Orientation to OCHIN data

AIM-AHEAD Projects

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OCHIN

A driving force for health equity

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What is a Community-based Health Center (CHC)?

Health centers are community-based and patient-directed organizations that deliver comprehensive, culturally competent, high-quality primary health care services to the nation's most vulnerable individuals and families, including people experiencing homelessness, agricultural workers, residents of public housing, and veterans. (HRSA 2021. https://bphc.hrsa.gov/about-health-centers/what-health-center)

CHCs are:

- Often include pharmacy, dental, mental health, substance use disorder care
- Provide services regardless of ability to pay; charge on sliding fee scale if uninsured
- Emphasize coordinated care management, use of quality improvement practices, health information technology
- Have federal reporting requirements (UDS)

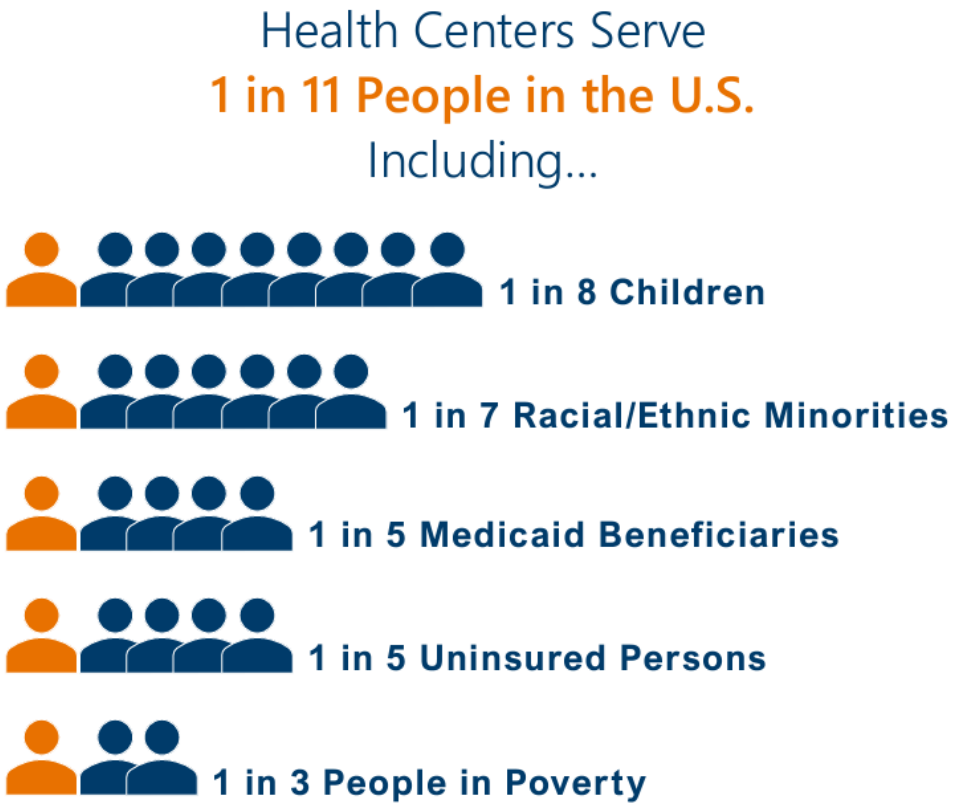
CHCs are NOT:

- Hospitals
- Health plans
- Integrated health systems

All clinics in the OCHIN network are community-based health centers. This umbrella term includes (but is not limited to):

- Federally qualified health centers (FQHCs)
- FQHC lookalikes
- Rural Health Centers
- Ryan White HIV/AIDS clinics
- Healthcare for the Homeless grantees

Who are CHC Patients Nationally?

