# Truven Health Analytics MarketScan ®

**Jodi Segal, MD, MPH**
**Professor of Medicine, Epidemiology, Health Policy and Management**
**Co-director, Center For Drug Safety and Effectiveness**

# Outline

- MarketScan ® Commercial Claims and Encounters - nuts and bolts
- Examples of use
- Next steps

# MarketScan® Commercial Claims and Encounters

# Contributors to Funding



- Institute for Clinical and Translational Research

- Center for Drug Safety and Effectiveness

- Department of Health Policy and Management

- Center for Health Services and Outcomes Center for Surgical Trials and Outcomes Research

- Division of General Internal Medicine

# Data Source

- Data represent the medical experience of <span style="color:red">insured employees and their dependents</span>

- These are active employees, early retirees, COBRA continuees and Medicare-eligible retirees with employer-provided insurance

- Claims data are collected from approximately 100 different insurance companies, including Blue Cross Blue Shield plans, and third party administrators

- The MarketScan Databases are constructed from these privately insured paid medical and prescription drug claims.

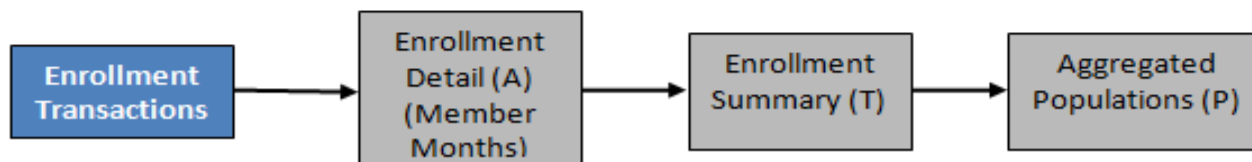- No Medicaid or Workers Compensation data are included!

