What can Healthcare Data Tell Us about Public Health?

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Health Information Systems Consulting LLC
Public Health Informatics Conference
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Introduction: Who am I?

Working with public health information systems for over 30 years

- Massachusetts Department of Public Health
- Independent consultant, primarily with state governments, academic institutions and nonprofits

Relevant work experience relating to discussion this afternoon:

- Developed a data system to pay claims for a small program covering pregnancies and deliveries
- Health care quality performance projects using claims data
- Drug and vaccine safety surveillance using claims data
Introduction: What will be doing?

Goals of session for attendees – For health care claims:

- Describe business processes
- Present contents
- Discuss examples of use in surveillance
- Describe strengths and limitations of these data
- Provide resources for obtaining these data
Where do claims come from?

**Three requirements:**
- **Health care event:** Office visit, Emergency Department, Hospitalization, Pharmacy fill, etc.
- Patient is **covered by insurance**
- Entity **bills** for services/products

**Does not meet requirements:**
- Patient is not covered by insurance (self-pay)
- Health care provider does not bill

*If there’s no insurance and payment, there’s no claim*
Billing Claim Forms and Contents

- **Outpatient Visits:** Uses form [CMS 1500](#)

- **Inpatient Visits:** Uses form [CMS UB04, page 18](#)
  - UB04 (Uniform Billing)
  - Succeeded the UB92 and implemented in 3/1/2007

- **Outpatient Prescriptions:** Discussion
  National Council for Prescription Drug Programs, Universal Claim Form
Clinical Code Sets

- Codes sets provide *coded* information about the health care encounter of a patient with a provider:
  - *Diagnoses*
  - *Procedures*
  - *Drugs*

- *Are mandated by HIPAA for use in administrative transactions*
Clinical Code Sets

- We will cover the following code sets:
  - ICD9 Diagnosis
  - ICD10 Diagnosis
  - CPT Procedure
  - HCPCS Procedure
  - ICD9 Procedure
  - ICD10 Procedure
  - Revenue
  - DRG
  - Place of Service
  - Type of Bill
  - NDC
Clinical Code Sets
Diagnoses-ICD9

International Classification of Diseases, Ninth Revision, Clinical Modification

- ICD-9-CM, or “ICD9” for short
- Used currently in all health care transactions to indicate the disease or condition for why a patient presented for care
- Approximately 13,000 codes
- Codes are 3-5 characters in length
- First 3 characters, followed by decimal point, followed by 1-2 characters for more specificity (e.g., 999, or 999.9, or 999.99)
Clinical Code Sets
Diagnoses – ICD10

International Classification of Diseases, Tenth Revision, Clinical Modification

- ICD-10-CM, or “ICD10” for short
- Scheduled for implementation on October 1, 2014...now extended to October 1, 2015
- Currently in use in classifying causes of death in mortality records
- Approximately 68,000 codes
- Codes are 3-7 characters in length
  - 1st character is a letter: All except for “U”
  - 2nd and 3rd characters are digits
  - Decimal point
  - 4th through 7th characters are letters or digits
Clinical Code Sets
Diagnoses – ICD9 Example #1

493  Asthma

  493.0  Extrinsic asthma
  493.1  Intrinsic asthma
  493.2  Chronic obstructive asthma
  493.8  Other forms of asthma
      493.81  Exercise induced bronchospasm
      493.82  Cough variant asthma
  493.9  Asthma, unspecified

  8 codes for asthma
Clinical Code Sets
Diagnoses – ICD10 Example #1

J45.20  Mild intermittent asthma, uncomplicated
J45.21  Mild intermittent asthma with (acute) exacerbation
J45.22  Mild intermittent asthma with status asthmaticus
J45.30  Mild persistent asthma, uncomplicated
J45.31  Mild persistent asthma with (acute) exacerbation
J45.32  Mild persistent asthma with status asthmaticus
J45.40  Moderate persistent asthma, uncomplicated
J45.41  Moderate persistent asthma with (acute) exacerbation
J45.42  Moderate persistent asthma with status asthmaticus
J45.50  Severe persistent asthma, uncomplicated
J45.51  Severe persistent asthma with (acute) exacerbation
J45.52  Severe persistent asthma with status asthmaticus
J45.901 Unspecified asthma with (acute) exacerbation
J45.902 Unspecified asthma with status asthmaticus
J45.909 Unspecified asthma, uncomplicated
J45.990 Exercise induced bronchospasm
J45.991 Cough variant asthma
J45.998 Other asthma

