

How Bridging the Gap Between VB6 and .NET Provides Efficiency for Automated Tumor Linkage Procedures in Registry Plus Central Registry Database Software

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Project Overview

- Background
- Automated Tumor Linkage Process
- Initial Deployment
- Transition to .NET
- Future Plans

Background

- ❑ Limited Automation for Tumor Linkage
- ❑ Registry Automation Needs Increasing Rapidly
- ❑ Records Sent for Manual Review

Initial Deployment

- ❑ External Program programmed in .NET
- ❑ Not optimal; allowed for partial automation and testing
- ❑ Abstracts needed to be processed in VB6 for Consolidation

Automated Tumor Linkage Process

- ❑ Abstract links to a patient and runs through the automated tumor linkage process
- ❑ Based on SEER's 2007 "Multiple Primary and Histology Coding Rules"
- ❑ Utilized Existing Table Structure to Draft Logic
 - ❑ Added tables to define logic

Rule Sets

Breast

Colon

Lung

Melanoma

Prostate

Rectosigmoid

Rectum

*Remaining rule sets will be added in the future

Exceptions

Name	Histology	Site	Behavior
Leukemia_Lymphoma	9590-9992		
Kaposi Sarcoma	9140		
Breast (Paget Disease)	8530,8540,8541,8543	C500-C509	
Unknown Primary		C809	
Non Reportable Squamous Intraepithelial Neoplasia	8077	C210- C211,C51, C529,C53	2
Non Melanoma Skin	8000-8005,8010-8046, 8050-8084,8090-8110	C44	
Non Reportable Cervix	8010,8070	C53	2

Site and Histology Pairs

- ❑ NAACCR Site and Histology Pair Tables
 - ❑ NAACCR Tumor Linkage Workgroup reviewed pair tables used in several Central Registries for consensus
 - ❑ Developed to provide guidance for tumor linkage
 - ❑ <http://www.naacr.org/StandardsandRegistryOperations/ATLGDocs.aspx>

NAACCR Site Pair Table

Agreement Code Definitions

- Pairs that correspond to written SEER rules for same site
- Pairs that are a reasonable extension of the SEER rules
- Pairs that experience has shown are likely same but may be handled differently by registries
- Pairs that require special handling

Registry Plus Site Pairs

- ❑ Utilizes NAACCR Site Pair Table
- ❑ Assigned Match Strength 4 to indicate pair of codes often representing same tumor

ID	KEY	SITE_PAIR_LOW	SITE_PAIR_HIGH	IngLRRID	MatchStreng
889	C199C199	C199	C199	30	1
890	C199C209	C199	C209		4
891	C199C260	C199	C260		4
892	C199C268	C199	C268		4
893	C199C269	C199	C269		4

Programmed Rules

❑ **Comparing Sites with Linkage Rules**

IA with a site that does not have programmed linkage rules is compared to a DBT having a site with programmed logic - automated decision

❑ **Sites Without Programmed Rules**

If none of the sites being compared have programmed rules - manual review required

Rule Set Timing Tables

- ❑ Based on SEER Timing Interval Rules
- ❑ Developed Rule Sets Associated with DX Timing Rule and Behavior Timing Rule
- ❑ If Behavior differs, time interval between DxDates and sequence of occurrence reviewed

Timing/Interval Rule

- ❑ Ranging from 60 Days to Five Years
- ❑ Intervals Expressed as Days

Timing Rule ID	Days	Comment
1	60	60 days
2	182	6 months
3	365	1 year
4	1095	3 years
5	1825	5 years

- ❑ Ex. SEER Colon MP/H Timing Rule
 - ❑ **Rule M5** Tumors diagnosed **more than one (1) year** apart are multiple primaries.

General Description

- ❑ Linkage Rule Tables by Rule Set
- ❑ Values of Selected Data Items Compared
 - ❑ Primary Site
 - ❑ Laterality
 - ❑ Histology
 - ❑ Behavior
 - ❑ Diagnosis Date
 - ❑ Reporting Facility

General Description

❑ Code Designations

COMPARISON CODE	DEFINITION
1	Same
2	Different
3	Maybe Same
0	Irrelevant

❑ Results of Comparison Accumulated

❑ Accumulated Values

- ❑ Identify a specific row in table of linkage rules
- ❑ Identified row contains Disposition

Comparison and Disposition

❑ Accumulated Comparison

- ❑ Site Pair = C187
- ❑ Histology = 8140
- ❑ Laterality = 0
- ❑ Behavior = 3
- ❑ DxDate = 20151201
- ❑ Reported by different facilities

