CARDIOVASCULAR CONDITIONS

IN 2024

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Table of Contents

Introduction

Cardiovascular disease (CVD) remains one of the most prevalent – and urgent – health issues in the world. Recent data reveal the scope of the challenge: CVD is the leading cause of death globally, accounting for **1 in every 5 deaths in the U.S.**,[1,2] and nearly **1 in every 3 deaths worldwide**,[3] according to the Centers for Disease Control and Prevention (CDC) and World Health Organization (WHO).

That makes CVD the leading cause of death across most segments of the population – men, women, and people of most racial and ethnic groups – in the U.S.[1] The financial impact is also severe; in 2018 and 2019, the U.S. racked up about **$239.9 billion in CVD-related spending** each year through health care services, medicines, and lost productivity due to death.[4]

Addressing this pervasive condition requires a deeper understanding of CVD and its most common risk factors. In this report, Veradigm examines the prevalence of CVD and underlying conditions across all 50 states and a variety of demographics, including sex and ethnicity. Using structured and unstructured data, we present cardiovascular condition prevalence by U.S. state and three-digit zip code areas, which aggregate zip codes by their first three digits. We also examine prevalence of cardiovascular conditions such as dyslipidemia/hyperlipidemia and hypertension, and through the lens of body mass index (BMI).

A body of cardiovascular data collected from the Veradigm Network EHR database from 2018 to 2022 informed this report. Veradigm Network EHR Data contains 53 million distinct cardiovascular patients and is uniquely positioned to study and analyze these trends, not just on the national level, but also on the local level where healthcare is practiced and delivered.

