

The curious and complementary relationship of the CO APCD and electronic healthcare data from UCHealth

JESSICA TOTH, MSPH – UNIVERSITY OF COLORADO ANSCHUTZ

EDDY COSTA III, SENIOR DATA CONSULTANT – CENTER FOR IMPROVING VALUE IN HEALTHCARE

MICHAEL G. KAHN, MD, PHD - UNIVERSITY OF COLORADO ANSCHUTZ

Nov 6, 2019

Partnership | Thank you



HEALTH DATA
Compass

uchealth



Medicine



CENTER FOR IMPROVING
VALUE IN HEALTH CARE



Aim

- ▶ Describe the various relationships between UCHHealth clinical data and the Colorado APCD.
- ▶ Demonstrate differences and similarities among a linked EHR and APCD cohort.
- ▶ Share the challenges when bridging EHR data and APCD data.

Data sources used

- ▶ Electronic healthcare data source:
 - ▶ UCHHealth: Denver-based adult hospital. 5 million patients in system.
- ▶ All payer claims data source:
 - ▶ Colorado CIVHC (Center for Improving Value for Healthcare)
 - ▶ Collect ~70% of claims in Colorado.
- ▶ Finder File
 - ▶ 2.2 million patients sent to CIVHC.
 - ▶ Clinical relationship
 - ▶ Bi-yearly data exchange between organizations.
 - ▶ 60% match-rate, once matched to claims.

