EXTENDING MEDICAL CENTER COMPUTER APPLICATION TO RURAL HEALTH CLINICS

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Abstract
A paper entitled "A COMPUTER DATA BASE FOR CLINICIANS, MANAGERS AND RESEARCHERS," presented during the 1981 SCAMC, described the Salt Lake VA Medical Center computer system. Since that time, two Rural Health Clinics each about 150 miles from Salt Lake City were established by the SL VAMC to reduce traveling distances and improve services for Veterans. Although many existing computer applications were available with no modifications, additional software was needed to support unique needs of the clinics. The Rural Health package of software was designed to gather and store demographic and clinical information on each Veteran, determine the types of services provided, track services over time, monitor services provided by local hospitals and clinical laboratories which are paid for by the VA, determine total clinic costs, etc. These computer applications may be of interest to Medical Centers with separate clinics or outreach programs and individuals or groups in private practice with programs similar to the VA Rural Health Clinics.

Introduction
The Salt Lake VA Medical Center (SL VAMC) has two DEC 11/70 computers with 95 terminals and 25 printers supporting core applications for Admission/Discharge/Transfer (ADT), Pharmacy, Clinical Laboratory, Mental Health and some administrative functions in addition to the Rural Health Clinic applications. The two computers use the Massachusetts General Hospital Utility Multi-Programming System (MUMPS) programming language and operating system. Each Clinic has an intelligent CRT terminal with a built in printer linked to the computer by direct coupled modems and dedicated telephone lines. Transmission is at 1200 baud. The Roosevelt Clinic received equipment and began computer operation on March 24, 1983. The equipment was installed in Richfield on April 1, 1983. This paper will focus on the unique Rural Health Clinic applications and the ways in which they interact with the other core computer applications. As additional computer "packages" of routines have been added to support different core applications, the number of "options" available to users has increased exponentially. In each package there may be several menus of options. To efficiently allow users access primarily to those menus in a particular package, a master menu driver was developed. The menu of options which a user sees on a computer terminal is selected according to information determined by the user security access code. Information on the Rural Health package will be presented by reference to the different menus of options.

Initial Menu

Figure 1 illustrates a CRT terminal display during initial access with a security code for Rural Health applications.

<table>
<thead>
<tr>
<th>INTERSYSTEMS #87</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCESS CODE:</td>
</tr>
<tr>
<td>VERIFY CODE:</td>
</tr>
<tr>
<td>GOOD MORNING DOUG</td>
</tr>
<tr>
<td>RURAL HEALTH</td>
</tr>
<tr>
<td>PATIENT SSN OR NAME (LAST,FIRST):</td>
</tr>
<tr>
<td>RURAL HEALTH OPTION:</td>
</tr>
<tr>
<td>1 PATIENT</td>
</tr>
<tr>
<td>2 GENERAL</td>
</tr>
<tr>
<td>3 LAB</td>
</tr>
</tbody>
</table>

Figure 1. Initial Rural Health Menu

Access and Verify Codes are not echoed on the CRT screen for security purposes. When a patient name or last 4 or 6 digits of a social security number are entered, the computer does a file search to determine if the Veteran has previously received services at the SL VAMC. The efficient soundex search was described in the 1981 SCAMC paper. Options can be entered immediately after the "OPTION:" prompt. A list of available options can be obtained by entering a question mark (?) as in the above illustration. The initial menu in the Rural Health package allows access to the other listed menus.

Patient Menu

Options available on the Patient Menu are shown in Figure 2. Options may be entered either by the appropriate number or by typing a few letters of the option name.

The EDIT option allows editing of patient information. LIST provides demographic information, origin, reason for coming to the Rural Health Clinic, and a history of VAMC and Rural Health visits. The HISTORY PARTS 1, 2 and 3 provide information on the chief complaint, history of

present illness, current medications, family health history and review of systems. These, along with the Physical Exam and Message About Patient option, are described in the 1991 SCAMC paper. The Progress Notes option uses a word processor feature of the computer system to enter and maintain information about the patient in the computer file. The Visit & Log Info option is used to log the veteran into the clinic, post information about the visit and print the 24 hour log of veteran visits and clinic costs.

