



American Heart Association | American Stroke Association®

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CARDIOVASCULAR DISEASE: A COSTLY BURDEN FOR AMERICA

PROJECTIONS THROUGH 2035



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Introduction

Cardiovascular disease (CVD) has been the leading killer of Americans for decades. In years past, a heart attack or stroke almost certainly resulted in death. But advances in biomedical research, improved emergency response systems and treatment and prevention efforts have helped Americans fight back. Between 2000 and 2011, researchers found the national heart-related mortality rate declined at an average of 3.7 percent per year, while stroke mortality declined at 4.5 percent per year.

But in the past few years this remarkable progress has stalled.

The burden of cardiovascular disease is now growing faster than our ability to combat it due to the obesity epidemic, poor diet, high blood pressure and a dramatic rise in Type 2 diabetes – all major risk factors for heart disease and stroke. In a frightening reversal, the overall decline in CVD mortality rates have flattened to less than 1 percent per year since 2011, and rates have even worsened for our most at-risk populations. In 2015, the death rate from heart disease actually increased by 1 percent for the first time since 1969, according to the Centers for Disease Control and Prevention's (CDC) National Center for Health Statistics.

In addition, CVD has become our nation's costliest chronic disease. In 2014, stroke and heart failure were the most expensive chronic conditions in the Medicare fee-for-service program. Expenses associated with CVD are expected to soar in the coming years and surpass medical cost estimates for other chronic diseases, such as diabetes and Alzheimer's. Based on prevalence, death rates, disability and cost, CVD will continue to be the most burdensome disease Americans will face in the next decades.

Given these developments, it is hard to understand why federal research funding levels for heart and stroke research are not commensurate with the number of Americans afflicted with CVD and the toll it exacts.

Even though heart disease and stroke account for 23 percent and 4 percent of all deaths respectively, the National Institutes of Health (NIH) invests a meager 4 percent of its budget on heart disease research, a mere 1 percent on stroke research and only 2 percent on other CVD research. We believe this must change and change dramatically. The stakes are too high.

This comprehensive analysis projects what lies ahead in CVD prevalence and costs from the present through 2035. The American Heart Association hopes this tool will help guide and inform policymakers as to what we must do as a nation to reduce the heavy toll of CVD on our nation's health and economy.



About this Study

The association commissioned this **study**, and it was conducted by RTI International. The goal was to project the prevalence and medical costs of cardiovascular disease from the present through 2035. These new projections update similar ones made by the American Heart Association in 2011.

What is CVD?

Cardiovascular disease represents a number of heart and blood vessel diseases. Specifically, this study incorporates the prevalence and medical costs of high blood pressure, coronary heart disease (CHD), congestive heart failure (CHF), stroke, atrial fibrillation (AFib) and other heart diseases from the present through 2035. Below are definitions of each of these conditions:

Atrial Fibrillation: Atrial fibrillation is a disorder of the heart's internal electrical system affecting heart rate and rhythm. Also commonly abbreviated as AF or AFib, it occurs when the heart's two small, upper chambers (atria) beat in a fast and irregular manner and empty blood into the heart's lower chambers (ventricles) in a disorganized manner instead of beating effectively. Blood that isn't pumped completely out of the atria when the heart beats may pool and clot. If a piece of a clot enters the bloodstream, it may lodge in the brain, causing a stroke. Causes of atrial fibrillation include dysfunction of the sinus node (the heart's pace-making area in the right atrium), coronary artery disease, rheumatic heart disease, high blood pressure and hyperthyroidism.

Congestive Heart Failure: Also called heart failure, congestive heart failure is when the heart can't pump enough blood to the organs. The heart works, but not as well as it should. Heart failure is almost always a chronic, long-term condition. The older you are, the more common congestive heart failure becomes. Your risk also increases if you are overweight, diabetic, smoke, abuse alcohol or use

cocaine. When a heart begins to fail, fluid can pool in the body; this manifests as swelling (edema), usually in the lower legs and ankles. Fluid also may collect in the lungs, causing shortness of breath.

Coronary Heart Disease: Also called coronary artery disease, coronary heart disease is the most common type of heart disease. It occurs when plaque builds up in the heart's arteries, a condition called atherosclerosis. As plaque builds up, the arteries narrow, making it more difficult for blood to flow to the heart. If blood flow becomes reduced or blocked, angina (chest pain) or a heart attack may occur. Over time, coronary artery disease can also lead to heart failure and arrhythmias.

