Integrating ACS Data with Electronic Health Records: Using Community Vital Signs to Investigate Health-Related Outcomes

Presented by:
Sophia Giebultowicz, MA,
Research Analyst at OCHIN, Inc.

WE ARE OCHIN

OVERVIEW

- What is OCHIN?
- OCHIN Research
- ADVANCE and ACS Data
- BACKGROUND as Example

OCHIN

OCHIN OVERVIEW

WHAT IS OCHIN?

OCHIN is a **nonprofit health care innovation center** designed to provide knowledge solutions that promote quality, affordable health care to all.

Technology

Best-of-breed technologies targeted to the needs of the safety net and health care transformation

Data Analytics
Electronic Health Records
Networking & Broadband
Telehealth

Research

Research focused on improving the health of underserved populations, enhancing quality of care and informing health policy

Health Systems
Practice Transformation
Health Policy
Social Determinants of Health

Services

Professional services that range from clinic operational support to strategic planning

Billing
Compliance & Security
Consulting
Staff Augmentation

OUR MEMBERS

Federally Qualified Health Centers

- Public or private nonprofit, charitable, tax-exempt organizations that receive funding under the Public Health Services Act and provide comprehensive and preventive care to persons of all ages regardless of their ability to pay or health insurance status

Private Clinics

- Clinics controlled by a practitioner and operated for profit, which provide primary care or specialty services

Academic Health Centers

- Institutions that consist of a medical school, at least one other health professions school or program, and at least one affiliated or owned teaching hospital

Rural Health Clinics

- Public, private, or nonprofit clinics located in a rural, medically under-served area that provide primary care services

Local Health Department Clinics

- Clinics supported by public funds to provide primary care and preventive health services

OCHIN MEMBER SERVICES TO PATIENTS

PRIMARY CARE	MENTAL HEALTH	DENTAL	PUBLIC HEALTH	IN-PATIENT
24 HOUR EMERGENCY	EARLY CHILDHOOD	SCHOOL-BASED HEALTH	ANCILLARY SERVICES	CASE MANAGEMENT
SOCIAL WORK	VISION	NATUROPATHIC MEDICINE	HIV MEDICAL CARE	HEALTHCARE FOR HOMELESS

OCHIN RESEARCH OVERVIEW

OCHIN RESEARCH

OCHIN is committed to building the nation's leading primary care focused network for health services, outcomes, and policy research with vulnerable and underserved communities.

Our aim is to equitably improve health, enhance care, and inform policy through research.