# Key words

- Commercial claims
- Employer-based

# Data Flow Diagram
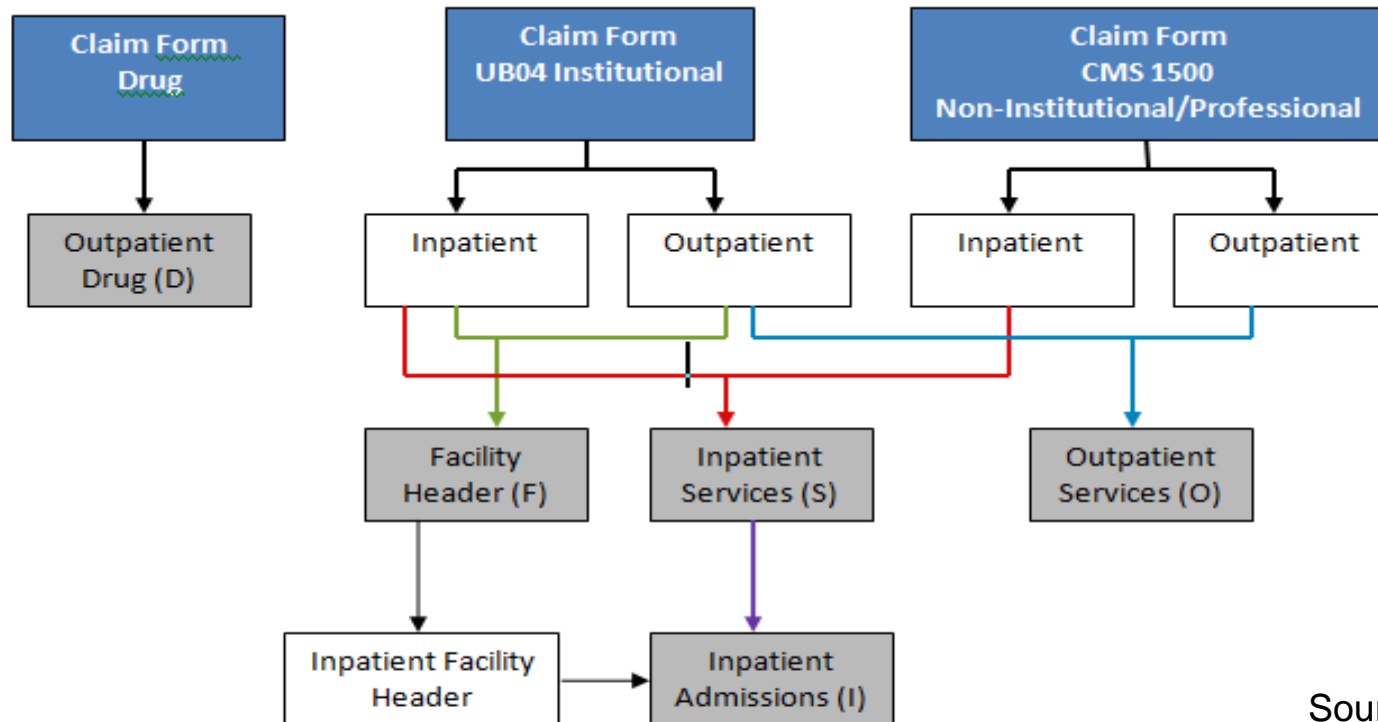


Source: 2012 MarketScan®
CCAE MDCR User Guide

# Data Files (1)

**Inpatient Admissions (I) :**  Admission summary records

**Inpatient Services (S):**  The individual inpatient claim records that were used to create the admissions records

**Outpatient Services (O):**  Individual outpatient claim records

**Facility Header (F):**  Header records from the inpatient and outpatient services

**Outpatient Pharmaceutical Claims (D):**  Individual outpatient prescription drug claim records

# Data Files (2)

**Population (P):**  Summarizes demographic information about the eligible population

**Annual Enrollment Summary (A):**  Contains one enrollment record per enrollee during the database year

**Enrollment Detail (T):**  Contains multiple records per enrollee; one record per enrollee per month during the database year

# Sample Data Elements

| Demographic | Enrollment |
|---|---|
| Enrollee ID | Date of enrollment |
| Age | Member days |
| Gender | Date of disenrollment |
| Employment status | |
| Geographic location (MSA) | |
| Industry | |
| | |
| | |

# Sample Data Elements

| Demographic | Enrollment | Health Plan | |
|---|---|---|---|
| Enrollee ID | Date of enrollment | Coordination of benefits amount | |
| Age | Member days | Deductible amount | |
| Gender | Date of disenrollment | Copayment amount | |
| Employment status | | Plan type | |
| Geographic location (MSA) | | | |
| Industry | | | |
| | | | |
| | | | |

# Sample Data Elements

| Demographic | Enrollment | Health Plan | Medical | |
|---|---|---|---|---|
| Enrollee ID | Date of enrollment | Coordination of benefits amount | Admission data and type | |
| Age | Member days | Deductible amount | Principal diagnosis and code | |
| Gender | Date of disenrollment | Copayment amount | Discharge status | |
| Employment status | | Plan type | Principal procedure code | |
| Geographic location (MSA) | | | Secondary codes | |
| Industry | | | DRG | |
| | | | Provider ID | |
| | | | Length of stay | |

# Sample Data Elements

| Demographic | Enrollment | Health Plan | Medical | Financial |
|---|---|---|---|---|
| Enrollee ID | Date of enrollment | Coordination of benefits amount | Admission data and type | Total payments |
| Age | Member days | Deductible amount | Principal diagnosis and code | Net payments |
| Gender | Date of disenrollment | Copayment amount | Discharge status | Payments of physician |
| Employment status | | Plan type | Principal procedure code | Payments to hospital |
| Geographic location (MSA) | | | Secondary codes | Payments total admission |
| Industry | | | DRG | |
| | | | Provider ID | |
| | | | Length of stay | |

# Sample Data Elements

| Demographic | Enrollment | Health Plan | Medical | Financial | Drug |
|---|---|---|---|---|---|
| Enrollee ID | Date of enrollment | Coordination of benefits amount | Admission data and type | Total payments | Generic product ID |
| Age | Member days | Deductible amount | Principal diagnosis and code | Net payments | Average wholesale price |
| Gender | Date of disenrollment | Copayment amount | Discharge status | Payments of physician | Prescription drug payment |
| Employment status | | Plan type | Principal procedure code | Payments to hospital | Therapeutic class |
| Geographic location (MSA) | | | Secondary codes | Payments total admission | Days supplied |
| Industry | | | DRG | | National drug code |
| | | | Provider ID | | Refill number |
| | | | Length of stay | | Therapeutic group |

# Licensed from *RED BOOK*

DEACLAS  DEA Class Code
DEACLDS  DEA Class Description
DESIDRG  DESI Drug Indicator
EXCDGDS  Exceptional Drug Description

EXCLDRG  Exceptional Drug Indicator
GENERID  Generic Product ID
GENIND   Generic Indicator
GENNME   Generic Drug Name
GNINDDS  Generic Indicator Description

