AN INTERFACE WITH SAS SOFTWARE AND MUMPS

Dr. H. William Cooley, Veterans Administration
Michelle Gallagher, Veterans Administration

BACKGROUND

DHCP--THE VA AND COMPUTERS

The VA has undergone an historic effort to computerize its 172 hospital system from a manual system (with a few exceptions in some of the major medical centers who are running systems that are ten years or so behind state of the art systems). This effort is called Decentralized Hospital Computer Program, or DHCP. It got its name because some computer oriented personnel began to develop systems on their own in MUMPS. These individuals were able to prevail on a policy level and their beginning programming efforts were used as the basis for a series of application packages that were to be implemented sequentially for a total integrated hospital information system.

HARDWARE AND SOFTWARE FOR AN HIS

The heart of this system is a data base management package written in MUMPS which is called File Manager. The application programs are written in an ANSI standard version of MUMPS, Digital Standard Mumps, and designed to run on Digital 11/44 processors for four classes of hospital. The smaller hospitals are run on a smaller processor, the Digital 11/23. These processors utilized Intersystem Mumps.

LIMITATIONS OF MUMPS FOR CLINICAL MANAGEMENT

MUMPS is an interpretive computer language. The acronym MUMPS stands for Massachusetts General Hospital's Utility Multi-Processing System. The development of MUMPS began in 1967 and in 1977 MUMPS became the fourth computer language to be accepted by the American National Standards Institute (ANSI). MUMPS can now be found running on anything from a microprocessor to a mainframe, and can even be found as an operating system. The strengths of MUMPS include the abilities to handle large dynamic files and manipulate text strings.

Since MUMPS is relatively a new computer language, very few "packages" with the capabilities of statistics, graphics, report generation and higher mathematical functions have been written for it. In the late 1970's a data base management system written in MUMPS, called File Manager, was developed by George Timson of the Veterans Administration. File Manager has since gained widespread acceptance among MUMPS users. File Manager was designed so that non-programmers can set up a data base for their information. It then allows random searching and printing. The statistical functions available are total, mean, standard deviation, minimum, and maximum. The extended mathematical functions are square root and absolute value.

ADVANTAGES OF SAS SOFTWARE

Clinical Management Needs

1. The VA, like its private sector counterparts, is faced with cost containment pressures and has decided to adopt a similar approach to resource allocation. The Diagnostic Related Group, or DRG, has been tied to a weighted workload unit for budgetary purposes. Although there are pass-through and hold-harmless provisions of this system, much of the same type of information that private sector hospitals need is needed by VAMCs.
2. From a clinical management perspective, DRGs can be seen as an opportunity to gain information about physician behavior and patients' clinical characteristics. Since much of the relevant diagnostic and ancillary information can be automated, the DRG in a case mix system can provide invaluable information for both treatment and management. In the difficult area of cost and outcome, physician managers can track a number of relationships.
3. Statistical analysis can be made a part of the ongoing production system of a hospital by providing an interface to SAS and SAS/GRAPH. Frequently for purposes of clinical management, a statistical table, listing or graphic will communicate a point in an area which is of concern to management. Such areas as risk management and quality assurance are amenable to such analysis and presentation. In effect, a clinical decision support system can be structured for each service.
4. The graphics that are most effective from a decision support standpoint are often quite simple. The use of color enhances the effectiveness of such presentations.

The MUMPS/SAS Software Interface

Output from MUMPS File Manager

Because File Manager does not have the capability to output sequential files from its data base, a set of MUMPS routines was written to extract the necessary data. We required information from three interconnected File Manager files. The Patient file contains the demographic data, the Lab file contains ancillary lab service data and the PTF file contains ICD diagnosis, surgery and procedure codes. Many auxiliary files were also used such as the Race file and the DRG file which contains the high and low length of stay trim points and affiliated weights for each DRG.

SAS File Construction

The output from MUMPS File Manager was a simple ASCII sequential file written to a directory under VMS. The only problem was to decide how to represent those occurrences which are multiple in File Manager. An appropriate summary measure has to be selected and output. Once the SAS file is built, then, all of the power of SAS and SAS/GRAPH is available to produce the kind of decentralized clinical and administrative reports shown.