Incorporating Administrative Claims into Registry Datasets: Opportunities and Challenges

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EMORY | ROLLINS SCHOOL OF PUBLIC HEALTH
Objectives:

By the end of the session, attendees should better understand the:

- Need
- Opportunity
- Process
- Future Aims

Administrative Claims data
Comparison of SEER Treatment Data With Medicare Claims

Anne-Michelle Noone, MA; Jennifer L. Lusko, PhD; Angela Mariotto, PhD; Kathleen Cronin, PhD; Timothy McNeel, B.S.E. Dennis Cooper, DrPH; and Joan L. Warren, PhD

Background: The population-based surveillance, epidemiology, and end results (SEER) program collects information on treatment, including surgery, chemotherapy, radiation therapy, and hormone therapy. However, the SEER program does not collect data on chemotherapy or hormone therapy due to limitations regarding data completeness. Activists are urging to leverage the opportunity to supplement SEER treatment data with other data sources.

Methods: Using the linked SEER-Medicare data, we examined the validity of the SEER data to identify receipt of chemotherapy and radiation therapy among those aged 65 and older diagnosed from 2001 to 2006 with bladder, breast, colorectal, lung, ovarian, or prostate cancer and hormone therapy among those diagnosed with prostate cancer at age 65 or older. Treatment collected by SEER was compared with treatment as determined by Medicare claims, using Medicare claims as the gold standard. The estimates, specificity, positive predictive values, and negative predictive values were estimated for each type of treatment availability.

Results: The overall specificity of SEER data to identify chemotherapy use, radiation therapy (RT), and hormone therapy (HT) receipt was excellent for both chemotherapy (99%), and hormone therapy (99%), and for radiation therapy (99.5%) for all treatment types except chemotherapeutic agents for prostate cancer.

Conclusions: SEER data should not be used for confirmation of treated and untreated individuals or for the comparison of treatment received in the population. Augmenting the SEER data datasets will provide the needed accurate treatment estimates.

Key Words: SEER, Medicare, treatment, validation, chemotherapy (Medicare 2005, 5(1-65))

The Surveillance, Epidemiology, and End Results (SEER) program, sponsored by the National Cancer Institute (NCI), is a system of population-based cancer registries that currently covers approximately 28% of the U.S. population from geographically defined areas. In addition to reporting national cancer statistics on incidence and survival, the SEER registries serve as a platform for studies of cancer etiology, early detection, and treatment. They collect and validate cancer data continuously as a routine public health monitoring function to provide the public and health professionals with important and timely information on the status and trends of cancer incidence and survival. The SEER registries regularly collect data on the frequency and type of cancer treatment including information on surgery, radiation therapy (RT), chemotherapy (CT), and hormone therapy (HT) information on surgery, radiation therapy (RT) and chemotherapy (CT) as reported in the SEER program.

Prevalence Session Developed in Collaboration with:
- Unit of Epidemiology, Istituto Nazionale per lo Studio e la Cura dei Tumori, Milano, Italy
- Laboratory of Epidemiology and Biometry, Istituto Superiore di Sanita, Roma, Italy

Multiple Primary - Standardized Incidence Ratio (MP-SIR) Session Developed in Partnership with:
- The Radiation Epidemiology Branch of the Division of Cancer Epidemiology and Genetics, National Cancer Institute


e-mail: seer@imsweb.com

web: see.nci.nih.gov/seerstat

68–72% Sensitivity of Chemo Receipt Documentation

Produced by:
- The Surveillance Research Program of the Division of Cancer Control and Population Sciences, National Cancer Institute
- Information Management Services, Inc. 3901 Calkins Blvd. Suite 200 Calverton, MD 20705

TABLE 2. Sensitivity and NPP of SEER Data to Identify Chemotherapy Receipt and a Statistic by Patient and Tumor Characteristic*

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<th>SEER Patients No</th>
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</table>
**NEED** – value of administrative data for both routine surveillance operations and for research

- Potential misclassification of single vs mult agents
- Lack of detail on specific agents administered
- Uncertain or estimated start dates
- Limited information on duration; second course
- Recommended but unknown if admin codes
- No data on change in agents - start/stop
837 - “A standardized format designed to expedite the goal of achieving a totally electronic data interchange health encounter/claims processing and payment environment.”