OUR NETWORK

3,641,037
Patients

97
Health Systems

15
States

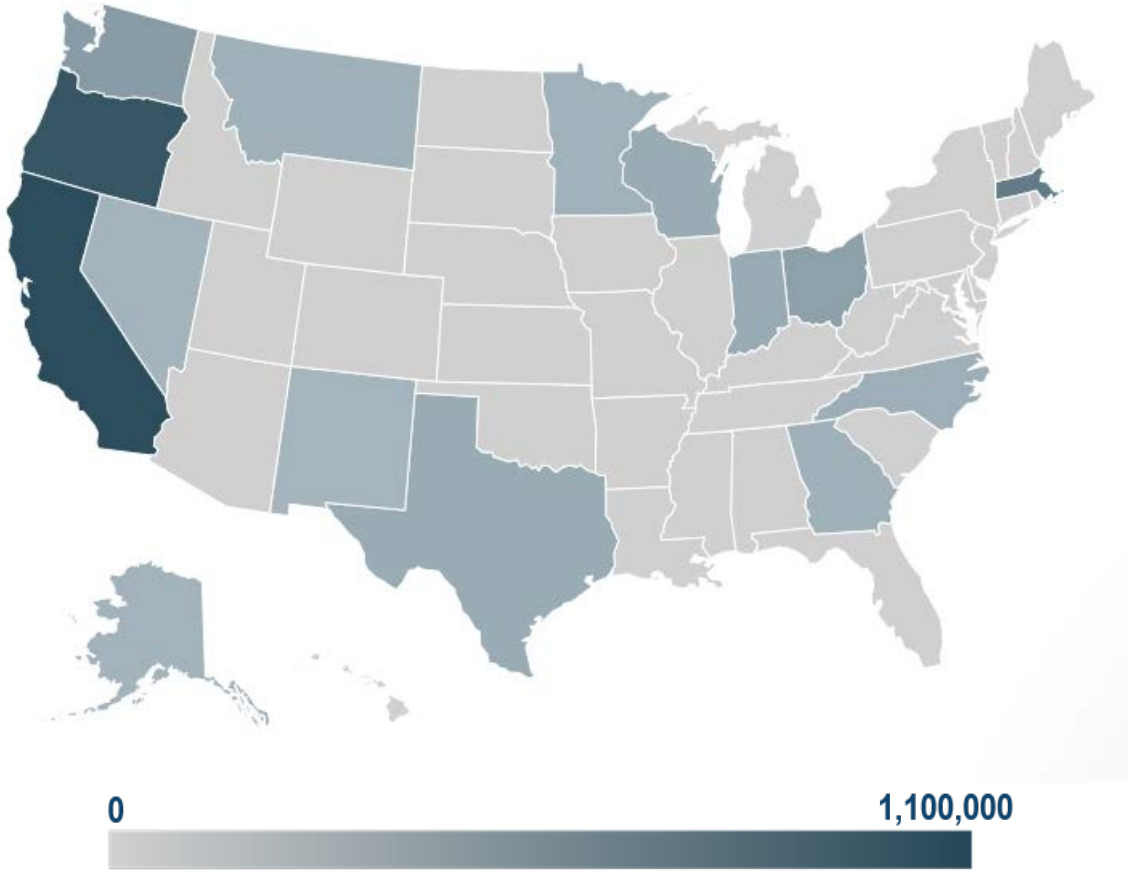
519
Clinic Sites

56.2%
FEMALE PATIENTS

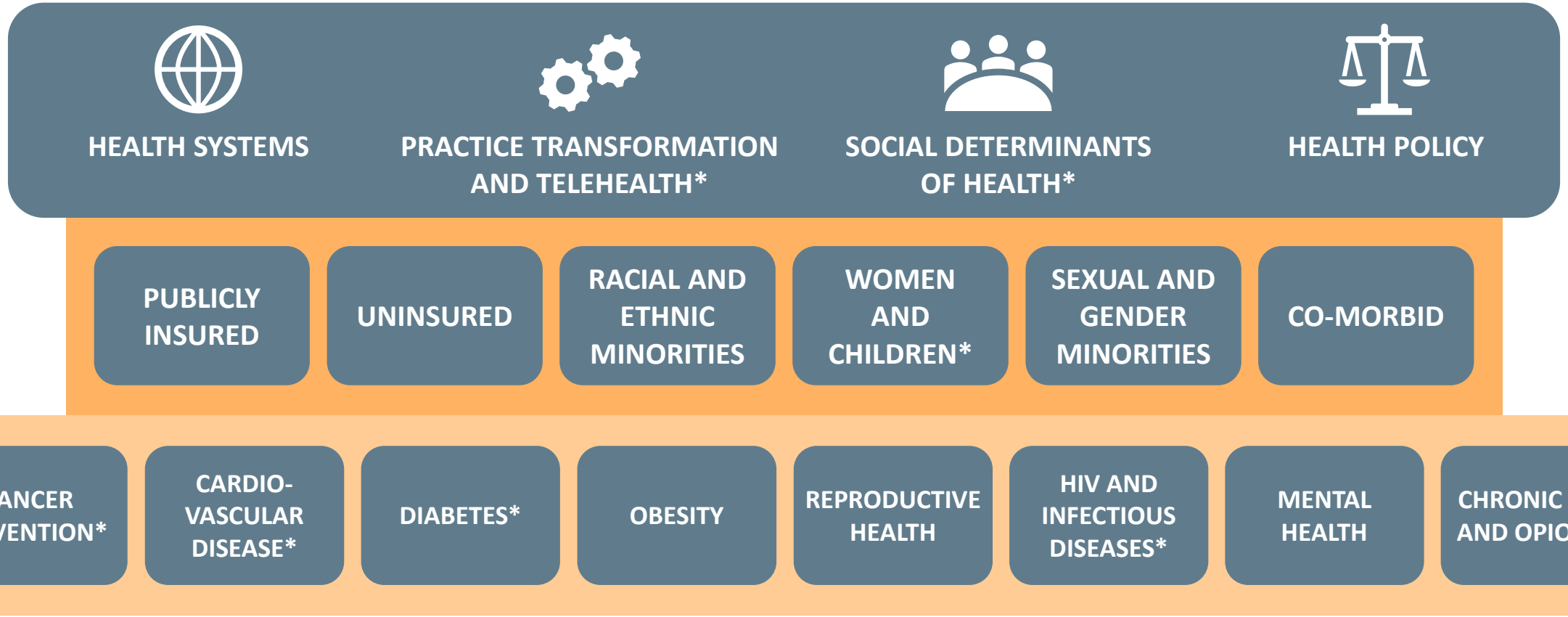
26.5%
PATIENTS UNDER 18

22.9%
UNINSURED PATIENTS

Patient Distribution by Clinic's State