*18 codes for asthma*
Clinical Code Sets
Diagnoses – ICD9 Example #2

305.2 Cannabis abuse

1 code for cannabis abuse
Clinical Code Sets
Diagnoses – ICD10 Example #2

13 codes for cannabis abuse
Clinical Code Sets
Diagnoses-ICD9 - E-Codes

- First character of:
  - “E”, for external cause of injuries

- Examples:
  - E865 Accidental poisoning from poisonous foodstuffs and poisonous plants
  - E865.3 Berries and seeds
  - E920 Accidents caused by cutting and piercing instruments or objects
  - E920.0 Powered lawn mower
Clinical Code Sets
Diagnoses-ICD9 - V-Codes

- First character of:
  - “V”, for preventive

- Four circumstances, to indicate supplementary reasons for an encounter:
  1) Not currently sick, health care encounter for a specific purpose, such as a screening, or need for immunization
  2) Known current or resolving disease or injury, health care encounter for a specific treatment of that disease or injury; e.g., chemotherapy, or dialysis
  3) A problem or circumstance influences an individual’s health status but are not in themselves a current injury or injury; e.g. history of a condition
  4) Birth status of Newborns
Clinical Code Sets
Diagnoses-ICD9 - V-Codes

Examples

1) **Not currently sick**, health care encounter for a *specific purpose*
   - V04.0 Poliomyelitis vaccine needed

2) Known current or *resolving disease* or injury, health care encounter for a *specific treatment* of that disease or injury; e.g., chemotherapy, or dialysis
   - V07.2 Prophylactic immunotherapy

3) A problem or circumstance influences an individual’s health *status* but are not in themselves a current injury or injury; e.g. history of a condition
   - V12.03 Personal history of Malaria

4) Birth status of **Newborns**
   - V29.0 Observation for suspected infectious condition in newborn
   - V30.1 Single liveborn, born before hospital admission
Clinical Code Sets
Procedures - CPT

- Owned by the American Medical Association*
  - Distributed in Fall for use in the following calendar year
  - Some sets of CPT codes (e.g., vaccines, molecular pathology) may have twice/year distribution
- Reports *medical procedures and services*
- Used in primarily ambulatory/outpatient claims, but may be seen on inpatient claims
- Almost 10,000 in number
- 5 characters, usually all digits
- Special codes used in quality performance measurement
  - 4 digits followed by a letter

*CPT copyright 2012 American Medical Association. All rights reserved. CPT is a registered trademark of the American Medical Association.*
Clinical Code Sets
Procedures – CPT Example #1

**Surgery related**
01380  Anesthesia for all closed procedures on knee joint
11760  Repair of nail bed
11762  Reconstruction of nail bed with graft
64858  Suture of sciatic nerve

**Imaging**
70030  Radiologic examination, eye, for detection of foreign body
72070  Radiologic examination, spine; thoracic, 2 views
72072  Radiologic examination, spine; thoracic, 3 views

**Tests**
84152  Prostate specific antigen (psa); complex (direct measurement)
84153  Prostate specific antigen (psa); total
87040  Culture, bacterial; blood, aerobic, with isolation and presumptive identification of isolates (includes anaerobic culture, if appropriate)
Clinical Code Sets
Procedures – CPT Example #2

Office Visits

99381  *Initial* comprehensive preventive medicine evaluation...  
       *new patient; infant* (age younger than 1 year)

99386  *Initial* comprehensive preventive medicine evaluation...  
       *new patient; 40-64 years*

99391  *Periodic* comprehensive preventive medicine reevaluation...  
       *established patient; infant* (age younger than 1 year)

99396  *Periodic* comprehensive preventive medicine reevaluation...  
       *established patient; 40-64 years*
Clinical Code Sets
Procedures – HCPCS

- Healthcare Common Procedure Coding System (HCPCS)
- Managed by CMS (Centers for Medicare and Medicaid Services)
- Multiple Levels
  - Level 1: Identical to the full CPT code set
  - Level 2:
    - Additional set of codes to identify items not covered by CPT
    - Intended for non-physician services and supplies
    - 5-characters: 1 letter, followed by 4 digits
    - Almost 10,000 in number