MAINTDS  Maintenance Indicator Description
MAINTIN  Maintenance Indicator
MANFNME  Manufacturer Name
MASTFRM  Master Form Code
METSIZE  Metric Size
MSTFMDS  Master Form Description

NDCNUM   National Drug Code
ORGBKCD  Orange Book Code
ORGBKDS  Orange Book Code Description
ORGBKFG  Orange Book Standard Flag
PKQTYCD  Package Quantity Code
PKSIZE   Package Size
PRDCTDS  Product Category Description
PRODCAT  Product Category Code
PRODNME  Product Name
SIGLSRC  Single Source Indicator
STRNGTH  Strength
THERCLS  Therapeutic Class
THERDTL  Therapeutic Detail Code
THERGRP  Therapeutic Group
THRCLDS  Therapeutic Class Description
THRDTDS  Therapeutic Detail Code Description
THRGRDS  Therapeutic Group

# Demographics of Enrollees

- Claims years: 2010 through 2014

- Roughly 80 million covered lives

- Age
  - 0-17: 27%
  - 18-34: 27%
  - 35-44: 16%
  - 45-54: 17%
  - 55-64: 14%

- Gender: 51% female
- No Race/Ethnicity data

# Examples of Use

- Published examples
- Hopkins examples

# Clinical Questions

**ORIGINAL RESEARCH ARTICLE**

## Use of Statins and the Risk of Incident Diabetes: A Retrospective Cohort Study

Busuyi S. Olotu[1,2,3] · Marvin D. Shepherd[2] · Suzanne Novak[2,3] · Kenneth A. Lawson[2] · James P. Wilson[2] · Kristin M. Richards[2] · Rafia S. Rasu[1]

# Results: Statins and Incidence DM

**Table 2** Weighted[a] and unweighted incidence density and cumulative incidence of diabetes by statin use

| | Subjects (N) [a] | Sum of follow-up months (person-months) [b] | Number of new cases of diabetes [c] | Incidence density rate (per 1000 person-months) [c/b × 1000] | Cumulative incidence (per 1000 population) [c/a × 1000] |
|---|---|---|---|---|---|
| Study population | 106,424 | 1,608,088.77 | 2478 | 1.54 | 23.2 |
| | 4,554,802 | 68,836,394.87 | 115,720 | 1.68 | 25.4 |
| Statin users | 53,212 | 798,909.73 | 1833 | 2.29 | 34.4 |
| | 2,454,285 | 36,851,101.44 | 88,208 | 2.39 | 35.9 |
| Non-statin users | 53,212 | 809,179.03 | 645 | 0.80 | 12.1 |
| | 2,100,517 | 31,985,293.44 | 27,512 | 0.86 | 13.1 |

# Quality of care

**Prescriptions Filled Following an Opioid-Related Hospitalization.**
Naeger S, Ali MM, Mutter R, Mark TL, Hughey L.

**OBJECTIVE:**
The purpose of this study was to identify patterns of postdischarge prescription fills following an opioid-related hospitalization.

**METHODS:**
Using the 2010-2014 MarketScan Commercial Claims and Encounters database, this analysis identified the percentage of patients (N=36,719) with an opioid-related inpatient admission who received substance use disorder treatment medications within 30 days of being discharged.

**RESULTS:**
Thirty-five percent of the sample did not have any prescription fills in the 30-day postdischarge period. Less than a quarter (16.7%) of patients received any FDA-approved opioid dependence medication in the 30 days following discharge. Forty percent of patients in the sample received antidepressants, 15.6% received antipsychotics, 13.9% filled a prescription for a benzodiazepine, and 22.4% filled a prescription for an opioid pain medication.

**CONCLUSIONS:**
More effort is needed to ensure that patients hospitalized for opioid misuse are receiving recommended services.

# Cost Analyses

Taylor & Francis
Taylor & Francis Group

ORIGINAL ARTICLE

## Healthcare resource utilization and costs associated with herpes zoster in the US

Barbara H. Johnson[a], Liisa Palmer[a], Justin Gatwood[b], Gregory Lenhart[a], Kosuke Kawai[c] and Camilo J. Acosta[d]

[a]Truven Health Analytics, Ann Arbor, MI, USA; [b]University of Tennessee Health Science Center College of Pharmacy, Nashville, TN, USA; [c]Clinical Research Center, Boston Children's Hospital; Harvard Medical School, Boston, MA, USA; [d]Center for Observational and Real-World Evidence, Merck & Co., Inc., Kenilworth, NJ, USA