RURAL HEALTH OPTION: 1 PATIENT
PATIENT OPTION: ?
1 EDIT
2 LIST PATIENT INFO
3 HISTORY PART 1
4 HISTORY PART 2
5 HISTORY PART 3
6 MESSAGE ABOUT PATIENT
7 PHYSICAL EXAM
8 PROGRESS NOTES
9 VISIT & LOG INFO

Figure 2. Patient Menu

Figure 3 provides an example of the information that is entered with the Visit & Log Info option.

PATIENT OPTION: VISIT & LOG INFO
PATIENT SSN OR NAME (LAST, FIRST): YOKUM, HOKUM
NAME SSN BORN AGE
YOKUM, HOKUM LAB RX 1234 SEP 18, 1960 23
YOKUM, HOKUM 123-99-1234 OK? YES//
MOST RECENT VAMC DISCHARGE: 2-10-83
TYPE OF DISCHARGE: ?
ANSWER WITH TYPE OF DISCHARGE NUMBER, OR NAME
CHOOSE FROM:
1 REGULAR
2 OPT-NSC
3 DEATH
4 TRANSFER OUT
5 NON-VETERAN

TYPE OF DISCHARGE: OPT-NSC
MOST RECENT VAMC CLINIC VISIT: 4-12-83
NUMBER OF VISITS PAST YEAR: 2
ON LONG TERM MEDS FROM VA?: Y (YES)
ORIGIN: ?
ANSWER WITH RH PATIENT ORIGIN NUMBER, OR NAME
CHOOSE FROM:
1 SWITCH FROM MD RICHFIELD
2 SWITCH FROM MD ROOSEVELT
3 SWITCH FROM OTHER PRIVATE UTAH MD
4 NO PRIOR MD LAST 5 YEARS

ORIGIN: 3 SWITCH FROM OTHER PRIVATE UTAH MD
REASONS: ?
ANSWER WITH RH REASON FOR COMING NUMBER, OR NAME
CHOOSE FROM:
1 FINANCIAL
2 UNHAPPY WITH LOCAL MD
3 UNABLE TO SEE LOCAL MD
4 MORE CONVENIENT THAN SLC VAMC

REASONS: 4 MORE CONVENIENT THAN SLC VAMC

The above example illustrates how basic information about the veteran is entered into the file. An example of entering the veteran onto the daily log and recording services performed is given in Figure 4.

LOG DATE: T (OCT 15, 1983)
(N)EW, (E)DIT, (P)RINT, (Q)UIT: N/
PATIENT SSN OR NAME (LAST, FIRST): YOKUM, HOKUM//
COMMENTS: REPORTED IN WITH INJURED ANKLE
Select SERVICES: ?
ANSWER WITH CPT CODES NUMBER, OR NAME
DO YOU WANT THE ENTIRE 99-ENTRY CODES LIST? Y (YES)
CHOOSE FROM:
1 NEW PATIENT BRIEF SERVICE 90000
2 NEW PATIENT LIMITED SERVICE 90010
9 ESTABLISHED PATIENT INTERMEDIATE SERVICE 90060
etc.
27 ELECTROCARDIOGRAM 93000

Select SERVICES: 9 ESTABLISHED PATIENT INTERMEDIATE SVC.
Select SERVICES:
ENTER XRAY, LAB, RX, HOSP, DISP,

Select XRAY: ANKLE, RADIOLOGIC EXAMINATION,

FIGURE 3. Patient Menu

Selection of Services, Xray, Lab, local hospital and travel expenses, etc., are all made with the File Manager system. The CPT codes are stored with number, name and CPT code and relative value scale which can be easily converted to a dollar figure for computing expenses. Selections may be made with number, name or CPT code by using the cross-reference feature of the File Manager. Selecting the print option will list the 24 hour log with an expense summary. A sample 24 hour log is shown in Figure 5, and a sample expense summary is available from the GENERAL MENU which will be illustrated later. The monthly expense summary is in the same format as the daily expense summary but with cumulative expense information for the period of the month.