- Level 2 Examples
  D7410  EXCISION OF BENIGN LESION UP TO 1.25 CM
  E0752  IMPLANTABLE NEUROSTIMULATOR ELECTRODE, EACH
  G8204  ANTIBIOTICS WITHIN 24 HOURS OF SURGICAL END TIME
  J0120  INJECTION, TETRACYCLINE, UP TO 250 MG
  Q4049  FINGER SPLINT, STATIC
Clinical Code Sets
Procedures – ICD9

- Used only on UB04 (facility/hospital) claims
- Almost 4,000 in number
- Code is 2 digits, decimal point, followed by 1 or 2 more digits

- **Examples**
  - 03.53  Repair of vertebral fracture
  - 16.82  Repair of rupture of eyeball
  - 77.62  Local excision of lesion or tissue of bone, humerus
  - 80.51  Excision of intervertebral disc
  - 87.15  Contrast radiogram of sinus
  - 90.55  Microscopic examination of blood, toxicology
Clinical Code Sets
Procedures – ICD10 PCS

- Also to be used only on UB04 (facility/hospital) claims
- PCS = Procedure Coding System
- Almost 72,000 in number
- Maintained by CMS
- Code is 7 characters, any of which can be a letter or number
  - All digits (0-9) + all letters (except for “I” and “O”)
  - Each character position has a meaning, such as procedure type, body system, body part, approach, etc.
Clinical Code Sets
Procedures – ICD10 PCS

- **Examples**
  - 00590ZZ  Destruction of Thalamus, Open Approach
  - 05NY0ZZ  Release Upper Vein, Open Approach
  - 05NY3ZZ  Release Upper Vein, Percutaneous Approach
  - 2W0KX2Z  Change Cast on Left Finger
  - B30FZZZ  Plain Radiography of Left Vertebral Artery
  - F02Z2ZZ  Feeding/Eating Assessment
Clinical Code Sets
Revenue Codes

- Found in facility (hospital) claims on UB04 claim forms
- Developed for Medicare but also used by private insurers
- 4-digit code
  - Started as 3-digit
  - If provided as only 3-digits, assume leading zero
- Descriptions and pricing attributed to specific departments (e.g., ED, surgery, OR, etc.) and for specific treatments

Examples:
- 0111 Medical/Surgical/Gyn, private room and board
- 0137 Oncology, Semi-Private 3 and 4 Beds
- 0212 Pulmonary care
- 0263 IV Therapy/Drug/Supply Delivery
Clinical Code Sets
Diagnostic Related Groups (DRGs)

- Found in facility (hospital) claims on UB04 claim forms

- Statistically groups related ICD9 diagnoses into a smaller group of codes, for payment purposes
  - Attempted to simplify payment rules from Medicare, versus simple cost-reimbursement
  - E.g., an uncomplicated appendectomy is an uncomplicated appendectomy, so long as there are minor differences in the procedure(s) and care

- Over 700 codes
  - Grouped into 25 major diagnostic categories (MDCs)

- There are two DRG code sets:
  - Started, with what are now called CMS-DRG
  - In 2007, severity-adjusted, called MS-DRG (Medicare severity)
Clinical Code Sets
Diagnostic Related Groups (DRGs)
MS-DRG Examples

163 Major Chest Procedures with MCC (major comorbid conditions)
164 Major Chest Procedures with CC (comorbid conditions)
165 Major Chest Procedures without CC/MCC
258 Cardiac pacemaker device replacement with MCC
259 Cardiac pacemaker device replacement without MCC
370 Cesarean Section With Complications
371 Cesarean Section Without Complications
372 Vaginal Delivery With Complications
Clinical Code Sets
Place of Service (POS)

- Indicate the setting in which a service was provided
- Placed on health care professional claims (CMS 1500)
- 2-digit codes
  - In the range of 01 – 99
  - Only 49 codes in the range are assigned to a value

Examples:
20 Urgent Care Facility
21 Inpatient hospital
49 Independent Clinic
71 Public Health Clinic
72 Rural Health Clinic
Clinical Code Sets
Type of Bill

- Found on facility claims (UB04)
- Three specific types of information
- 3-character codes
  - 3-characters
  - 1st character: Type of facility (all digits)
  - 2nd character: Type of care (all digits)
  - 3rd character: Sequence in episode of care (digits and letters)
    - Can indicate interim billing, replacement claims and other adjustments