# Costs of annual incremental office visits

HOPKINS

CrossMark
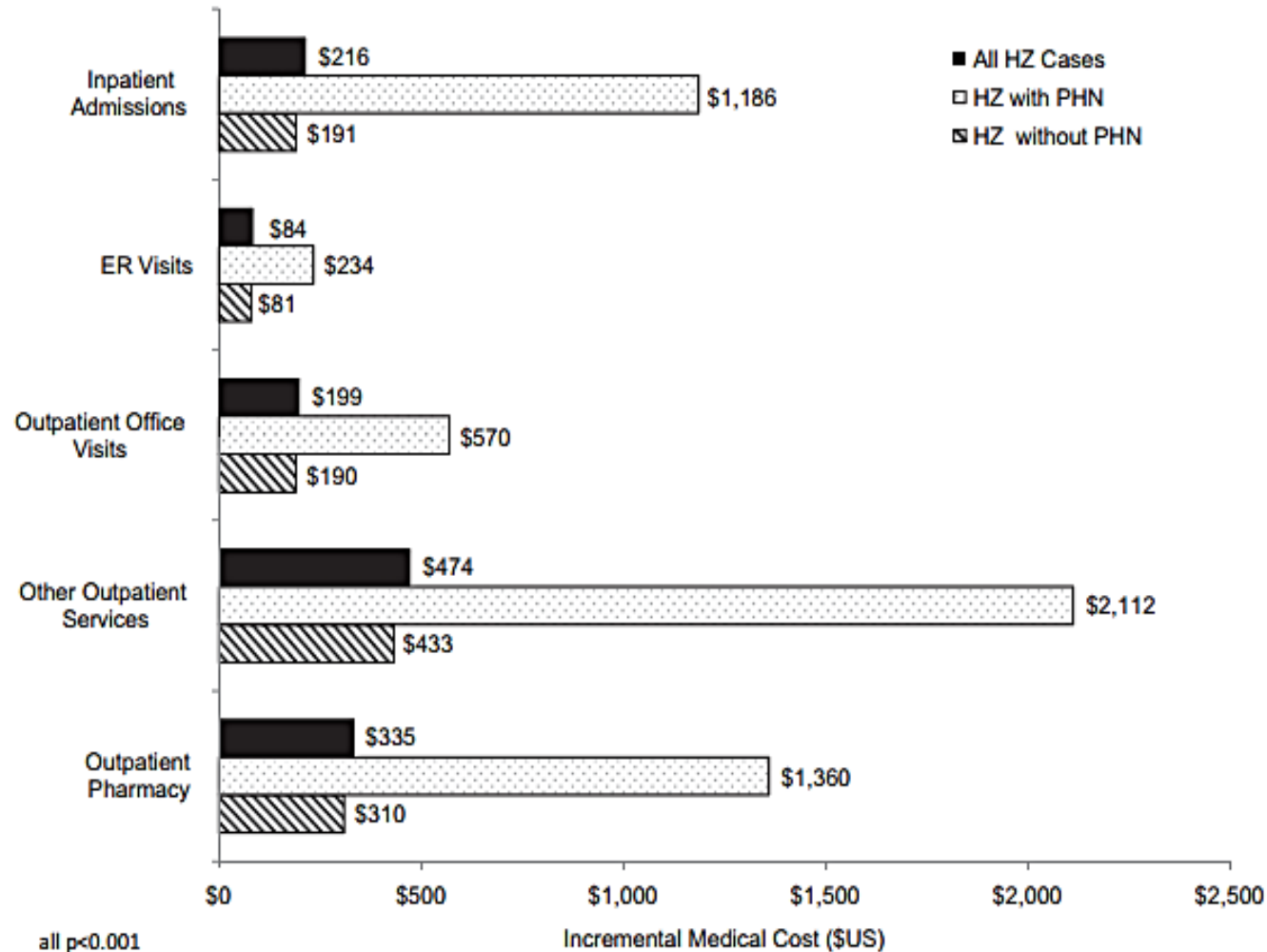
# Metformin Use Is Associated with Improved Survival in Patients Undergoing Resection for Pancreatic Cancer

Marcelo Cerullo[1] · Faiz Gani[1] · Sophia Y. Chen[1] · Joe Canner[1] · Timothy M. Pawlik[1]