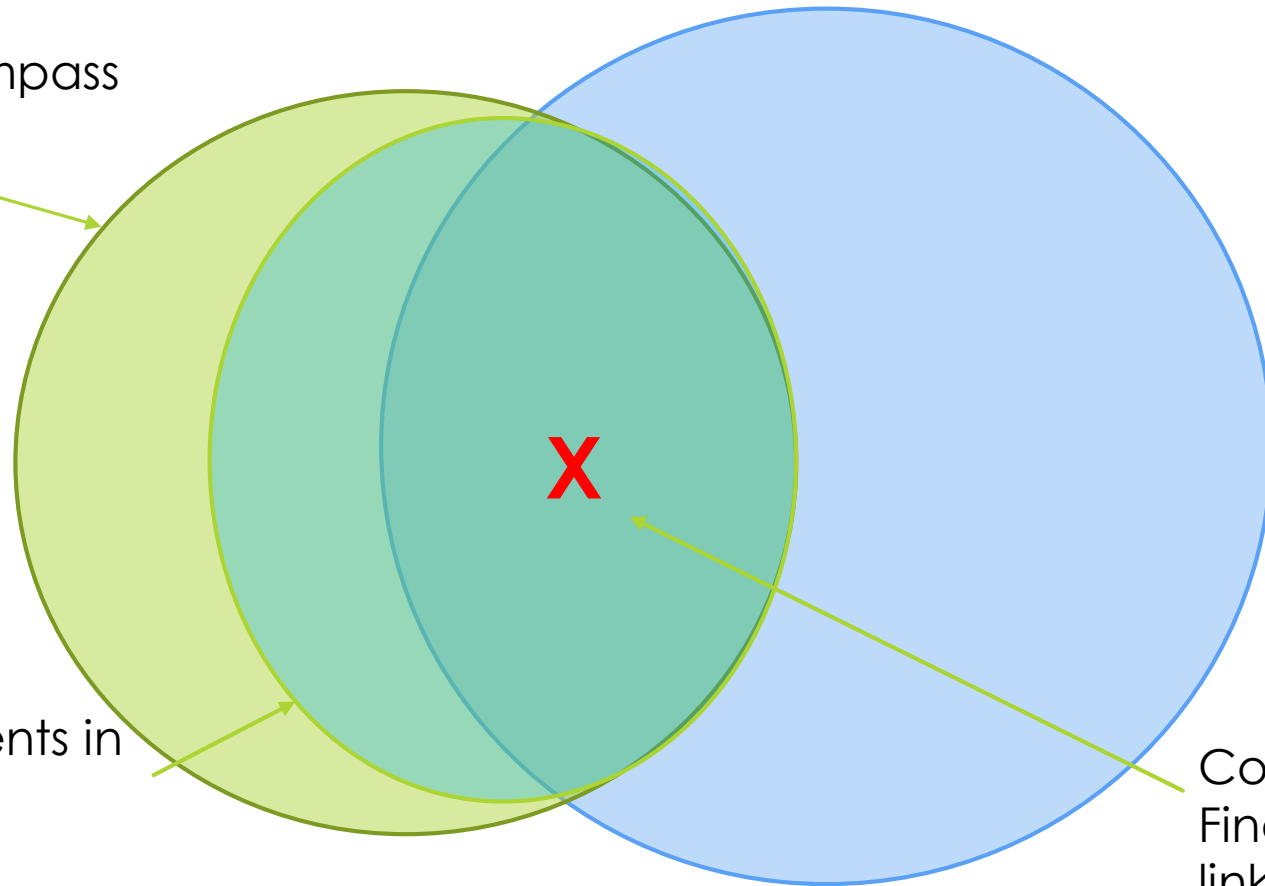
CO APCD and UCHealth data sources

Complete Compass Database

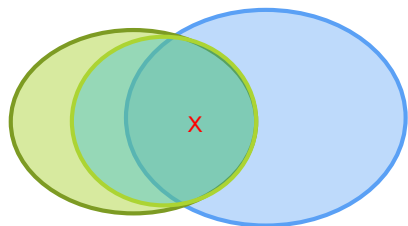
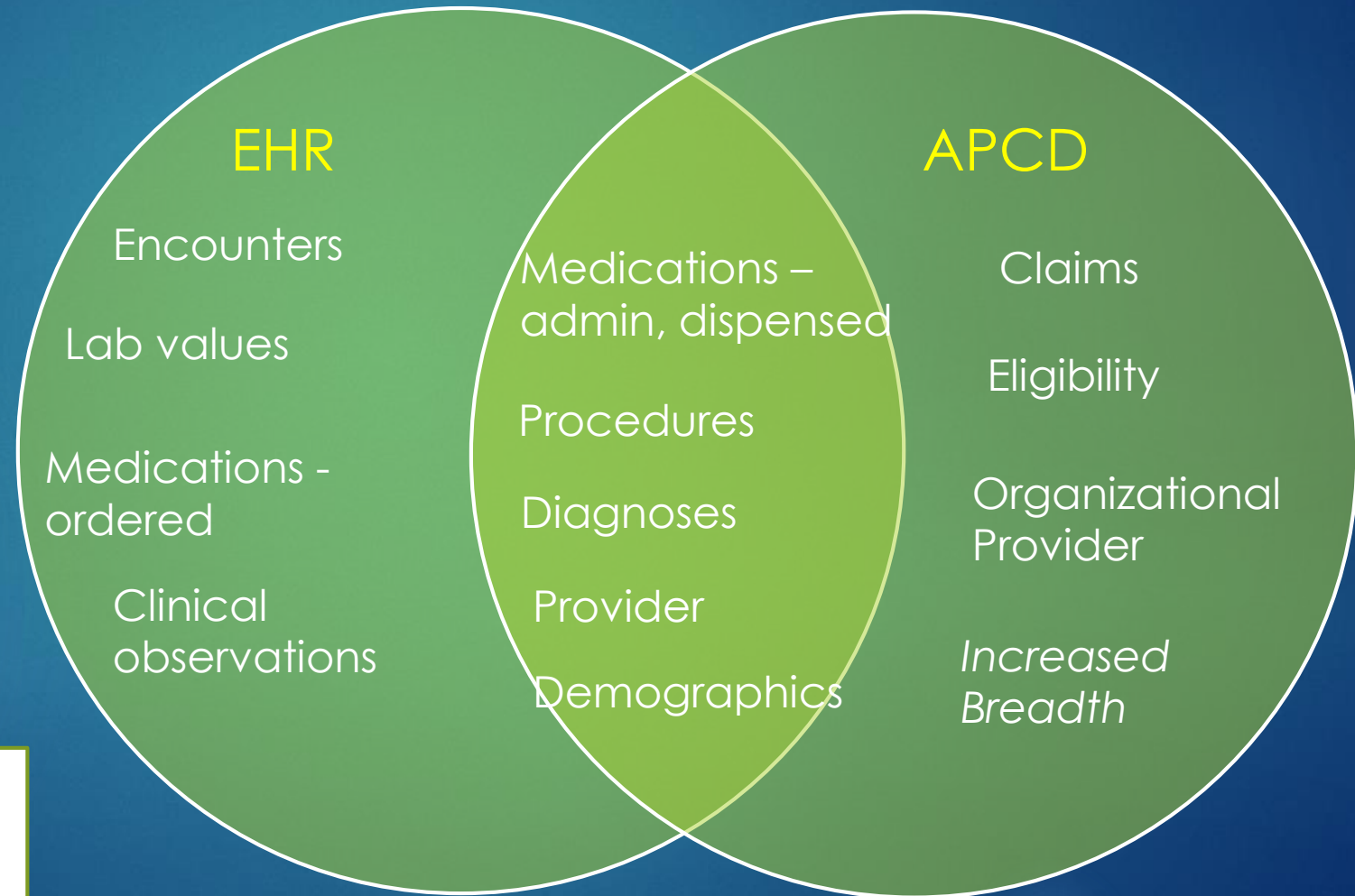
Complete CO-APCD Database

