

Electronic Health Records And Population Health: A Regional Collaboration

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Overview

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- Problem Statement
- Solution Approach
 - Partnership
 - Infrastructure
 - Tools
- Results
- Conclusions

Problem Statement



- We have seen little value from federal investments in healthcare information systems
- EHRs has generated a ton of health data and created data overload
- Few tools exist to express EHR data as usable population health information
- Existing tools are focused on services lines or organizations rather than population health

If You Remember 3 Things...

There is value to be gained from using EHR data in regional partnerships



Healthcare providers will voluntarily contribute their data towards population health

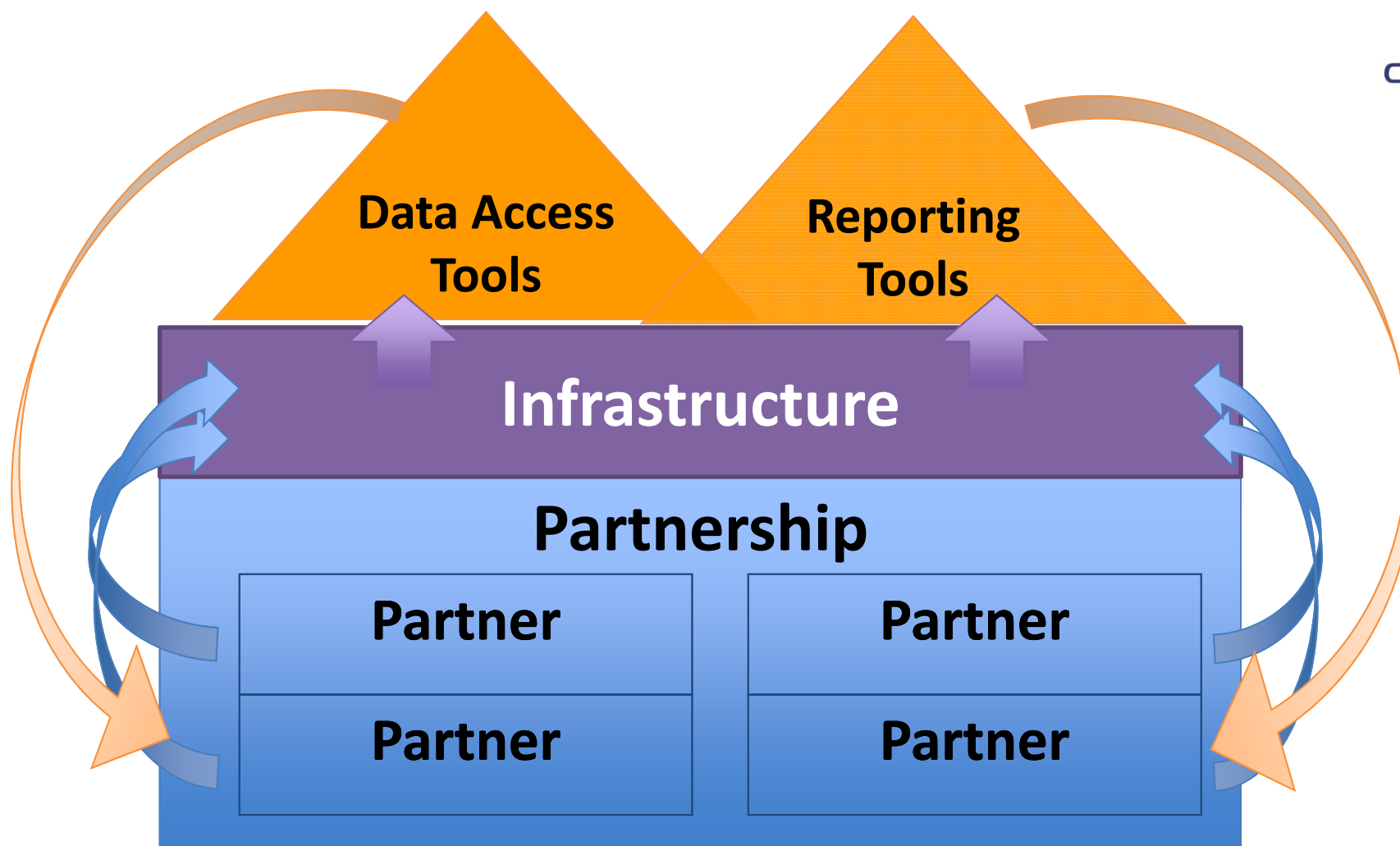
Public health has an important role to play to convening this diverse group