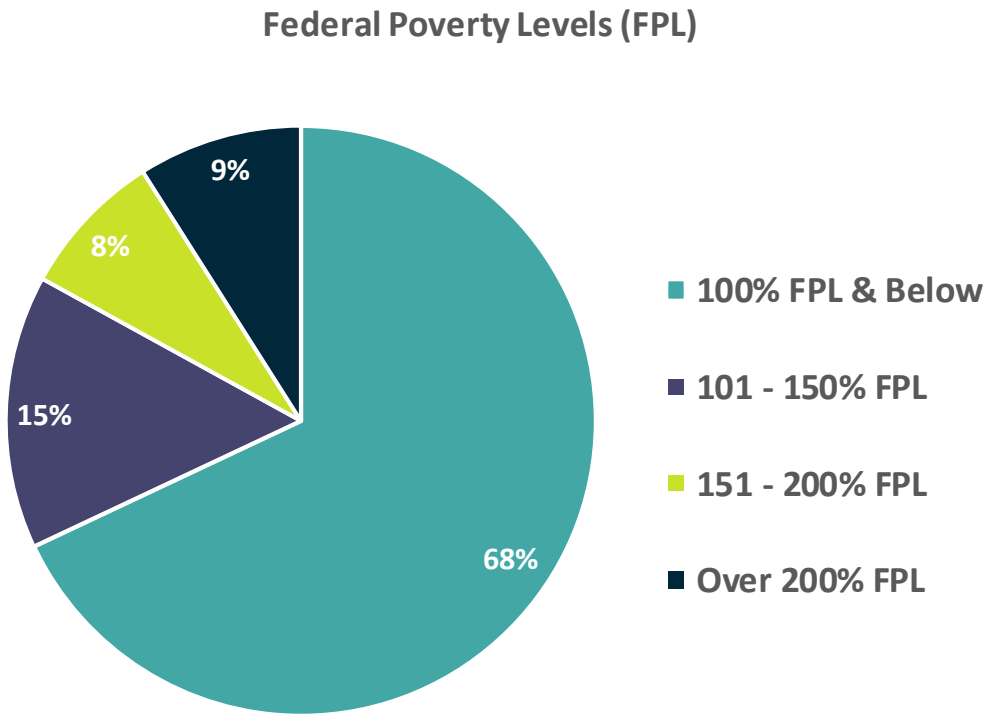


Source: NACHC Community Health Center Chartbook 2022.

>29 million

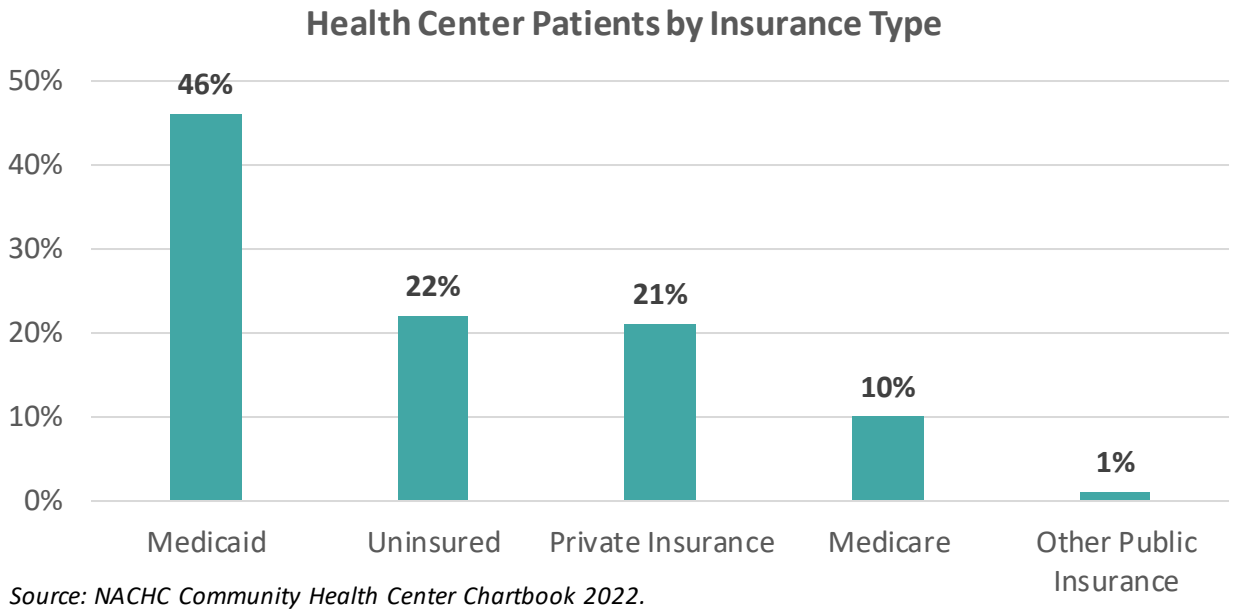
Number of people Community Health Centers provide care to across the U.S.