IngRAID	IngLR	IngSite	IngHist	IngLaterality	IngBehavior	IngDxDate	IngBehaviorTin	IngDxFacility	IngDisposition	MP/H Rule
3212	29 R	1	1	0	1	1	0	1	1 M2	
3213	29 R	1	1	0	1	1	0	2	1 M2	

Tumor Linkage Result

Automated Decisions

- Link to Existing Tumors
- Create New Tumors

Manual Review

- Diagnosis Date Prior to 2007
or Unknown
- Tumor Linkage not determined

Codes for Failed Tumor Linkage

CODE	DESCRIPTION
1	Failed tumor linkage – Diagnosed before 2007
2	Failed tumor linkage – Non-reportable benign tumor
3	Failed tumor linkage – Linkage not applicable/Exception
4	Failed tumor linkage – Rule set not implemented
5	Failed tumor linkage – Possible tumor link (Match Strength 4)
6	Failed tumor linkage – Linkage rule for combination of codes requires manual review
7	Failed tumor linkage – Links to more than one tumor

Calculating Sequence Number Central

❑ General Assumptions

- ❑ Sequence Number Central of existing tumors correct and meets rules of registry
- ❑ Existing tumors pass inter-record edits

❑ Identical Diagnosis Date

- ❑ If date of IA is identical to DBT, Summary Stage reviewed

Calculating Sequence Number Central

- ❑ Sequence Number Hospital Groupings
 - Between 00 and 59
 - Between 60 and 88

- ❑ Assigned Number for Incoming Tumor Compared to Sequence Number Hospital

Calculating Sequence Number Central

- ❑ Auto Calculation
 - ❑ Based on chronological order (Diagnosis Dates)
- ❑ Re-sequencing of Remaining Tumors

Testing Results – Defined Rule Sets

Site	Total Cases Run Through Automation by Site	% Automated Disposition Determined	% Manual Review
Prostate	222	97	3
Lung	883	86	14
Colon	399	83	17
Rectum/Rectosigmoid	160	77	23
Skin-Melanoma	359	69	31
Breast	1027	56	44
Total	3050	74	26

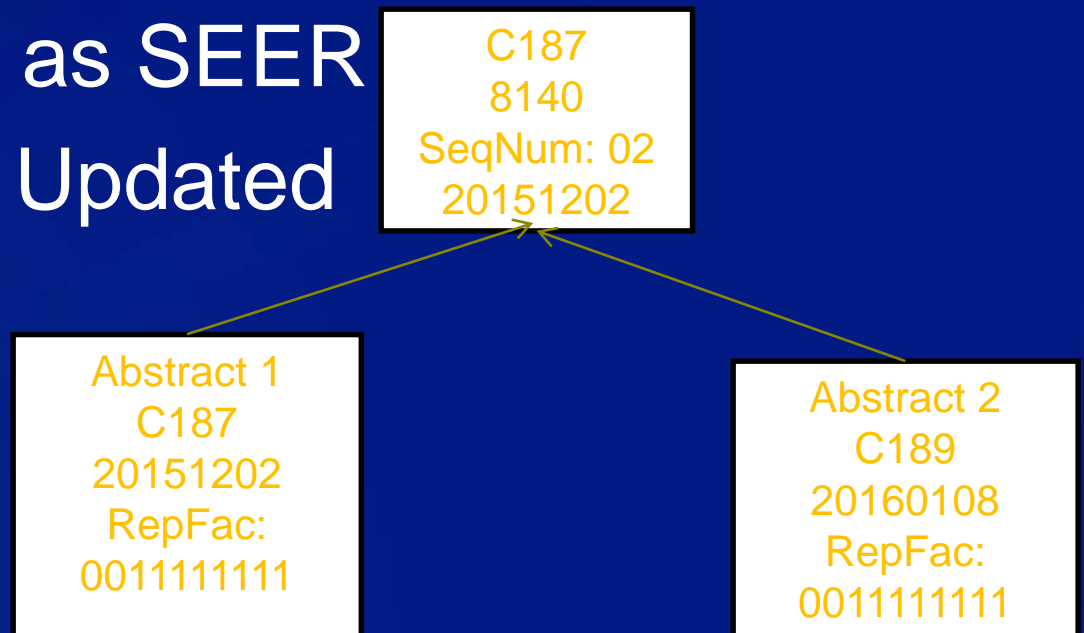
Transitioning to .NET

- ❑ CRS Plus re-written in .NET
 - ❑ Releasing June 2016
- ❑ Full impact of Tumor Linkage automation will be available
- ❑ Records that are linked, consolidated, and edited successfully sent to database



Future Plans

- ❑ Add Rules Sets
- ❑ Re-evaluate Exceptions
- ❑ Increase Automation
- ❑ Review/Modify as SEER
MP/H Rules Updated



Questions

Thank You!

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