Compass patients in Finder File

Compass patients in Finder File who were linked by CO-APCD



Linked Cohort: Distinct and Shared Domains



APCD Breadth



<u>Dates of service</u>	<u>EHR</u>	<u>APCD</u>
01/13/2018		Ambulatory services
01/15/2018, 02/11/2018, 03/02/2018, 05/13/2018, 07/11/2018, 10/17/2018		Community health center – location 1
11/28/2018, 01/13/2019		Community health center – location 2
04/26/2019	UC Health Radiology	UC Health Radiology

Flowsheets: ED encounter: 2,655 flowsheet rows. 14 minute sample:

8

5:52 pm:

- Skin assessment: Pink, warm, and dry
- ABD assessment: Round, tender, soft.
- Patient/Caregiver language: English
- Acuity: 35
- NPO?: yes
- Last bowel movement: colostomy bag
- GI WNL? No
- Isolation? : Standard
- Respirator WNL? : Yes
- Orientation: Alert, awake, oriented appropriate for age

5:54 pm:

- Care instructions: Room/call light education
- Received acetaminophen last 4-6 hours?: no
- Is pain present? Yes
- Pain scale: verbal
- Pain goal score: 0
- Pain score: 7

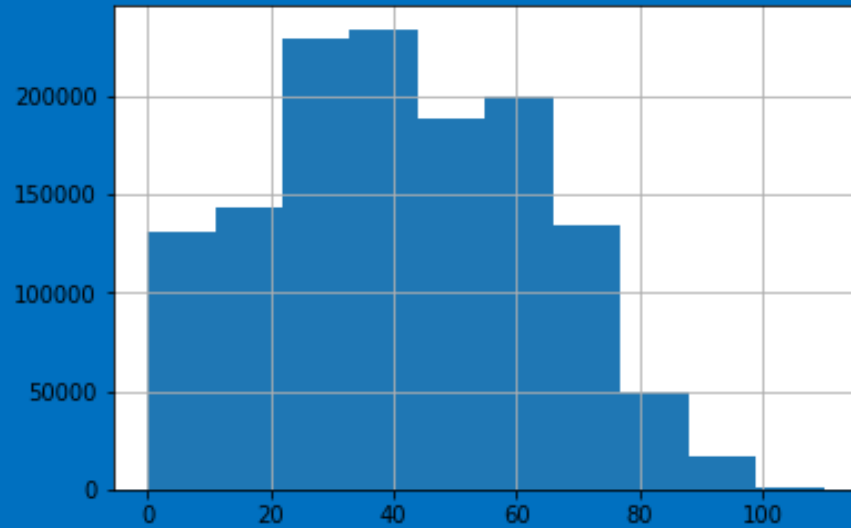
5:40 pm:

