Hands on with MarketScan

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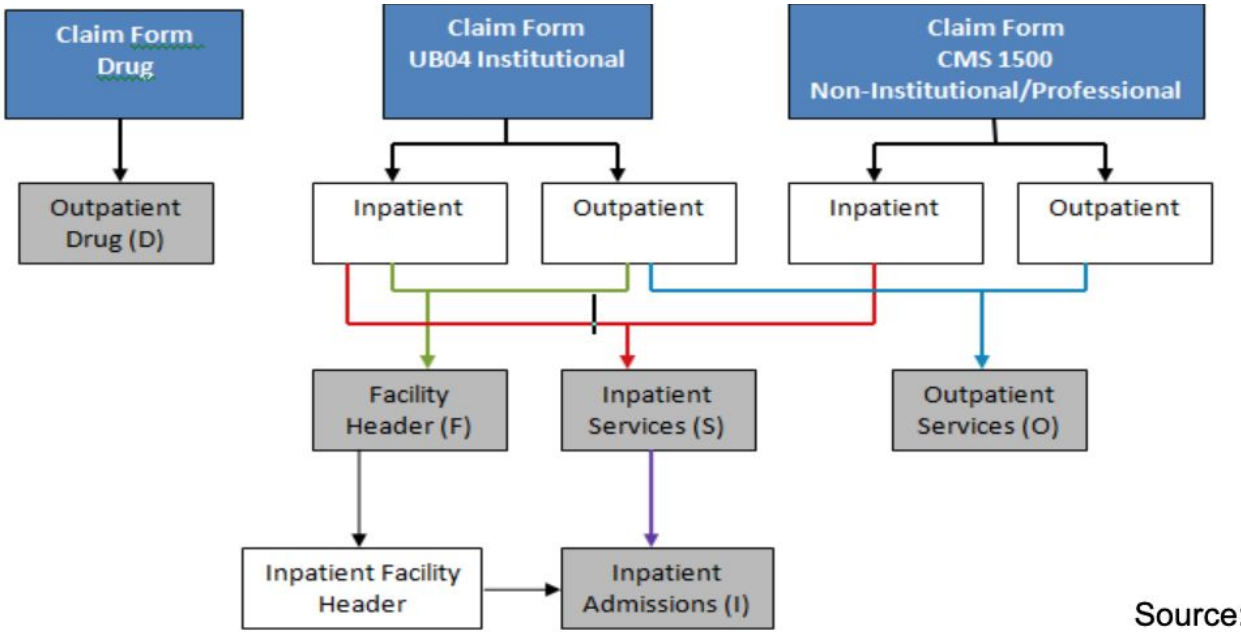
6.S897/HST.956
FRI MAR 1

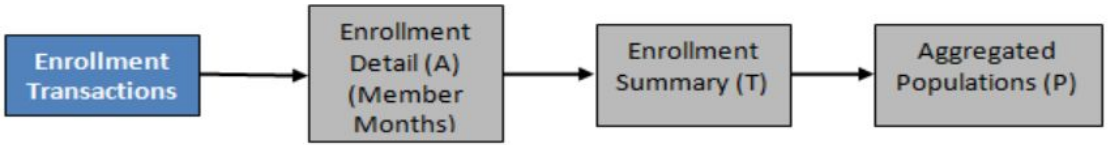
Presentation adapted from https://ictr.johnshopkins.edu/wp-content/uploads/2016/06/jodi_MS-slide-deck.pdf

What is MarketScan Commercial Claims?

- Part of the family of MarketScan databases.
- The medical experience of insured employees and their dependents.
- These are active employees, early retirees, COBRA continuees and Medicare-eligible retirees with employer-provided insurance.
- Claims data are collected from ~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!



Source: 2012 MarketScan®
CCAE MDCR User Guide



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

Plan for Today

1. Examples of projects using MarketScan
2. Game: Could We Investigate X?
3. Live Coding

The incidence of herpes zoster in a United States administrative database

Authors | Authors and affiliations

Ralph P. Insinga, Robbin F. Itzler, James M. Pellissier, Patricia Saddier, Alexander A. Nikas