Who are CHC Patients Nationally? (Continued)



For more information: FPL Amounts

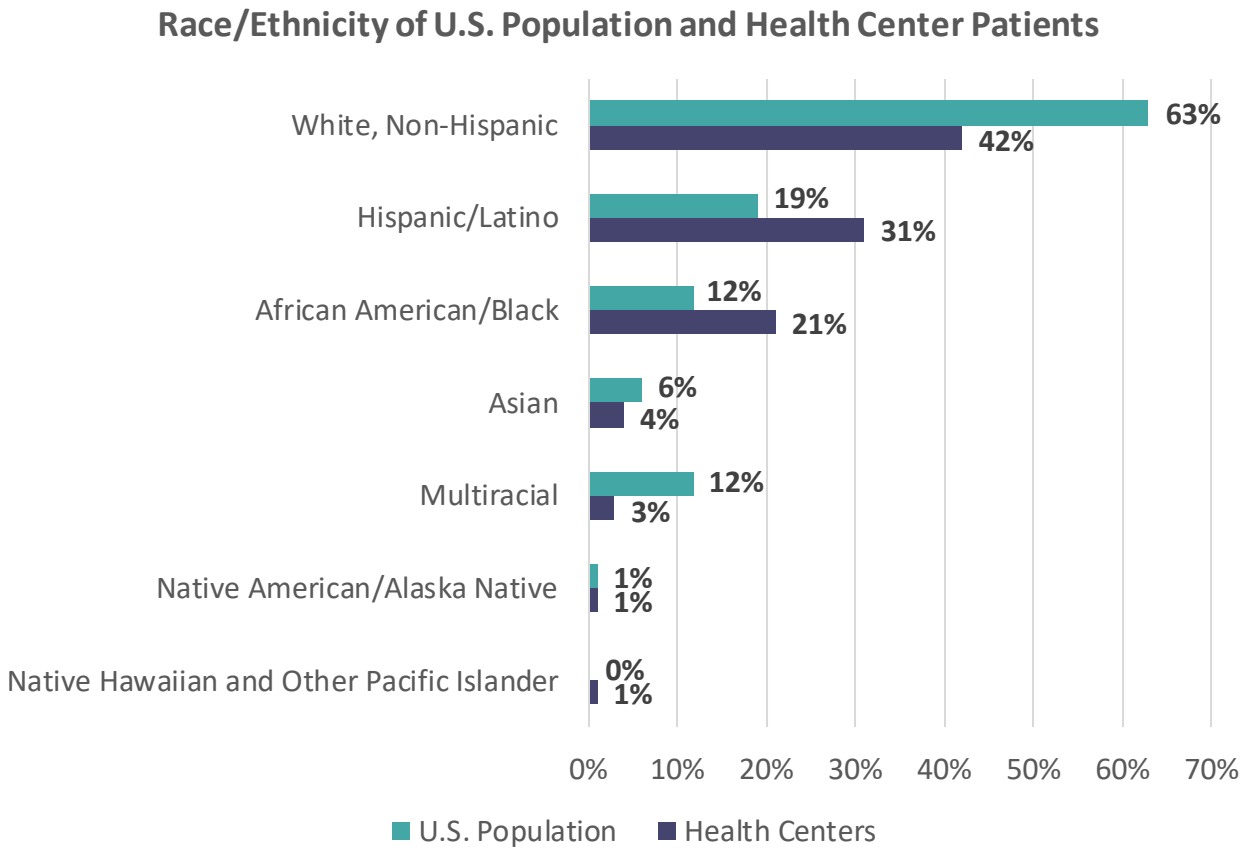
Source: NACHC Community Health Center Chartbook 2022.



