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Prevention of Coronary Heart Disease 2020: If Not Now, When?

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Abstract

Prevention of Coronary Heart Disease remains an urgent challenge. We have made progress over the past 50 years, but in the last few years coronary heart disease mortality curves have flattened and begun to trend upwards coincident with worldwide epidemics of diabetes and obesity.

We understand the problem. We know what to do. We understand the multiple paths toward prevention. What is missing is uniform acknowledgement from medical practitioners, hospitals, insurers, government and the general public that a problem exists, followed by unified commitment of financial, educational and program resources commensurate with shining a bright light on Prevention. Why are we so complacent with treating disease rather than preventing it? The answer may lie in the current economics of healthcare where financial incentives are not aligned with prevention and health promotion.

The Hippocratic Oath contains the clause, "*I will prevent disease whenever I can, for prevention is preferable to cure*."

Keywords: Prevention; Coronary heart disease; Cardiac rehabilitation

Introduction

The incidence and consequences of coronary heart disease (CHD) have been well defined [1].

- Someone in the U.S. has a heart attack every 40 seconds
- 805,000 heart attacks/yr, 365,914 of which result in death (2017)
- 2/10 deaths from CHD happen in adults<65 yrs old [1]

Risk factors involved in CHD have been well characterized [2]. The INTERHEART Study compared 12,461 people having their first heart attack with 14,820 matched controls in 52 countries, concluding that 90% of heart attacks were associated with at least one risk factor [3] (Table 1).

	Odds ratio
Elevated apoB/apoA ration	3.25
Smoking	2.87
Psychosocial factors	2.67
Diabetes	2.37
Hypertension	1.91
Abdominal obesity	1.62
Regular etoh	0.91
Regular physical activity	0.86
Daily fruits and veges	0.70

Table 1: INTERHEART Study-Risk of First Heart Attack compared to control group. Odds ratio above 1.0 indicated higher risk.

Since the 1960's, mortality from Coronary Heart Disease has been dropping (Figure 1). This fall in mortality predated both the First Dietary Goals for the United States which came out of Senator George McGovern's Select Committee in 1977, as well as the introduction of statins (lovastatin) in 1987. The general consensus is that this fall in mortality was multifactoral, related to improvements in earlier diagnosis, improved treatments, medications, and studies such as Framingham which identified targetable risk factors like smoking, hypertension and elevated cholesterol [4]. But alas, over the last 10 years, the mortality curve has flattened and recently begun climbing. Heart Disease deaths, the majority being coronary heart disease, increased from 596,577 in 2011 to 614,348 in 2014 [5]. This trend reversal is arguably fueled by the current obesity and diabetes epidemic. What should be our prevention strategy(s) in 2020?

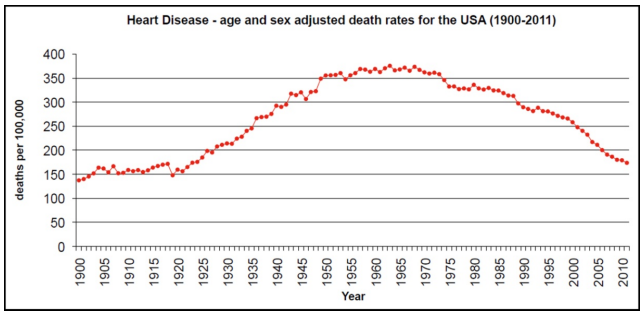

Figure 1: Age- and sex-adjusted rate of deaths due to heart disease in the United States (1900-2011).(6)

In the United States, Coronary Heart Disease prevention has been a multifaceted work in progress over the past several decades. In 2010 the American Heart Association (AHA) Published National Goals for Cardiovascular Health Promotion and Disease Reduction(7) and in 2011, following the passage of the Affordable Care Act(ACA), the Federal Department of Health and Human Services, lead by Kathleen Sebelius, announced the Million Hearts Initiative(8). These programs were the results of extensive discussion and research showing that despite great positive strides, cardiovascular disease remained our number one killer.

