AUTOMATIC CASEFINDING OF CANCER INTEGRATION of DATABASES in the VA DHCP AUTOMATED TUMOR REGISTRY

Susan Richie
Department of Veterans Affairs
Washington Information Systems Center
8304 Colesville Road Suite 200
Silver Spring, Md 20910
301-427-3700

ABSTRACT

CASEFINDING is the systematic method of locating all eligible cases of cancer that should be included in the Cancer Registry. Historically manual casefinding required many hours to locate and track cases for accession into the Registry. Automating this function, enables the Cancer Data Manager to access a wealth of information at its storage source. The advantage of electronically searching and capturing this data over the manual method is in greater identification of cases, and a more efficient registry. The Automatic Casefinding feature of Oncology Version 2 is an example of the power of the VA DHCP (Decentralized Hospital Computer Program) software, using MUMPS and the VA File Manager, and strict standards for package verification. This option accesses and advantages the fully integrated system: by going into the Radiology, Anatomic Pathology, Patient Treatment files, extracting the case specific data, and creating an Oncology Patient record when appropriate.

INTRODUCTION

Casefinding must include all inpatients and outpatients who meet the eligibility criteria. Completeness of casefinding is an important and fundamental component of an effective registry. Multiple sources must be used to identify eligible cases:

- **Medical Records Department**
- **Disease Index**
- **Pathology Department**
- **Cytology Laboratory**
- **Oncology-related ambulatory facilities that are part of the institution such as a radiation oncology unit.**

It is important to remember that casefinding procedures will also identify cases already entered into registry. These readmissions constitute follow-up for an existing cancer or primary site: referred to as a primary, or a new primary for that patient, and should be dealt with appropriately. After careful examination of the underlying data, a follow-up should be posted, or a

new primary accessioned for that patient: a case of multiple primaries. In contrast to a stand-alone PC system, the DHCP software offers a fully integrated Hospital Information system which allows the automation of this casefinding process, thus saving many hours of manual labor, and increasing the amount of eligible cases found. Prior to automatic casefinding in DHCP Oncology Version 2, the VA Tumor registrars had to request printouts from Radiology, Anatomic Pathology, and Medical Administration discharges. They would search though looking for abnormal xrays, SNOMED codes indicating malignancy, and ICD9 (International Classification of Diseases 9th Edition) discharge diagnoses indicative of cancer. This took many hours to review these documents and many cases were missed. With all this data already within the DHCP database, this developer automated the process by developing programs to search the Radiology, Anatomic Pathology, and the Patient Treatment files and subsequently create an "Oncology Patient". Guidelines are set according to the ACOS (American College of Surgeons), modifiable by the user in the site-parameters file.

A SUSPENSE SYSTEM is a file or a list of cases that have been identified but have not yet been accessioned into the registry as a bonafide case. After identifying cases that must be entered into the registry, they must become part of the suspense system. It has particular merit because casefinding methods overlap areas and a case may be identified more than once. The suspense system allows information from multiple sources to be merged. Using Mumps and the VA File Manager make automation of this process very simple: no extra files need be used, and merging is automatic with each search, resulting in records being formed only once. Now the Tumor Registrar selects a casefinding option, defines the parameters, schedules the task, and the Oncology patient file is populated with all eligible suspense cases and a list printed - with just a few keystrokes! The resulting list also gives the status for patients with multiple primaries.

METHODS

The casefinding options for Radiology, Anatomic Pathology, and the Patient Treatment File, all allow the user to specify the date time frame for the search. Each file has a date cross reference: for Radiological exam, Laboratory test, or date of discharge. Each department or file searched has its own search criteria - some of which can be modified by the user though the site parameters file. For instance, Basal Cell carcinomas are not required by the ACOS to go in the registry, but some VA's do want to include them. With the aging veteran population moving to the "sunbelt", basal cell carcinomas are on the increase, and most facilities, although they may not register them, do want to be aware of them, or even follow them. It is felt that these too will soon be required in the registry. The Registrar can specify in the Site Parameters file, whether or not Basal Cell Carcinomas will be or not be picked up.