1. Treatments are billed ($)
   • Treatment data is already reportable

2. Format is standardized (CMS)
   • Complex but flexible structure

3. Comprehensive and detailed
   • All providers can produce billing claims

ANSI = American National Standards Institute
ASC = Accredited Standards Committee
OPPORTUNITY -
Structured claims
ANSI ASC 837, 5010A1 format (Professional)

- Agents / Regimens
- Transition or stop therapy
- Timing & Duration
- Second & later course
- Dose and Units
- 837P
- Service Dates
837P - Key Basic Terms

- Data elements
- Data segment
- Header & trailer
- Transaction set
- Loop
- Delimiter
• Corresponds to a data field in data processing terminology
• Smallest named item in ASC standard
• Some are mandatory while others are optional

Elements

NM1*IL*1*DOE*JANE*C***MI*MBRID12345~
• Corresponds to a record in data processing terminology
• Contains related data elements
• Sequence of data elements within one segment is specified by ASC standard

Segment:

NM1*IL*1*DOE*JANE*C***MI*MBRID12345~
• Character used to:
  – Separate two data elements
  – Terminate a segment
• Integral / key part of data
- Group of related data segments
- Specified by each Implementation Guide
- Importance of loops
  - Some segments repeat
    - Example: service line

<table>
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<tr>
<th>LX<em>1~SV1</em>HC:J9171<em>167</em>UN<em>1</em>11<em>1~DTP</em>472<em>D8</em>20151202<del>LX*2</del></th>
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<tr>
<td>SV1<em>HC:J9045</em>18<em>UN</em>1<em>11</em>1<del>DPT<em>472</em>D8*20151202</del></td>
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</table>
• Contains data segments
• Grouping of data records
  – For instance, a group of claims sent from provider to insurer is considered a transaction set
• Sequence of data segments within one transaction set is specified by ASC standard

Transaction Set

Header / Trailer

• Header is the start segment for transaction set
• Trailer is the end segment for transaction set
Sample 837P

ST*837*0711*005010X222A1~BHT*0019*00*0013*20151215*1200*CH~NM1*41*2*GEORGIA ONCOLOGY PRACTICE*****46*587654321~PER*IC*OFFICE MANAGER*TE*8017268899~NM1*40*2*XYZRECEIVER*****46*324561258~HL*1**20*1~NM1*85*2*GEORGIA ONCOLOGY PRACTICE*****XX*123456789~N3*2050 ATLANTA~N4*ATLANTA*GA*30322~REF*EI*587645231~HL*2*1*22*0~SBR*P*18*G RP01020102******CI~NM1*IL*1*DOE*JANE*C***MI*MBRID12345~N3*1518 FRAZIER ROAD~N4*DECATUR*GA*30033~DMG*D8*19551215*M~NM1*PR*2*R&R HEALTHPLAN*****XY*PLANID12345~CLM*CLMNO12345*103.37***11:B:1*Y*A*Y*Y~HI*ABK:C50012~NM1*82*1*82*1*DRFIRST*DRLAST*****XX*1122333341~PRV*PE*XPC*208D00000X~LX*1~SV1*HC:J9171*167*UN*1*11*1~DTP*472*D8*20151202~LX*2~SV1*HC:J9045*18*UN*1*11*1~DPT*472*D8*20151202~AMT*T*3.37~LIN*~N4*0044541545~CPT*****10*ML~SE*31*0711~
Claim Sections

- Transaction Header
- Claim Submitter Name and Receiver Name
- Billing Provider Detail
- Subscriber Detail
- Patient Detail
  - Claim Information
    - Diagnoses
    - Procedures
    - Dates of Service
Sample 837P

ST*837*0711*005010X222A1~
BHT*0019*00*0013*20151215*1200*CH~
NM1*41*2*GEORGIA ONCOLOGY PRACTICE*****46*587654321~
PER*IC*OFFICE MANAGER*TE*8017268899~
NM1*40*2*XYZRECEIVER*****46*324561258~
HL*1**20*1~
NM1*85*2*GEORGIA ONCOLOGY PRACTICE*****XX*123456789~
N3*2050 ATLANTA~
N4*ATLANTA*GA*30322~
REF*EI*587645231~
HL*2*1*22*0~
SBR*P*18*GRP01020102******CI~
Transaction Header

