

## A Short Guide to the ADVANCE Clinical Research Network (CRN)

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### Purpose of this Document

This document is a high-level summary of the ADVANCE Clinical Research Network (CRN). More detailed and technical information about the ADVANCE CRN and its contents is available in the “ADVANCE User Manual and Data Dictionary.”

### Overview of ADVANCE

The Accelerating Data Value Across a National Community Health Center Network (ADVANCE) Clinical Research Network (CRN), funded by the Patient-Centered Outcomes Research Institute (PCORI), integrates outpatient electronic health record (EHR) data for Community Health Center (CHC) patients across the United States and integrates community data for these patients. The ADVANCE CRN serves as a ‘community laboratory’ for engaging vulnerable patients in people-centered research. As the nation’s largest safety-net community laboratory, consisting of researchers, patients and clinicians, ADVANCE works to improve health outcomes, policy, and primary care research among vulnerable and underserved populations utilizing rigorous scientific methods.

### Background

The PCORI-sponsored Patient-Centered Clinical Research Network (PCORnet) was created in 2014 to improve the nation’s capacity to conduct comparative effectiveness research by creating a large, highly representative electronic data infrastructure for conducting clinical outcomes research. PCORnet consists of:

- 9 Clinical Research Networks (CRNs), such as ADVANCE
- 2 Health Plan Research Networks (HPRNs)
- A Steering Committee comprised of PCORnet member networks and patient representative
- 3 Coordinating Centers: Harvard Pilgrim, Duke, and Academy Health

ADVANCE is led by the OCHIN in partnership with Health Choice Network (HCN), Fenway Health, and Oregon Health and Science University (OHSU). ADVANCE is:

- A national network of CHC healthcare systems
- Building a ‘community laboratory’ of CHCs with longitudinal outpatient EHR data on patients seen since 1/1/2012
- Bringing in community-level data to help assess environmental/external factors that impact health

All data stored in the ADVANCE Research Data Warehouse (RDW) are de-identified. Crosswalks to actual patient identifiers are kept in a secure location for patient de-duplication during data loads and for use by analytical staff as needed for approved research protocols (e.g., re-identification for a clinical trial).

### **The ADVANCE Research Data Warehouse (RDW) and the PCORnet® Common Data Model (CDM):**

The ADVANCE Research Data Warehouse (RDW) is an expansion of the PCORnet Common Data Model (CDM). The RDW contains all tables and fields defined for the PCORnet CDM, plus additional tables and fields that the ADVANCE CRN includes to support health equity research. These fields are elements unique to CHCs that collect data for HRSA Uniform Data System (UDS) and other CHC-related reporting purposes, which are typically not collected by non-CHC clinics. These fields include the Federal Poverty Level (FPL), patient primary language, migrant/seasonal worker status, homeless status, veteran status, and others. RDW data are cleaned, validated, and research-ready.

### **RDW and CDM Patient Inclusion Criteria:**

Data are included from the ADVANCE ambulatory data partners (OCHIN, Fenway, HCN, and OHSU) on any patient seen in their respective systems who was defined as “active” at the time of a data extract. Patients are active if they have had a primary care, behavioral health, or dental visit in one of the networks’ clinics within the past three years as of the date of the data extract. For each active patient, all available historic data are then included in the RDW as far back in time as available. In addition, geographic data, referred to as Community Vital Signs (CVS), are then also included for patients seen in the OCHIN network.

ADVANCE started loading patient on 1/1/2015, so the RDW includes patients deemed as “active” starting on 1/1/2012. Any patients that become inactive over time (i.e., were included in the RDW as “active” after 1/1/2012 but not seen in the past three years as of any given extract date) are not removed from the RDW but are flagged as “inactive”.

### **Datavant Death Index (DDI):**

The DDI is a combined dataset of death records assembled from government death records and third-party obituary data (e.g. funeral homes, newspapers) that can be linked to patient records in ADVANCE datasets in a privacy-preserving manner, improving the quality of mortality data. Datasets utilizing DDI will include one additional field called Date of Death, a date field that includes the month and year of death and the day portion set to “01”. Note that there is no additional data available such as cause of death.