**Abstract** Preclinical evidence has demonstrated anti-tumorigenic effects of metformin. The effects of metformin following pancreatic cancer, however, remain undefined. We sought to assess the association between metformin use and survival using a large, nationally representative sample of patients undergoing surgery for pancreatic cancer. Patients undergoing a pancreatic resection between January 01, 2010, and December 31, 2012, were identified using the Truven Health MarketScan database. Clinical data, including history of metformin use, as well as operative details and information on long-term outcomes were collected. Multivariable Cox proportional hazards regression analysis was performed to assess the effect of metformin use on overall survival (OS). A total of 3393 patients were identified. The mean age of patients was 54.2 years (SD=9.1 years). Roughly one half of patients were female ($n=1735$, 51.1 %); 49.1 % ($n=1665$) presented with a Charlson comorbidity index of 3 or greater (CCI ≥3); and 19.6 % ($n=664$) had diabetes. At the time of surgery, 60.0 % ($n=2034$) of patients underwent a pancreaticoduodenectomy, 35.7 % ($n=1212$) a partial/distal pancreatectomy, while 4.3 % ($n=147$) had a total pancreatectomy. On pathology, 1057 (31.2 %) had lymph node metastasis. Metformin use was identified in 456 patients (13.4 %) and was more commonly administered among patients without locally advanced disease (14.3 vs. 11.6 %, $p=0.038$). While OS was comparable between patients within the first year of surgery (OS at 1 year 65.4 % [95 % confidence interval (CI) 63.4–67.3 %] vs. 69.2 % [95 % CI 64.2–73.4 %]), patients who received metformin demonstrated an improved OS beginning at 18 months following surgery. On multivariable analysis adjusting for patient and clinicopathologic characteristics, metformin use was independently associated with a decreased risk of mortality (hazard ratio [HR]=0.79, 95 % CI 0.67–0.93, $p=0.005$). Metformin use was associated with an improved overall survival among patients undergoing pancreatic surgery for pancreatic cancer. Further work is necessary to better understand its role in modifying cancer-specific and overall health outcomes.

# More Hopkins

Schneider EB, Canner JK, Gani F, Kim Y, Ejaz A, Spolverato G, Pawlik TM. Early versus late hospital readmission after pancreaticoduodenectomy. J Surg Res. 2015 Jun 1;196(1):74-81.

Daubresse M, Hutfless S, Kim Y, Kornfield R, Qato DM, Huang J, Miller K, Emery SL, Alexander GC. Effect of Direct-to-Consumer Advertising on Asthma Medication Sales and Healthcare Use. Am J Respir Crit Care Med. 2015 Jul 1;192(1):40-6. doi:

Nazarian S, Reynolds MR, Ryan MP, Wolff SD, Mollenkopf SA, Turakhia MP. Utilization and likelihood of radiologic diagnostic imaging in patients with implantable cardiac defibrillators. J Magn Reson Imaging. 2016 Jan;43(1):115-27.