Solution Approach

Denver Public Health partnered with a handful of local healthcare providers, a managed care group, and the Colorado Clinical Translational Sciences Institute to develop and implement a common information infrastructure

- Approach: Regional distributed EHR data network
- Focus: Public Health Surveillance
- Topics: Chronic Disease
- Output: Disease agnostic distributed network platform
- Outcome: Extensible population health monitoring tools

Conceptual Model



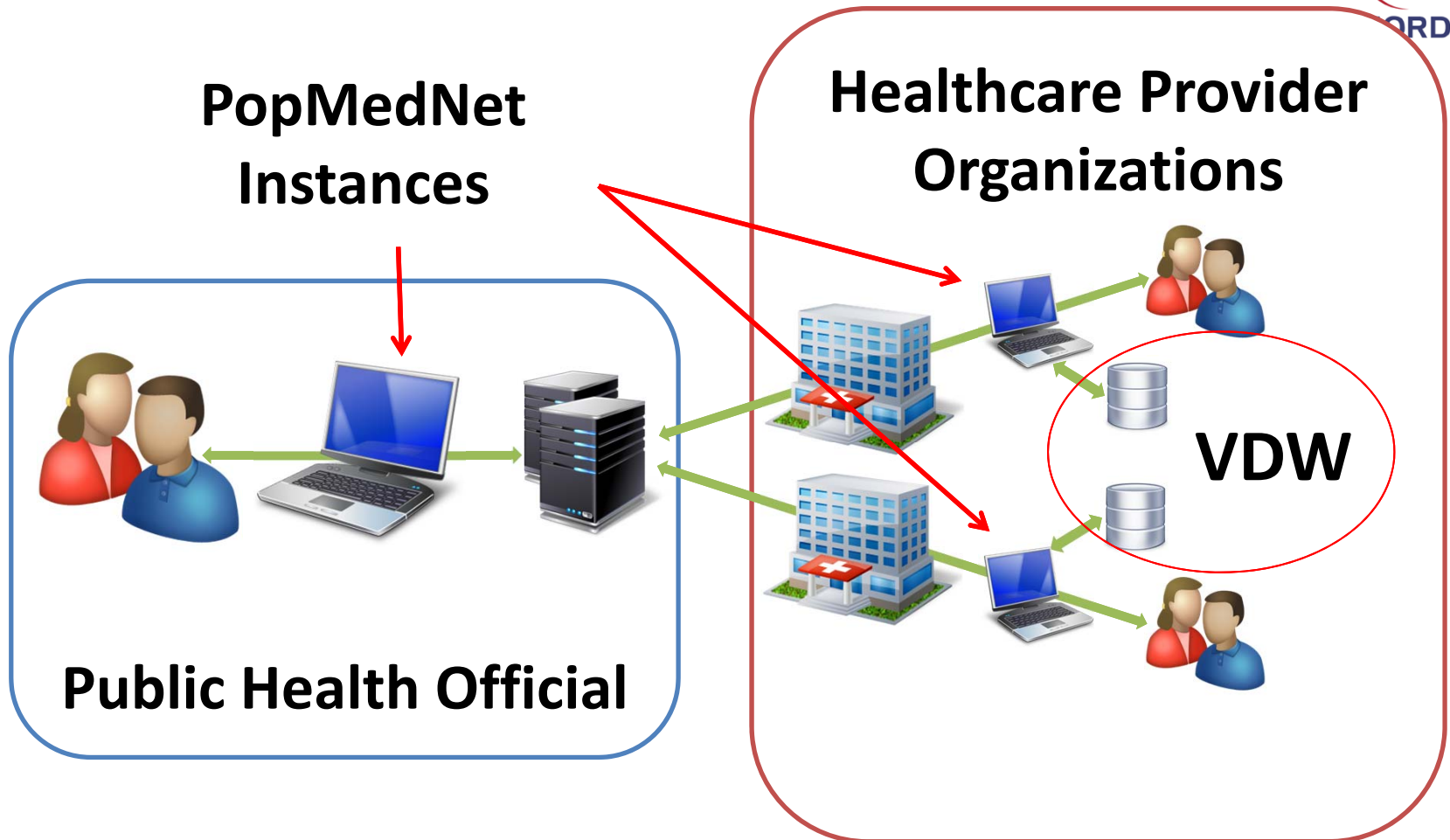


- Identify Partners (stakeholders, ends users, and data contributors)
- Convene to establish shared goal and focus
- Develop governance principles and policies
 - Implement a regulatory approach (to IRB or not to IRB)
 - Draft and execute data use agreements (DUA)
 - Distribute voluntary data contribution letter from local public health departments
- Define guiding principles for infrastructure and data sharing