### **The PCORnet® COVID-19 Common Data Model (COVID-19 CDM):**

The COVID-19 CDM is a separate data warehouse from the ADVANCE RDW. The COVID-19 CDM contains all tables and fields defined for the PCORnet CDM but includes only patients who are COVID-19 positive, suspected of being positive, and tested as COVID-19 negative.

### **COVID-19 CDM Patient Inclusion Criteria\*:**

The base criteria for patient inclusion in the COVID-19 CDM are the same as those of the primary ADVANCE RDW/CDM, but with the following additional requirements:

- Patients must have one or more COVID and COVID related diagnoses on or after 1/1/2020,
- OR patients must have at least one or more records of certain COVID-related specified lab tests (does not have to be a positive result),
- OR a patient had a prescription for Remdesivir.

\*Please see the data dictionary for a completed list of COVID-19 inclusion codes.

## ADVANCE and its Partners

The ADVANCE RDW includes data from two healthcare networks (OCHIN and HCN) and two healthcare organizations (Fenway Health and OHSU). All clinics represented within ADVANCE provide care for low-income, uninsured, and vulnerable patients across the country. The ADVANCE RDW contains data from all OCHIN member organizations for patients seen since 1/1/2012, including both current and former members.

OCHIN and HCN are networks of healthcare organizations and community health organizations of varying sizes, each with their own clinics, providers, and patients. Fenway Health and OHSU are themselves healthcare organizations containing two to four ambulatory clinics each.

### ADVANCE overall statistics (incl. all partners):

- 6,742,249 total distinct patients over all time
- 4,325,489 distinct patients with a visit within the last 3 years
- 3,565,875 distinct patients with a medical ambulatory visit in the last 3 years
- Clinic sites in 30 states
- 168 health systems containing 1,544 clinic sites

Following is information for each partner organization within ADVANCE. More information is available on each organization's web site:

**OCHIN, Inc.:** Based in Portland, Oregon, OCHIN is a Health Center-Controlled Network (HCCN). The OCHIN cohort within the ADVANCE RDW includes:

- 4,203,098 total distinct patients over all time
- 2,870,969 distinct patients with a visit within the last 3 years
- 2,498,039 distinct patients with a medical ambulatory visit in the last 3 years
- Member clinics in 26 states
- 141 member organizations with 1028 clinics

**Health Choice Network (HCN):** HCN is a Health Center-Controlled Network (HCCN) founded in Florida by a group of FQHCs collaborating to recover from Hurricane Andrew. The HCN cohort contains:

- 2,413,851 total distinct patients over all time
- 1,374,538 distinct patients with a visit within the last 3 years
- 9,94,757 distinct patients with a medical ambulatory visit in the last 3 years

- Member clinics in 8 states
- 25 health systems with 511 clinics

**Fenway Health:** Founded in 1971 as a free community clinic for the Fenway neighborhood of Boston, Fenway Health serves Boston’s lesbian, gay, bisexual and transgender community and the greater Fenway neighborhood. The Fenway cohort of the RDW includes:

- 74,058 distinct patients over all time
- 45,282 distinct patients with a visit within the last 3 years
- 43,471 distinct patients with a medical ambulatory visit in the last 3 years
- Member clinics in 1 state
- 1 health system with 3 clinics

**Oregon Health & Science University (OHSU) Department of Family Medicine:** OHSU is the Oregon’s only academic health center. It offers an array of services as the state’s most comprehensive health care provider, from the education of the next generation of clinicians and biomedical researchers to achieving breakthroughs and innovations in multiple fields of health care. The ADVANCE RDW contains data from the Federally Qualified Health Centers (FQHCs) within the OHSU health system:

- 58,114 distinct patients over all time
- 40,684 distinct patients with a visit within the last 3 years
- 33,863 distinct patients with a medical ambulatory visit in the last 3 years
- Member clinics in 1 state
- 1 health system with 2 clinics

### Data Refresh Timelines

For each data refresh, a log table is kept which documents any unexpected data changes. Data profiles of all tables and fields in the CDM are run regularly to identify potential data quality issues at the field level. We are building out the breadth of the data and continuing to explore the expansion of the RDW to meet future data needs.