CVD IS THE LEADING CAUSE OF DEATH GLOBALLY

1 IN EVERY **5** DEATHS in the **U.S.**[1,2]

1 IN EVERY **3** DEATHS **worldwide**[3]

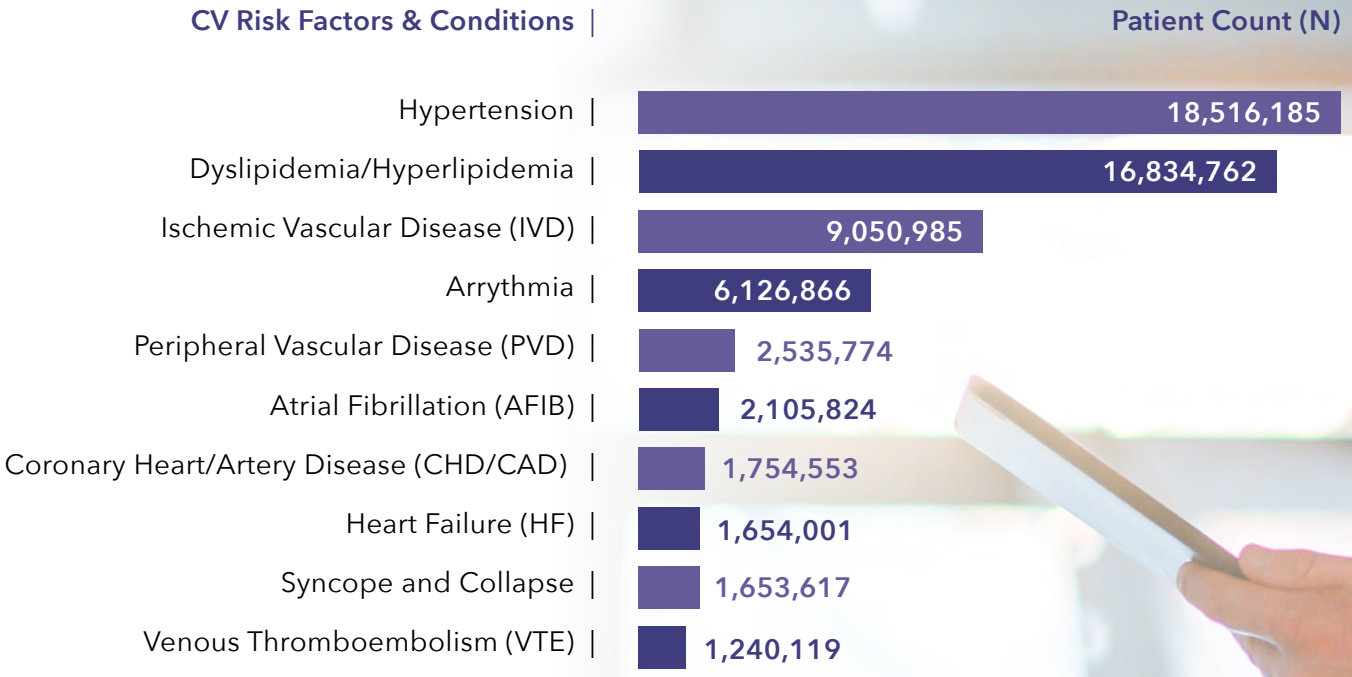
In 2018-2019 the U.S. spent about

$239.9 BILLION IN CVD-RELATED SPENDING THROUGH

- health care services
- medicines
- lost productivity[4]

Major Risk Factors and Cardiovascular Conditions

Hypertension and dyslipidemia/hyperlipidemia are two common risk factors for CVD, and as such, are common in patients diagnosed with CVD. The data reflect this predominance – as well as a notable prevalence of Ischemic Vascular Disease (IVD) and Arrythmia.



Sex and Age Gaps