- Translate guiding principles to functional requirements
 - Data model requirements
 - Query tool requirements
- Convene technical experts and evaluate distributed models (local distributed network framework)
- Collaboratively define and distribute infrastructure work plan, roles, tasks, and milestones
- Support your site implementations
- Collect feedback from implementing partners

Details about Infrastructure



1. Clinical measures with demographic and geographic attributes are extracted from each data partner through a query
2. Query aggregates sites data into analytic dataset and attributes each observation to a geographic unit
3. Data is cleaned and transformed to express indicator
 - Dataset is unduplicated
4. Data is visualized/mapped
 - Exclude records that cannot be geocoded
 - Dynamic meta-data is generated

- *Dates and excluded values*

Results

How many people are tracked in CHORDS?
What public health questions can be asked?
What does the data say?

- Local PMN hub built by University of Colorado's shared informatics resource
- 11 healthcare organizations have a DUA, a VDW, and installed PopMedNet
- Hybrid funding model: 100% soft funded through 4 funding lines (state and federal)
- Chronic disease monitoring dashboards in development for obesity, tobacco, and cardiovascular disease trends.

Population Health Topics	Key Indicators
Obesity	% of children and adults obese
Tobacco Use and Exposure	% of adults using tobacco % of children exposed to second hand smoke
Cardiovascular Disease Risk	% of adults with hypertension % of adults with hyperlipidemia % of eligible adults on a statin
Mental Health	% of Denver adults diagnosed with depression

Results | Tools

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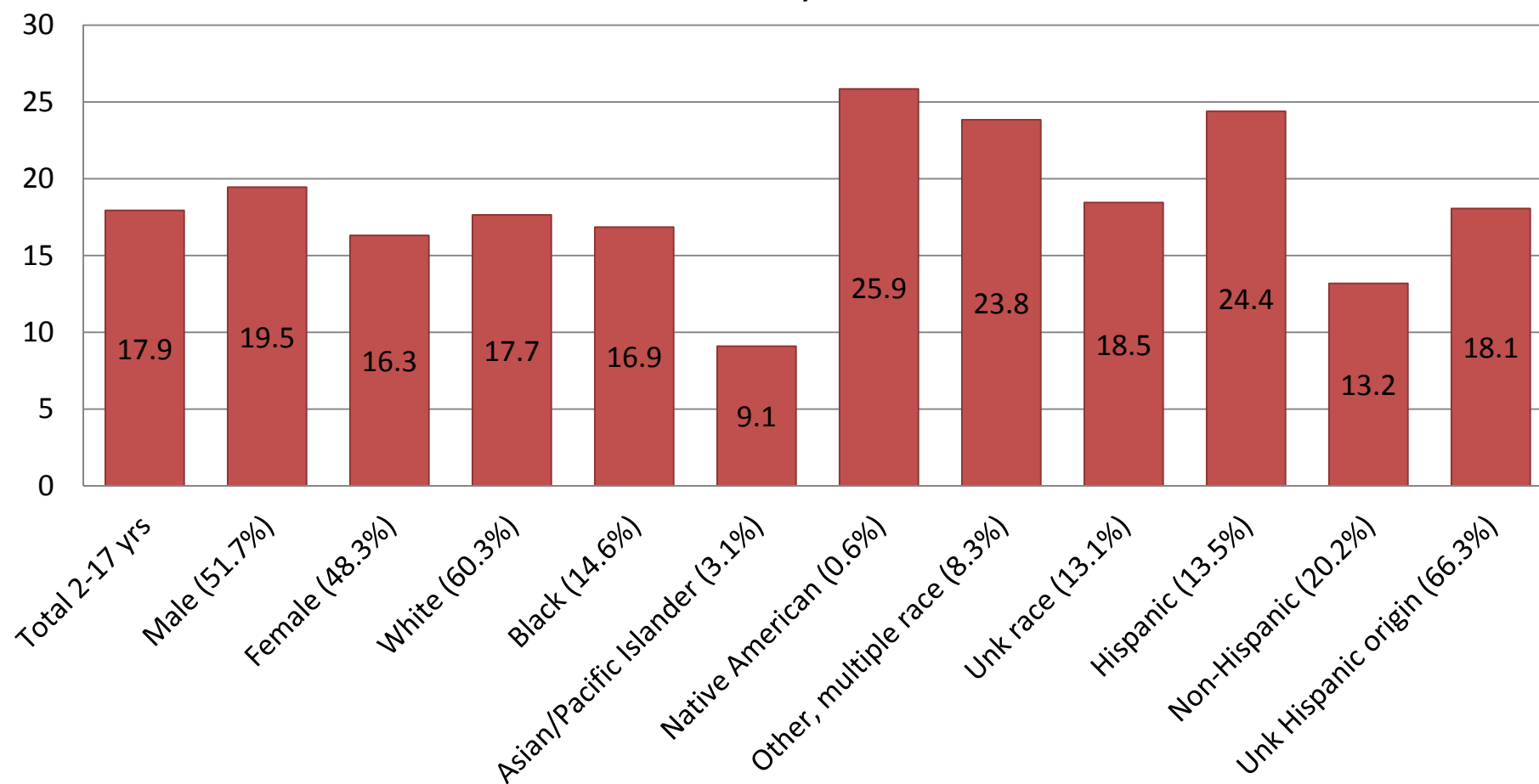
Results | How Many People?