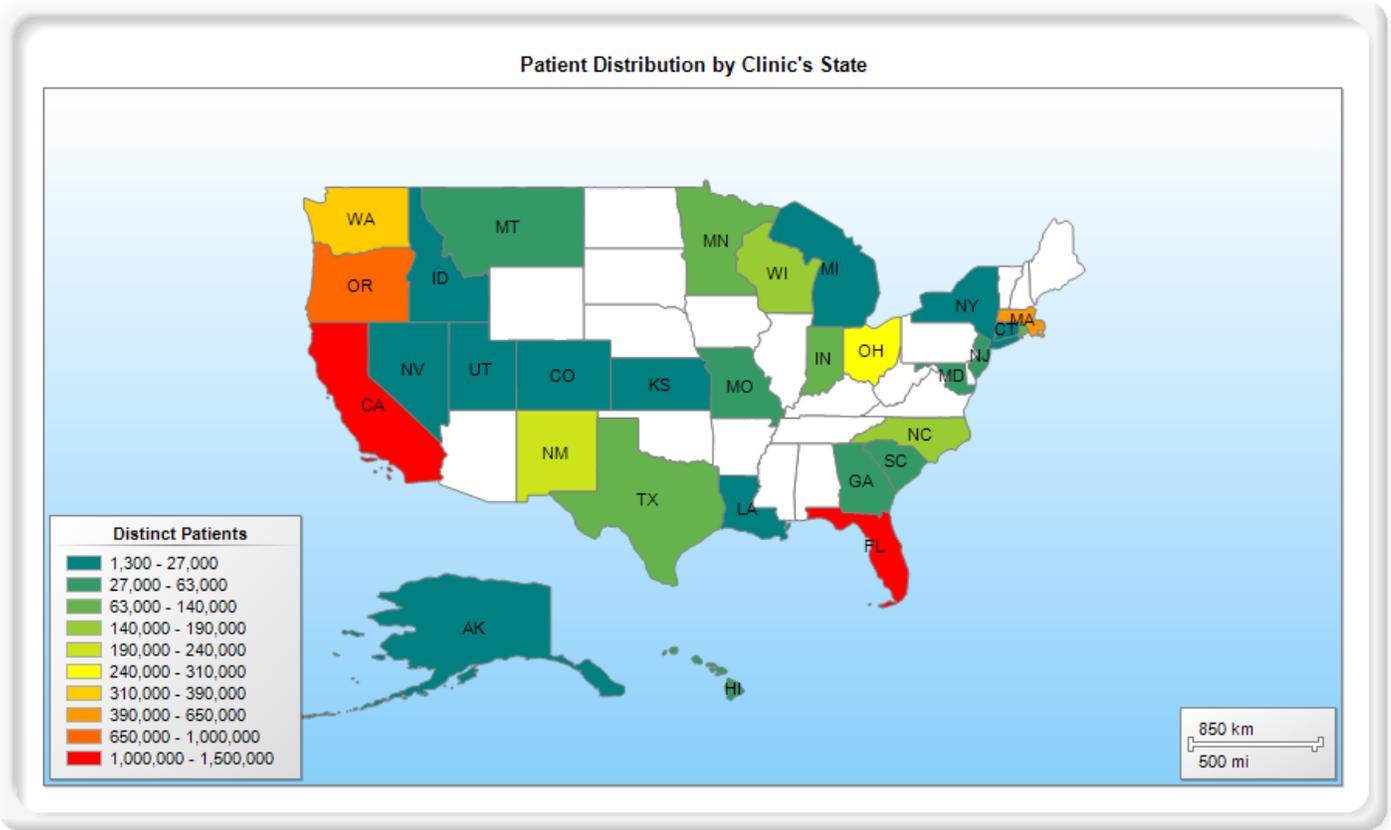
- OCHIN and HCN data are updated weekly. This includes the updating of the geographic CVS linkages for OCHIN patients, and ZCTA-level linkages for HCN patients.
- Fenway and OHSU data are updated quarterly. (Fenway and OHSU patients are not linked to CVS data.)

### Descriptions of RDW Tables

The following table lists and describes the contents of each table (i.e., domain) in the ADVANCE RDW. For a complete, detailed list of all tables and the fields within each table, see the “ADVANCE User Manual and Data Dictionary”.