OCHIN RESEARCH PRIORITY AREAS

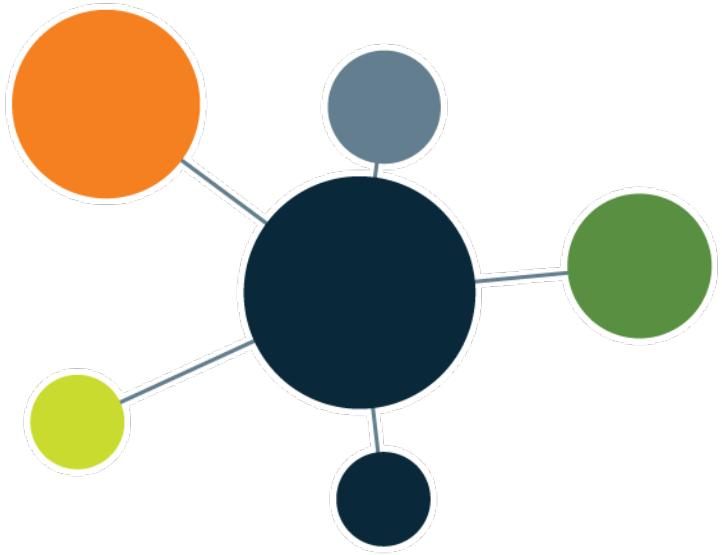


*OCHIN clinical quality metrics and organizational priority areas

We are one of a just few organizations currently capturing aggregate **health care data and statistics on low income and uninsured populations.**

