



# Mapper Plus

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Sanjeev Baral, Northrop Grumman contractor  
Wendy Scharber, Northrop Grumman contractor  
Sandy Thames, CDC

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# Introduction

- Originally developed as a prototype tool for processing HL7 v2.3.1 messages from LabCorp as part of ePath pilot project.
- Now added to the Registry Plus family of products.
- Free.
- Several states are evaluating and some have started using it in production.

# Features

- Message Mapping to NAACCR Data Elements
- Filtering
- Manual Review
- Histology Coding
- PHIN-MS Integration
- Multiple Database Support

# Message Mapping

- Parses HL7 messages and maps to NAACCR data elements to create partial abstracts during import.
- Parsed HL7 messages are stored in a set of relational tables.
- Partial abstracts are stored in a separate table.
- Translates data values from the HL7 standard to the NAACCR standard: dates, race, marital status, vital status and sex codes are currently translated.
- Partially created abstracts can be completed manually and exported in the NAACCR format.

# Filtering

- Mapper Plus offers 3 filtering options to write to the database during import
  - write only reportable cases, or
  - write all reports, mark non-reportables, or
  - write all reports, skip terms search
- Reportability is determined by doing a term search in the text (OBX-5) of reports.
  - a search terms table is provided but can be modified locally based on the local experience

# Filtering (Contd.)

- Specificity of search function for reportability is improved by the use of negation finder based on the NegEx algorithm.
  - “no evidence of melanoma” vs. “melanoma”
  - based on prenegation (“no evidence of”) and postnegation (“was ruled out”) tables - customizable by states locally.

# Search Terms Table

TermNumber	SearchTerm
1	ABDOMINAL PERINEAL RESECTION
2	ACIDOPHIL CARCINOMA
3	ACIDOPHIL-BASOPHIL CARCINOMA
4	ACINAR CARCINOMA
5	ACINAR CELL CARCINOMA
6	ACINIC CELL TUMOR
7	ACOUSTIC NEURILEMOMA
8	ACOUSTIC NEURINOMA
9	ACOUSTIC NEUROMA
10	ACOUSTIC SCHWANNOMA
11	ACUTE DIFFERENTIATED PROGRESSIVE HISTIOCYTOSIS
12	ACUTE ERYTHREMIA
13	ACUTE ERYTHREMIC MYELOSIS
14	ACUTE GRANULOCYTIC LEUKEMIA
15	ACUTE INFANTILE RETICULOENDOTHELIOSIS
16	ACUTE LEUKEMIA
17	ACUTE LYMPHATIC LEUKEMIA
18	ACUTE LYMPHOBLASTIC LEUKEMIA
19	ACUTE LYMPHOCYTIC LEUKEMIA
20	ACUTE LYMPHOID LEUKEMIA
21	ACUTE MEGAKARYOBLASTIC LEUKEMIA
22	ACUTE MONOBLASTIC LEUKEMIA
23	ACUTE MONOCYTIC LEUKEMIA
24	ACUTE MYELOBLASTIC LEUKEMIA
25	ACUTE MYELOCYTIC LEUKEMIA
26	ACUTE MYELOFIBROSIS
27	ACUTE MYELOGENOUS LEUKEMIA
28	ACUTE MYELOID LEUKEMIA
29	ACUTE MYELOMONOCYTIC LEUKEMIA
30	ACUTE MYELOSIS
31	ACUTE PANMYELOSIS
32	ACUTE PROGRESSIVE HISTIOCYTOSIS
33	ACUTE PROMYELOCYTIC LEUKEMIA
34	ACUTE RETICULOSIS
35	ACUTE UNDIFFERENTIATED LEUKEMIA
36	ADAMANTINOMA
37	ADENO BRONCHIOLAR LEUKEMIA
38	ADAMANTINOMA TIBIA
39	ADENO CYSTIC CARCINOMA
40	ADENOACANTHOMA
41	ADENOCA
42	ADENOCARCINOID
43	ADENOCARCINOID TUMOR

# Negation Tables

5	declined
6	declines
7	denied
8	denies
9	denying
210	did rule her out
215	did rule her out against
213	did rule her out for
209	did rule him out
214	did rule him out against
212	did rule him out for
206	did rule out
208	did rule out against
207	did rule out for
211	did rule the patient out
217	did rule the patient out against
216	did rule the patient out for
10	evaluate for
251	evolving
264	excludes a
265	excludes an

Prenegation table  
(customizable by state)

3	was ruled out
4	is ruled out
5	are ruled out
6	have been ruled out
7	has been ruled out
8	were ruled out
9	are not seen
10	are not identified
11	are not noted
12	is not seen
13	is not identified
14	is not observed
15	cannot be ruled out
16	is not present
17	are not present

Postnegation table  
(customizable by state)



# Histology Coding

- Tries to find the best histology code by reading the texts of path reports.
- Allows users to override auto-coded histologies during manual review.
- Histology coding is based on a table of terms that is separate from the table used for filtering.
- A histo-pairs table is used to determine the best code if multiple histologies are found in the report.
- Histology terms table can be customized locally.