High Blood Pressure: Blood pressure is the pressure of the blood against the walls of the arteries. When that pressure is consistently above the normal range, it is considered hypertension, or high blood pressure. This increases the heart's workload, putting a person at a greater risk for heart attack, angina, stroke, kidney failure and peripheral artery disease.

Stroke: A stroke is an interruption of blood flow to the brain, causing paralysis, slurred speech and/or altered brain function. About nine of every 10 strokes are caused by a blockage in a blood vessel that carries blood to the brain; this is known as an ischemic stroke. The other type of stroke is known as hemorrhagic, caused by a blood vessel bursting. Warning signs include sudden numbness or weakness of the face, arm or leg (especially on one side); sudden confusion, trouble speaking or understanding (aphasia); sudden trouble seeing in one or both eyes; sudden trouble walking, dizziness, loss of balance or coordination; and sudden, severe headache with no known cause. Call 9-1-1 if you think you or someone else is having a stroke.

For more information on CVD, please see the American Heart Association's Heart and Stroke Encyclopedia at heart.org/encyclopedia.



Projections: Prevalence of CVD

“By 2035, nearly half of the U.S. population will have some form of cardiovascular disease.”

Cardiovascular disease has been the No. 1 killer of Americans since 1920. Your great-grandparents or another member of your family tree probably died from it. What’s more disturbing, however, is your great-grandchildren could die from CVD, too, if we don’t take deliberate and focused action now.

In our 2011 projections, the American Heart Association predicted that by 2030, upwards of 40 percent of the U.S. population – or more than 100 million Americans – would suffer from some form of CVD. Disturbingly, we reached that benchmark in 2015 – almost 15 years sooner than anticipated.

Our Latest Projections on the Prevalence of CVD Reveal:

- In 2015, 41.5 percent (102.7 million) of the U.S. population had at least one CVD condition:

High Blood Pressure.....	96.1 million
Coronary Heart Disease.....	16.8 million
Stroke	7.5 million
Congestive Heart Failure	5.8 million
Atrial Fibrillation	5.2 million

- In 2035, the number of Americans with CVD is projected to rise to 131.2 million – 45 percent of the total U.S. population. This means additional increases of:

High Blood Pressure.....	27.1 million
Coronary Heart Disease.....	7.2 million
Stroke	3.7 million
Congestive Heart Failure	3.0 million
Atrial Fibrillation	2.0 million

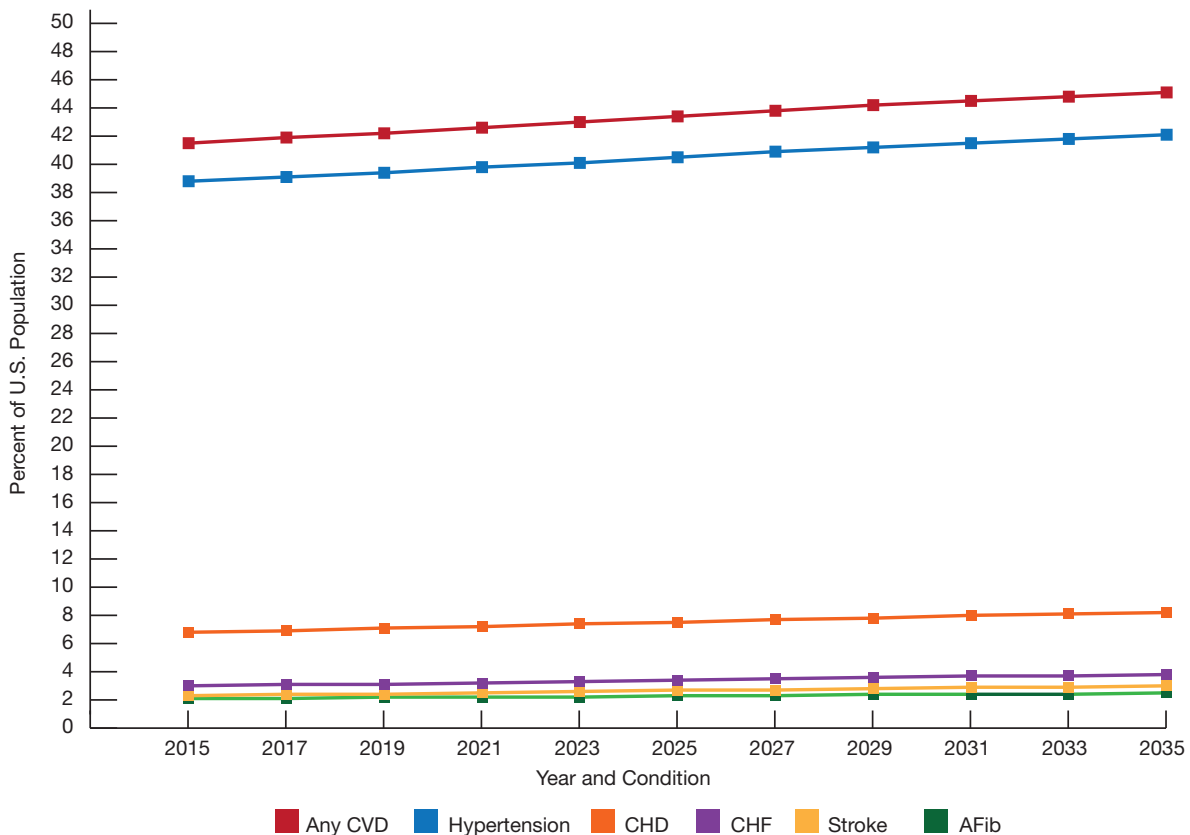
Age, Race, Sex – Differences That Matter