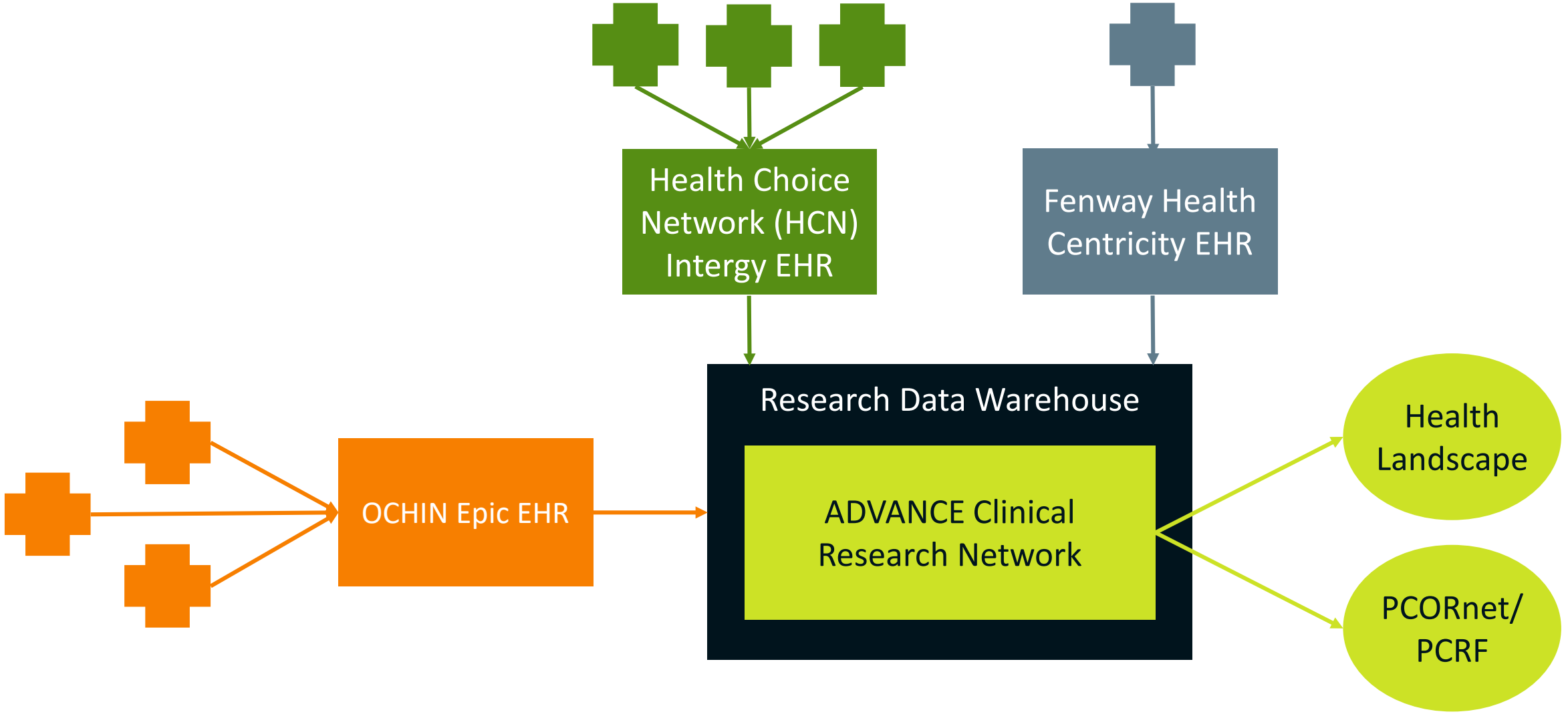
We have one of the nation's **most diverse patient databases of Medicaid-insured and uninsured individuals**

Our **centralized expertise** and **collaborative of innovative organizations** enables us to develop and test information technology tools.



ADVANCE

EHR DATA FOR RESEARCH USE



ADVANCE COLLABORATIVE

The OCHIN-led ADVANCE Clinical Data Research Network is the most comprehensive database on healthcare and outcomes of safety net patients in the U.S.