CHORDS Sites	Clinical Data Start Date	CHORDS Registrants
Site 1	1/1/2005	937,000
Site 2	1/1/2011	959,616
Site 3	1/1/2012	731,978
Site 4	1/1/2008	131,519
Site 5	1/1/2009	233,909
Site 6	10/13/2013	6212
Site 7	1/1/2011	4650
Site 8	1/1/2006	257,703
Site 9	1/1/2009	36,407
Site 10	1/1/2010	14,004
Total		3,312,998

Results | Childhood Obesity

**BMI Monitoring %Obese Children 2-17 yrs old
Race and Ethnicity, 2009-2014 (% total sample)
n = 100,268**



Results | Representativeness



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Demographics	Denver County Individuals	% Total
Girls	48,412	48%
Boys	51,856	52%
Race/Ethnicity		
White	60,471	60%
Black	14,585	15%
Hispanic	13,541	14%
Other	12,072	12%
Age Group		
2-4 years	19,420	19%
5-10 years	36,358	36%
11-17 years	44,490	44%

Results | Adult Tobacco Use

CHORDS Dataset	2011	2012	2013	2014
Adults (18 and above)	176,250	201,807	227,119	232,214
Females	108,103	124,597	140,642	147,912
Males	68,147	77,210	86,477	84,302
Race/Ethnicity				
Black	13,259	14,639	15,553	17,311
Hispanic	36,685	40,604	43,031	46,942
Other	22,609	26,186	32,528	25,483
White	103,697	120,378	136,007	142,478

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Tobacco Prevalence (Denver Metro)				
Overall Adults (18 and above)	15.8%	14.9%	13.9%	12.7%
Females	14.0%	13.1%	12.0%	11.2%
Males	18.7%	17.8%	16.8%	15.2%
Race/Ethnicity				
Black	26.4%	26.0%	24.9%	23.0%
Hispanic	17.4%	16.6%	15.4%	14.4%
Other	14.2%	14.1%	13.9%	11.1%
White	14.2%	13.2%	12.1%	11.1%

Results | Weighing Denver Tobacco Use



Age Group	Observed Tobacco Users	Observed person	Unweighted Prevalence	Census Population	Projected Patients
18-19	190	1541	12%	14760	1820
20-24	747	4271	17%	47688	8341
25-34	2072	11900	17%	122830	21387
35-44	1986	11611	17%	89763	15353
45-54	2878	11482	25%	72476	18166
55-64	2749	12490	22%	61473	13589
65+	1427	15738	9%	62132	5634
Total	12049	69033	17.45%	471392	84290