Original Articles

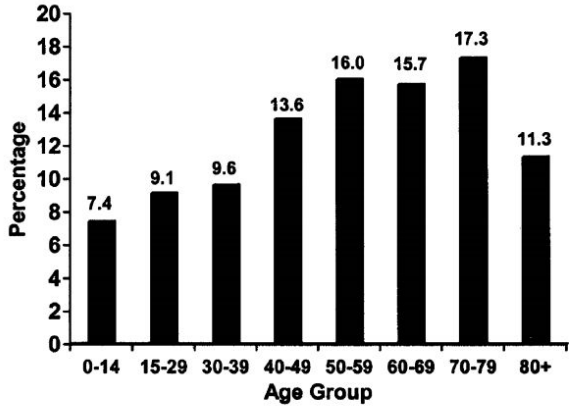


FIGURE 1. Distribution of herpes zoster cases in the MarketScan population (n=9,152) by age group. Exact percentages are listed above each bar and are age- and sex-adjusted to the 2000 U.S. population.

https://lib.mit.edu/record/mdc/16050886

Fair Regression for Health Care Spending

Anna Zink
Harvard University
and
Sherri Rose
Harvard Medical School*

January 31, 2019

$$\underset{\theta}{\text{minimize}} \left\{ \sum_k \left(Y_k - \sum_p \theta_p X_{kp} \right)^2 \right\},$$

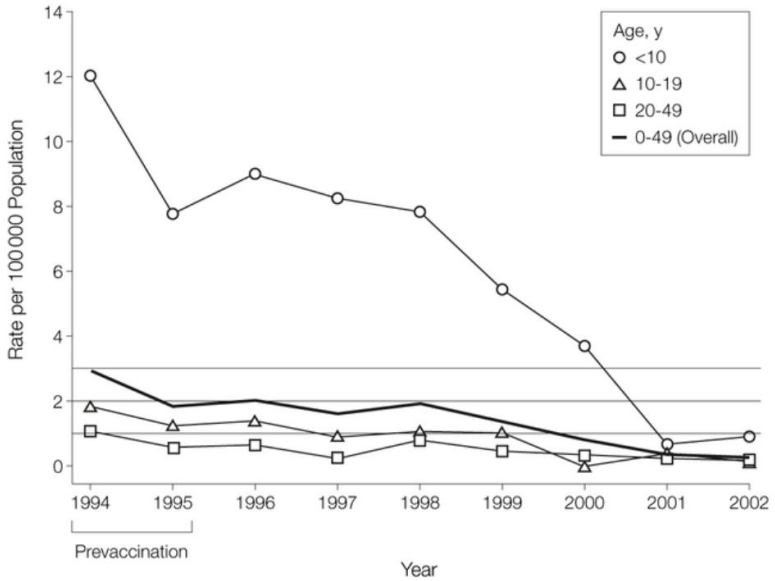
$$\text{subject to } \frac{1}{n_g} \sum_{i \in g} \left(Y_i - \sum_p \theta_p X_{ip} \right) \leq z,$$

https://arxiv.org/pdf/1901.10566.pdf

Impact of Varicella Vaccination on Health Care Utilization

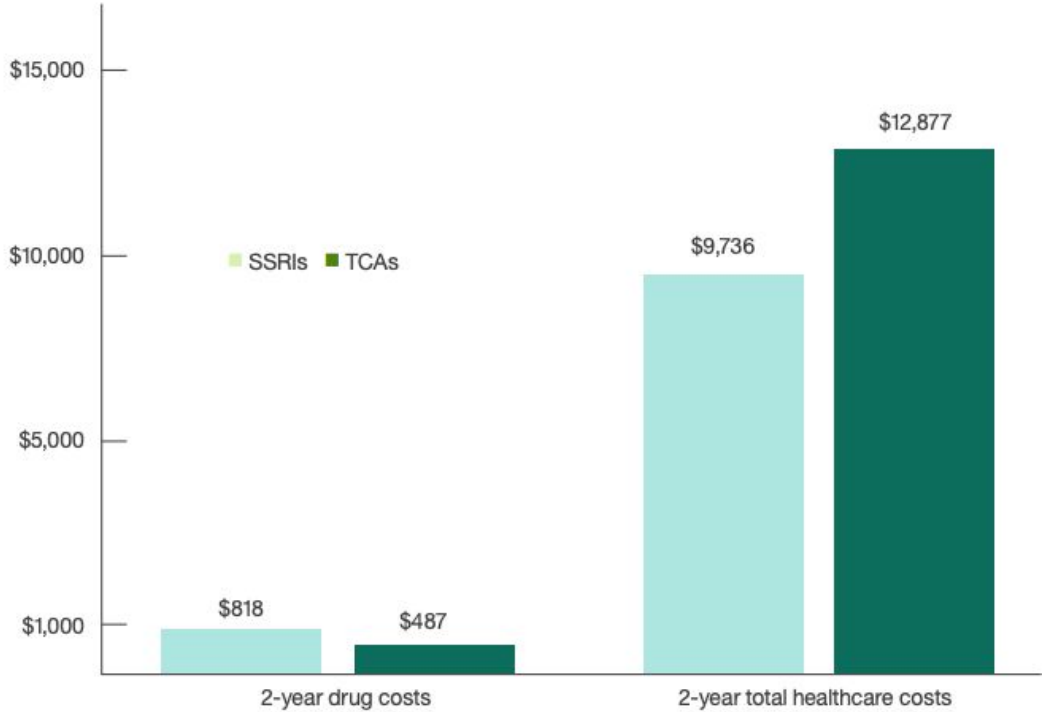
Fangjun Zhou, PhD, MS; Rafael Harpaz, MD, MPH; Aisha O. Jumaan, PhD, MPH; et al