Neither men nor women have a monopoly on prevalence of CVD. While men have higher prevalence compared to women for most conditions, women still bear a significant burden due to heart disease including higher prevalence of arrythmia and syncope (Figure 2).

Perhaps not surprisingly, there is a significantly higher prevalence among those aged 65+ for the cardiovascular conditions examined in this report especially AFIB and heart failure, however we do see a higher relative prevalence among minors of syncope and collapse, arrythmia, and dyslipidemia/hyperlipidemia (Figure 3).

FIGURE 2:

Relative Prevalence By Sex

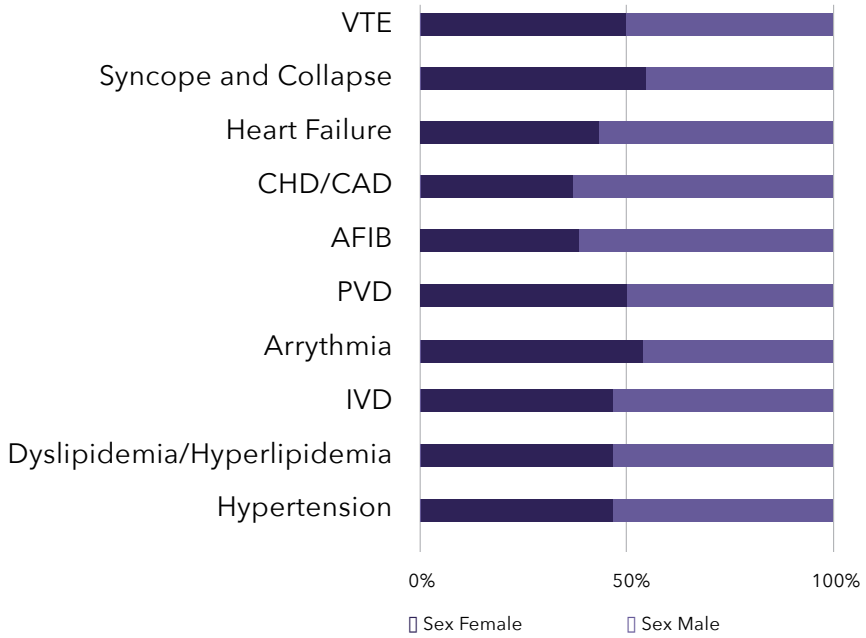
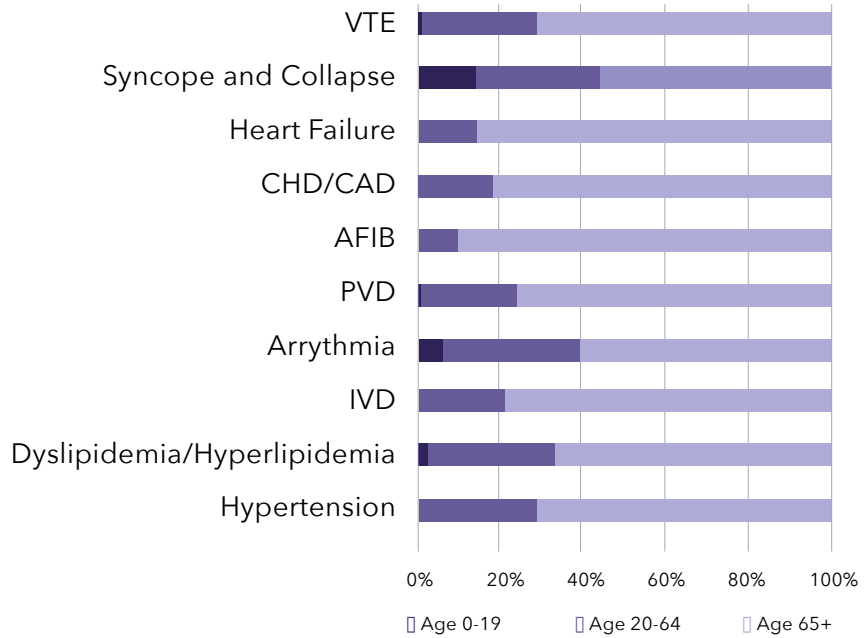