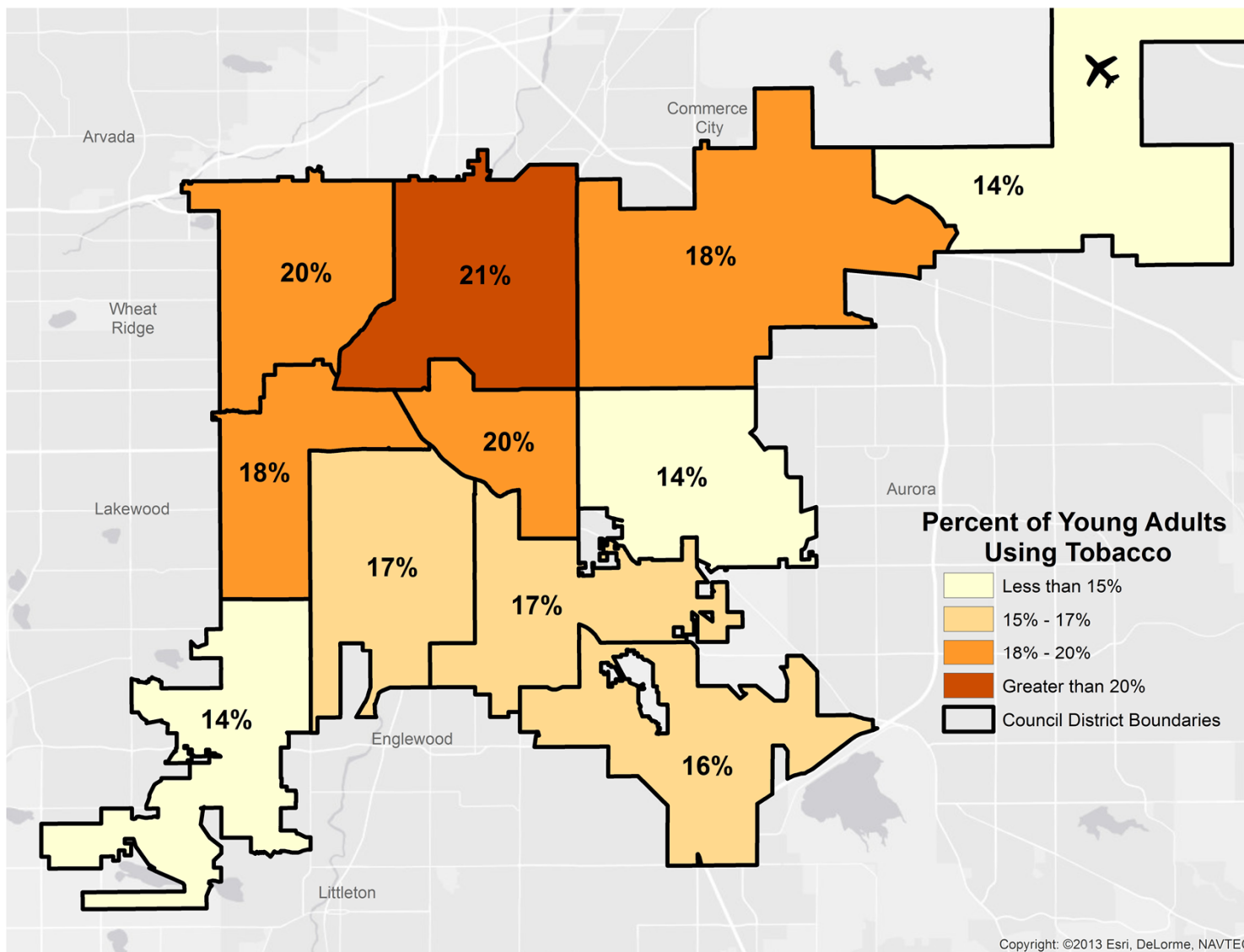
2014 Unweighted prevalence: $12049/69033 = 17.45\%$