Age, race, ethnicity or sex should not put people at a higher risk for CVD. But unfortunately, each of these factors has an impact on whether you are likely to experience a heart attack or stroke. These differences not only affect your prospects for having CVD, they also help determine your chance of survival.

Not surprisingly, the prospect of having some form of cardiovascular disease increases the older you get.

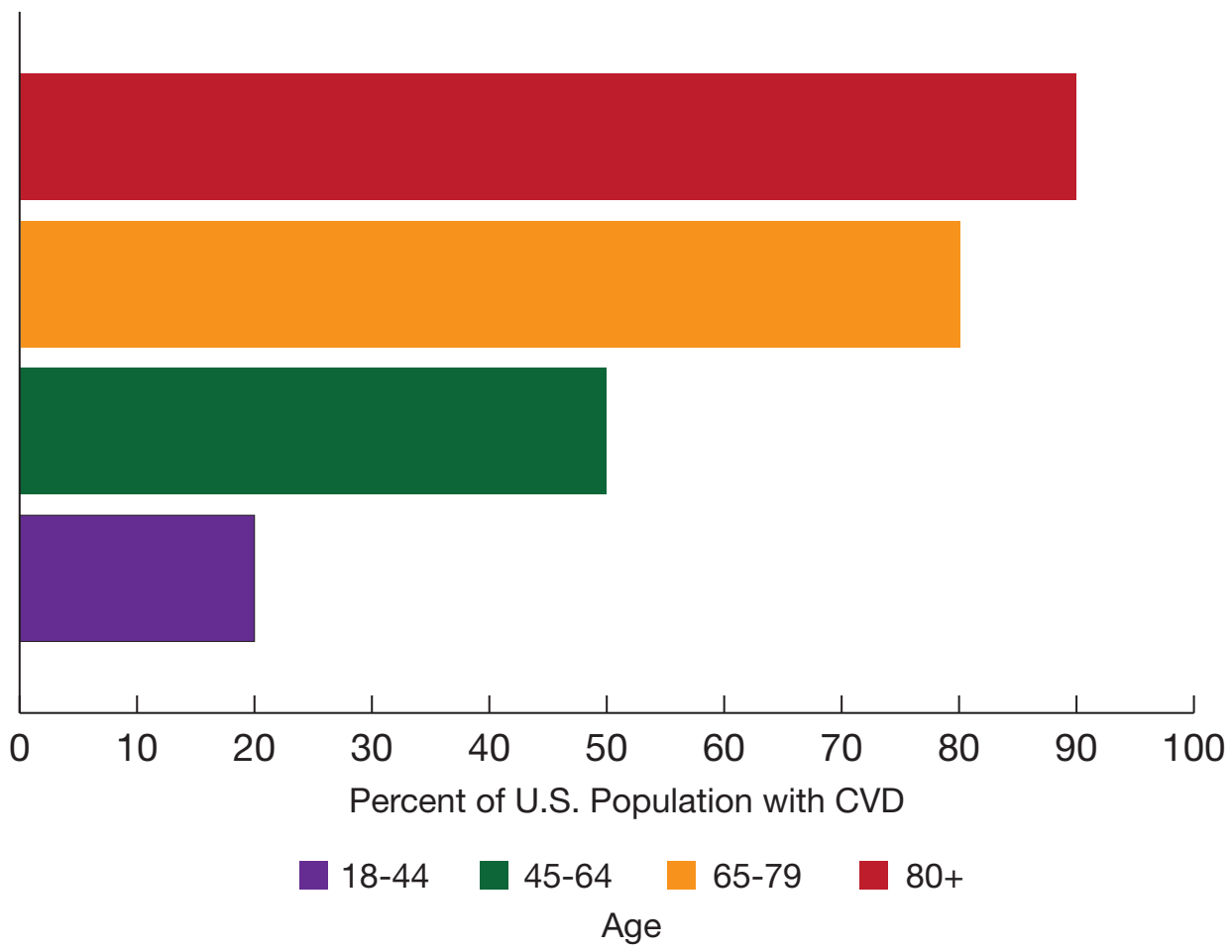
“At age 24, your risk for CVD is just 20 percent. By age 45, your chances more than double to 50 percent. Ninety percent of individuals over the age of 80 have some form of CVD.”