FIGURE 3:

Relative Prevalence by Age



Disparities Across Racial and Ethnic Groups

CV risk factors and conditions vary by race and ethnicity. Among risk factors, hypertension is more prevalent among Black patients and dyslipidemia is more prevalent among Asian patients (Figure 4). Among CV conditions AFIB is more common among White patients and heart failure is more common among Black patients. Among risk factors hypertension is more prevalent among non-Hispanic patients while dyslipidemia is similar by ethnicity (Figure 5).

FIGURE 4:

Relative Prevalence by Race

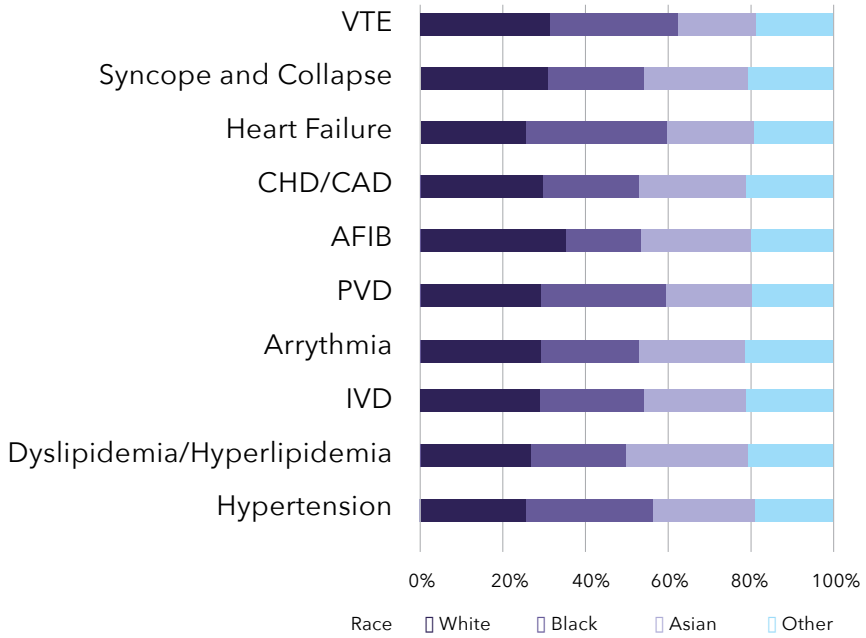
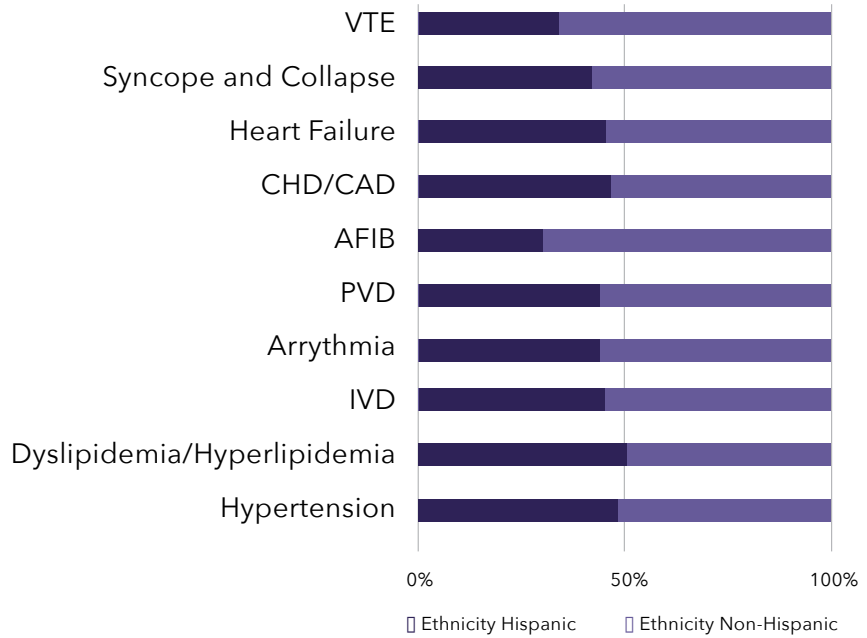