- Ebola contact: no
- Country contact: no

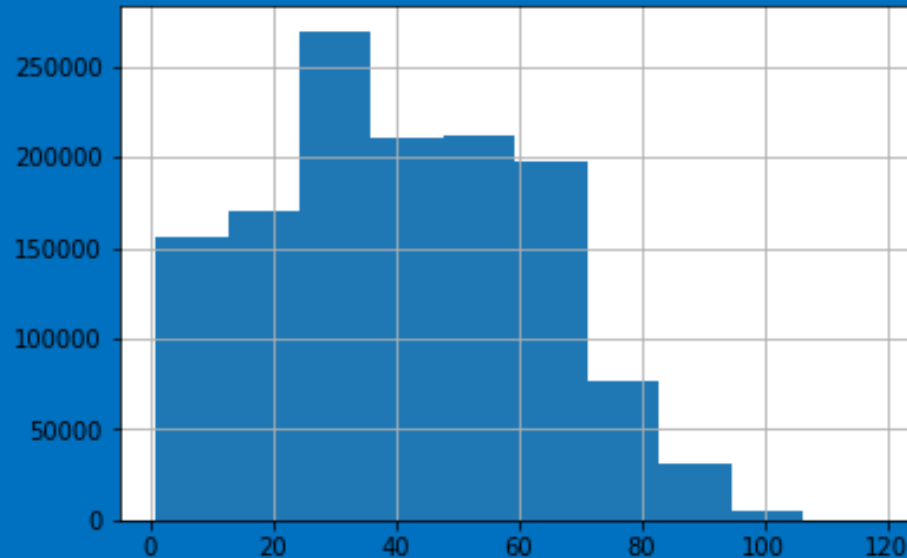
5:53 pm:

- BP: 112/75
- Has hx of asthma, reactive airway disease, wheezing: no
- Pulse: 99
- Recheck vitals: 2 hours
- SpO2: 97
- Temp: 98.1
- Temp source: tympanic
- Barriers to learning: none