Projected Prevalence of Stated Disease (2015-2035)





Prevalence of CVD by Age (2015)



CVD and its associated risk factors exact a disproportionate toll on many racial and ethnic groups, accounting for nearly 40 percent of the disparity in life expectancy, for example, between blacks and whites.

Racial and ethnic minority populations also confront more barriers to CVD diagnosis and care, receive lower quality treatment and experience worse health outcomes than their white counterparts.

Such disparities are linked to a number of complex factors, such as income and education, residential neighborhood and physical environment, access to care, social support, culture and communication barriers. To illustrate just one of these factors – life expectancy for low-income men in the United States is 14.6 years lower than men in the highest income category and for women, the difference is 10.1 years. These disparities have tremendous implications for diminished earnings potential, labor productivity and stress on our health care system.

Men are projected to suffer from cardiovascular disease at a greater rate than women between now and 2035, but women appear to be catching up. Rates of high blood pressure, coronary heart disease, congestive heart failure, stroke and AFib among women are projected to see a huge upsurge. According to the CDC, heart disease is the leading cause of death for women in the United States.

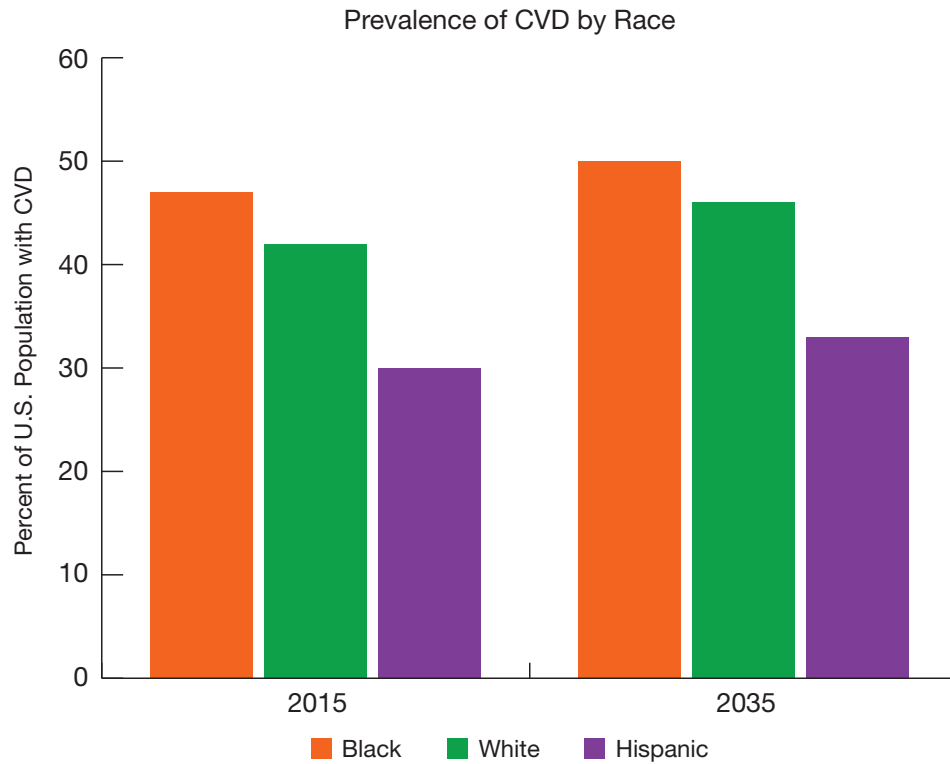
Projections: Costs of CVD

“In 2016, CVD cost America \$555 billion. By 2035, the cost will skyrocket to \$1.1 trillion.”