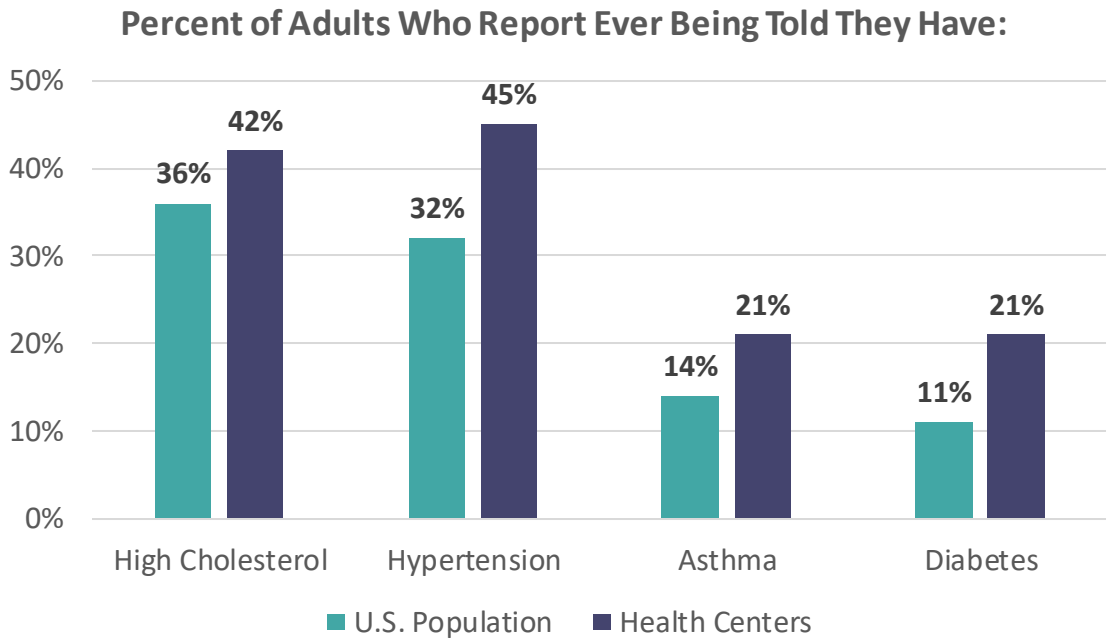
Source: NACHC Community Health Center Chartbook 2022.

79% of health center patients are uninsured or publicly insured

Who are CHC Patients Nationally? (Continued)



Source: NACHC Community Health Center Chartbook 2022.



Source: NACHC Community Health Center Chartbook 2022.

Nationally, **63%** of the health center patients are members of racial/ethnic minorities compared to **42%** of the general population.

By reducing access barriers and focusing on quality, CHCs generally have higher clinical quality metrics and patient satisfaction than other primary care environments

Better Clinical Quality Metrics

- Diabetes and hypertension control
- Immunizations
- Cancer screening
- Tobacco cessation

Greater Patient Satisfaction

Patient-level Social Needs Data Collection

Novel Payment and Delivery System Models

Source: NACHC Community Health Center Chartbook 2022.

OCHIN Research Data Warehouse (RDW)

- OCHIN is a nonprofit leader in equitable health care innovation and trusted partner to a growing nationwide provider network.
- OCHIN stewards the largest collection of community health EHR data in the country with more than two decades of practice-based research expertise.
- OCHIN leads the AIM-AHEAD Data and Research Core, and the OCHIN Research Data Warehouse is the source of the AIM-AHEAD Community Health Equity Database.
- Data are aggregated from OCHIN's a single instance of the Epic EHR for **170** health systems with **1600** clinic sites across **33** states

The **OCHIN RDW** integrates outpatient EHR data for patients seen in all member health centers.

- Data are standardized into a common data model based on the PCORnet CDM.
- Contains all table and fields defined for the PCORnet CDM plus additional fields that are unique to safety net clinics (e.g., FPL, primary language, homeless status).