- Examples:
  212  Skilled nursing, Inpatient (e.g. skilled nursing facility), claim is first of continuing billing
  811  Special facility, Inpatient (e.g., hospice), claim covers entire admission through discharge interval
Clinical Code Sets
Other Code Sets – Typically *Not* Found in Claims

- **LOINC observation codes**
  - *Logical Observation Identifiers Names and Codes*
  - Tests, measurements, and observations, such as lab results, vital signs, or clinical documents

- **SNOMED-CT health condition codes**
  - *Systematized Nomenclature of Medicine--Clinical Terms*
  - Promoted for Electronic Health Record (EHR) systems
  - Promoted for precise recording and retrieval of clinical information

- **RxNorm codes**
  - Normalized names for clinical drugs and links to many the private drug vocabularies commonly used in pharmacy management and drug interaction software
Clinical Code Sets
National Drug Codes (NDCs)

- Found primarily in outpatient/retail pharmacy claims
  - Also assigned to over the counter products; look carefully at your ibuprofen bottle

- Codes identify the:
  - Manufacturer/labeler
  - Drug product (strength, dosage form, and formulation)
  - Packaging

- Codes maintained by HHS/FDA, in collaboration with manufacturers

- 11 digits in full, sometimes 10 or 9 digits

- Configurations have 3 parts to indicate:
  - (1) Manufacturer/labeler + (2) Product + (3) Package
  - In these formats: 4-4-2, 5-3-2, or 5-4-1
  - But looking at a code alone cannot tell you which configuration applies!
  - Drug code reference manuals are required
Clinical Code Sets
National Drug Codes (NDCs) - Examples

00003010120  amoxicillin 250 mg oral capsule
00026855336  ciprofloxacin 500 mg/5 mL oral liquid
00026855463  ciprofloxacin 400 mg/200 mL intravenous solution
00172531160  ciprofloxacin 250 mg oral tablet
00172531210  ciprofloxacin 500 mg oral tablet
041129212    Rite-Aid 200mg ibuprofen, 100 tablets/bottle
35356014230  atomoxetine 40 mg oral capsule (Strattera)
54569061300  lovastatin 20 mg oral tablet
54569061301  lovastatin 20 mg oral tablet
54868170602  methylphenidate 5 mg oral tablet (Ritalin)
54868170603  methylphenidate 5 mg oral tablet (Ritalin)
68387053401  ciprofloxacin 750 mg oral tablet
68387053515  ciprofloxacin 500 mg oral tablet

FDA and private vendor products available for managing drug lists
What Else in Claims?

➢ Dates

• Dates of Service: From and To
• Admit and Discharge dates
• Date of pharmacy fill and refill

<table>
<thead>
<tr>
<th>April 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Su</td>
</tr>
<tr>
<td>1</td>
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<td>13</td>
</tr>
<tr>
<td>20</td>
</tr>
<tr>
<td>27</td>
</tr>
</tbody>
</table>

Admitted to hospital  Discharged from hospital  Saw doctor  Began drug  Completed drug
Pharmacy Claims

- Elements include:
  - Patient identifiers, as in other claims
  - Drug identifier - NDCs
  - Date filled
  - Days supplied
  - Amount supplied
  - *May* include prescriber identifiers
Pharmacy Claims

- Why does Days Supplied matter?
- How is it used?

Start Drug → 30 Days → Refill #1 → 30 Days → Refill #2 → 30 Days → Refill #3 → 30 Days

Gap?
Membership Information

- “Static” information about the person
  - Demographics:
    - Date of birth
    - Gender
    - Relationship to subscriber
    - Race/ethnicity
    - Language preferences
  - Residence Address/Geography information

Race, Ethnicity, Language data usually poorly completed or reliable
Enrollment Information

- Duration of membership in a health insurance plan
  - Start and End dates
  - Health insurance product examples:
    - HMO
    - PPO (preferred provider organizations)
    - FFS (fee for service)
  - Benefit “flags” during enrollment
    - Medical
    - Pharmacy
    - Behavioral health
    - Dental
    - Vision
  - Primary vs. secondary payer

*Every plan is different!*
*Every enrollment period can be different*
Enrollment Information