4,530,563
Patients

134
Health Systems

24
States

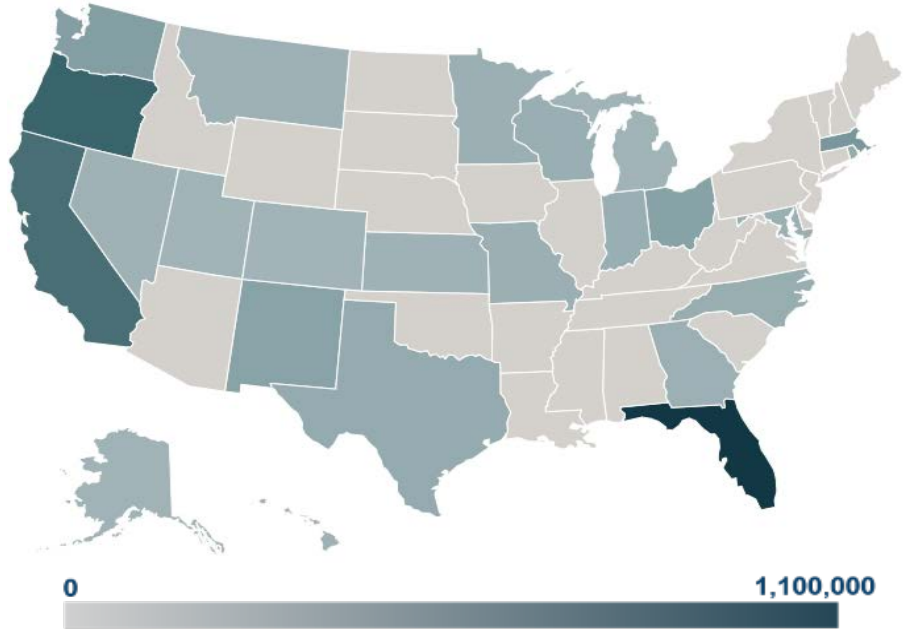
1,116
Clinic Sites

55.8%
FEMALE PATIENTS

26.9%
PATIENTS UNDER 19

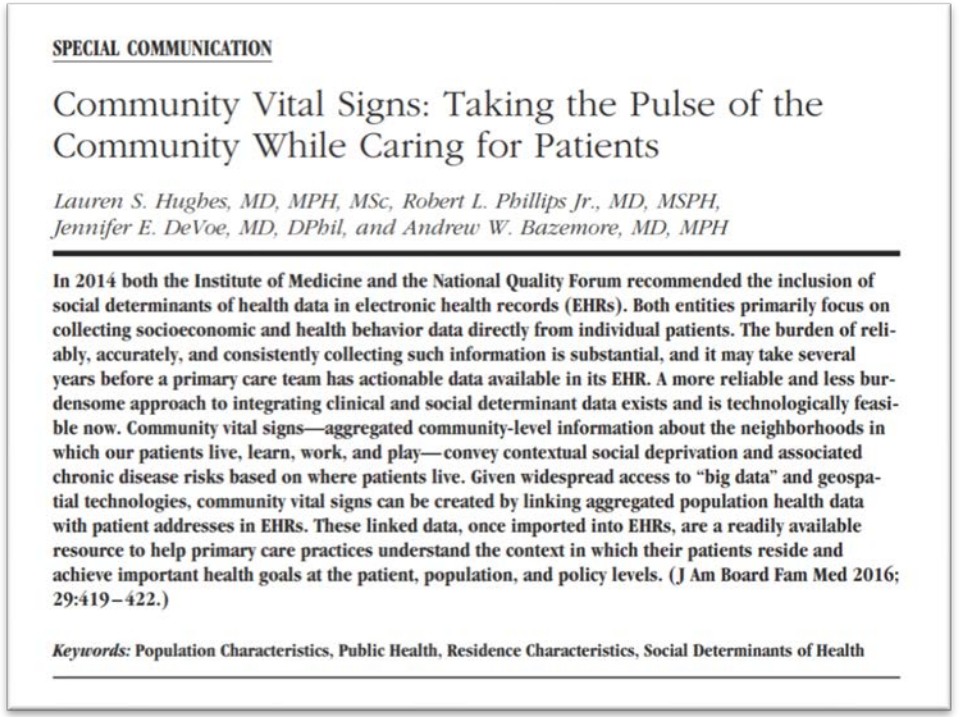
19.6%
SPANISH SPEAKING

Patient Distribution by Clinic's State



COMMUNITY VITAL SIGNS (CVS)

- Relatively New for Clinical Data
  - Context matters
  - Using neighborhood-level variables
  - Linking to patient addresses
- Robert Graham Center + Health Landscape
  - Partnership through ADVANCE
  - Geocoding and aggregated data (including ACS) that is integrated w/ Research Data Warehouse



SPECIAL COMMUNICATION

Community Vital Signs: Taking the Pulse of the Community While Caring for Patients

Lauren S. Hughes, MD, MPH, MSc, Robert L. Phillips Jr., MD, MSPH, Jennifer E. DeVoe, MD, DPhil, and Andrew W. Bazemore, MD, MPH

