A Managed Care Workstation for Support of Ambulatory Care in Veterans Health Administration Medical Centers

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This paper describes the development of a Managed Care Workstation for implementation in a Department of Veterans Affairs hospital. Each VA hospital information system contains a wealth of information in a comprehensive and well integrated M database, however, a clinician's access to the information is hampered by a lack of usable database tools. The Managed Care Workstation is designed to enhance access to VA databases. The workstation uses M (Mumps) and SQL to present the VA's M hierarchical database as relational tables on the workstation. This work reveals the benefits of using a SQL-M workstation to access data contained in an M based hospital information system and demonstrates how the workstation architecture supports the information model necessary for management of patient care outcomes.

INTRODUCTION

The Veterans Health Administration (VHA) develops, supports, and implements its own software, known as Decentralized Hospital Computer Program (DHCP) at 172 VHA medical centers throughout the nation. DHCP maintains patient and administrative data in a comprehensive, integrated, and well organized data structure. DHCP programs are written in M (formerly known as MUMPS) and are standardized across VHA medical centers, such that core application programs and data dictionary are identical at every VHA medical center.1 Information is normally retrieved from the database by way of DHCP menu options. When a menu option cannot deliver desired information, ad hoc reports can be generated using M tools, such as VA FileMan. In cases where FileMan cannot produce desired information, programmers must write code to generate the required reports.

DHCP menu options are designed for quick retrieval of individual patient records or

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reports centered on ancillary package design (Radiology, Pharmacy, etc.). However, staff interested in managed care and outcomes assessment require information which is based on elements that cross services and hospital functions, populations of patients, or summary information grouped by providers or clinics. Information needs may include patient self reported data as well. For instance, a provider may be interested in assessing causes of variation in outcomes (amputations, infections) for patients who suffer from diabetes. This could involve studying the relationships between a patient's risk factors (smoking, weight, family history), clinic visits, prescriptions, lab test results, and demographics. Since the variation in patient outcomes is of interest, it is necessary to study a group of such patients. Since the particular patient cohort being studied may change based on clinical guidelines or recent findings, methods to access and display information must be modifiable and expeditious. Ideally, the information management tool for managed care data collection and analysis is one that does not interfere with the performance or operation of the existing DHCP system, but provides end users with enhanced access to clinical information, particularly information from data categorized in particular clinical groupings.

The Managed Care Workstation capitalizes on strengths of DHCP, which are: a comprehensive and integrated database; well organized, standardized data dictionary; distributed data processing capabilities of DHCP; and existing network infrastructure. The Managed Care Workstation interfaces with DHCP's database and integrates workstation relational database techniques with the hierarchical DHCP data structure. Instead of viewing data organized around ancillary services such as Radiology, Laboratory and Pharmacy, workstation data is also presented in terms of clinical parameters such as, patient demographics or diagnostic codes which are used for health care outcomes management. Ad hoc reports can be generated by querying the database using standard SQL commands, or Query By Example (QBE) Interface.

METHODS

The Managed Care Workstation consists of a PC connected to the main DHCP system via Ethernet. The prototype workstation is a PC-386 with 8 MB RAM, and 200 MB hard disk drive. PC software includes MS-DOS, Micronetics Mumps (MSM), KB_SQL for MSM (by KB-Systems), and application packages such as VA DHCP, VA Kernel, VA FileMan, and Excel (Microsoft Corp).

In order for the workstation SQL software to recognize the DHCP database and represent the M data structure as SQL tables, a mapping between the two data structures (DHCP globals and workstation tables) had to be accomplished. M global mapping techniques and the MSM Translation Table Facility were used to create software links between the workstation and DHCP system. In general, M global mapping is a mechanism for mapping logical structures (in this case, the workstation SQL tables) onto global arrays (DHCP hierarchical database). M global mapping strategies have been described in detail previously. An automatic mapping routine was used create links between most SQL tables and DHCP globals. Some manual mapping was also accomplished with a KB_SQL utility for data dictionary mapping.

MSM Translation Table Facility is a utility which creates logical links between data