ST*837*0711*005010X222A1~
BHT*0019*00*0013*20151215*1200*CH~
Submitter and Receiver Name

NM1*41*2*GEORGIA ONCOLOGY PRACTICE*****46*587654321~
PER*IC*OFFICEMANAGER*TE*8017268899~
NM1*40*2*XYZRECEIVER*****46*324561258

Receiver

Parties responsible for creating transaction and receiving transaction
Billing Provider

HL*1**20*1~
NM1*85*2*GEORGIA ONCOLOGY PRACTICE*****XX*123456789~
N3*2050 ATLANTA RD~
N4*ATLANTA*GA*30322~
REF*EI*587645231~

HL – Hierarchical level (groups segments together in the claims)
Subscriber / Patient Detail

HL*2*1*22*0~
SBR*P*18*GRP01020102********CI~
NM1*IL*1*DOE*JANE*C***MI*MBRID12345~ ← (Name and ID)
N3*1518 FRAZIER ROAD~ ← (Address)
N4*DECATUR*GA*30033~
DMG*D8*19551215*M~ ← (Demographics)
NM1*PR*2*R&R HEALTHPLAN*****XY*PLANID12345~ ← (Payer)
Claim Information - Diagnosis

CLM*CLMNO12345*403.37***11:B:1*Y*A*Y*Y~
HI*ABK:C50012~ (Diagnosis codes: ABK = ICD-10)
NM1*82*1*DRFIRST*DRLAST****XX*1122333341~ (Rendering MD)
PRV*PE*PXC*208D00000X~
Claim Information - Service

LX*1~ (Service line number)
SV1*HC:J9171*167*UN*1*11*1~ (Procedure code and diagnosis pointer)
DTP*472*D8*20151202~ (Service date)
LX*2~
SV1*HC:J9045*18*UN*1*11*1~
DPT*472*D8*20151202~

Docetaxel
Carboplatin
Phase 1 – Capitalized on existing vendor

• Unlimited Systems is a oncology workflow solutions company with 13 years of experience
• Specifically, they provide revenue cycle software application (g4) to oncology practices and facilitate billing claims preparation/transmission
• Currently service 2100 oncologists and 225 cancer centers
• In Georgia, they have 12 distinct oncology practices with approximately 120 providers (over 1 million claims from 2013-15)
Site Recruitment

- Identification of practices and contacts
- Introductory letter from GA SEER to Unlimited to share with clients
- Developed claim data relay consent form
- Unlimited reached out to practices by email
- Individual calls with each site (Unlimited, Registry, Client)

PROCESS- a scalable approach for integrating these data into the cancer registry
Claims Processing

Initial goals:

1. Establish process for receiving, loading and matching claims to registry data
2. Store raw data in DMS for use and access as needed (pre-record table) – Framework for nontraditional data storage
3. Use claims to supplement missing treatment for existing patient sets and conduct QC on existing treatment data
4. Create semi-automated process (QC tasks to flag patient sets with potential missing adjuvant therapy)
Claims Processing

Progress:
• Received backlog of claims from 2013-2015
• Prospective claims from 2016 forward (nightly – claims relay)
• All claims have been loaded into DMS
• 75% have ICD-9/10 diagnosis of cancer that converts to ICD-O-3
• 93% of claims with ICD-O-3 code matched to a patient in the registry
Example from: SEER*DMS
### Demographics

- **SSN**: 8140/3
- **DOB**: 01-01-2014
- **DX Date**: 06-06-2014
- **Rpt Src**: 1
- **Reg**: GA
- **SEER**: Yes
- **NPCR**: Yes
- **LOCAL**: Yes

### Summary TX (PAT-)

- **Name**: [Name]
- **SSN**: [SSN]
- **DOB**: [DOB]
- **R**: 01
- **S**: 1
- **DOLC**: 06-10-2014
- **VS**: 1

### Course 1

**Course Dt**: 06-06-2014

**CoC Dt 1st Course**: 06-06-2014

**Tx Status**: 1

**Der Neoadjuv Rx Flag**: [Flag]

### Summarized Diagnostic Procedures

#### Surgery

- **Surg Rev**: 1
- **Surg Dt**: 06-06-2014
- **Dt Most Def Surg**: [Flag]
- **Rs No Surg**: 0
- **1st Recon**: [Flag]
- **Surg 03+**: 40
- **Surg 98-02**: [Flag]
- **Surg 73-97**: [Flag]
- **Margin**: [Flag]
- **Scope 03+**: 5
- **Scope 98-02**: [Flag]
- **Oth 03+**: 2
- **Oth 98-02**: [Flag]