Electronic Healthcare Records

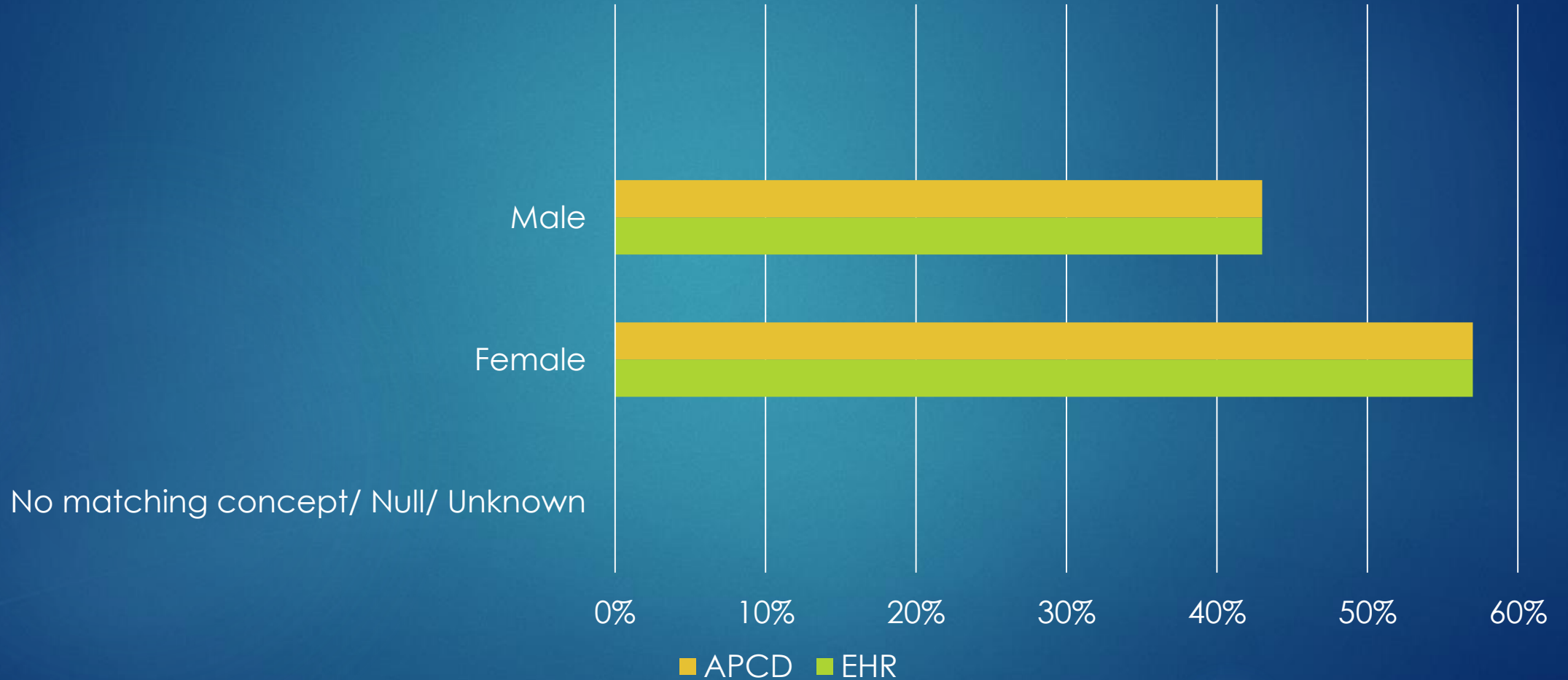


All Payer Claims Data



Age: EHR
&
APCD

Linked Cohort - Gender



Race (in) Congruency

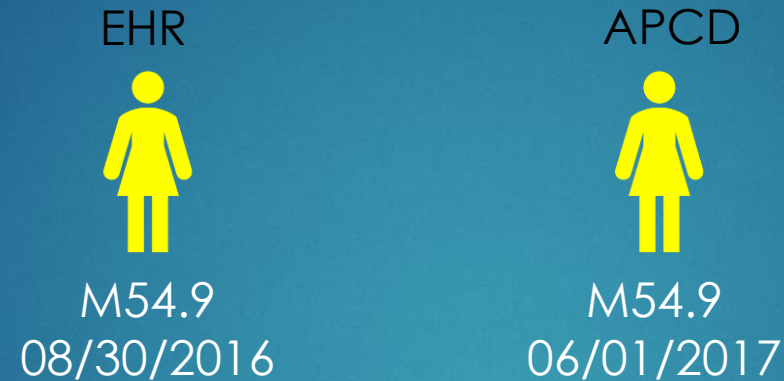
	APCD									
	White	Unknown	Other	Black or African American	Asian	Native Hawaiian or other Pacific Islander	American Indian or Alaska Native	Multiple Race	No Matching Concept/Null	
White	224,948	340,625	178,738	1,767	23,905	804	4,849	10,113	100,304	886,053
Unknown	25,078	60,276	37,771	2,644	3,776	210	1,958	1,735	21,089	154,537
Other	8,312	28,101	77,729	1,728	2,107	464	7,485	1,134	9,685	136,745
Black or African American	1,579	16,971	26,794	38,783	255	137	179	807	5,844	91,349
Asian	975	7,448	5,031	91	7,037	127	45	260	2,478	23,492
Native Hawaiian or other Pacific Islander	198	718	951	22	118	358	69	27	264	2,725
American Indian or Alaska Native	595	1,232	2,039	51	79	221	779	56	339	5,391
Multiple Race	1,788	4,337	8,054	836	424	93	395	183	1,181	17,291
No Matching Concept/Null	3,956	2,184	1,271	411	269	7	57	76	1,201	9,432
	267,429	461,892	338,378	46,333	37,970	2,421	15,816	14,391	142,385	1,327,015

30% congruency in race between EHR and APCD

Linked Cohort – Top 10 Diagnoses (ICD-10)