Domains in RDW	Description	Fields Specific to Domains
Community Vital Signs	Aggregate data of social and environmental factors that may impact patient health.	College graduates, Median income, Professional jobs, FPL levels, Unemployment, Race, Residential segregation, etc.
Condition	Representation of a patient's diagnosed and self-reported health conditions and diseases. Includes medical history and current state.	Condition ID, Report and Resolve date, Onset date, Status, Condition code, Type, and Source, etc.
Death	Reported mortality information for patients.	Source, etc.
Death Cause	The individual causes associated with a reported death.	Death cause, Code, Type, Source, and Confidence
Demographic	Current (most recently available patient information at time of data refresh) direct attributes of individual patients with at least one medical ambulatory encounter on or after 1/1/2012. No infants younger than 31 days at time of data extract.	Birth date and time, Sex, Race, Language, Family size, Income, FPL, Payor, Migrant and Homeless Status, Veteran Status, Sexual Orientation, Gender Identity, etc.
Diagnosis	Indication of the results of diagnostic processes and medical coding within healthcare delivery.	Diagnosis ID, Encounter type, Diagnosis code, type, and source
Dispensing	Outpatient pharmacy dispensing, such as prescriptions filled through a neighborhood pharmacy with a claim paid by an insurer.	Dispensing ID, Prescribing ID, NDC, Supply, Amount, etc.
Encounter	Description of the interactions between patients and providers within the context of healthcare delivery.	Encounter type, Admit and Discharge dates, Provider type, Facility location and ID, Discharge status, DRG, Migrant and Homeless status, Admitting source, Income, FPL, Payor, etc.
Enrollment	Designed to identify periods during which a person is expected to have complete data capture for one enrollment period.	Enrollment start date, end date, etc.
Family Linkage	Contains mother's patient ID where a relationship has been determined by one or more data sources and algorithms.	Mother's guarantor, Coverage, Medicaid case number, Address, etc.
General Observations	Table to store data needed for funded studies, which isn't captured in other CDM tables, such as diabetic foot exams not recorded as procedure codes in the EHR.	Provider ID, observation date, code, coding system type, numeric value, qualitative value, units, etc.
Immunization	Immunizations ordered and administered within healthcare delivery. Contains historical, patient-reported immunizations administered elsewhere.	Immunization date, CVX code, CPT code, Route, Order date, Vaccine lot number, Expiration date, etc
Lab Result	Quantitative and qualitative measurements from blood and other body specimens. These standardized measures are defined the same way across all PCORnet networks.	Lab result ID, Lab name, Specimen source, LOINC, Priority, Result, Procedure code and Type, Order and Specimen date, Result date and Time, Qualitative and Quantitative result, Unit, Range, etc.
Medication Administration	Records of medications administered to patients by healthcare providers. These administrations may take place in any settings, including inpatient, outpatient or home health encounters.	Provider ID, start / stop dates, units, etc.
Patient Reported Outcome Common Measures	Standardized measures that are defined in the same way across all PCORnet networks. Recorded at individual item level: question/statement, paired with its standardized response options.	PRO CM ID, PRO item, PRO LOINC, Response, Method, Mode, CAT, Code, etc.
Prescribing	Provider orders for medication dispensing and/or administration.	Prescribing ID, Order date and Time, Quantity, Refills, Days supply, Frequency, Basis, etc.
Procedures	Description of the discreet medical interventions and diagnostic testing, such as surgical procedures, administered within healthcare delivery.	Procedure ID, Encounter type, Procedure code and type, etc.
Surgical History	Patient's self-reported history of past surgical procedures.	Surgical history ID, History date, Procedure date, Code, Type, and Source
Vital	Vital signs (height, weight, and blood pressure) to represent a patient's current state.	Vital ID, Source, Height, Weight, BP, BMI, Smoking, Tobacco use and Type, etc.
OBS_Clin	Standardized qualitative and quantitative clinical observations about a patient	EncounterID, Obsclin_Providerid, Obsclin_Date, Obsclin_Type, Obsclin_code, etc.
OBS_Gen	Table to store everything else.	Obsgenid, Patid, Encounterid,Obsgen_providerid, Obsgen_start_date, Obsgen_type, etc.