FIGURE 5:

Relative Prevalence by Ethnicity



Geographic Prevalence

Hypertension

Hypertension is so prevalent in the U.S. that nearly half of adults – 119.9 million people – have it or are taking medication for it, according to CDC.[5] Our data show states with higher prevalence of hypertension are clustered in the south and states with lower prevalence of hypertension are clustered in the northwest.

As evidenced by Figure 6 and Figure 7, we can discern a level of granularity at the zip-3 level that we are unable to achieve looking at the data on a state-by-state basis. State-level data may give the false impression of homogenous cardiovascular health and patient needs. The zip-3 map shows that there can be wide ranges within small areas, and therefore both interventions and analyses can be geo-tailored to achieve optimal outcomes.

Prevalence of Hypertension

By State

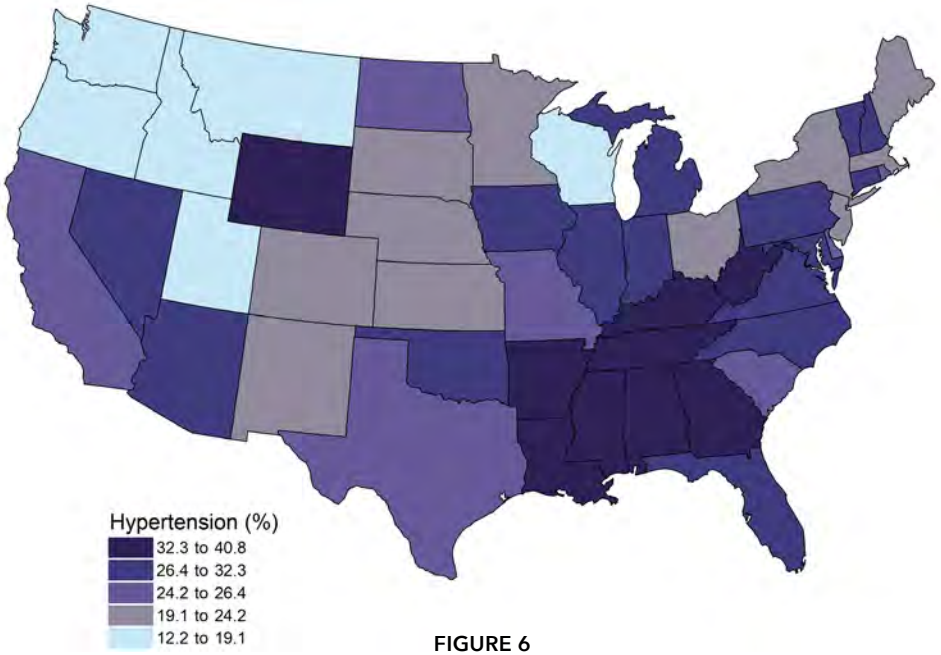


FIGURE 6

Prevalence of Hypertension

By 3-digit Zip Code Area

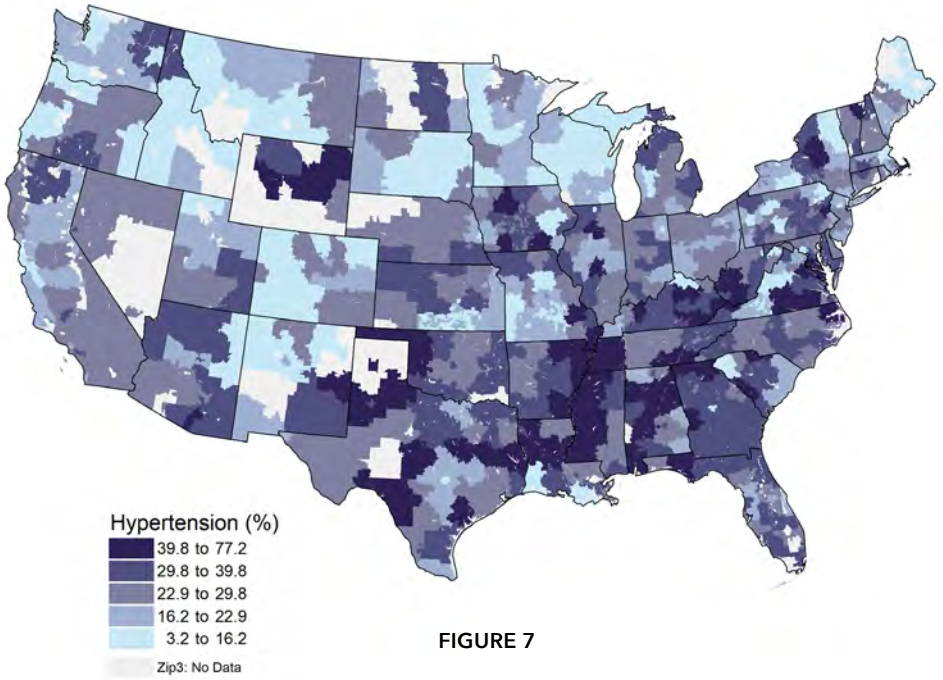


FIGURE 7

Coronary Heart Disease

Coronary heart disease (CHD)/Coronary artery disease (CAD) is the most common type of CVD[2] – and the CVD with the highest mortality rate.[6] Similar to hypertension, states with higher prevalence of CHD/CAD are clustered in the south and states with lower prevalence of hypertension are clustered in the northwest.