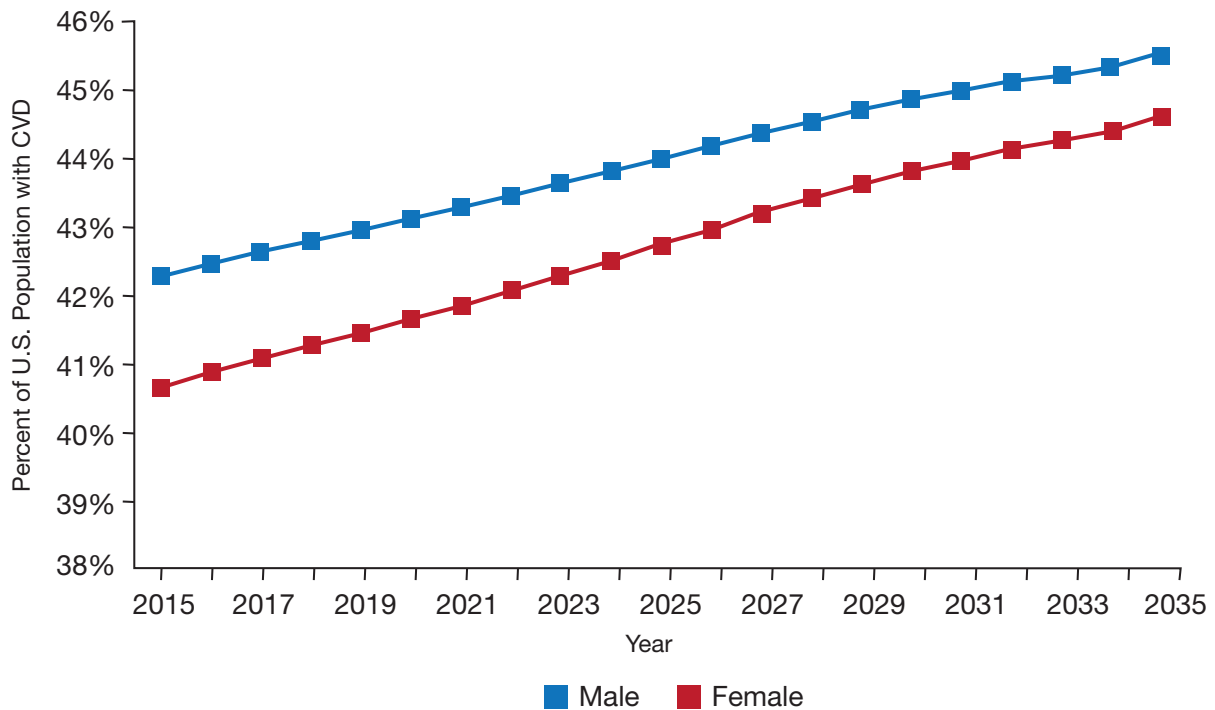
Cardiovascular disease not only exacts a heavy toll on the health of Americans, its economic burden is enormous. Right now it is America’s costliest disease, and this price tag will soar in the coming decades.



“In the next two decades, black Americans will have the highest rates of cardiovascular disease.”



Projected Prevalence of CVD by Sex (2015-2035)





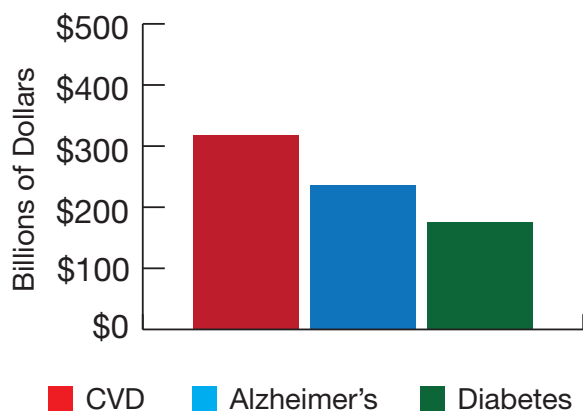
Projections – CVD Total Costs Through 2035

	Current	2035
Medical costs up 135 percent	\$318 billion	\$749 billion
Indirect costs up 55 percent (Lost productivity)	\$237 billion	\$368 billion
TOTAL COSTS	\$555 billion	\$1.1 trillion

The Cost Generators: Aging Baby Boomers

As Baby Boomers age, costs for CVD will shift from middle-aged Americans to individuals ages 65 and over. By 2035, Boomers who are 80 and older will be the source of the largest cost increases for CVD.

Medical Costs of CVD Compared to Other Diseases (2015)



“By 2035, across all conditions, total CVD costs will more than triple among those age 80+ and more than double among those age 65-79.”