In 2014 both the Institute of Medicine and the National Quality Forum recommended the inclusion of social determinants of health data in electronic health records (EHRs). Both entities primarily focus on collecting socioeconomic and health behavior data directly from individual patients. The burden of reliably, accurately, and consistently collecting such information is substantial, and it may take several years before a primary care team has actionable data available in its EHR. A more reliable and less burdensome approach to integrating clinical and social determinant data exists and is technologically feasible now. Community vital signs—aggregated community-level information about the neighborhoods in which our patients live, learn, work, and play—convey contextual social deprivation and associated chronic disease risks based on where patients live. Given widespread access to "big data" and geospatial technologies, community vital signs can be created by linking aggregated population health data with patient addresses in EHRs. These linked data, once imported into EHRs, are a readily available resource to help primary care practices understand the context in which their patients reside and achieve important health goals at the patient, population, and policy levels. (J Am Board Fam Med 2016; 29:419–422.)

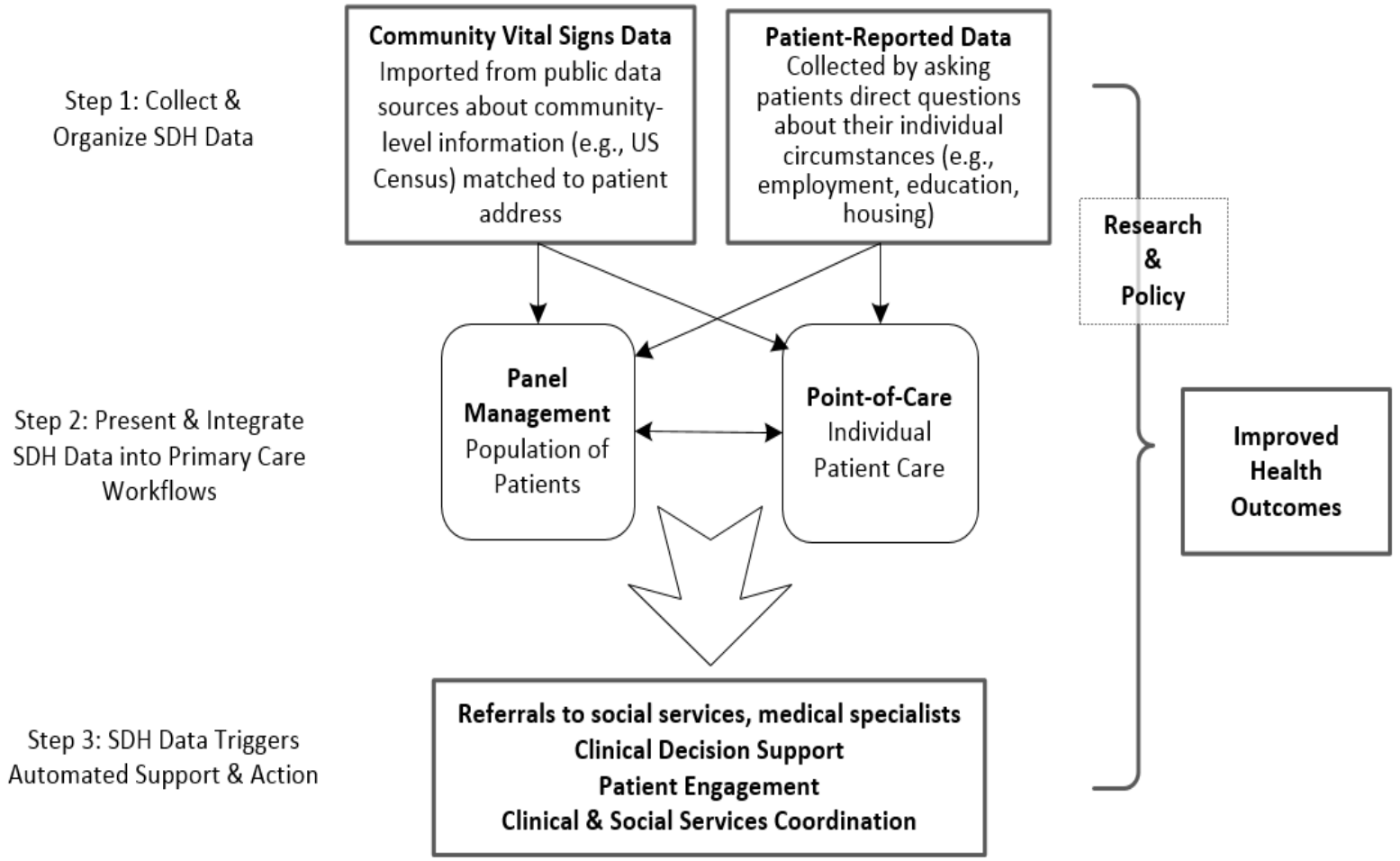
Keywords: **Population Characteristics, Public Health, Residence Characteristics, Social Determinants of Health**