Prevalence of CHD/CAD

By State

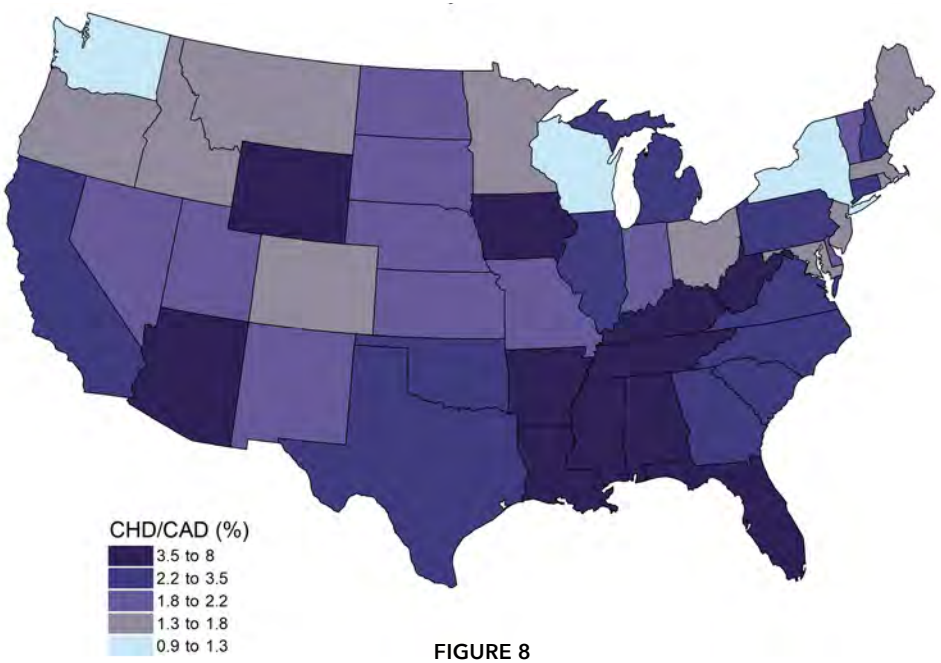


FIGURE 8

Prevalence of CHD/CAD

By 3-digit Zip Code Area

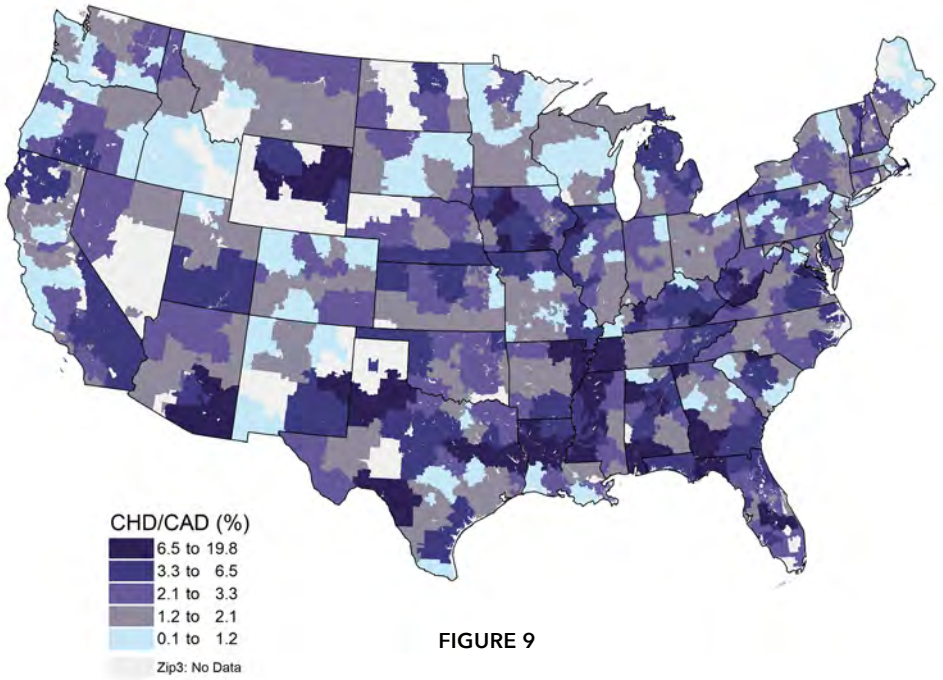


FIGURE 9

Heart Failure

The American Heart Association reports that about 6.7 million adults in the United States have heart failure[2], a chronic condition that, while serious, can be mitigated with early diagnosis and treatment to improve both quality and length of life.

The prevalence of heart failure in the United States is concentrated in the Southern states and parts of the Midwest. A greater proportion of men have heart failure than women (Figure 2) and it's more common in non-Hispanic and White communities than Asian and Hispanic communities (Figures 4 and 5).

