

Data-Driven Inquiry with Existent Observational Assets

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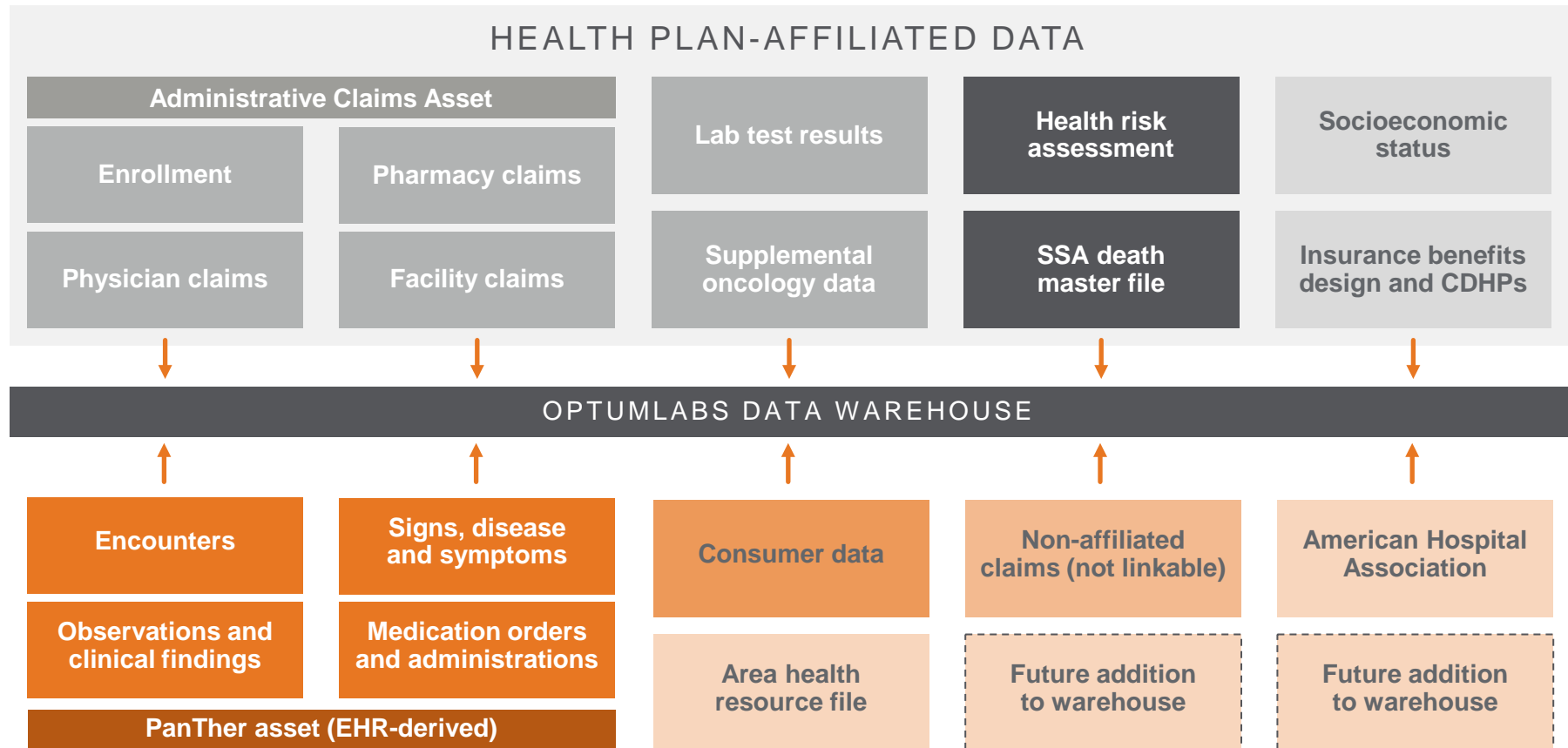


OPTUMLabs®



OptumLabs Data Warehouse

High-level data schema: Linked, de-identified assets



Decision process with an existing RWD asset

Do the required sample & variables exist?

- Population (power, subpopulations)
- Exposure
- Outcome
- Covariates/confounders
- Special issues:
 - Repeated measures
 - Data in relation to an event

What is the quality and provenance of the variables?

- Quality standard given the question, audience, purpose
- Linkage (matching)
- Reliability, validity
- Logical relationships hold
- Data completeness
- Provenance (“chain of custody”) of data
- Sufficient knowledge of the impact of quality issues

Can sources and impact of bias be addressed?