The user dialog and result for Laboratory casefinding is shown below:

```
********** AUTOMATIC CASEFINDING **********

     This option will allow you to search the Lab Files
     and build a 'suspense list' within the Oncology Patient File,
     and print a Suspense list on the selected device.


  Select one of the following:

       1         All Anatomic Path Labs
       2         Particular Lab Division

        Select Search Option: 1//   All Anatomic Path Labs

  Do you wish to include Basal Cells? N// Yes - Include Basal Cells

          Setting up a task to Search Anatomic Pathology
          for Surgical Pathology, Cytopathology, Electron
          Microscopy (when present) - in the event there are
          two/more tests the earliest date will be selected.
          (This search does not include AUTOPSY section).

    Include 'suspicious for malignancy cases' (Cytopathology)? Yes//

  Start with Date TODAY// SEPT 1,1991  (SEP 01, 1991)
  Go to Date TODAY// NOV  8, 1992

  Setting up a task to search Lab files, FIND Oncology Patients.
-------------------------------------------------------------------------------
  CASE FINDING              ANYWHERE VAMC                          11/08/92
  Patient Name   PtID#  Lab Test    Organ/Tissue   CODE-Morphology (SNOMED)
-------------------------------------------------------------------------------
      SOURCE: CYTOPATHOLOGY
  DOBBIN,GLENN   D5726  02/25/92-CY JAW            80703-CARCINOMA, SQ CEL
  MALLE,MICHAEL  M4594  02/28/92-CY BRONCHIAL CYT  81413-SMALL CELL CARCIN

                        Last Contact: 09/17/91
   Acc/Seq#    Primary Site       Last Tumor Status  Date DX   Abst Status
   88-0034/00  LUNG                Evidence of CA    03/01/88  Complete

      SOURCE: SURGICAL PATHOLOGY
  HOILMAN,FRANK  H9677  09/03/91-SP LUNG           80703-CARCINOMA, SQ CEL
  GRINDSTAFF,J   G5474  09/12/91-SP SKIN           81403-ADENOCARCINOMA

                        10 Cases found
                         2 New Patients added
                         3 New cases added
```

For each date the data is examined, and if it meets the criteria:
All cases in Radiology that have the diagnosis code "suspicious for malignancy", all Anatomic Pathology cases having SNOMED codes falling between 80001 and 99906, with the possible exception of Basal Cells, and all ICD9 discharge diagnoses indicative or suspicious of cancer, are built into a temporary global along with important relevant information. This global is then reviewed and compared to existing cases, and new qualifying entries are entered into the Oncology patient file with a suspense status. This process is described below in more detail.

The programs $Order through each date cross-reference, then for each date found within the date time period specified, examine in depth, the data in the corresponding records. In some cases, such as the Laboratory package, this means navigating down a serious of multiples to get to the relevant data. The following criteria are used for selection of cases:

- **RADIOLOGY** - Diagnosis code: **Suspicious for Malignancy**
  Requires Follow-up

- **ANATOMIC PATHOLOGY:**
  Surgical Pathology
  Cytopathology
  Electron Microscopy
  Autopsy
  SNOMED codes from: 8*X,**
  9*X**
  X=1,2,3,6,9
  with an option to include suspicious for Cytology and programmedinclusion/elimination of basal cell carcinoma

- **PATIENT TREATMENT FILE:**
Since there can be up to ten ICD9 discharge diagnoses, a prioritized search is made in order of importance according to the type of malignancy involved as follows:

140-195.8
Primary malignant neoplasms according to the point of origin.

200-208.9
Primary malignant neoplasms of lymphatic or hemopoetic tissue

230-234 Carcinoma in Situ

196-199.1 Secondary malignancies; metastasis beyond sie of origin

259.2,273.2-273.3,289.8,042.2
Miscellaneous and HIV V-Codes:

10.0-9,58.0-1,67.1-2,76
Procedure codes NOT including

209-229.9 Benign Tumors

All programs follow the same algorithm for adding new patients to the into the Suspense system, or putting existing patients into a suspense status. The temporary global is searched and for each patient found, a lookup is done in the Oncology Patient file: if the person is not found, and entry is automatically made and the suspense node created, containing the date of the test or procedure the SNOMED morphology, or radiological procedure, or the ICD9 discharge diagnosis. If the patient already exists in the Oncology Patient file an examination of the Primary file is made to look at the patient's other primaries. Two fields are then looked at: the

date of diagnosis, and the suspense date previously used to identify the patient. If either of these dates match the test (suspense) date, it is assumed that this is a duplicate case, and no entry is made. If however, the new suspense date is different than the ones present, the assumption is made that is possibly a new primary, or a recurrence and the Oncology patient is put into suspense by setting the suspense node and setting the fields with the associated information.It was felt by the Tumor Registrars that it was better to delete a suspense case, rather than to miss multiple primaries. list of all cases put into suspense is printed with the relevant data, and in the cases of multiple primaries, information on their current status.

```
******** RADIOLOGY: SUSPICIOUS MALIGNANCY SEARCH ********
-------------------------------------------------------------------------
RADIOLOGY CASEFINDING          ANYWHERE VAMC                    11/08/92
Patient Name                      PtID#    Exam Date            Procedure
-------------------------------------------------------------------------
NVETERAN,JOHN Q                   N9011    07/28/92  COLON BARIUM ENEMA
TVETERAN,JOHN Q                   T9264    08/17/92  CHEST INCLUDE FLUORO
GVETERAN,JANE Q                   G3781    08/18/92  CT PELVIS W/CONT
PVETERAN,JOHN Q                   P5008    09/16/92  UPPER GI + SMALL BOWEL

            Last Contact: 01/06/92
Acc/Seq#    Primary Site          Last Tumor Status  Date DX   Abst Status
89-0124/02  PROSTATE                 Unknown         05/03/89  Complete

VETERAN,JOHN Q                    A7998    11/05/92  CHEST SINGLE VIEW

                RADIOLOGY CASEFINDING RESULTS
                6 Cases found
                4 New Patients added
                5 New cases added
```