Medical Costs Breakdown

Direct Costs

Direct medical costs related to CVD are more extensive than medical costs related to any other disease, including Alzheimer’s and diabetes.

Such costs include money spent on medical services via a physician, hospital or health care system, and corresponding or follow-up costs, such as prescription drugs, home health or nursing home care.

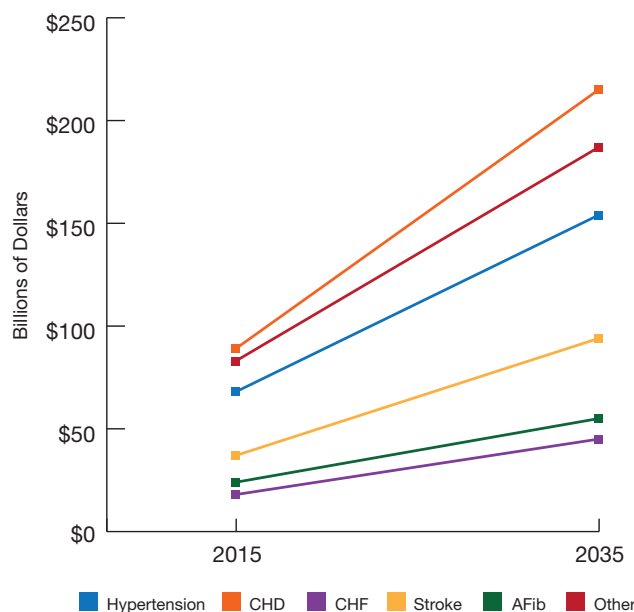
Direct costs will continue to rise for white, black and Hispanic Americans with CVD. As the nation’s black and Hispanic populations increase, costs for both groups over the next two decades are expected to surpass costs of white Americans.

Regardless of the condition, medical costs will likely triple over the next 20 years for Hispanics, more than double among blacks and be higher for women than men.

Projections – CVD Medical Costs Through 2035

	Current	2035
High Blood Pressure	\$68 billion	\$154 billion
CHD	\$89 billion	\$215 billion
CHF	\$18 billion	\$45 billion
Stroke	\$37 billion	\$94 billion
AFib	\$24 billion	\$55 billion
Other	\$83 billion	\$187 billion
TOTAL MEDICAL COSTS	\$318 billion	\$749 billion

Projected CVD Direct Costs Through 2035 by Condition



Indirect Costs

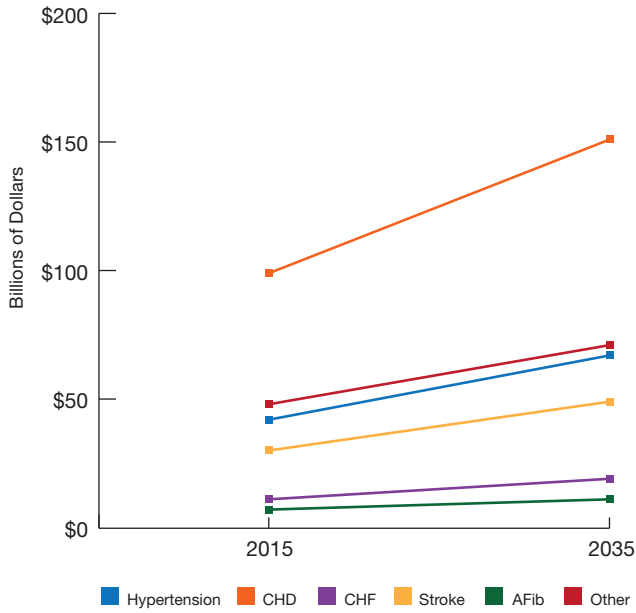
Indirect costs of CVD related to lost productivity in the workplace and at home can also have damaging consequences.

This study includes projections for two different types of indirect costs: morbidity and premature mortality.

Costs from morbidity include three components: days of work lost by employed individuals due to CVD, home productivity loss (days spent in bed due to CVD and the need to hire housekeeping services) and work loss among individuals who are too sick to work.