#### Radiation

- **Radn Rev**: 1
- **Start Dt**: [Date]
- **Radn**: [Flag]
- **Radn CNS**: 9
- **Radn Seq**: 0
- **Radn Mod**: [Flag]
- **Boost Mod**: [Flag]

#### Systemic

- **Systemic Rev**: 1
- **Systemic Dt**: [Date]
- **Systemic Seq**: 3
- **Chemo**: 30
- **Hormone**: 30
- **BRM**: 30
- **HemoEndo**: 30
- **Other**: [Flag]
Surg Txt
Course 1 TX
FAC: NA CL-14 C184-0 8480/3 06-06-2014
6/6/14 DR - LEFT HEMICOLECTOMY W/ TRANSVERSE COLOSTOMY

Chemo Txt
Course 1 TX
FAC: NA CL-14 C184-0 8480/3 06-06-2014
DR CONSULT WHILE PT WAS IN HOSPITAL, NEVER FOLLOWED UP. SENDING REQUEST TO SEE IF PT WENT ELSEWHERE.

Micro Desc
FAC: HL7 C809-9 8000/3 06-06-2014
FAC: HL7 C809-9 8000/3 06-06-2014
Microscopic Description
A - See template below.
Specimen: Left colon and omentum.
Procedure: Left hemicolectomy.
Specimen length: 38 cm.
Tumor site: Transverse colon.
Tumor size: 5.0 x 4.5 x 2.0 cm.
Macroscopic tumor perforation: Not identified.
Macroscopic intactness of mesorectum: N/A.
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### Diagnosis Summary

**Count** | **Primary** | **Code** | **Scheme** | **Site** | **Morph** | **Description**
--- | --- | --- | --- | --- | --- | ---
43 | Primary | 1532 | 9CM | C186 | 8000/3 | Malignant neoplasm of descending colon
23 | Secondary | E9331 | 9CM | | | Antineoplastic and immunosuppressive drugs causing adverse effects in therapeutic use

### Diagnoses

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<tr>
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<th>Date</th>
<th>Site</th>
<th>Code</th>
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<th>Morph</th>
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| CLM-76727: | 06-06-2014 | C186 | 8140/3 | 1532 | 9CM | Malignant neoplasm of descending colon
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| CLM-151167: | 07-22-2014 | C186 | 8000/3 | 1532 | 9CM | Malignant neoplasm of descending colon
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| CLM-151167: | 07-22-2014 | E9331 | 9CM | | | Antineoplastic and immunosuppressive drugs causing adverse effects in therapeutic use
| CLM-291745: | 07-22-2014 | E9331 | 9CM | | | Antineoplastic and immunosuppressive drugs causing adverse effects in therapeutic use
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Future Aims

- Automation
- Expansion
- AIMS
- Case Finding
- Research Use
- Recurrence

Your thoughts?
Automation (Window – 4 months)

GA Registry data from 2013-2014 (All Sites)

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Percentiles (in days)

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Expansion

Capitalize on existing scalable framework:

• Expand to all non-hospital medical and radiation oncologist
• AIM E-Path like tool for processing and transmission
• Make data available to hospital registries

• Expand to other claim data sources
  – Large retail chain pharmacy
  – Medicare and Medicaid
Expansion

Capitalize on existing scalable framework:

Institutional versions of ANSI 837 format exists
• Pilot with 1 or more institutions (validate)
• Additional detail would greatly support research
• Potential to ease registry workload in this specific area
AIMS

Case finding
• Challenge – prevalent cases
• Initial focus on hematopoietic
• Facility referred from in claims
• Automated followback

Recurrence
• Longitudinal history is helpful
• Validation studies
• Use a signal for follow-back

Research
• Disparities
• Outcomes
• Standard of Care
• Treatment discontinuation
• Signals of disease progression
Future Aims

Your thoughts?

Automation

Expansion

AIMS

Case Finding

Research Use

Recurrence
Questions or Comments?

kward@emory.edu