Figure 1. Varicella-Related Hospitalization Rates, 1994-2002



https://jamanetwork.com/journals/jama/fullarticle/201405

Case study: Cost offset in treating depression

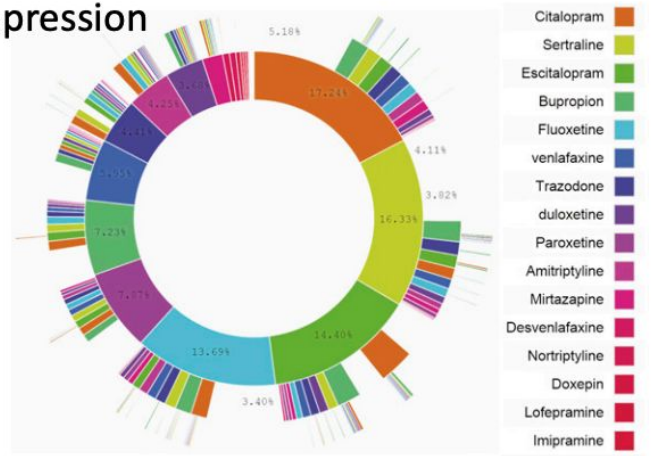


https://truvenhealth.com/portals/0/assets/2017_MarketScan_Databases_Health_Services_Researchers.pdf

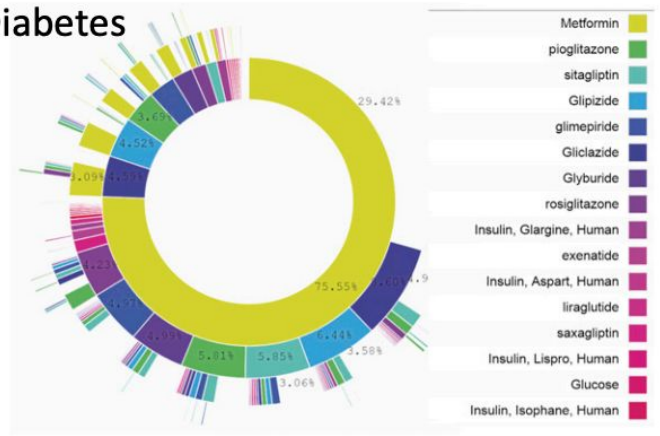
Characterizing treatment pathways at scale using the OHDSI network

George Hripcsak[a,b,c,1], Patrick B. Ryan[c,d], Jon D. Duke[c,e], Nigam H. Shah[c,f], Rae Woong Park[c,g], Vojtech Huser[c,h], Marc A. Suchard[c,i,j,k], Martijn J. Schuemie[c,d], Frank J. DeFalco[c,d], Adler Perotte[a,c], Juan M. Banda[c,f], Christian G. Reich[c,l], Lisa M. Schilling[c,m], Michael E. Matheny[c,n,o], Daniella Meeker[c,p,q], Nicole Pratt[c,r], and David Madigan[c,s]

C Depression



A Diabetes



https://www.pnas.org/content/pnas/early/2016/06/01/1510502113.full.pdf

Economic Measurement of Medical Errors Using a Hospital Claims Database

Guy David, PhD[1], Candace L. Gunnarsson, EdD[2,], Heidi C. Waters, MBA[2], Ruslan Horblyuk, MA, MBA[3], Harold S. Kaplan, MD[4]*

[1]*Health Care Management, The Wharton School, University of Pennsylvania, Philadelphia, PA;* [2]*S[2] Statistical Solutions, Inc., Cincinnati, OH;* [3]*GE Healthcare, Wauwatosa, WI;* [4]*Mount Sinai School of Medicine, New York, NY*

