

Cardiovascular Disease: How it Became a Problem, Risk Factors, and the Role of Public Policy

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“Parts of the body unused and left idle become liable to disease, defective in growth and age quickly.” – Hippocrates

What many people don't know is that unlike diseases such as cancer, cardiovascular disease (CVD) is not an inevitable part of human life. In fact, CVD is associated with many preventable and treatable risk factors, such as high cholesterol, smoking, hypertension, diabetes, physical activity, and obesity. Within this list, the primary underlying risk factor is elevated cholesterol, although what we consider normal cholesterol is high compared to the levels that human beings used to have, and this normal level is high enough for CVD to develop. In that setting, the other factors are important accelerators of CVD.

Given these risks, it is recommended that policymakers pay close attention to the following: (1) decreasing barriers to physical activity, (2) decreasing barriers to healthy food, and (3) increasing barriers to smoking among the citizens of Massachusetts.

THE BIOLOGY OF CARDIOVASCULAR DISEASE

The underlying cause of CVD is atherosclerosis, which is plaque buildup in one's arteries. This process typically begins early in life, although it normally becomes more noticeable in one's 50's, 60's, or 70's.⁷

As time passes, aided by various accelerating factors, these fatty deposits increase in size and—in the worst case scenario—inflame and rupture, prompting blood to clot around the site. This further increases the blockage in the arteries which then leads to other serious problems such as heart attack and stroke.⁷

HOW DID CARDIOVASCULAR DISEASE BECOME SUCH A PROBLEM?

CVD is a relatively new disease, at least in the epidemic proportions that we see today, and its status as the current leading cause of death is also new. Humans are “designed” to lead a physically active life. While humans are not as good at sprinting as many other mammals, we are one of only four groups of mammals who are superb endurance runners.² That is why we have long legs. Given that we are designed to be endurance runners—yet currently live mostly sedentary lifestyles—it is not surprising that CVD has become our society's leading cause of death.

RISK FACTORS FOR CVD

Nationwide data suggest that the primary risk factors for CVD are high cholesterol, smoking, diabetes, and high blood pressure. Secondary risk factors include low levels of physical activity and obesity.⁷

High Cholesterol. Among these risk factors, high cholesterol is the primary predictive factor for CVD. Longitudinal studies show a link between diets high in saturated fat and cholesterol and risk of CVD. Experiments among lab animals showed that rats fed diets high in saturated fat and cholesterol were more likely to have high blood cholesterol than rats fed diets low in saturated fat and cholesterol. As a whole, these studies suggest that a change in diet is an important component of better cardiovascular health.⁷

Smoking. Numerous studies have documented the relationship between smoking and risk of CVD. A longitudinal study of 190,000 men found that men who smoked regularly were more likely to die from CVD than men who did not smoke regularly. Another study found that people who had quit smoking significantly decreased their risk of CVD. Nicotine in cigarettes negatively affects the cardiovascular system through increasing heart rate, decreasing the oxygen-carrying capacity of the blood, and stimulating blood clotting.⁷

High Blood Pressure. High blood pressure (a.k.a., hypertension) is also a major risk factor for CVD. Many studies have shown a direct and continuous relationship between increased blood pressure and risk of CVD, especially an increased risk of stroke. However, when treating high blood pressure in the elderly, it is necessary to be cautious because attempting to lower blood pressure to “normal” levels can increase their risk of falling.⁷

Low Physical Activity. Considerable evidence links physical activity and decreased risk of CVD. The Lipid Research Clinics Prevalence Survey (a study of 3,000 men between the ages of 30 and 69) found that men who engaged in high levels of physical activity were at a significantly lower risk of dying from CVD than men who were less physically active. Similarly, a longitudinal study of 13,000 men and women found increased levels of physical exercise correlated with lower deaths from CVD. Inactive individuals have a 35–52% greater risk of developing hypertension than physically active individuals. In addition, inactivity is linked with many other risk factors for CVD, including increased risk of diabetes and obesity.¹⁴

Diabetes and Obesity. Ninety percent of diabetics have type 2 diabetes, which requires a genetic predisposition but is triggered by obesity. Diabetes is one of the major risk factors contributing to deaths caused by CVD. Because of its link to obesity, diabetes is often the second most important factor that makes individuals susceptible to CVD. Diabetes is strongly associated with stroke and coronary heart disease. Further, although women tend to have lower rates of CVD, women with diabetes have rates of CVD equal to those of men, indicating that diabetes is a stronger risk factor for CVD among women in comparison to men.³

CVD is the leading cause of death among Latino individuals in the U.S., and evidence suggests this mortality rate due to CVD is growing. Some of this increased risk is due to a genetic predisposition to insulin resistance (a pre-diabetic condition), but lifestyle factors also contribute.³

CVD and associated risk factors, particularly diabetes, vary widely between Latino groups from different national origins. These differences may be due to variations in traditions, diets, and socio-economic backgrounds, but is largely attributed to the degree of acculturation and length of residence in the U.S. Groups that are well acculturated or have spent the longest duration of time in the U.S. are most susceptible to CVD and its risk factors.³