Petri M, Daly RP, Pushparajah DS. Healthcare costs of pregnancy in systemic lupus erythematosus: retrospective observational analysis from a US health claims database. J Med Econ. 2015;18(11):967-73.
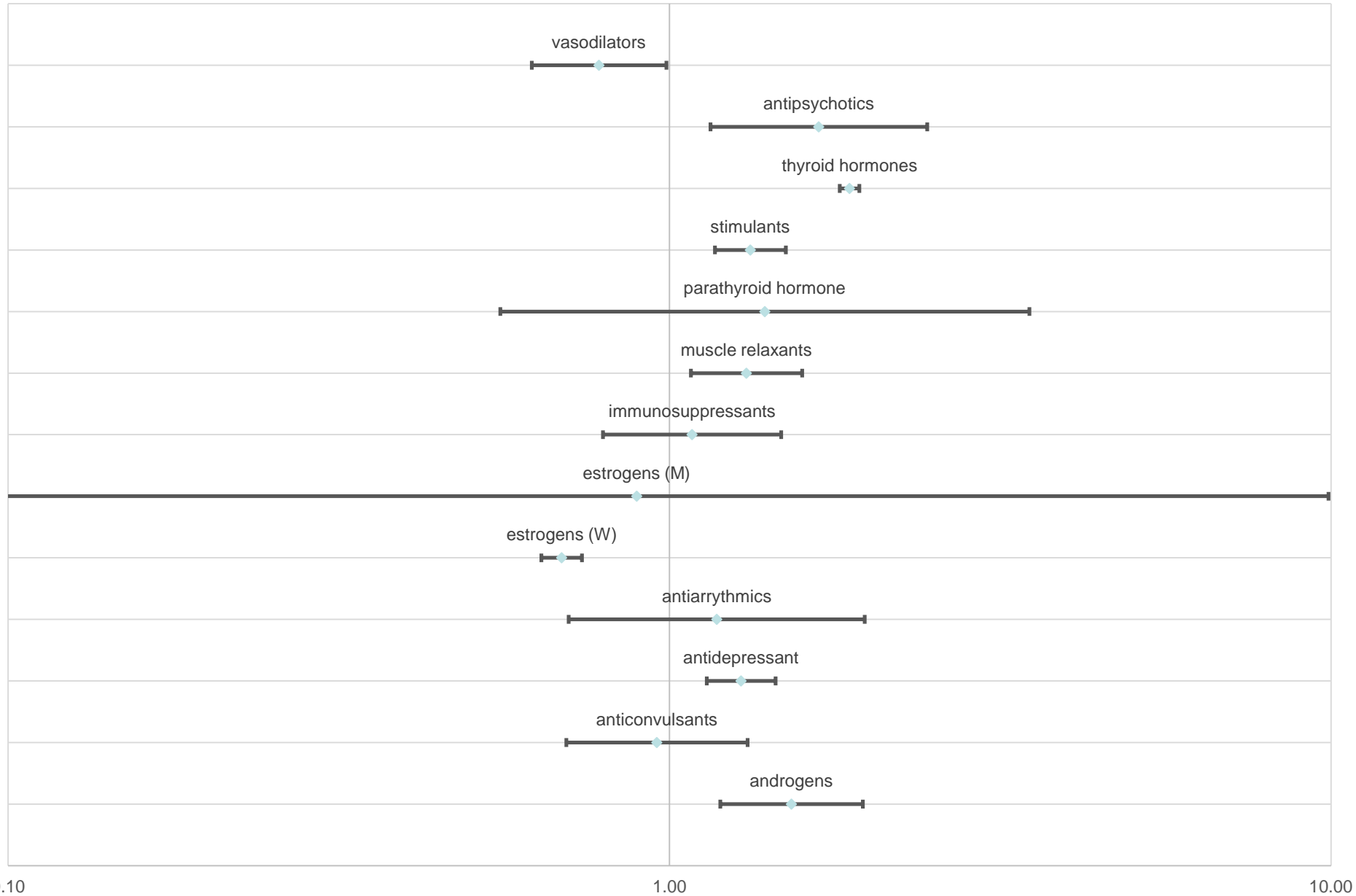
# Our work in progress