- Examples of date ranges and benefit flags

**Medical**
- Start: July 1, 2010
- End: Dec 31, 2012

**Pharmacy**
- Start: July 1, 2010
- Rx Stop: Sep 31, 2011
- End: Dec 31, 2012

**Dental**
- Start: July 1, 2010
- End: Dec 31, 2012

**Medical**
- Start: July 1, 2010
- Switch: June 30, 2011
- End: Dec 31, 2012

**Beh Hlth**
- Start: July 1, 2010
- Switch: June 30, 2011
- End: Dec 31, 2012
Why does enrollment matter?

- It’s a form of *eligibility* and is frequently called such
- Forms expectations for observing health events
- No enrollment, or benefit...then no expectation of observed events
Rules for use of enrollment information

• Specify the time frame

• Specify the benefits, for observing the health events; e.g.
  o **Medical**: Visits, hospitalizations, surgeries, etc.
  o **Pharmacy**: Outpatient drug use

• Use primary payers

• Consider allowable gaps...
  ...if you need to count total eligible person-time
Money Information

- This is *billing* after all!
  - Billed amount
  - Allowed amount
  - Paid amount to provider
  - Patient Deductibles
  - Patient Copays
  - Other patient payments

*Payment rules vary across plans and products*
Provider Information

- Two basic types
  1) Individual Clinicians
     - Doctors, nurses, physician assistants, etc.
  2) Institutions
     - Hospitals, nursing homes, hospice, surgery centers, imaging centers, etc.

- Provider codes are essential to understanding and classifying providers
- These codes are intrinsic to each payer
- National Provider Identifier (NPI) codes, *if filled*, may be useful for linking the same providers across plans
Provider Information (Continued)

- **Individual Clinicians**
  - Medical specialty
  - Type/credential:
    - Physician, Nurse, Psychologist, Social Worker
  - Servicing vs. billing
  - Associated to: site, practice, group, network

- **Institutions**
  - Smaller entities may bill through a larger entity
    - E.g., community health center bills through the hospital owner
Let’s Put It All Together

For any investigation, we need to carefully specify:

<table>
<thead>
<tr>
<th>Item</th>
<th>Values</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age Range</td>
<td>Month or year ranges and/or groupings</td>
<td>• 6 through 36 months</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 20 – 64 year olds</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0, 1-4, 6-10, 11-20, 21-40, 41-64, 65+</td>
</tr>
<tr>
<td>Age “As of” date(s)</td>
<td>Anchor date(s) for age calculation</td>
<td>• Start of study period</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• End of study period</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Anytime during study period</td>
</tr>
<tr>
<td>Sex</td>
<td>Female, Male, Both</td>
<td>• Males only</td>
</tr>
<tr>
<td>Enrollment Time frame</td>
<td>Months through years</td>
<td>• 2001 through 2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Mar, 2008 through Dec, 2008</td>
</tr>
<tr>
<td>Enrollment gaps</td>
<td>None, days, weeks, etc.</td>
<td>• 30 days, 45 days, 0 days</td>
</tr>
<tr>
<td>Benefit(s)</td>
<td>Medical, pharmacy, dental</td>
<td>• Medical only</td>
</tr>
</tbody>
</table>
Let’s Put It All Together

- And the following...

<table>
<thead>
<tr>
<th>Item</th>
<th>Values</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnoses</td>
<td>Conditions, diseases</td>
<td>• ICD9: 493 (Asthma)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ICD10: A82 (Rabies)</td>
</tr>
<tr>
<td>Procedures</td>
<td>Medical services</td>
<td>• CPT: 99407 (Tobacco cessation counseling)</td>
</tr>
<tr>
<td>Setting</td>
<td>Ambulatory, E.D., Hospitalization</td>
<td>• ED or Hospitalization</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ED only (not admitted)</td>
</tr>
<tr>
<td>Drug therapy type</td>
<td>NDC codes, Drug classes</td>
<td>• Insulin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Inhaled steroid combinations</td>
</tr>
<tr>
<td>Drug therapy duration</td>
<td>Days</td>
<td>• 30 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 90 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 183 days</td>
</tr>
<tr>
<td>POS? TOB?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Let’s Put It All Together

- **Complications of health event definitions**
  - How much certainty is needed to know that someone has a disease/condition?
    - Is one outpatient visit with a diagnosis sufficient?
    - How many visits *would be* sufficient?
    - What about a hospitalization? What about an E.D. visit?
    - What about taking drugs used only for specific conditions (e.g., insulin for diabetes)?
  - *Procedures* specific to a conditions can be useful
    - A coronary artery bypass graft would indicate that someone has heart disease
      - **CPT** codes: 33510-33514, 33516-33519, 33521-33523, 33533-33536, 35600, 33572 *or*
      - **ICD9-Procedure** codes: 36.1, 36.2 *or*
      - **DRG** codes: 106, 107, 109, 547-550
Using Claims Data in Public Health
Three Core Functions of Public Health