Prevalence of Heart Failure

By State

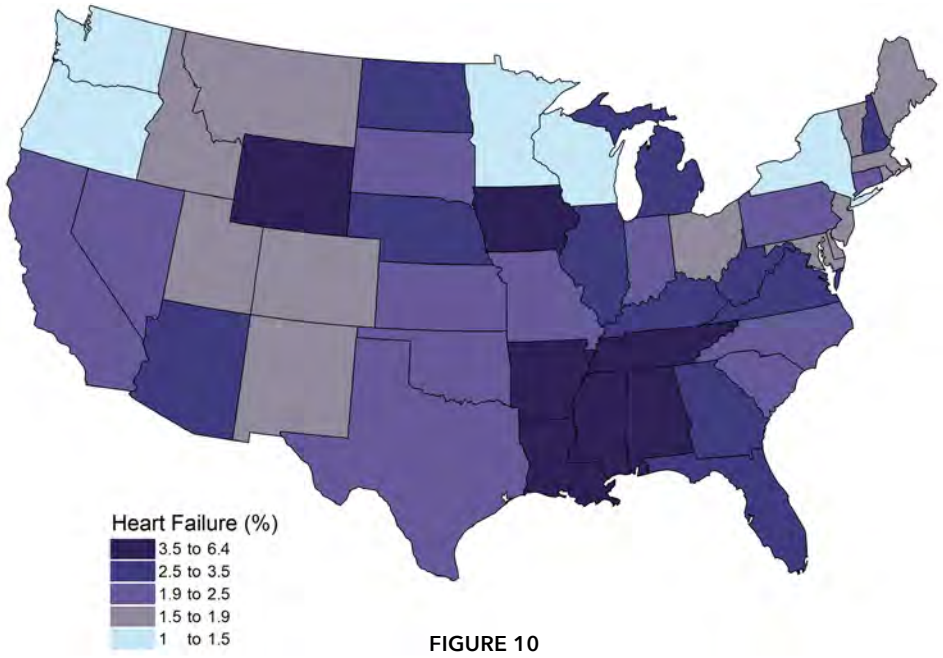


FIGURE 10

Prevalence of Heart Failure

By 3-digit Zip Code Area

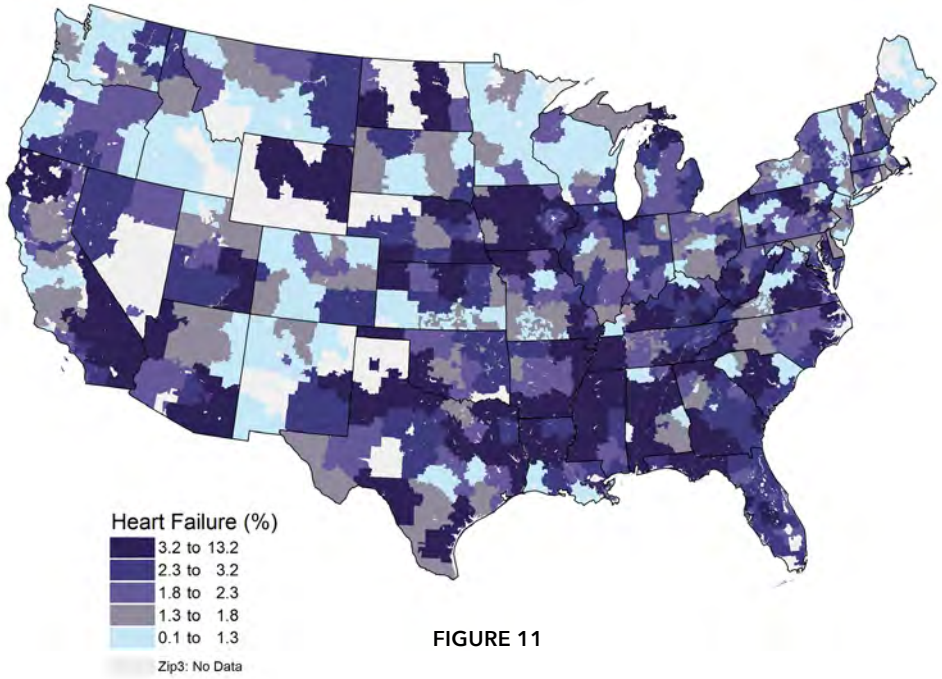


FIGURE 11

Clinical Measurements (BMI) & Lab Test Results (LDL Cholesterol)

Several medical conditions and health behaviors can put people at a higher risk for heart disease, including being overweight or obese. CDC notes that, overall, the **prevalence of obesity** among U.S. adults has increased significantly since the 1970s, **as measured by a BMI greater than or equal to 30 kg/m2** – though this trend has plateaued for most populations in recent years.[7]

Among patients with a BMI value, almost two-thirds of all patients, we looked at the two most common CVD risk factors, Dyslipidemia and Hypertension, and found that nearly half or half have a **BMI of 30+ (46% and 50%, respectively)**. Similarly, EHR data also has laboratory test results available. Among CVD patients with a recent LDL cholesterol test result, **over 80% have an elevated value >= 70 mg/dL**. Lab test results and clinical measurements can provide deeper insights for those patient subsets with available data.