Source: OCHIN RDW, accessed 2/8/2023

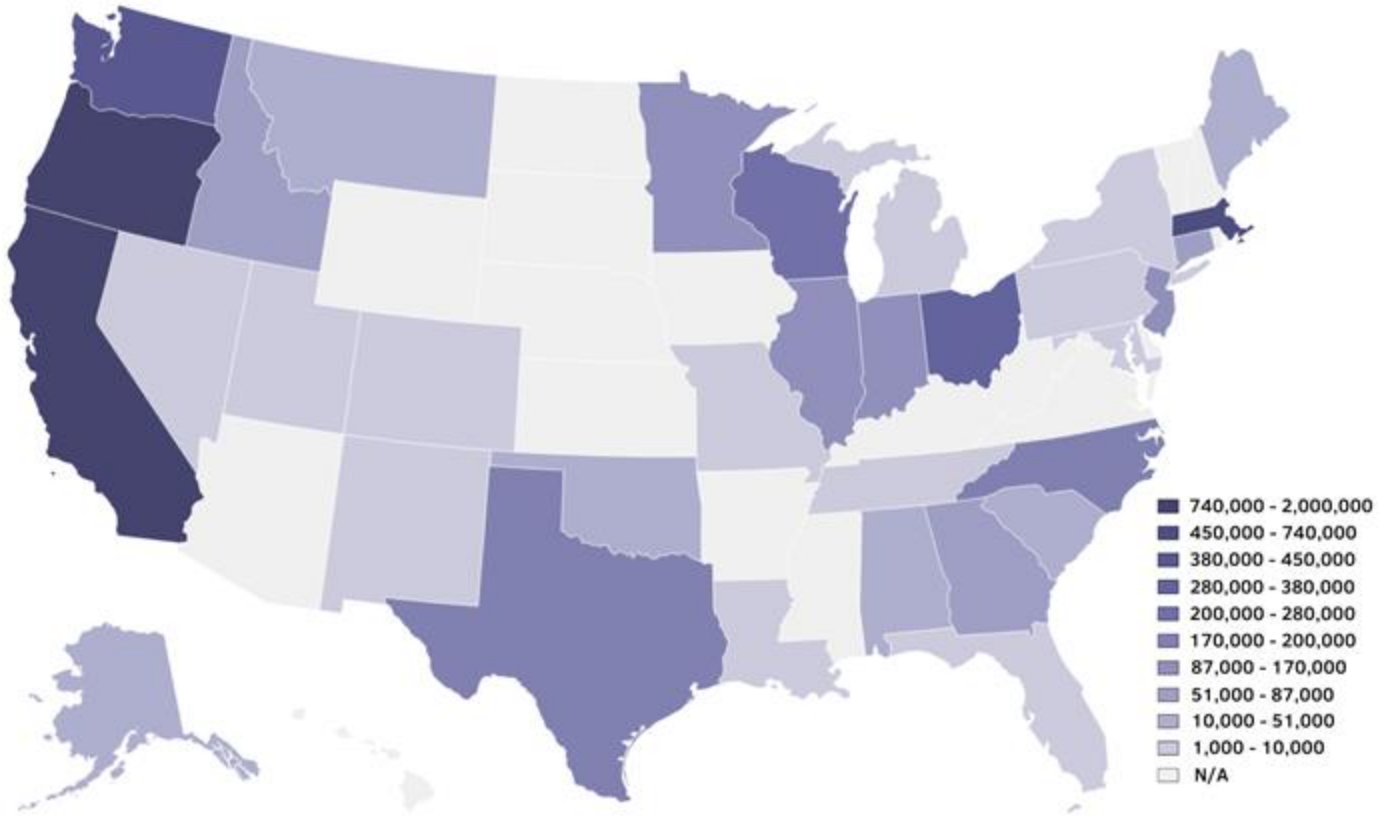
OCHIN EHR Data Overview

OCHIN, a nonprofit health care innovation center with a core mission to advance health equity, operates the most comprehensive database on primary healthcare and outcomes of safety net patients in the United States.[1] The OCHIN Epic EHR data warehouse aggregates electronic health record (EHR) and social determinants of health (SDH) data representing:

- **>6** million patients (**4.6** million patients are 'active,' with a visit in the last 3 years)
- **170** health systems
- **1,600** clinic sites
- **33** states

Approved AIM-AHEAD projects can obtain access to up to 10 years of longitudinal OCHIN Epic ambulatory EHR data, which is research-ready on the PCORnet Common Data Model (CDM).