	EHR	APCD
1	Encounter for general adult medical examination without abnormal findings	Illness, unspecified
2	Essential (primary) hypertension	Other general symptoms and signs
3	Encounter for immunization	Encounter for general adult medical exam w/o abnormal findings
4	Encounter for screening mammogram for malignant neoplasm of breast	Essential (primary) hypertension
5	Acute upper respiratory infection, unspecified	Encounter for immunization
6	Encounter for routine child health examination without abnormal findings	Low back pain
7	Acute pharyngitis, unspecified	Type 2 diabetes mellitus w/o complications
8	Low back pain	Obstructive sleep apnea
9	Type 2 diabetes mellitus without complications	Encounter for routine child health examination without abnormal findings
10	Cough	Hypoxemia

Diagnosis Temporality

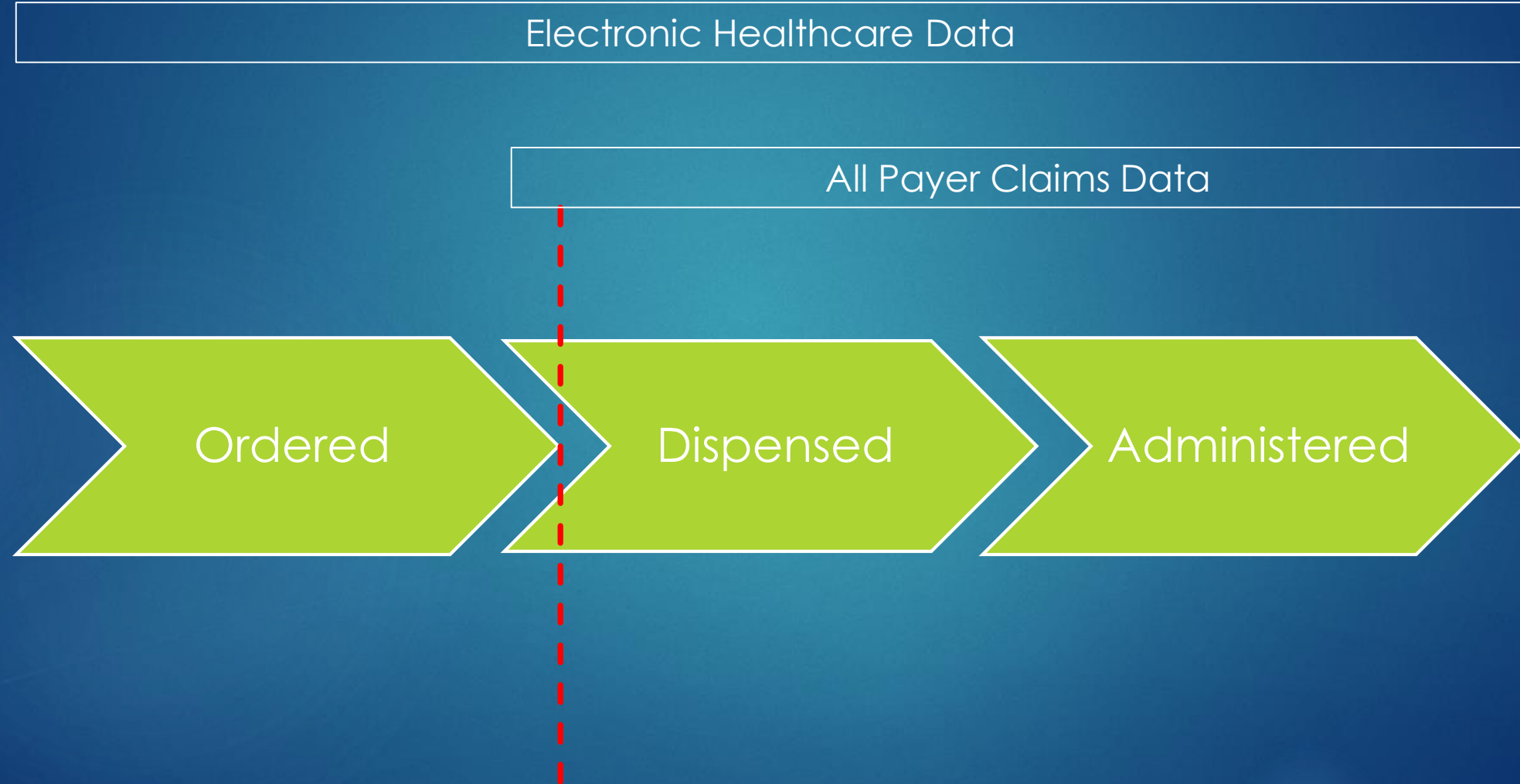


- ▶ The majority of diagnoses (primary) fall on same date between data sources.
- ▶ When that is not the case, diagnoses show up in APCD data first.... 30 days sooner, on average.

Linked Cohort – Top 10 Procedures

	EHR	APCD
1	CBC with auto diff	Behavioral assessment billing
2	Basic metabolic panel	Office or other outpatient visit for the evaluation and management of an established patient
3	Comprehensive metabolic panel	Collection of venous blood by venipuncture
4	CBC no auto diff	20 minutes of neuromuscular re-education
5	Post glucose (bedside)	CBC automated
6	PR collection venous, venipuncture	Manual therapy
7	Magnesium serum	Comprehensive metabolic panel
8	ECG 12 lead	Habitation, residential, waiver.
9	PT/INR	ED visit for the evaluation and management of a patient, which requires these 3 key components: A detailed history; A detailed examination; and Medical decision making of moderate complexity.