Appendix A: ADVANCE Patient Distribution by Clinic's State



Health Systems	Clinic Sites	Cities	States
168	1544	479	30

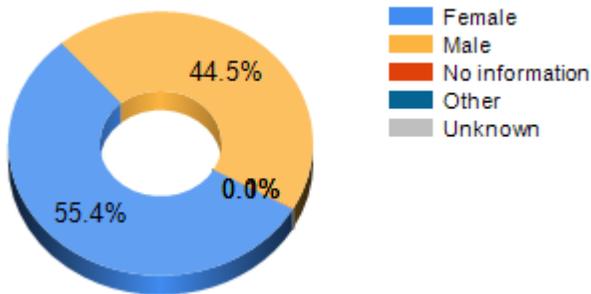
**Appendix B: ADVANCE Selected Patient Characteristics**

Counts are for patients in the ADVANCE RDW with at least one ambulatory encounter, telemedicine, dental encounter, emergency department encounter, institutional professional consult, inpatient hospital stay, non-acute institutional stay, observational stay, or “unknown” encounter type between 1/1/2012 and 3/31/2021.

Sex	Patients	%
Female	3,725,145	55.41%
Male	2,991,575	44.50%
No information	3,855	0.06%
Unknown	1,607	0.02%
Other	589	0.01%
<b>Total</b>	<b>6,722,771</b>	<b>100.00%</b>

Patients 18 and older by Condition		
Condition	Patients	%
Diabetic (Type I or II)	463,494	8.83%
Diabetic Type I	17,643	0.34%
Diabetic Type II	445,851	8.50%
Obese	1,555,659	29.65%
Obese & Diabetic (Type I or II)	258,314	4.92%
Alpha-1	381	0.01%
<b>Total Adults</b>	<b>5,246,603</b>	<b>100.00%</b>

**Patients by Sex**



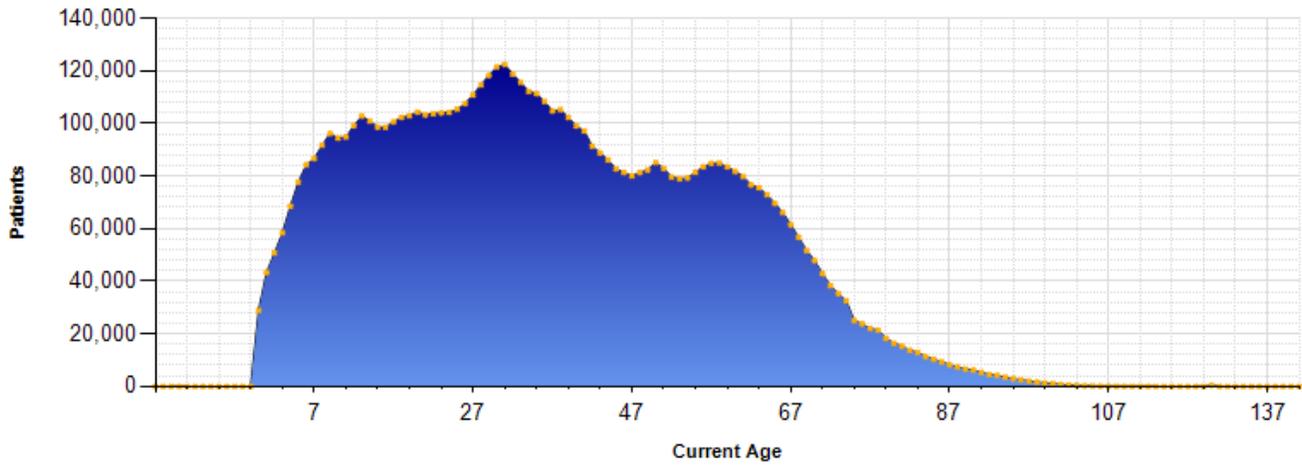
## Patients by race and ethnicity:

Race \ Hispanic Ethnicity	Not Hispanic	Hispanic Ethnicity	Unknown Ethnicity	No information	Refuse to answer	Total	%
White	2,122,925	1,834,909	55,031	62,367	51,293	4,126,525	61.4%
Black or African American	1,157,584	70,493	17,426	29,623	33,807	1,308,933	19.5%
Asian	241,795	5,800	6,837	8,347	6,065	268,844	4.0%
Unknown	74,565	178,613	169,749	719	2,169	425,815	6.3%
Refuse to answer	55,281	161,916	2,866	7,484	34,242	261,789	3.9%
No Information	53,812	44,200	1,535	3,614	4,050	107,211	1.6%
Multiple race	16,775	45,852	5,450	49,758	5,687	123,522	1.8%
Native Hawaiian or Other Pacific Islander	29,402	10,462	1,000	307	2,743	43,914	0.7%
American Indian or Alaskan Native	25,783	18,359	1,206	487	810	46,645	0.7%
Other	235	7,843	162	1,332	10 or less	9,573	0.1%
<b>Total</b>	<b>3,778,157</b>	<b>2,378,447</b>	<b>261,262</b>	<b>164,038</b>	<b>140,867</b>	<b>6,722,771</b>	<b>100.0%</b>
<b>%</b>	<b>56.2%</b>	<b>35.4%</b>	<b>3.9%</b>	<b>2.4%</b>	<b>2.1%</b>	<b>100.0%</b>	

## Patients by current age:

Age Category	Patients	%
Unknown	16	10.2%
0-9	686,465	14.8%
10-19	994,873	16.0%
20-29	1,076,058	16.7%
30-39	1,122,117	12.9%
40-49	870,006	12.3%
50-59	824,042	10.3%
60-69	692,243	4.6%
70-79	307,363	1.7%
80-89	111,510	0.5%
90-99	34,107	0.1%
99+	3,979	10.2%
<b>Total</b>	<b>6,722,779</b>	<b>100.0%</b>

Patients by Current Age

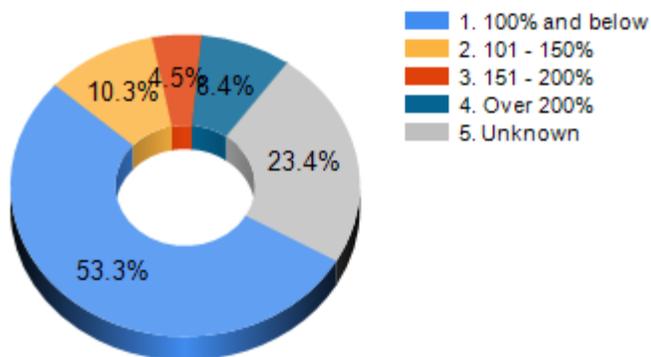


Patients by primary language:

Patients by primary language - Top 10		
Primary Language	Patients	%
English	4,904,653	73.0%
Spanish	1,331,068	19.8%
Unknown	206,489	3.1%
Other language	139,973	2.1%
Vietnamese	29,533	0.4%
Somali	28,142	0.4%
Chinese-Cantonese	22,698	0.3%
Arabic	18,375	0.3%
Russian	17,950	0.3%
Creole	13,338	0.2%
Dari	10,552	0.2%
<b>Total Patients</b>	<b>6,722,771</b>	<b>100.0%</b>

**Patients by their most recent Federal Poverty Level (FPL):**

FPL Category	Patients	%
1. 100% and below	3,581,668	53.3%
2. 101 - 150%	695,158	10.3%
3. 151 - 200%	305,836	4.5%
4. Over 200%	564,701	8.4%
5. Unknown	1,575,408	23.4%
<b>Total Patients</b>	<b>6,722,771</b>	<b>100.0%</b>

**Patients by FPL**

**Patients by known payer type on most recent visit\***

Payer Type	Patients	%
Medicaid	2,348,529	41.3%
Uninsured	1,597,299	28.1%
Private Insurance	1,068,595	18.8%
Medicare	408,807	7.2%
Other Public Payer	205,120	3.6%
Private	55,196	1.0%
Managed Care	4,136	0.1%
Blue Cross	1,840	0.0%
Commercial	436	0.0%
Other	247	0.0%
Tricare	108	0.0%
Medicaid Washington	46	0.0%
Agency/Grant	36	0.0%
Worker's Comp	27	0.0%
Medicaid Other	24	0.0%
Veterans	22	0.0%
Self-pay	10 or less	0.0%
NonSponsored	10 or less	0.0%
Shriners	10 or less	0.0%
<b>Total Patients</b>	<b>5,827,415</b>	<b>100.0%</b>

\*Table excludes patients with Payer Type values of 'Unknown' or 'No Information'. Total count is based on patients with payers only.