- Missing data
- Representativeness
- Present patient bias
- Special issues:
 - Benefit design
 - State/federal policy
 - Local issues
 - Realities of health care delivery
 - Site-specific care

MMSE: Does the required variable exist? What is the quality?

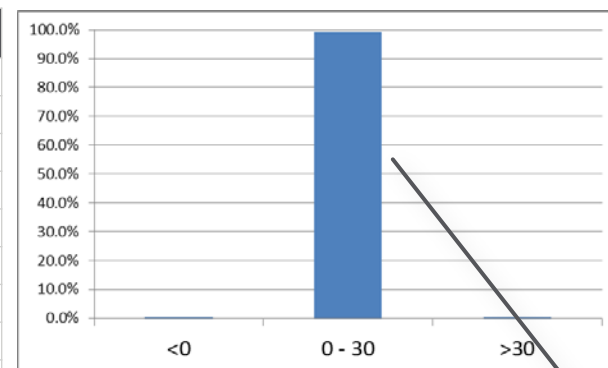
PATIENT ID	NOTE DATE	MEAS_TYPE	MEAS_VALUE	MEAS_DETAIL	NOTES_SECTION	MEAS_DATE
...0001	8-Jul-11	MMSE	28	of 30	Phys Exam	8-Jul-11
...0001	8-Jul-11	MMSE	24	24;30	Objective	8-Aug-10
...0008	10-Oct-12	MMSE	22	score	UNK	11-Jan-04

MEAS_DETAIL	CNT
30	193,040
NA	126,928
30^date=today	8,761
date=today	4,318
28	2,490
31	2,209
#	2,057
20	1,882
score	1,812
27	1,006
29	873
value=10-20	828
total	778
25	754
10	582
3	580

Which "units" do we deem acceptable?

MEASUREMENT_VALUE	CNT
30	60,645
29	40,609
28	33,730
27	28,062
26	23,323
25	20,761
24	17,221
23	15,354
...	
normal	13,133
not performed	12,232
stable	1,273
abnormal	1,199
low	606

Which "values" do we deem acceptable?



Are values in range?

More than 100,000 patients with at least one MMSE in 2012–2015

Table 4. Population with valid MMSE results

	Unique patient count	Cumulative percent	Percent of previous
Unique baseline patients	46,101,387	100	NA
With MMSE test any time	179,904	0.3902	
With MMSE during 2012–15	126,244	0.2738	
... and with valid value	107,346	0.2328	

Among those with at least one valid score, mean of two valid results

Table 5. Sample view of data after cleaning

optum_lab_id	MEAS..._TYPE	MEAS.._DETAIL	MEAS.._DATE	MEAS		
1000aaa	MMSE	30	2014-02-17			
10008bbb	MMSE	30	2012-03-28			
10010ccc	MMSE	30	2012-05-09			
10019ddd	MMSE	NA	2013-12-02	27		0
100304eee	MMSE	30	2012-04-19	30		1
100309fff	MMSE	30	2013-02-11	30		1
100345ggg	MMSE	30	2012-09-19	28		0
100345ggg	MMSE	30	2013-10-11	28		0
100345ggg	MMSE	30	2013-07-02	28		0
100345ggg	MMSE	30	2013-10-11	26		0

Is project-specific cleaning still required?