10	Phosphorous serum	ED visit for the evaluation and management of a patient, which requires these 3 key components: An expanded problem focused history; An expanded problem focused examination; and Medical decision making of moderate complexity.

Medications



Linked Cohort – Top 10 Medications

	EHR (ordered, administered, billed)	APCD (billed)
1	Sodium chloride 0.9% IV solution	Albuterol Sulfate
2	Ondansetron HCL 4MG/2ML injection solution	Hydrocodone Bitartrate And Acetaminophen
3	Oxycodone 5mg tablet	Oxycodone HCl/acetaminophen 5 mg-325 mg ORAL TABLET
4	Fentanyl 50 mcg/ml injection solution	Tramadol Hydrochloride, 50 mg, 1000
5	Oxycodone-acetaminophen 5mg	Hydrocodone Bitartrate / Acetaminophen 5 mg - 325 m
6	Hydrocodone 5mg-acetaminophen 325 mg	Albuterol Sulfate (Ventolin HFA)
7	Insulin lispro 100 unit/ML subcutaneous solution	Fluticasone Propionate
8	Lactated ringers IV solution	Oxycodone And Acetaminophen
9	Heparin, porcine 5,000 unit	
10	Sodium chloride flush injection syringe	Tramadol Hydrochloride, 50 mg 500

Encounter and Claims, Linked?

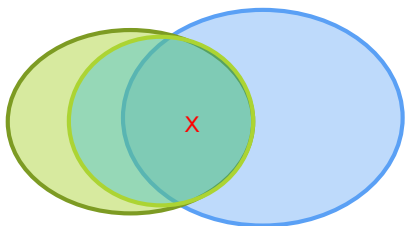
1,327,010 million patient/members with 46 million claim/encounter combinations

Encounter date = Claim date: 888,392 people

Encounter date ~ Claim date: 934,195 people (+/- 5 days)

Encounter date <> Claim date: 1,322,055 people

Missing date: 117,326 people



Encounter and Claims, Linked?

APCD/EHR Date Relationship	Cohort (% of Total Cohort)	APCD. NPI = EHR. NPI
Encounter date = Claim date	888,392 (67%)	82%
Encounter date ~ Claim date	934,195 (70%)	80%
Encounter date <> Claim date (+/-5days)	1,322,055 (99%)	48%

Conclusion

- ▶ The Curious – race, for example
- ▶ The Complementary
 - ▶ Breadth meets Depth
 - ▶ Orders -> Administration
 - ▶ Procedures
 - ▶ Medications
- ▶ Data-source specific concepts
 - ▶ Eligibility
 - ▶ Observations
- ▶ The case for claim identifiers