OCHIN Patients by Clinic's State



[1] OCHIN leads and is the largest data contributor of the ADVANCE Clinical Research Network (CRN), a member of PCORnet. (https://advancecollaborative.org/)

OCHIN EHR Data

Key Characteristics of OCHIN EHR Data		
Variables	**Percent**	**Patient Count**
Total all-time patients		6,009,798
100% and Below Federal Poverty Level (FPL)	55.0%	3,306,034
101% - to 200% FPL	15.4%	928,348
Medicare	8.0%	482,055
Medicaid	47.5%	2,856,580
Uninsured	25.7%	1,545,991
Spanish Speaking	20.1%	1,209,433
Black	17.3%	1,038,841
Hispanic/Latino/a/x	32.4%	1,948,448
Asian	5.4%	324,851
American Indian/Alaska Native	1.0%	59,143
Diabetes	6.3%[1]	300,333
Hypertension	10.6%	506,999
Congestive Heart Failure	1.0%	49,377
Chronic Kidney Disease	1.3%	64,289
Mental/Behavioral Health Dx[2]	15.6%	747,272
Obesity[3]	30.0%	1,434,893

[1]Chronic condition percentages presented among adult patients (N=4,787,300)
[2]Includes anxiety, bipolar, depressive disorders, schizophrenia, and other psychotic disorders
[3]Obesity diagnosis on problem list or last-recorded BMI >30

Available Data at a Glance	
Domain	**Example Variables**
Demographics	Sex, age, race, ethnicity, language, FPL, sexual orientation, gender identity, vital status/death date, state and zip code of residence
Encounters	Encounter type, level of service, provider type, date
Diagnoses (from encounters, problem list, and patient-reported medical history)	ICD-9 and ICD-10 diagnosis codes, description, date
Procedures (from encounters and patient-reported surgical history)	CPT and HCPCS procedure codes, description, date
Vitals	BP, BMI, and tobacco use measurements, measurement date
Laboratory results	Lab type (standardized to LOINC), specimen source, date, result
Medications (prescribing and dispensing)	RxNorm, NDC, medication name, dose, quantity, route, frequency, refill count
Patient-reported outcomes	Screening questionnaire responses (e.g., PHQ2, PHQ9, AUDIT), screening date
Immunizations	Immunization type, dose, administration date
Social determinants of health	Patient-level social needs screenings recorded in EHR, e.g., food insecurity, housing quality, housing insecurity, transportation needs, education, employment
Community vital signs	Geographically linked neighborhood-level indicators at census tract and/or ZCTA level, primarily from the American Community Survey. Sample measures: median household income, educational attainment, employment rate, social vulnerability index.

Overall inclusion of source database

- Data years available for AIM-AHEAD: 2012-2022 (>170 million total encounters)
- Patients with 1 or more ambulatory, telehealth, or dental visit at a member clinic site on or after 1/1/2012.
- Records from institutionalized patients and neonates (<28 days old) are excluded.

Unique Features of the OCHIN RDW

- Single patient record across the system, allowing unduplicated longitudinal analysis at patient level.
- Data available from 2012 through current.
- Many OCHIN members provide integrated primary care, dental, mental/behavioral health, and specialty care.
- Includes **>1.5 million** patient-level social determinants of health screens (e.g., food insecurity, housing needs).
- Includes 'community vital signs', publicly available indicators at various geographic levels (e.g., census tract, ZCTA, county).
    - Linkable to patient geocoded addresses to provide context on the environment in which patients live

Source: OCHIN RDW, accessed 2/8/2023

Data Available for AIM-AHEAD Projects

Available data domains	
Patient demographics	Patient-reported social needs (SDH)
Patient location (state, ZIP)	Clinic type, location (state), go-live date, health system identifier
Encounter details (encounter type, payer, provider type, vitals, diagnoses, procedures, lab results, immunizations)	Community vital signs (e.g., social vulnerability index)
Patient problem list, medical history, surgical history (limited)	Medicaid claims (Oregon only)
Medication prescribing and dispensing	Vital status and death date (when recorded in EHR)
Patient-reported outcomes (PHQ-9, AUDIT, DAST)	