Community Vital Signs: Taking the Pulse of the Community While Caring for Patients
Lauren S. Hughes, Robert L. Phillips, Jennifer E. DeVoe, Andrew W. Bazemore
J Am Board Fam Med May 2016, 29 (3) 419-422; **DOI:** 10.3122/jabfm.2016.03.150172

GEOCODING AND CVS DATABASE

- Initial load included all current and historic addresses for OCHIN patients (> 2 million addresses)
- Over 130 CVS variables integrated
- Currently performing quarterly updates
- Moving toward close-to-real-time model (i.e., update geospatial data at moment of address update)

CONCEPTUAL MODEL OF SDH IN PRIMARY CARE



See DeVoe JE, Bazemore AW, Cottrell EK, Likumahuwa-Ackman S, Grandmont J, Spach N, Gold R (2016). Perspectives in Primary Care: A Conceptual Framework and Path to Integrating Social Determinants of Health Into Primary Care Practice. *Annals of Family Medicine*, *14*(2).

PEOPLE, HEALTH, AND PLACE

The ADVANCE Research Data Warehouse Includes:

Demographics
Patient information, such as date of birth, sex, race, hispanic ethnicity, etc.

Encounter
Encounter type, date, provider, location, discharge disposition, etc.

Diagnosis
Diagnosis code(s) associated with each encounter.

Procedures
Procedure code(s) associated with each encounter.

Prescribing
Rx order information such as order date, start date, end date, RxNorm CUI, refills, quantity, etc.

Vital Signs and Smoking Info
Measure date, weight, height, blood pressure, smoking/tobacco status, etc.

Death Date and Cause
Death date and associated cause of death diagnosis.

Lab Results
Result date, result value, units, normal range, LOINC, etc.

Condition
Problems list and medical history diagnoses. Report date, onset date, resolved date, etc.

Dispensing
Medication dispensing records for publicly and privately insured patients. Dispense date, NDC, amount, etc.

Community Vital Signs
Community indicators at the census track, ZCTA and/or county levels such as census indicators. These indicators have been linked to current and historical patient addresses.

Patient Reported Outcomes
Screening tool scores such as PHQ, DAST, SBIRT, AUDIT, etc.

AMERICAN COMMUNITY SURVEY DATA

- Consistent source of data for US neighborhoods
  - Census tract address linked for 85-90% of patients
  - ZCTA and county linkages as well
  - Socioeconomic and demographic data
- Social Deprivation Index* - RGC
  - Composite measure of area-level deprivation based on seven demographic characteristics
  - One “powerful” indicator of social and geographic context

*Butler DC, Petterson S, Phillips RL, Bazemore AW. Measures of Social Deprivation That Predict Health Care Access and Need within a Rational Area of Primary Care Service Delivery. *Health Services Research*. 2013;48(2 Pt 1):539-559. doi:10.1111/j.1475-6773.2012.01449