# Histology Codes Table

SEARCHTERM	HISTOLOGY	HISTOLOGYHIERARCHY
ABDOMINAL PERINEAL RESECTION		
ACIDOPHIL ADENOMA	8280/0	1
ACIDOPHIL CARCINOMA	8280/3	1
ACIDOPHIL-BASOPHIL CARCINOMA	8281/3	1
ACINAR CARCINOMA	8550/3	1
ACINAR CELL CARCINOMA	8550/3	1
ACINIC CELL TUMOR	8550/1	1
ACOUSTIC NEURILEMOMA	9560/0	1
ACOUSTIC NEURINOMA	9560/0	1
ACOUSTIC NEUROMA	9560/0	1
ACOUSTIC SCHWANNOMA	9560/0	1
ACUTE DIFFERENTIATED PROGRESSIVE H	9754/3	1
ACUTE ERYTHREMIA	9840/3	1
ACUTE ERYTHREMIC MYELOSIS	9840/3	1
ACUTE GRANULOCYTIC LEUKEMIA	9861/3	1
ACUTE INFANTILE RETICULOENDOTHELIO:		
ACUTE LEUKEMIA	9801/3	1
ACUTE LYMPHATIC LEUKEMIA	9835/3	1
ACUTE LYMPHOBLASTIC LEUKEMIA	9835/3	1
ACUTE LYMPHOCYTIC LEUKEMIA	9835/3	1
ACUTE LYMPHOID LEUKEMIA	9835/3	1
ACUTE MEGAKARYOBLASTIC LEUKEMIA	9910/3	1
ACUTE MONOBLASTIC LEUKEMIA	9891/3	1
ACUTE MONOCYTIC LEUKEMIA	9891/3	1
ACUTE MYELOBLASTIC LEUKEMIA	9872/3	1

# Histo-pairs Table

HISTO_PAIRS_LOW	HISTO_PAIRS_HIGH	HISTO_PAIRS_PREFERRED
8000	8000	8000
8000	8001	8001
8000	8002	8002
8000	8003	8003
8000	8004	8004
8000	8005	8005
8000	8010	8010
8000	8011	8011
8000	8012	8012
8000	8013	8013
8000	8014	8014
8000	8015	8015
8000	8020	8020
8000	8021	8021
8000	8022	8022
8000	8030	8030
8000	8031	8031
8000	8032	8032
8000	8033	8033
8000	8034	8034
8000	8035	8035
8000	8041	8041
8000	8042	8042
8000	8043	8043
8000	8044	8044

# Manual Review

- Presents path reports and corresponding partial abstracts created during import for manual review.
- Allows reportability of a path report to be changed.
- Allows auto-coded histology codes to be changed.
- Allows translated code values to be changed.
- Allows additional data items in partial abstracts to be coded to create complete abstracts.

# Manual Review – Workbench Screen

The screenshot displays the Mapper Plus [Workbench] application window. The interface is divided into several sections:

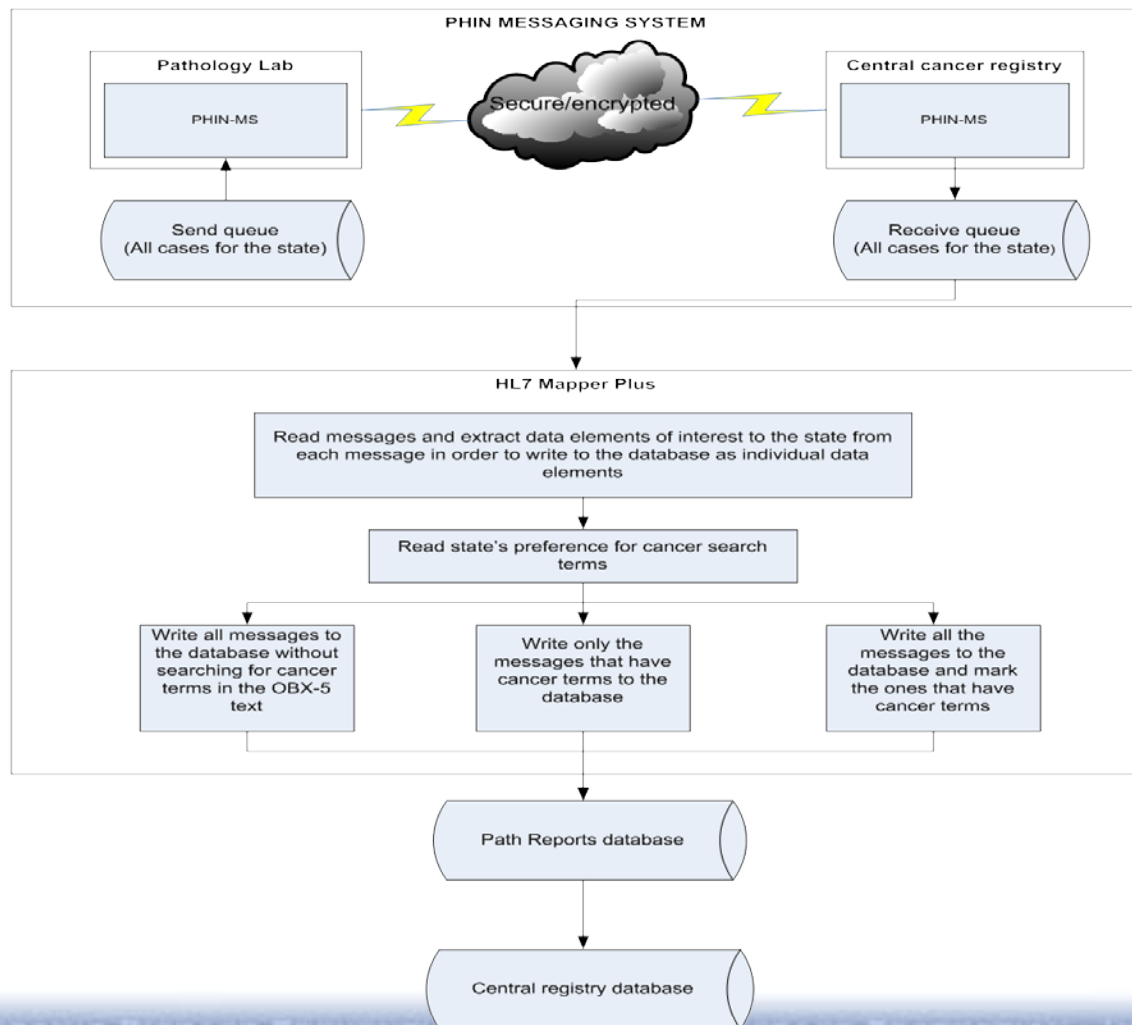
- Top Menu Bar:** File, Administration, Help.
- Toolbar:** Import batch, Open batch, Export abstracts, PHINMS-Queue, Back, Next, Non-reportable, Done Coding, Consult, Raw Data.
- Path Report Section (Left):** Path Report No: 06:50010044-MH, Sex: F, Spec Date: 06/01/2006, Status: Review. It contains sections for MSH SEGMENT, Pathology Final Diagnosis (Cellular bone marrow with relative left-shifted erythroid hyperplasia and subtle dysmyelopoiesis...), Pathology Text Diagnosis (M-99803^^L, C42.1^^L), Pathology Clinical History (Evaluate for myelodysplastic syndromes; CBC attached), Pathology Nature of Specimen (Bone marrow), Pathology Gross Pathology (Received in formalin are multiple portions...), Pathology Micro Pathology, and Pathology Comment Section (f this sample may represent a low-grade myelodysplasia, "REFRACTORY ANEMIA").
- Abstract Editor Section (Right):** Abstract 1, DATA TO BE CODED (Primary Site, Behavior Code ICD-O-3, Histologic Type ICD-O-3, Laterality, Grade, Date Of Diagnosis), DEMOGRAPHICS (Social Security Number, Name--Last, Name--First, Name--Middle, Name--Alias, Sex, Birth Date, Marital Status at DX, Race 1, Vital Status, Address fields, Telephone, Physician--Managing, Medical Record Number, NAACCP Record Version), and TEXT FIELDS.

Annotations on the screenshot include:

- A red circle around the 'Back', 'Next', 'Non-reportable', 'Done Coding', 'Consult', and 'Raw Data' buttons in the toolbar.
- A red circle around the 'Save', 'Delete', 'Add Abstract', 'Note', and 'Print' buttons in the toolbar.
- A callout box pointing to the 'Non-reportable' button with the text: "These buttons apply to the path report".
- A callout box pointing to the 'Save', 'Delete', 'Add Abstract', 'Note', and 'Print' buttons with the text: "These buttons apply to the abstract".
- A callout box pointing to the vertical splitter between the path report and abstract editor with the text: "Splitter to view more of path report".

- Path report shows on the left and abstract shows on the right
- Notice that cancer terms are marked up in the report - negated terms are in blue and non-negated terms are in red for easy identification.
- Negex algorithm is used to find negated terms.

# Integration with PHIN-MS



- This diagram shows flow of messages from a path lab to a CCR through PHINMS
- If you receive HL7 files some other way (without using PHIN-MS) you can also import files manually
- Note the three options available for writing reports to the database

# Multiple Database Support

- MS Access
- MS SQL Server
- Oracle

# Future Plans

- Refine histology coding: improve the search table for histology coding by expanding the lexicon.
- Add the capability to receive and store synoptic path reports through HL7 2.5 format support.
- Identify duplicate pathology report submissions.
- Modify auto-coding to give priority to an addendum histology.
- Add miscellaneous functionality to improve the usability of the application.





# Further Information



Sanjeev Baral - [sbaral@cdc.gov](mailto:sbaral@cdc.gov)

Wendy Scharber - [wks\\_ctr@yahoo.com](mailto:wks_ctr@yahoo.com)

Sandy Thames - [sthames@cdc.gov](mailto:sthames@cdc.gov)

Registry Plus site: <http://www.cdc.gov/Cancer/npcr/tools/registryplus/>

*The findings and conclusions in this presentation are those of the author(s) and do not necessarily represent the official position of the Centers for Disease Control and Prevention*

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