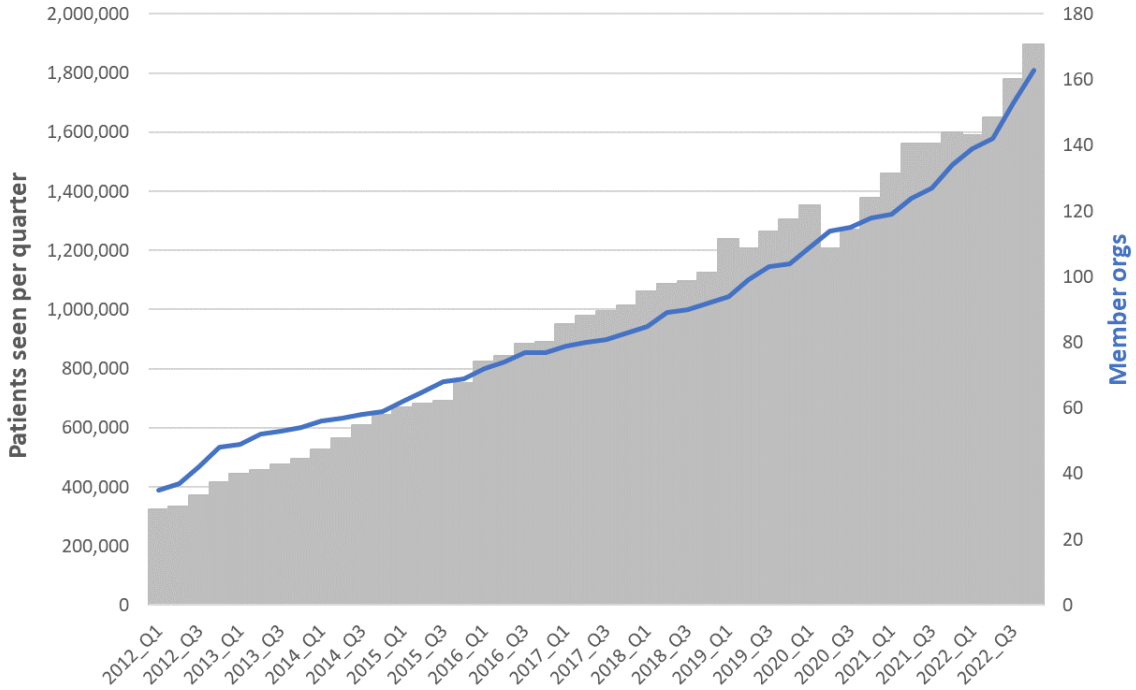
Not currently available	Reason
Network member or delivery location more granular than state	Confidentiality of member clinics and patients
Chart notes	PHI disclosure risk
Linked external death data and other vitals data*	Licensing and data use permissions
Family linkages within EHR*	Limited scope and completeness
PCORnet fields relating to inpatient care	Data unavailable in OCHIN CHC network

*Evaluating potential future use for AIM-AHEAD

NOTE: All OCHIN data come from ambulatory clinic settings. No ED, inpatient, or sub-specialty data available at this time.

Notes On Using OCHIN EHR Data for Research

- Open cohort
  - All data stem from CHC being 'live' on EHR and patient utilization
  - Health centers have joined the OCHIN network at different points in time
  - Most patient data are collected within the context of an encounter
- Different systems & practices = differential data completeness and quality
- Ambulatory only – no hospitals, sub-specialties
- Vulnerable populations filtered out (e.g., incarcerated persons, neonates)
- Implications for research studies
  - Cohorts from earlier time periods will be smaller
  - Data come from more clinics in recent years (avoid comparing raw volumes over time)
  - Watch for systematic differences by health system to avoid spurious results or conclusions



Source: OCHIN RDW, data as of 12/31/2022

Governance

The AIM-AHEAD Community Health Equity Database from OCHIN is a limited data set (LDS), specified in the HIPAA Privacy Rule as a dataset in which certain direct identifiers have been removed.

A limited data set is still Protected Health Information (PHI)

An LDS may include:

- Dates (e.g., date of birth, service dates)
- City, state, and/or zip code (with street address removed)

Access to data contained in this LDS requires an IRB-approved or exempt protocol and a Data Use Agreement (DUA) between OCHIN and the requesting party.

To request access as part of an AIM-AHEAD program, start with this form.

What is a Clinic?

- CHCs have several layers of organization, which has implications in how we pull, use, and interpret data
- Different terms are used for these concepts within **conversation** and **RDW**

Health System

Organizational/ ownership level. Has a HQ address. Many health systems have multiple clinics.

Health Center, CHC
Health System

e.g., Multnomah County Health Dept

Clinic Site

Physical location, "brick & mortar". Has an address and generally contains multiple departments.