BACKGROUND PROJECT

- Bettering Asthma Care in Kids - Geographic Social Determinants Data to Understand Disparities
  - OCHIN + OHSU Family Medicine
  - Funded by Natn'l Institute on Minority Health + Health Disparities
  - September 2017 – June 2022
- Primary Aims
  - Compare care utilization + quality in asthmatic Latino children with that of non-Hispanic white children in nationwide network of CHCs
  - Compare how individual-level and community-level social determinants of health affect receipt of ambulatory asthma care quality measures

BACKGROUND PROJECT

- Assessing address history
  - Data are often messy due to entry errors, etc.
  - Info updated at patient visits
  - “Dates” of residence are actually visit dates – best proxy for timeline
  - Below example of address history for a patient:

	start_date	end_date	tract_id	zcta	stcofips	addr_type
1:	2012-08-14	2015-02-20	13267	55104	27123	StreetAddress
2:	2015-02-20	2017-04-06	12958	55407	27053	StreetAddress
3:	2017-04-06	2017-06-06	13149	55454	27053	StreetAddress
4:	2017-06-06	2017-06-16	12958	55407	27053	PointAddress
5:	2017-06-16	<NA>	13179	55407	27053	Postal

BACKGROUND PROJECT

- Some Initial Decisions
  - Using longest duration of residence at an address
    - Only certain address types
    - Smallest possible geo-unit
  - Considering # of address changes
  - For patients with consistent address and geo-location (61%), assign community-level variable with:
    - Average of 2007-2011 and 2012-2016 American Community Survey (ACS) periods
    - Difference between the periods and its direction (i.e. positive, negative, null change)

BACKGROUND: NAPCRG ABSTRACT

The Role of Social Deprivation on Asthma Outcomes

Objective: To determine if higher neighborhood deprivation is associated with higher odds of asthma diagnosis and care measures among children treated at community health centers.
Population studied: A sample of 299,265 children aged 3-17 who had ≥1 ambulatory visit in study clinics between 2008-2017 and who had census tract-level geocoded addresses.
Outcome measures: Binary indicators of 1) asthma diagnosis, 2) asthma severity diagnosis, 3) albuterol prescription, 4) inhaled steroid prescription, and 5) oral steroid prescription. We used GEE logistic models adjusted for patient-level characteristics including age, sex, ethnicity, number of visits, insurance, BMI, and clinic site.
Results: The adjusted odds of having an asthma diagnosis were 30% higher for those living in areas with the most deprivation (top quartile), compared to the least deprived areas (lowest quartile). Patients in deprived neighborhoods also had 36% higher odds of having asthma severity diagnosed, 18% higher odds of albuterol prescription, and 22% higher odds of inhaled steroid prescription. The odds of oral steroid prescription were 6% lower for patients from the most deprived neighborhoods compared to those from the least deprived.
Conclusions: Among community health center patients, residing in a more socially-deprived neighborhood was associated with greater odds of having asthma diagnoses and medications documented. Regular access to administrative deprivation data such as the SDI may permit primary care providers and health systems to deliver higher quality care in a community context.

CONCLUSIONS

- Integrating ACS and Neighborhood Data
  - Newer development for primary care + social determinants
    - Place matters
    - What's next?
  - Presents challenges and questions
    - Aligning dates of residence and ACS estimates
    - Overall issue of "spatial uncertainty"
- More Projects Ahead
  - Insurance status and preventive screenings
  - Reproductive care
  - Many more ideas in the pipeline!

OCHIN RESEARCH: GET INVOLVED

For research overviews, study summaries, results, routine updates, blog posts, and contacts visit us online at:

www.ochin.org/ochin-research

www.advancecollaborative.org

Thank You!

Co-Collaborators

Jon Puro, *OCHIN*
Stuart Cowburn, *OCHIN*
John Heintzman, *Oregon Health and Sciences University*
Miguel Marino, *Oregon Health and Sciences University*
Jorge Kaufmann, *Oregon Health and Sciences University*
David Ezekiel-Hererra, *Oregon Health and Sciences University*
Katie Fankhouser, *Oregon Health and Sciences University*
Jennifer Lucas, *Oregon Health and Sciences University*

Sophia Giebultowicz
Research Analyst, OCHIN
giebultowiczs@ochin.org