Table 3 – Top 10 actual and extrapolated inpatient medical errors—2008 and 2009.*

Injury	Number of injuries by visit		Estimated number of errors by visit	
	Actual	Extrapolated	Actual	Extrapolated
2008				
Pressure ulcer (Medicare never event)	64,966	507,118	61,718	481,762
Postoperative infection	20,714	155,708	19,678	147,922
Hypotension—iatrogenic	15,434	117,174	7,717	58,587

Table 4 – Top 10 extrapolated inpatient errors with the largest annual measurable cost—2008 and 2009.*

Injury	Extrapolated injuries	Extrapolated errors	Median cost per error ($)	Total error cost (extrapolated) ($)
2008				
Postoperative infection	155,708	147,922	3,408	504,151,435
Pressure ulcer (Medicare never event)	507,118	481,762	1,040	500,801,536
Infection due to central venous catheter	39,615	37,635	13,289	500,130,140
Hemorrhage complicating a procedure	88,528	44,264	2,880	127,465,760

https://www.sciencedirect.com/science/article/pii/S1098301512042660

Evaluating the Impact of Database Heterogeneity on Observational Study Results

FREE

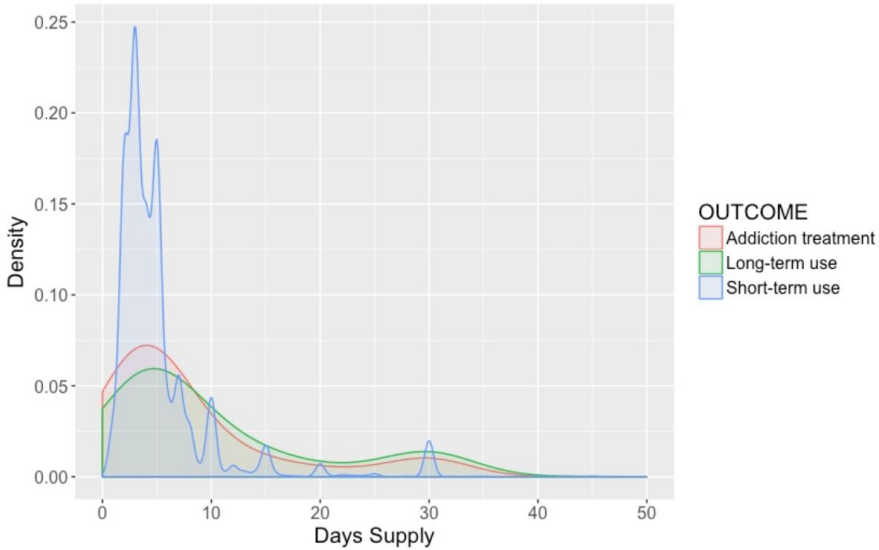
David Madigan ✉, Patrick B. Ryan, Martijn Schuemie, Paul E. Stang, J. Marc Overhage, Abraham G. Hartzema, Marc A. Suchard, William DuMouchel, Jesse A. Berlin

Clinical studies that use observational databases to evaluate the effects of medical products have become commonplace. Such studies begin by selecting a particular database, a decision that published papers invariably report but do not discuss. **Studies of the same issue in different databases, however, can and do generate different results,** sometimes with strikingly different clinical implications. In this paper, we systematically study heterogeneity among databases, holding other study methods constant, by exploring relative risk estimates for 53 drug-outcome pairs and 2 widely used study designs (cohort studies and self-controlled case series) **across 10 observational databases.**

https://academic.oup.com/aje/article/178/4/645/231982

Healthcare

Combating the Opioid Epidemic with Machine Learning



https://www.ibm.com/blogs/research/2017/08/combating-the-opioid-epidemic-with-machine-learning/

Could We Ask:

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

Could We Ask:

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

Sure!

Could We Ask:

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

Could We Ask:

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

No

(No inpatient drug data)

Could We Ask:

Are there significant gender/region disparities in some treatment pathways?

Could We Ask:

Are there significant gender/region disparities in some treatment pathways?

Sure!

Could We Ask:

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

Could We Ask:

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

No

(Unlikely we have decades of data for a person)

Could We Ask:

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

Could We Ask:

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

No

(No Medicare = Not many older patients)

Could We Ask:

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

Could We Ask:

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

Sure!

Live Coding!

What does claims data look like?