- Cooperative agreement with FDA Office of Generic Drugs
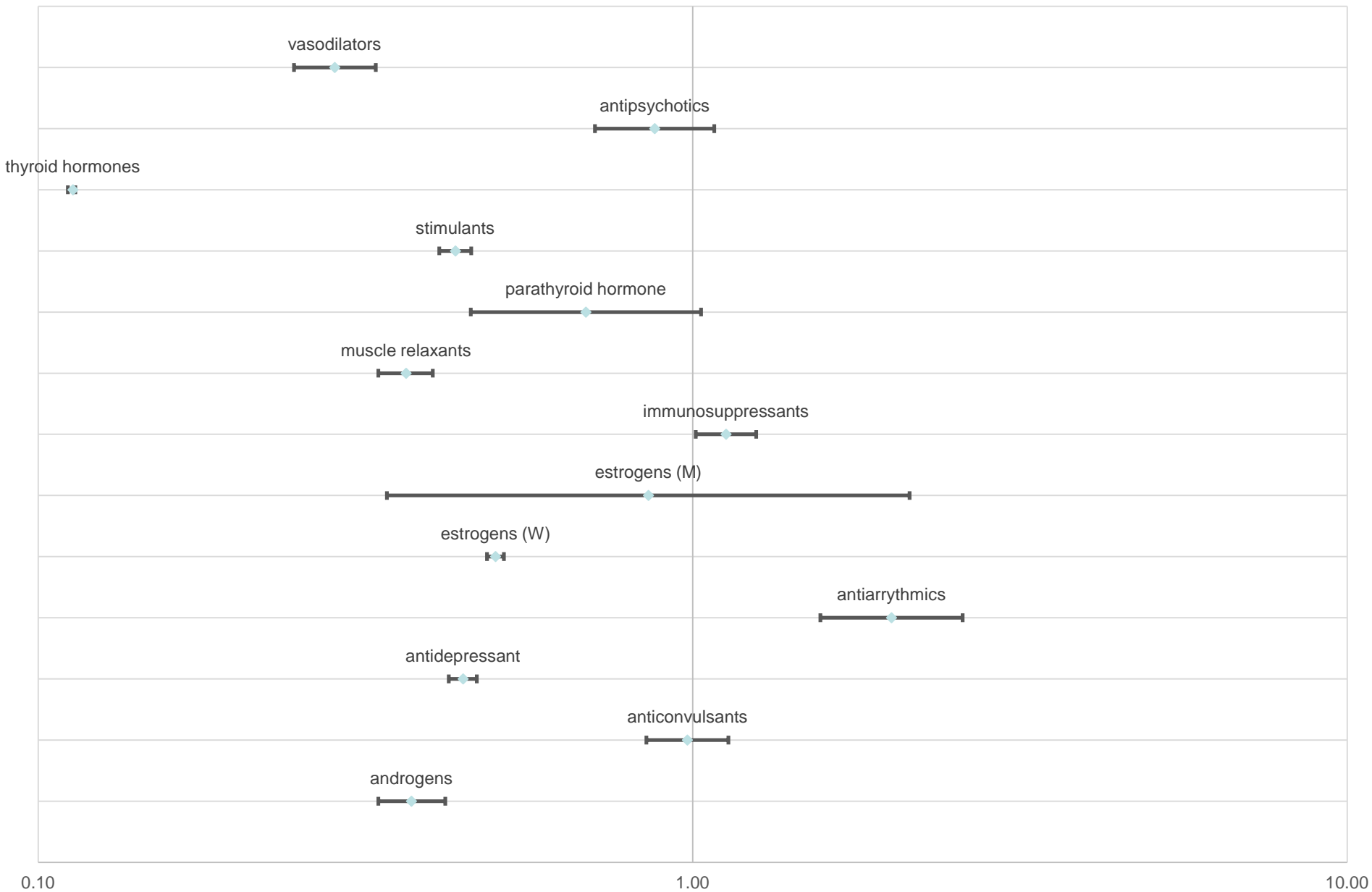- We said we would study determinants of generic drug usage by therapeutic class

# Drugs with >50% relative change in generic substitution over 3 years
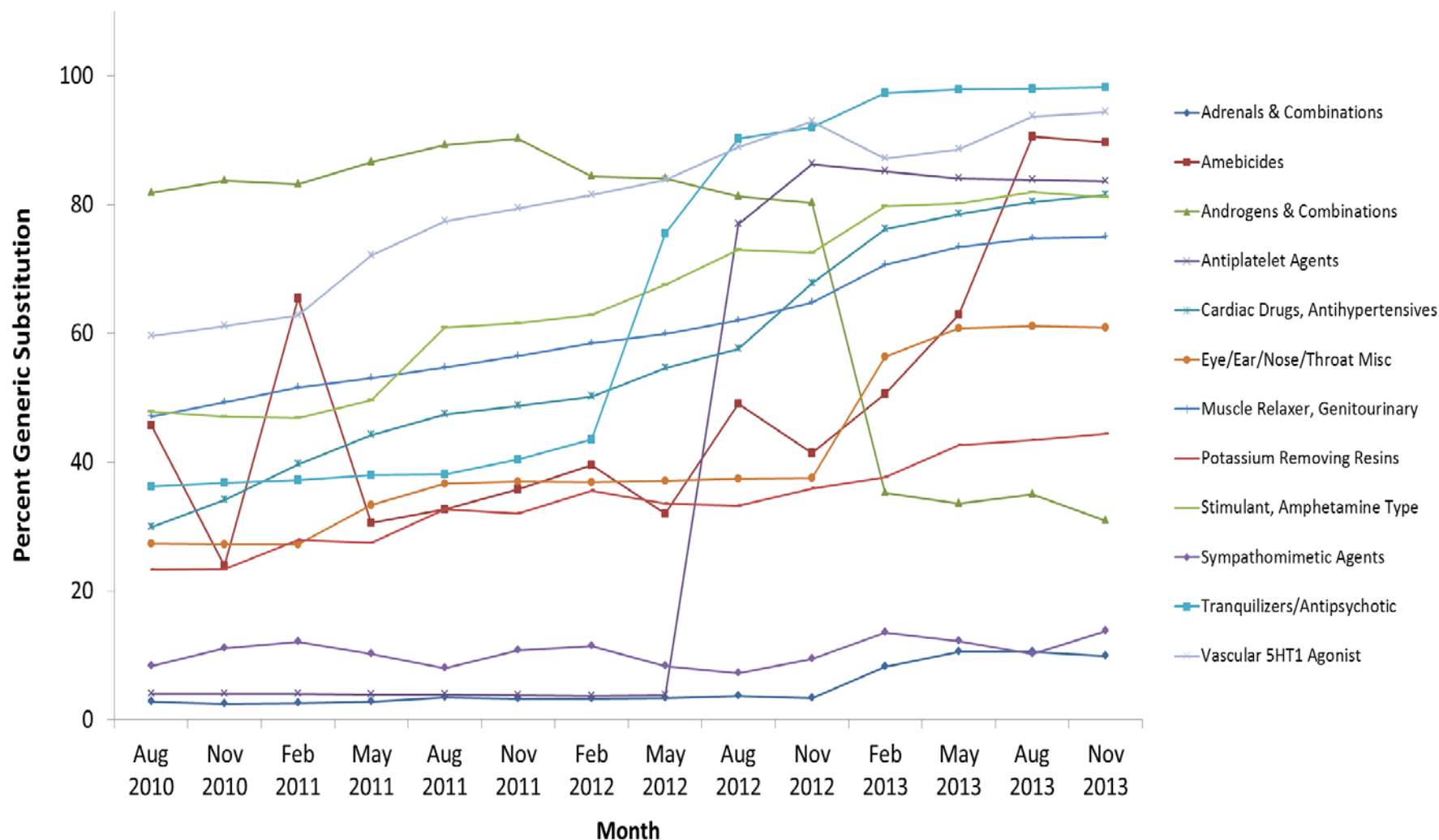
Odds Ratios for High Deductible Plans versus Fee-for-Service Plans