- **Assessment**
  - Monitor health status to identify community health problems
  - Diagnose and investigate health problems and health hazards in the community
  - Evaluate effectiveness, accessibility, and quality of personal and population-based health services

- **Policy Development**
  - Develop policies and plans that support individual and community health efforts
  - Enforce laws and regulations that protect health and ensure safety
  - Research for new insights and innovative solutions to health problems

- **Assurance**
  - Inform, educate, and empower people about health issues
  - Mobilize community partnerships to identify and solve health problems
## Examples: Asthma

<table>
<thead>
<tr>
<th>Item</th>
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<tbody>
<tr>
<td><strong>Age Range</strong></td>
<td>• 0, 1-4, 6-10, 11-20, 21-40, 41-64, 65+</td>
</tr>
<tr>
<td><strong>Age “As of” date(s)</strong></td>
<td>• Start of study period</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td>• Both</td>
</tr>
<tr>
<td><strong>Enrollment Time frame</strong></td>
<td>• 2011 and 2012</td>
</tr>
<tr>
<td><strong>Enrollment gaps</strong></td>
<td>• Single, up to 30 day maximum in any calendar year</td>
</tr>
<tr>
<td><strong>Diagnoses</strong></td>
<td>• ICD9 = 493x</td>
</tr>
<tr>
<td><strong>Procedures</strong></td>
<td>• None</td>
</tr>
<tr>
<td><strong>Setting</strong></td>
<td>• Outpatient or E.D. (2 visits), or</td>
</tr>
<tr>
<td></td>
<td>• Inpatient (1 visit)</td>
</tr>
<tr>
<td><strong>Drug therapy classes</strong></td>
<td>• Controller medications</td>
</tr>
<tr>
<td></td>
<td>• Rescue medications</td>
</tr>
<tr>
<td><strong>Drug therapy duration</strong></td>
<td>• Any single prescription</td>
</tr>
</tbody>
</table>
Examples: Asthma

Patient 1
Jan 1, 2011
Hospitalized With Asthma
Dec 31, 2012

Patient 2
Outpatient Visit With Asthma
E.D. Visit With Asthma

Patient 3
Controller medications

Patient 4
Outpatient Visit With Asthma
E.D. Visit With Asthma
Examples: Incidence of Influenza (With and Without Immunization)

<table>
<thead>
<tr>
<th>Item</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age Range</td>
<td>• 65+</td>
</tr>
<tr>
<td>Age “As of” date(s)</td>
<td>• Start of study period</td>
</tr>
<tr>
<td>Sex</td>
<td>• Both</td>
</tr>
<tr>
<td>Enrollment Time frame</td>
<td>• Flu season July 2011 through June, 2012</td>
</tr>
<tr>
<td>Enrollment gaps</td>
<td>• Single, up to 30 day maximum in 12 months</td>
</tr>
<tr>
<td>Diagnoses</td>
<td>• ICD9 = 487x, 488x</td>
</tr>
<tr>
<td>Procedures</td>
<td>• Flu vaccine: 90654, 90655, 90656, 90656, 90656, 90656, 90656, 90656, 90656, 90656, 90657, 90658, 90658, 90658, 90658, 90658, 90658, 90660, 90662</td>
</tr>
<tr>
<td>Setting</td>
<td>• Influenza disease: Any</td>
</tr>
<tr>
<td></td>
<td>• Influenza immunization: Any</td>
</tr>
<tr>
<td>Drug therapy classes</td>
<td>• Influenza antivirals; e.g., Tamiflu, Relenza</td>
</tr>
<tr>
<td>Drug therapy duration</td>
<td>• Single prescription</td>
</tr>
</tbody>
</table>
Examples: Incidence of Influenza (With and Without Immunization)

- **Patient 1**: Hospitalized With Influenza
- **Patient 2**: Flu Immunization
- **Patient 3**: Flu Immunization, Antivirals
- **Patient 4**: Flu Immunization, E.D. Visit With Influenza

Dates:
- July 1, 2011
- June 30, 2012
Examples:
Incidence of Influenza
Challenges With Claims Data

➢ Will these show up in claims?