Projected CVD Indirect Costs Through 2035 by Condition



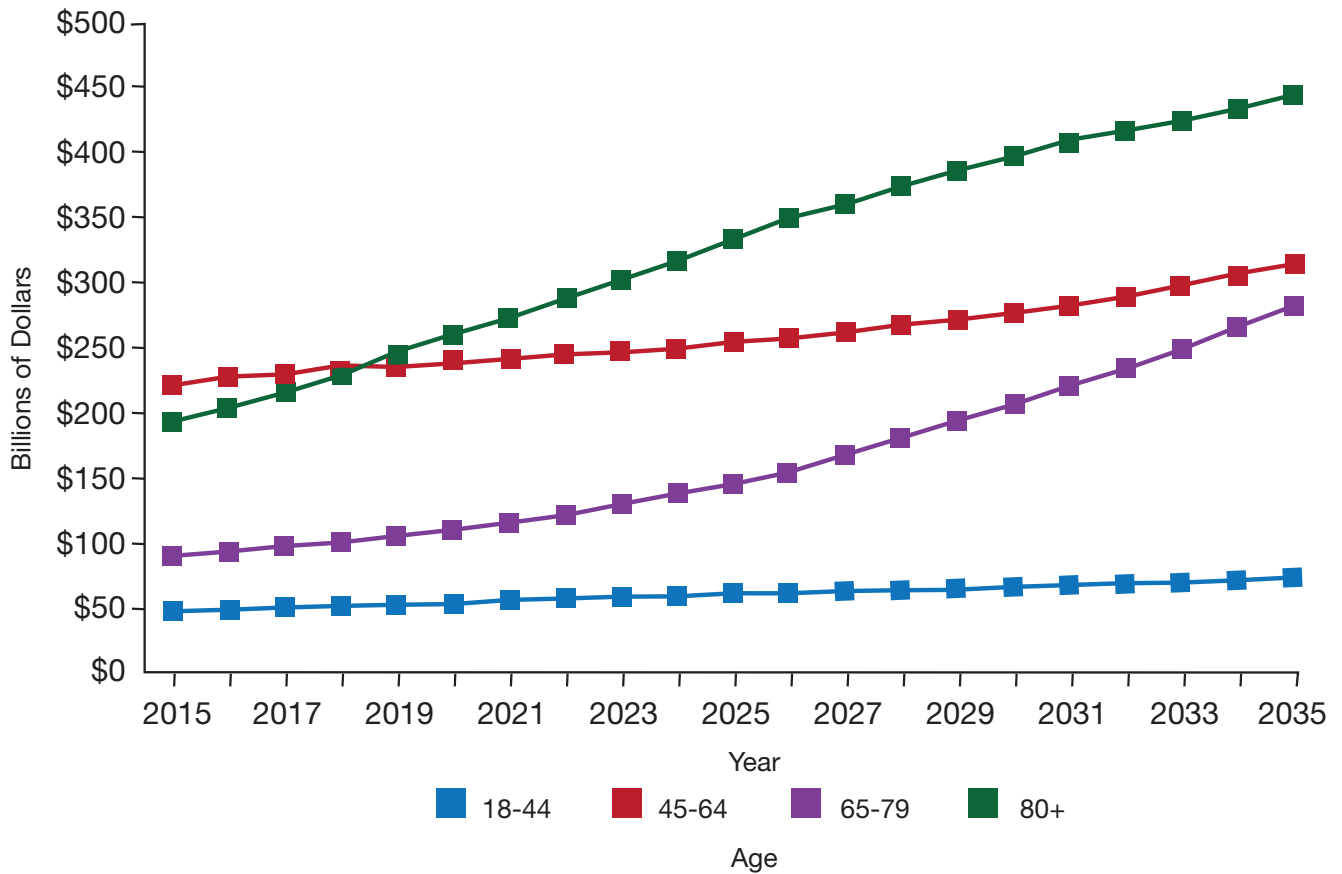
Costs from mortality include the value of lost earnings and household productivity from premature death due to CVD.

Individuals age 45-64 face the highest indirect costs due to CVD. While white Americans face the highest indirect costs, Hispanics are expected to experience the largest relative increase over the next 20 years.

Projections – CVD Indirect Costs Through 2035

	Current	2035
High Blood Pressure	\$42 billion	\$67 billion
CHD	\$99 billion	\$151 billion
CHF	\$11 billion	\$19 billion
Stroke	\$30 billion	\$49 billion
AFib	\$7 billion	\$11 billion
Other	\$48 billion	\$71 billion
TOTAL COSTS	\$237 billion	\$368 billion

Projected Total (Direct + Indirect) Costs of CVD by Age (2015–2035)







Recommendations

As the oldest and foremost organization dedicated to improving the cardiovascular health of all Americans, the American Heart Association advocates for policies that support a robust research agenda, help prevent cardiovascular disease and broaden access to affordable, high quality care. To address the escalating burden of cardiovascular disease highlighted in this report, the association recommends the following changes in federal policies:

- Increasing NIH research funding for heart disease and stroke.
- Enhancing focus on prevention to improve and preserve population health from birth to old age.
- Preserving and expanding access to high quality affordable health care.