Clinic
Clinic site
Delivery site

e.g., MC East County Health Center

Generally, most relevant to research

Department

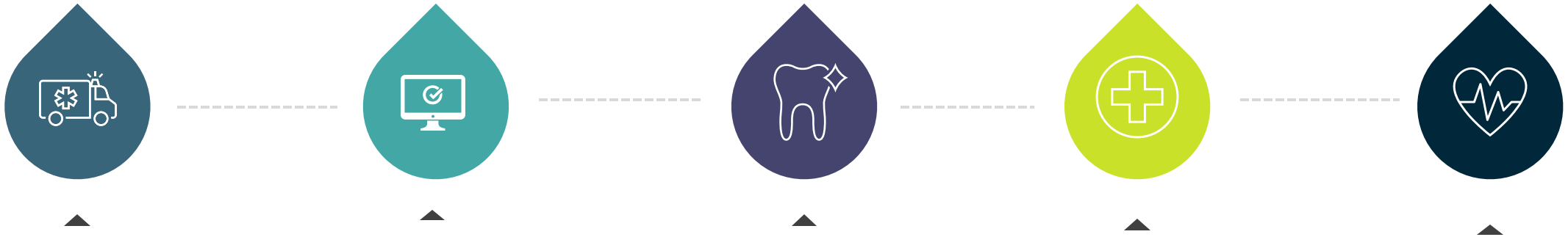
An EHR unit. Providers log into and patients have encounters at a specific departments. Many departments may be at one clinic site.

Department
Facility

e.g., Primary Care, Dental, Vaccine, Pharmacy

Notes on Key Variables

Encounter Types



Ambulatory Visit

- Majority of clinical face-to-face visits; generally billable
- Examples: primary care, well-child visits, behavioral health
- Diagnoses, procedures, labs, medications, and insurance type most often associated with AV and TH. AVs usually have vital signs (BP, BMI).

Telehealth

- Similar clinical and billable characteristics to AV, but delivered remotely
- Less likely to have vitals recorded
- Appear very rarely prior to 2020. Rapid uptake from 3/2020 onward.

Dental

Other Ambulatory

- Usually non-billable, limited-service encounters or patient contacts
- Examples: pharmacist calls, refill requests, patient registration, lab draw or immunization only
- Often filtered out of research queries

Other

- Similar to Other Ambulatory
- Often filtered out of research queries

Notes on Key Variables (Continued)

Diagnoses
(ICD-9: 2012-9/2015, ICD-10: 10/2015-current)

Visit Diagnosis

- All diagnosis codes recorded in the context of encounters, usually several per encounter
- Primary dx not available

Problem List

- A list of current and active as well as past/resolved diagnoses relevant to the care of the patient. Accessible and used across healthcare team. Meant to indicate ongoing, non-transitive conditions, and/or those that are most important about a patient
- Patient-based measure, not linked to or specific to a given encounter

Medical History

- Similar concept to problem list but recorded in medical history section of chart; often patient-reported, may be more subject to recall limitations and workflow differences

Highlighted limitations

- Medication dispensing data is difficult to measure and prone to bias
  - Only exist for patients who return for a subsequent visit (captured via pharmacy data vendors and queried automatically prior to scheduled visits
  - Limited to insured patients (where Rx was paid by a public or private plan)
  - Can't be directly linked to a prescribing record
  - Medication adherence difficult to measure (discrete days supply not available)
- Not all laboratory records are mapped to LOINC
- Social needs data are not collected consistently across health systems or patient populations
  - Lack of screening does not indicate absence of social need
- Patient-reported outcomes (PRO) are not collected consistently across health systems or patient populations
- Death data (i.e., known deceased) should be considered incomplete

Generalizability, Bias, and Scope of Interpretation

- Differential completeness and quality (coding differences) exist by network partner site, health system, and clinic
  - *Try to account for these differences by using the surrogate health system identifier as a clustering or control variable*
- Patient population/characteristics are not homogeneous across the OCHIN network
  - *Examine data to understand heterogeneity, identify potential sources of bias, and avoid unnecessary assumptions when making interpretations*
- Out-of-network care is captured incompletely. When care was not delivered within the OCHIN network, it could be the patient received it out of network, refused it, could not access it, or some other reason.
  - *Don't assume that care not delivered in an OCHIN clinic was not received*
- Reference/control group: still a socioeconomically disadvantaged subset of the population
  - *Please remember OCHIN's patient profile and be cautious not to generalize beyond this CHC population*