**Odds Ratios for Generic Subsitution for Mail Order Fills versus Retail Fills**

vasodilators

antipsychotics

thyroid hormones

stimulants

parathyroid hormone

muscle relaxants

immunosuppressants

estrogens (M)

estrogens (W)

antiarrythmics

antidepressant

anticonvulsants

androgens

0.10                                                                    1.00                                                                    10.00

# Possible or Not Possible
## (with MarketScan Commercial Claims)

1. Does use of enoxaparin prophylaxis in the hospital reduce risk of VTE after surgery?

Not possible

No inpatient drug data

# Possible or Not Possible
## (with MarketScan Commercial Claims)

2. Does leukemia treatment before age 12 lead to premature coronary events?

Not possible

Highly unlikely that you will have someone insured for that many years in this data

# Possible or Not Possible
## (with MarketScan Commercial Claims)

3. Do patients in HMO type insurance have fewer emergency room visits than patients with a fee-for-service type insurance?

Sure - possible

# Possible or Not Possible
## (with MarketScan Commercial Claims)

4. Do patients with laparoscopic hysterectomies have shorter lengths of stay than patients with open hysterectomies?

<span style="color:red">Sure - possible</span>

# Possible or Not Possible
## (with MarketScan Commercial Claims)

5. Do older patients with urinary incontinence have more falls than older patients without urinary incontinence?

Not possible

No Medicare data so very few older people

# Next Steps

Data access at JHU

- Contact CDSE for more information including:  Marketscan User Guide, Data Dictionary

  cdse@jhsph.edu

- Brief application and data use agreement for internal use

- **No charge for an unfunded project**

- There is a cost payable to Truven Health Analytics if the data is used as part of a grant (depends on size of grant and source of funding –e.g., small federal grant is $28K)

# Options

- You can be given access to the server where the data resides (biostatistics server)
  - Will do the short course to be allowed to access the server
  - There is a small fee for access

- Staff of Center for Drug Safety and Effectiveness can make an analytic data set  (if not overly complex)

# Shout out to Premier data

- A different data set
- Equally interesting and valuable
- Huge amount of INPATIENT data including inpatient medications

# Premier

- Premier is a healthcare performance improvement alliance of approximately 3,400 U.S. hospitals and 110,000 other providers –mostly community hospitals.

- The Premier Healthcare database, recently made available through a strategic Johns Hopkins partnership with Premier

- Has complete hospital charge master information (what is billed) for more than 610 million inpatient and hospital-based outpatient encounters

- Includes more than 1 out of every 4 hospital discharges in the United States.

# Thank you to:

- Institute for Clinical and Translational Research

- Center for Drug Safety and Effectiveness

- Department of Health Policy and Management

- Center for Health Services and Outcomes Center for Surgical Trials and Outcomes Research

- Division of General Internal Medicine

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