IMPORTANT BEHAVIORAL CHANGES

All of the risk factors mentioned above are changeable and/or treatable. The three most important behavioral changes are quitting smoking, better diet, and physical activity. These behavioral changes have been linked to many risk factors for CVD. Good nutrition is linked to lower cholesterol levels, reduced blood pressure, lower risk of diabetes, and lower risk of obesity.⁵ Physical exercise is linked with better diet, lower likelihood of smoking, reduced blood pressure, lower risk of diabetes, and lower likelihood of obesity.¹⁴

Quitting smoking is associated with prompt and substantial decreases in risk of CVD. Among smokers already diagnosed with CVD, quitting smoking is associated with a significant reduction in risk of another heart attack, sudden cardiac death, and mortality.¹¹

Despite all of these benefits, behavior change is difficult due to a variety of psychological (e.g., belief in capability to stop smoking), social (e.g., social support for behavior change), cultural (e.g., culture’s influence on food choices), environmental (e.g., availability of healthy food, access to resources that are conducive to physical activity), and economic factors (e.g., affordability of time and resources conducive to change).^{5,11,14}

THE BUILT ENVIRONMENT AND FOOD SUPPLY

Creating and sustaining effective behavior changes and preventing CVD are also related to environmental factors, including climate, land use, population density, and culture. A geographic analysis of obesity rates

and these environmental factors showed an association between spatial patterns of all these factors, indicating that they may produce environments that foster obesity.⁹

These associations might be due to interactions between the ecology of a region (climate, natural environment), the built environment (food supply, land use), and social factors (population density, culture). For example, rural counties might not necessarily be correlated with high obesity rates, but a rural county with low education and high unemployment is much more likely to show high obesity rates compared to a “recreation” rural county that also has higher education and lower poverty rates. Paying attention to these social and land use factors that contribute to people’s interactions with the landscape can help promote or limit healthy lifestyle choices.⁹

Food supply is also relevant. Whereas climates in Northeastern cities may not promote ready access to fruits and vegetables year-round, a high population density and extensive network of infrastructure allows for accessible grocery stores to stock healthy fruits and vegetables, whatever the weather. Alternatively, even in counties that are dominated by farming and have a more conducive climate, a lack of roads or population density can lead to food deserts, which lead to limited access to perishable foods like fruits and vegetables. Addressing these infrastructure issues to promote health may be best supported by regional efforts between states.⁹

TRENDS IN DEATHS DUE TO CARDIOVASCULAR DISEASE

In the U.S., age-adjusted death rates due to CVD have decreased in the past 30 years by 50.1% for men and 49% for women, and those rates continue to fall.⁴ Both changes in lifestyle and improvements in medical therapies have contributed to this improvement in mortality rates.

Changes in lifestyle are key to reducing risks associated with CVD and preventing/postponing CVD-related deaths. Specific risky behaviors include smoking, poor diet, sedentary behavior, and risky drinking.⁶ These behavioral risk factors are also associated with obesity, which may have a multiplicative effect for those with high CVD risk.⁸

Research shows that behavioral counseling leads to significant improvements in these risks and helps decrease CVD-related mortality. Further improvements to the health care system and clinical practices can improve these results, as would policies supporting environments that foster healthy lifestyle choices.⁶

Improvements in medical therapies account for approximately 47% of the decrease in deaths due to CVD.⁴ Specific examples of those therapies include medications to treat high blood pressure and manage diabetes, stents that treat the blockages in arteries, and coronary bypass surgery.

PUBLIC POLICY AS AN ACCELERATOR TO CHANGE

The public dissemination of information regarding the risks of CVD has played a large role in the decrease in the rates of CVD-related deaths. However, much more work is left to be done.

We need to institute policies that promote changes in practices by clinicians to provide more individualized and comprehensive therapy focusing on behavior change and prevention. The present health care system is oriented toward acute care. It would be helpful if policies enable more “patient-centered, population-based health and planned care [which] are needed to achieve broad, substantial and lasting improvements.”⁶

However, cardiovascular health is also influenced by external factors beyond clinical practices. These factors include personal behaviors (e.g., smoking), dietary restrictions, and environmental exposures (e.g., economic stress).^{1, 12, 15} Although some of these factors appear to be personal decisions, they can be influenced by public policy, should that policy take into consideration social reforms that impact these factors.^{10, 15}

Access to healthy food can be addressed through public policy by prioritizing nutritional access and education among citizens and through the promotion of community-based projects that are tailored to the immediate needs of the state.^{12, 13} Economic reform, such as a minimum wage bill, may also give more of the population access to the more expensive foods that are necessary for a balanced, healthful diet.¹⁵

Considering the integrated associations between social relationships, economy, and health, it is also important to consider the health implications of any social reform bills. Policy-makers should consider prioritizing infrastructure projects that promote physical activity, such as outdoor spaces for recreation and roadwork projects that emphasize sidewalk access,¹⁵ as well as ensuring safe environments for outdoor activity.

Tobacco usage and associated risks for CVD can be addressed through increasing barriers to access of tobacco products. Further, policies that promote better educational access should be considered not only for their benefit to the state's workforce and students, but also for their value in promoting better health outcomes (among adults, diabetes mortality rates are three times higher for high school graduates than college graduates).¹⁵

Overall, it may be most effective to combat the damages associated with CVD by integrating a health consciousness into policy actions across a broad range of issues. More immediately, direct action should be taken to address healthful food access, limiting tobacco use, and promoting safe environments for physical recreation.

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