• Instances of influenza disease
  o Physician or intake/screening nurse says:
    “Sounds like the flu. Don’t come into the office!”

• Flu immunizations
  o Retail pharmacy shots
  o Workplace shots
  o Board of health shots

• Antivirals
  o Physician/manufacturer samples
  o Board of health

...maybe...
Examples:
Policy Impact: Bicycle Helmets
Examples: Policy Impact: Bicycle Helmets

<table>
<thead>
<tr>
<th>Item</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age Range</td>
<td>• 5-&lt;10, 10-&lt;17, 17-&lt;40, 40-&lt;65, 65+</td>
</tr>
<tr>
<td>Age “As of” date(s)</td>
<td>• Start of study period</td>
</tr>
<tr>
<td>Sex</td>
<td>• Both</td>
</tr>
<tr>
<td>Enrollment Time frame</td>
<td>• 2004 through 2012</td>
</tr>
<tr>
<td>Enrollment gaps</td>
<td>• Single, up to 45 day maximum</td>
</tr>
<tr>
<td>Injuries</td>
<td>• Diagnoses <em>and</em> Procedures</td>
</tr>
<tr>
<td>Setting</td>
<td>• All: Outpatient, E.D., Hospitalizations</td>
</tr>
<tr>
<td>Drugs</td>
<td>• ?</td>
</tr>
<tr>
<td>Drug therapy duration</td>
<td>• ?</td>
</tr>
<tr>
<td>Comparisons</td>
<td>• Before and after helmet law implementation</td>
</tr>
</tbody>
</table>
Examples: Policy Impact: Bicycle Helmets

Helmet Law Implementation

- **Compare before and after** helmet law implementation for:
  - **Frequency of bicycle accidents noted on visits:**
    - Outpatient, E.D., Hospitalization
  - **Severity of head injury, measured by:**
    - Frequency of outpatient visits
    - Hospitalization lengths of stay
    - Nature and number of procedures required
    - Costs per incident

- **Compare demographics:**
  - Residence, age, race
Claims Data Strengths

- It’s cheap!
  - Already collected
  - Relatively low cost to access

- Covers large populations
  - Many people have health insurance coverage
  - This should be increasing with the ACA

- Uses standards
  - Clinical code sets
  - Common definitions of health events
  - Structure of files

- Long experience with its use
  - Health quality performance measurement
  - Payers themselves analyze their data
  - States use it for cost and quality analyses
Claims Data Limitations

- Some populations not covered
  - Poor, disenfranchised, homeless, undocumented
  - Self-pay individuals
  - Employees in self-pay organizations

- Data can be “old” by the time it is used

- Sparse information on:
  - Demographics
    - Race and ethnicity
    - Education
  - Individual risk factors
    - Alcohol, tobacco, and illegal drug use
    - Diet
    - Exercise
Claims Data Limitations

- Business conditions may affect the accuracy and completeness of codes
  - Some providers may not bother to bill for some events, if perceived payback is low
    - Example: MA immunization administrations
  - Some providers may “up-code” to favor the patient or a payment rule
    - Example: Provider believes that patient really needs a test, but only if there are specific diagnoses documented

- Paid claims vs. denied, adjustments, and reversals
  - Requires careful management and selection
Where’s the Data? Government

- **All Payer Claims Databases**
  - State-based
  - Single database contains data from multiple payers within state
  - All Payer Claims Database Council: [www.apcdcouncil.org](http://www.apcdcouncil.org)

- **Medicare**

- **Medicaid: By state**
Where’s the Data?
All Payer Claims Databases
Where’s the Data?
Private Sources

- Individual Private Payers
- Claims aggregators and data warehouses
  - *IMS Health*: ([www.IMSHealth.com](http://www.IMSHealth.com))
  - *There are others...*
Where’s the Data?
How do you get it?

- Well conceived investigation(s)
- Application process
  - Description of data required
    - *Time frame; e.g., years*
    - *Demographics: Age, geography, payer*
    - *Variables needed, with justification*
  - Listing of staff who will have access to the data
  - Promises to maintain confidentiality of data
  - Description of data security
  - Data destruction procedures
Finale

- You can reach
  Robert Rosofsky, Principal
  Health Information Systems Consulting LLC
  www.HealthInfoSys.net

- Slide deck available at:
  www.HealthInfoSys.net/phinformatics.html

- You will receive an email containing a link to the Web-based evaluation for the conference upon your return home
  • Please complete it!

- Questions?