The cross-reference on the Suspense Date field, and the source of the suspense entry: Radiology, Anatomic Pathology or PTF, allows for several Suspense lists to be generated upon request. One generated in terminal digit form constitutes a pull list" for the file-room. Once the charts are reviewed, and the Tumor registrar decides to accession the case into the primary file, data from the suspense node is carried over for input into the new primary record: the suspense date is brought over as a default for the date of diagnosis, and into its own field, in case the date of diagnose is changes; the morphology code is carried over as a default for the Histology field for the tumor. The suspense node is then deleted, and the patient is no longer in suspense.

DISSCUSSION and FUTURE DIRECTION

There are other areas that can be searched such a CPT codes for outpatients. Pharmacy for chemotherapy drugs, lab for chemistry tests indicative or suspicious of cancer such as PSA (Prostatic Specific Antigen) for prostate, CEA (Carcinoembryonic Antigen) for-colon or breast- more of these are being used everyday. In time it would be better to have the individual packages create MUMPS cross references, which when pre-defined conditions are met, would call the Oncology program to create an Oncology entry whenever a case found that meets the criteria for the registry. As the use of the DCHP Oncology Package grows this would be the direction we should pursue. The CASEFINDING feature described here is only possible with an integrated hospital information system, and should mark the beginning of many more extensions into the DHCP database for the Cancer Registry. The next step would be integration with the Records Tracking package which is trivial, but once again would save the user double entry: the patients now in suspense should automatically be entered into a request for the medical record.

Once a case is defined in the registry, all the relevant data for that case should be transferred electronically from its place of origin to become a permanent part ofthe cancer database. Having the Tumor Registrar re-input data that is already in DHCP is a waste of time when we have this integrated system.

The Automatic Casefinding feature introduced in the DHCP Oncology V2 is unique and innovative. It saves the Tumor Registrar many frustrating hours of paper chasing, and combing lists of data. It would be interesting to calculate how many FTEE hours it is worth per facility and the dollar amount of savings to the VA - not to mention more successful identification of registry cases, and greater accuracy of data input. The Cancer Registry data, for the most part, cannot be computed from other files, as it is needed for long term statistical analysis and survival studies, research, cancer management and planning. The more integrated the Cancer Registry can become with the other VA DHCP packages, the better and more useful the VA CANCER databases will become. This can, and should happen with the VA Decentralized Computer Program.

References:

1) Richie SR: Automatic TNM Staging of Cancer Using the VA-DHCP Oncology V2 Tumor Registry, MUMPS Computing Annual Proceedings 1993

2) Richie SR: Automated Tumor Registry for Oncology - A VA DHCP Mumps Application, SCAMC Proc. 1992

3) Richie SR: Hands on Demonstration of the VA-DHCP Automated Tumor Registry for Oncology, SCAMC Proc 1992

4) Richie SR: DHCP - Oncology Tumor Registry V2, MUMPS Computing 1992 Annual Proceedings

5) Richie SR, Marciniak T: File Manager and Statistics, MUG Quarterly June 1991

Attachment #3

AUTOMATIC STAGING makes statistical analyisis such as this more accurate and uniform amoung facitlies using the VA-DHCP Package. This table was produced using the cross-tab routines in the package. The Rows, Selected Sites, represents a computed field taking which selects out important sites, and groups all remaining sites as 'other'. The stage groups is also computed, combining IIA and IIb etc into II.

ALL ANALYTIC CASES 1981 - 1991 BIRMINGHAM VAMC

SELECTED SITES:	0	I	II	III	Total
BLADDER	8	47	12	11	164
COLON	18	58	40	50	254
LEUK	0	0	0	0	42
LUNG,NSC	3	206	38	426	1614
LUNG,SC	0	12	2	46	146
LYMPH-H	0	4	5	3	21
LYMPH-NH	0	9	3	10	85
MELANOMA	13	19	6	4	76
ORAL CAV	4	20	20	11	147
OTHER	58	277	158	170	2023
PROSTATE	8	84	87	50	577
Total	112	736	371	781	5149

STAGE GROUPING-AJCC

SELECTED SITES:	IV	Unk/Uns	?	Total
BLADDER	14	35	37	164
COLON	64	13	11	254
LEUK	4	21	17	42
LUNG,NSC	185	338	418	1614
LUNG,SC	34	23	29	146
LYMPH-H	1	2	6	21
LYMPH-NH	13	27	23	85
MELANOMA	5	26	3	76
ORAL CAV	21	71	0	147
OTHER	296	852	212	2023
PROSTATE	105	126	117	577
Total	742	1534	873	5149