Missing data and leakage

Example from a linked claims and EHR asset



Each icon is ~1 million patient days



Only in EHR



In both EHR and claims



Only in claims

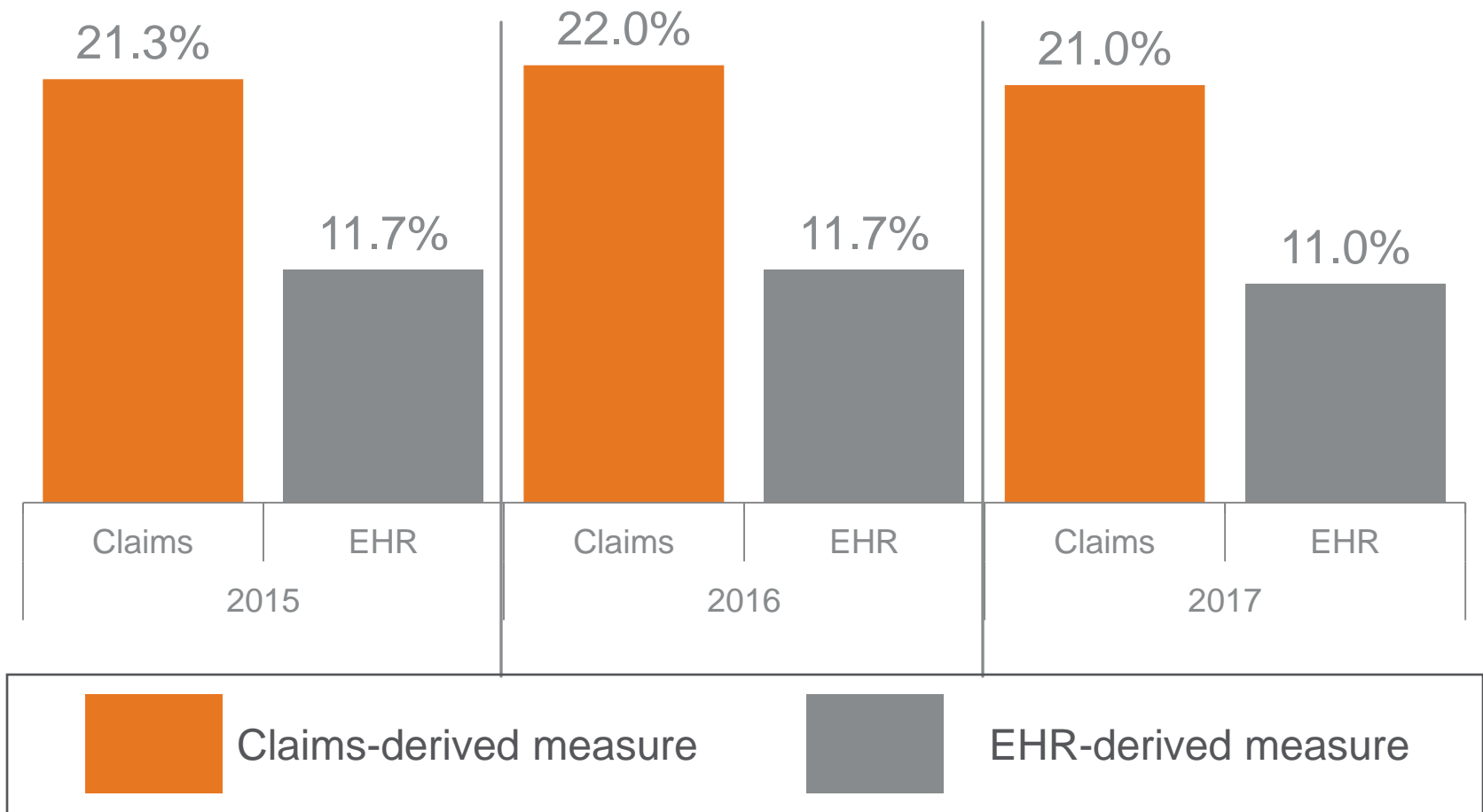
Missing data and leakage

Administration of aspirin during MI

Source	# of AMI hospitalizations	Any meds admin (%)	Meds admin and aspirin use (%)
S0002	483	100.0	97.3
S0008	6,708	82.9	85.5
S0009	7,328	95.1	90.0
S0019	4,150	92.9	92.5
S0020	1	100.0	0.0
S0034	10,351	91.5	94.7
S0039	10,920	99.5	92.1
S0041	15,227	84.3	40.2
S0042	535	99.8	91.9
S0048	3,657	28.4	92.4
S0057	2,584	73.7	69.3
S0058	1,055	89.8	30.7
S0062	2,187	54.1	95.3
S0068	2,217	81.8	94.3
S0069	1,748	90.7	94.5
S0070	2,375	96.4	90.6
Overall	101,388	88.0	83.0

Concurrent Exposure to Opioids and Benzodiazepines

Figure 5. Comparison of administrative claims vs. EHR-derived Indicator 2



Sources of bias: Special issues in RWD

BENEFIT DESIGN AND COVERAGE POLICY



- At-risk contracts
- Evolution in benefit designs
- Rx policy: step-edits, prior authorizations, formulary restrictions
- Capitated services and COEs
- Bundled payments
- Behavioral coverage

DATA FEATURES AND PROCESSING



- Infants attached to mothers' health record
- Coordination of benefits
- Batch billing
- Lack of device brand names
- Lack of drug delivery information from some sites
- Variation in lab processing

FEDERAL, STATE AND LOCAL VARIANTS



- State laws related to specific medications (e.g. opioids)
- Local and pharmacy disease management programs
- Geographic practice variants
- State insurance policy

REALITIES OF HEALTH CARE DELIVERY



- Drug sampling
- Site of service and coverage during clinical trial enrollment
- Site-specific care delivery (e.g., home care, dialysis services)
- Cash pay impact on detecting services

Thank you.

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