data entered by the user is also stored in the memory. As long as the computer is turned on, what has been placed into the memory can be worked with. The memory is only a temporary storage place; when the computer's power is turned off, the memory is cleared.

When the work done with the software in the memory is completed, it must be transferred to a storage device so that the work can be "saved." The most popular storage device is the 5¼ inch floppy disk. Depending on the hardware, a floppy generally holds from 160K to 1,200K of data. It is most advantageous to purchase a microcomputer system that will allow ample mass storage. For example, if one month's scan log takes up 60K of space on a floppy disk and the hardware allows only 180K of storage per floppy, only three months' worth of data can be stored on one disk. In a microcomputer that allows 1,200K of storage per floppy, 20 months of data can be stored. The advantage to more storage per floppy is easier retrieval. It is much quicker to get an answer to the question, "How many of all patients sent for bone scanning last year had metastatic lesions?" if the past year's data is on one disk instead of four.

Beyond the floppy disk is a hard disk device which can do the work of many floppies. The hard disk Winchester drive has many megabytes of storage, making it a tremendously powerful tool that is beginning to come within an attractive price range.

At some point, the work that is done with the computer will usually need to be transferred to a printer to be made into hard copy on paper. There are two major kinds of printers: the dot matrix and the daisy wheel. Dot matrix printers provide high speed printing and can reproduce graphics. The print quality, however, is not considered good enough for formal correspondence. Printers utilizing the daisy wheel head provide print which is of typewriter quality. The disadvantages of daisy wheel printers is a more expensive price, the inability to produce graphics, and a high noise level. The manufacturers of dot matrix printers have tried to improve the quality of letter character, scrambling to produce quality print at low price. With the proliferation of printers on the market, checking consumers' articles can help make the best choice possible.

Choosing a microcomputer is not an easy task since many factors have to be considered in the decision-making process. One such factor is long-range planning. Use of microcomputers in the total hospital picture should be explored. If several departments have the same hardware and software, it will be easier for those users to help each other with learning and solving the problems encountered. Applications ideas can be shared. Data files can be shared. Local area networking (LAN) allows multi-terminal use of a microcomputer, similar to multi-terminal use on large mainframe computers. In a nuclear medicine department, LAN would allow access to a database by more than one person at one time, thus improving productivity. Departments with only one microcomputer now find themselves scheduling user time. The logical solution to increased demand is either more microcomputers or LAN.

If chosen with care, a microcomputer can be a rewarding instrument to work with. If the time and effort is put forth to learn how to use the instrument properly, the evidence of greater information availability with significant time savings will be overwhelming.

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