ROOSEVELT 24 HOUR LOG FOR OCT 15, 1983
(PRINTED: OCT 16, 1983)

NAME SEX AGE SSN TIME
1. YOKUM, HOKUM M 22 123-99-1234 7:59AM
COMMENTS: REPORTED IN WITH INJURED ANKLE
ESTABLISHED PATIENT INTERMEDIATE SERVICE
XRAY: RADIOLOGIC EXAMINATION, ANKLE, AP & LAT
XRAY COST: 25.00/

Figure 4. Log & Service Info

Figure 5. 24 Hour Log
ROOSEVELT SUMMARY FOR OCT 15, 1983
(PRINTED: OCT 16, 1983)

PATIENT STATUS
SERVICE CONNECTED 50% TO 100% 1
SERVICE CONNECTED 0% TO 49% 3
etc.
TOTAL PATIENTS 17

ORIGINS
SWITCH FROM OTHER PRIVATE UTAH MD 1
SWITCH FROM TRAVEL TO SLC VAMC 14

REASONS
FINANCIAL 7
etc.

SERVICES
ESTABLISHED PATIENT BRIEF SERVICE 6
etc.

DISPOSITIONS
etc.

CLINIC COSTS
TOTAL RX COSTS 12.50
TOTAL LABORATORY COSTS 12.50
TOTAL XRAY COSTS 70.50
TOTAL HOSPITAL COSTS 110.50
TOTAL BENE TRAVEL COSTS 125.50
TOTAL CLINIC COSTS $331.50

Figure 6. Service and Expense Summary

The Rural Health General option allows clinic personnel access to administrative functions and information and input into the SL VAMC computer system to obtain information on patients, bed availability, etc. The Rural Health General Menu is illustrated in Figure 7.

RURAL HEALTH OPTION: 2 GENERAL

GENERAL OPTION: ?
1 SECURITY 2 GENERAL MENU
3 MAS FUNCTIONS 4 MONTHLY SUMMARY
5 TEXT NOT FOR PATIENTS 6 TIME & DATE
7 PRACTICE DRUG SELECTION 8 PRACTICE MED INSTRUCTIONS
9 SYSTEM STATUS

Figure 7. Rural Health General Menu

Space limitations do not allow a complete explanation of all the functions on the Rural Health General Menu. Briefly, SECURITY allows individuals to change their access and verify codes and access to all entitled functions. GENERAL MENU allows access to the SL VAMC General Menu. MAS FUNCTIONS includes access to the ADT package. MONTHLY SUMMARY is used for a printout of monthly Rural Health Clinic services and costs. TEXT provides a word processor function for any desired text which is not related to patients or will not be placed in patient files. PRACTICE DRUG SELECTION AND MED INSTRUCTIONS assists in becoming proficient in using the pharmacy package. SYSTEM STATUS provides information about the status of the DEC 11/70.

Personnel in the Rural Health Clinics depend on local hospitals/laboratories for current lab information. At times there is a need to compare lab results with results during the last hospitalization or clinic visit to the SL VAMC. Also to provide information in the event the veteran is first seen in the Rural Health Clinic and then admitted to the SL VAMC, it is desirable to have local lab results entered into the SL VAMC Computer System. The Rural Health LAB option provides these capabilities. A listing of the LAB options is shown in Figure 8.

Figure 8. Rural Health Lab Menu

Sample Lab Reports are shown in the 1981 SCAMC paper.

The Rural Health package of the SL VAMC computer system has greatly enhanced communication concerning veterans receiving care in the Rural Health Clinics. Approximately 1032 Veterans were seen in the two clinics during the first three months of operation. The major impacts of the computer have been immediate access to patient information without having to wait for the "paper" medical record and immediate transfer of medication information for prescriptions to be filled at the SL VAMC pharmacy. The Rural Health Clinics with the computer support have increased the efficiency of providing services to veterans living considerable distances from the Salt Lake City metropolitan area.

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