2014 Age group weighted prevalence: $84290/471392=17.88\%$

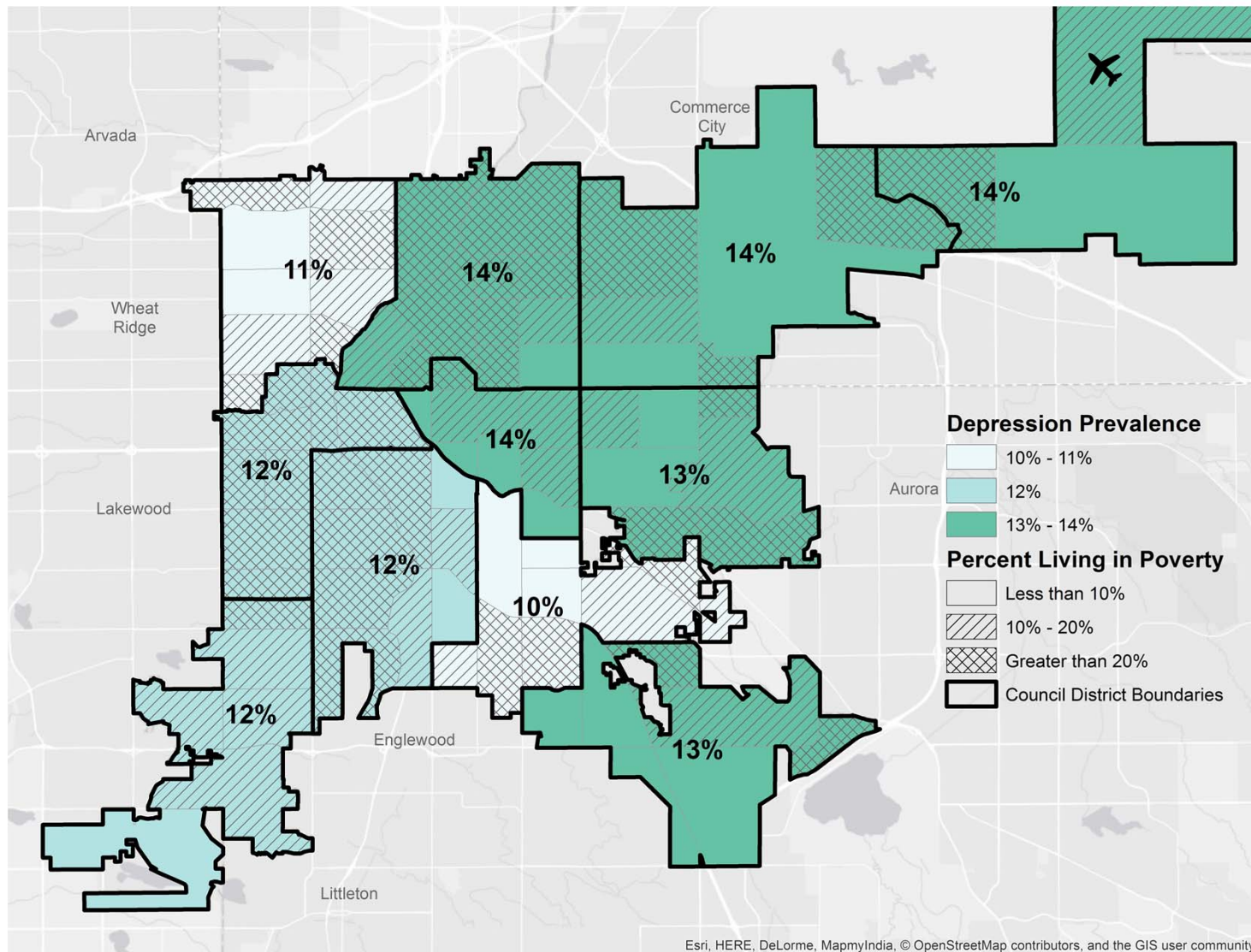
2014 Age and gender weighted prevalence: $92777/471392=19.68\%$

Geographic Trends

Young Adult Tobacco Use



Adult Depression Prevalence



Conclusions

- EHR data provides robust and valuable population health data and enables granular analysis
- A framework to extract, aggregated, and transform EHR data for population health surveillance is feasible and extensible
- Successful aggregation of health data is highly predicated on building trust
- Visualization tools for EHR data are actionable and exciting but best practices are limited

Local Challenges

- Funding
- What does accuracy mean?
- What does validation look like?
- Including providers big and small
- Duplication/Individual attribution
- Messaging population health to a broader audience



Back to 3 Things...



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Acknowledgements

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Metro Community Providers Network	High Plains Health Center

Questions?

Please visit us at chordsnetwork.org for more information