Research

Robust NIH-funded heart and stroke research is our country's best hope to discover innovative ways to prevent, treat and ultimately develop cures for heart disease and stroke. This analysis acknowledges the enormous progress that has been made in the fight against CVD while recognizing the significant challenges that lie ahead.

Now is the time to make meaningful investment in the NIH and the CDC. NIH-funded biomedical research has resulted in nearly a 70 percent reduction in the death rate for coronary disease and stroke over the past century. But, as this analysis shows, we need to do more if we are to stop the rising tide of CVD prevalence that is already outpacing previous predictions.

In addition, the association supports health services, genomics and population and epidemiological studies conducted by other federal agencies.

There is no one-size-fits-all answer to the questions of who gets CVD and why. This analysis clearly points out that age, race and sex can increase risk and determine survival rates. Given these findings, we advocate for addressing disparities, removing barriers to medical research and increasing participation of women, racial and ethnic minorities, and older Americans in clinical research. This forward thinking is also critical in light of the higher prevalence rates among black and older Americans, and for certain types of CVD that disproportionately affect women and Hispanics.

Prevention

Even today, stroke and heart failure top the list of chronic conditions that account for the most spending in the Medicare fee-for-service program. This spending pattern reflects how the U.S. health care system often rewards efforts that treat disease and injury rather than those that

prevent them. Cardiovascular disease is largely preventable, and prevention programs represent an enormous return on investment by reducing some costs and promoting patient well-being, including length and quality of life.

Rather than treating illness when it is far advanced, the American Heart Association advocates for heart-healthy habits and wellness throughout a person's life – and the earlier the better. Those who follow a lifestyle of regular exercise, a heart-healthy diet and regular screenings for blood pressure, cholesterol and diabetes can dramatically reduce their risk of developing CVD. If we have any chance of overcoming the burden that heart disease and stroke impose on our health care costs, our workforce productivity and our quality of life, we have to commit to policies, systems and environment changes that can transform population health.

We must promote access to healthy, affordable foods and beverages, and provide fully transparent nutrition labeling to help keep consumers informed about food and beverage choices and encourage healthy eating. To this end, we strongly support federal programs that provide nutritious foods and meals to our most vulnerable populations such as children, older Americans and low-income individuals, including keeping nutrition standards for school meals strong and evidenced-based.

To reverse sedentary behavior, the association supports science-based policies that promote physical activity and physical education in schools and early care and education; deliver exercise prescriptions in the clinical environment; include investments in biking and walking in transportation infrastructure; increase and improve recreational spaces in communities; and reduce sedentary work environments.

Prevention and control efforts have contributed to a decline in U.S. cigarette consumption by more than 24 percent over the past 10 years. However, new products like e-cigarettes that are especially enticing to children have entered the marketplace. We will continue to address CVD risk factors such as tobacco use by strongly supporting FDA regulation of these products; advocating for comprehensive clean indoor air laws and increased tobacco excise taxes; raising the purchasing age for tobacco to 21; and ensuring comprehensive coverage of tobacco cessation services in public and private health care plans.

Finally, a focus on prevention in the workplace is a win for both employees and employers. Prevention strategies keep workers healthy and productive and help employers steer clear of economic losses from morbidity and mortality. A 2012 study conducted by researchers at the University of Colorado found that each short-term disability claim filed because of a heart attack or hindering chest pain resulted in nearly \$8,000 in lost productivity, while long-term claims resulted in a more than \$52,000 loss to employers.

**Affordable Health Care**

The American Heart Association has long advocated for policies that expand access to meaningful and affordable health care coverage for all Americans. This report makes clear that if we do not address CVD risks for all Americans, we will fall short of our goals to eliminate heart disease and stroke. Building on this evidence, the association supports policies that remove barriers to affordable and quality health care and preventive benefits, improve the delivery of timely, quality health care, and eliminate disparities.

Although the future of the Affordable Care Act remains in flux, it is crucial to the association that lawmakers and administration officials provide Americans with an option

for high quality, affordable health care coverage and protect programs such as Medicare, Medicaid and CHIP that serve our most vulnerable populations. In addition, we support payment models for the use of telehealth and mobile health technologies and call for an adequate supply of and access to affordable pharmaceuticals and devices.

This research points to a future where more and more Americans will likely suffer and die from CVD. It speaks also to the mission of the American Heart Association and its more than 30 million volunteers and supporters who work each day to help everyone in our nation build healthier lives free of heart disease and stroke.

We dedicate this report to them.



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