US ADULTS SINCE THE 1970s

OBESITY
INCREASED
SIGNIFICANTLY

as measured by a BMI greater than or equal to 30 kg/m2

AMONG PATIENTS WITH A BMI VALUE

NEARLY HALF > **BMI 30+**
46% and 50%, respectively

CVD PATIENTS WITH RECENT **LDL CHOLESTEROL TEST RESULT** > **80%** have an elevated value **>= 70 mg/dL**

Natural Language Impact

Through data enrichment services, typically inaccessible clinical patient data entered into the EHR as free text can be turned into actionable clinical insights. This is done by applying Natural Language Processing (NLP) and Machine Learning to descriptive and numeric results based on imaging or unstructured clinical notes and semi-structured free text EHR data available in patient EHRs and clinical registries. The result is the specific identification of datapoints that enhance utility in the cardiovascular therapeutic area and streamline insights that lead to meaningful discovery and the delivery of reliable Real-World Evidence.

Veradigm is using NLP to mine data and insights previously inaccessible in many EHRs and clinical registries, including information related to left ventricular ejection fraction (LVEF), the indication of how well the heart is pumping blood to diagnose and track heart failure. This LVEF data, pulled from unstructured clinical notes, show that there are almost 20,000 patients with possible heart failure and almost 30,000 with low function. This type of insight can help improve management of patients with cardiovascular disease and offers implications for early intervention, as LVEF offers a prognostic value for adverse events or the need for a defibrillator.

Overall CV Category: LVEF Overall CV Category: LVEF

Ejection Fraction	Range	Patients
Possible Heart Failure	1 - 39	19,571
Low Function	40 - 54	29,375
Normal Function	55 - 69	127,879
High Function	70+	20,573

Methodology

Findings in this report are based on data from the Veradigm Network EHR Database of de-identified real world data. This data represents an extensive national population of patients and is drawn from physician practices in the Veradigm Network. The Veradigm Network incorporates structured and unstructured data using NLP on approximately 100,000 U.S-based healthcare practitioners and over 145 million patients with clinical activity. Veradigm Network EHR Data is one of the largest EHR data products available designed for research purposes, and combines EHR, claims, and NLP data which allows for a more complete picture of the patient journey while allowing researchers to distill down into the details of care.

The data were selected and mapped for states and 3-digit zip codes areas for a subset of 53 million patients in the Veradigm Network EHR Database with cardiovascular risk factor or condition data. To avoid confusion, cardiovascular EHR data that did not include BMI data were removed from the data set.

Veradigm has a variety of additional data sources including clinically enriched Veradigm Network EHR Data across various therapeutic areas and Veradigm Cardiovascular and Metabolic Registries.

References

1 National Center for Health Statistics. Multiple Cause of Death 2018–2021 on CDC WONDER Database. Accessed February 2, 2023.

2 Tsao CW, Aday AW, Almarzooq ZI, Beaton AZ, Bittencourt MS, Boehme AK, et al. Heart Disease and Stroke Statistics–2023 Update: A Report From the American Heart Association. Circulation. 2023;147:e93–e621.

3 World Health Organization. Cardiovascular diseases (CVDs). Accessed January 4, 2023.

4 National Center for Health Statistics. Percentage of coronary heart disease for adults aged 18 and over, United States, 2019–2021. National Health Interview Survey. Accessed February 17, 2023.

5 Centers for Disease Control and Prevention. Hypertension Cascade: Hypertension Prevalence, Treatment and Control Estimates Among U.S. Adults Aged 18 Years and Older Applying the Criteria from the American College of Cardiology and American Heart Association's 2017 Hypertension Guideline–NHANES 2017–2020. Atlanta, GA: May 12, 2023. Accessed July 6, 2023.

6 Tsao CW, Aday AW, Almarzooq ZI, Alonso A, Beaton AZ, Bittencourt MS, Boehme AK, et al. Heart Disease and Stroke Statistics Update Fact Sheet At-a-Glance. Circulation. Updated January 26, 2022.

7 CDC. About Adult BMI. Accessed January 11, 2024.

About Veradigm

Veradigm is a healthcare technology company that drives value through its unique combination of platforms, data, expertise, connectivity, and scale. The Veradigm Network features a dynamic community of solutions and partners providing advanced insights, technology, and data-driven solutions for the healthcare provider, payer, and biopharma markets.

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