The Million Hearts Initiative utilized funding included in the Affordable Care Act; primary targets included smoking cessation, diagnosis and treatment of hypertension and hypercholesterolemia and proper use of aspirin. The goal was the prevention of one million heart attacks and strokes over 5 years. The Million Hearts Initiative was partially successful, preventing an estimated 500,000 cardiovascular events from 2012-2016. The Initiative's goal may have been blunted by the uptick in obesity and diabetes, but efforts are being redoubled in a new Million Hearts Initiative 2022.

The AHA 2020 Strategic Impact Goals were to improve cardiovascular health by 20% while reducing death from cardiovascular disease by 20% by the year 2020. The goals defined "Ideal Cardiovascular Health" as "Life's Simple 7" (Table 2) (7).

Ideal Cardiovascular Health / Life's Simple 7	
Smoking status	never or quit > 1 year
Physical activity	150 min / wk
Healthy diet	4-5 components
Body weight (BMI)	< 25
Total cholesterol	< 200
Blood glucose	< 100
Blood pressure	< 120/80
Healthy Diet	
Fruit and veges	> 4.5 cups/day
Fish (oily)	> 2 3.5oz servings/wk
Whole grains	> 3 1oz (28 gm) servings/day
Sodium	< 1500 mg/day
Sugar sweetened drinks	< 450 cal (36oz) / week
Saturated Fat	< 7% total calories
Nuts, legumes, seeds	> 4 servings/week
Processed meat	none or < 2 servings/week

Table 2: Life's Simple Seven and Details of the Healthy Diet

When "Life's Simple 7" was launched in 2010, it was estimated that about 5% of the population was at goal for ideal cardiovascular health. The ARIC (Atherosclerosis Risk in Communities) Study followed 12,744 adults, age 45-64 for 18.7 years and looked at cardiovascular (CVD) event rates (stroke, heart failure, myocardial infarction or fatal coronary disease). For 357(2.8%) with 6 ideal health factors the CVD event rate was 6% compared to 319 (2.5%) with 0/7 ideal health factors who had a 50% CVD event rate [9].

One review, published in 2016 [10], looked at 14 U.S. cohorts and found 0.5% to 12% had 6-7 of the Simple 7. Not only was the presence of 6-7 simple 7s associated with lower cardiovascular events, but also lower incidences of cancer, depression and cognitive impairment. What other tools are in the toolbox?

Traditional Cardiac Rehabilitation

Traditional Cardiac Rehabilitation is primarily exercise-based and has shown improvement in risk profile and outcomes, including survival in individuals with known CHD. Traditional Cardiac Rehabilitation reduces the chances of being rehospitalized or depressed after a coronary event, and helps patients recover strength and build skills in managing medications and activities. A challenge for Traditional Cardiac Rehabilitation is suboptimal referral and participation. Women, minorities, older people, and people with comorbidities are less likely to be referred and/or attend Traditional Cardiac Rehabilitation. A strong recommendation by the patient's physician may be the most significant factor in a patient's decision to participate [11].

Intensive Cardiac Rehabilitation (ICR)

The Medicare definition of Intensive Cardiac Rehabilitation is "a physician- supervised program that furnishes cardiac rehabilitation services more frequently and often in a more rigorous manner (than Traditional Cardiac Rehabilitation)."

One of the first Intensive Cardiac Rehabilitation programs was developed by Dean Ornish during his groundbreaking studies on the effects of lifestyle on CHD. The benefits in terms of risk factor modification and prognosis with Intensive Cardiac Rehabilitation are generally superior to Traditional Cardiac Rehabilitation, but, both Traditional Cardiac Rehabilitation and Intensive Cardiac Rehabilitation are underutilized [12].

We conduct an Intensive Cardiac Rehabilitatio program in Tucson called the Heart Series [13]. It is a twelve week program. Each participant group meets weekly for 3 hours. Each week has a different theme, covering risk factors, pathophysiology, nutrition, safe and effective exercise, yoga, stress management, communication, food label reading, creating resiliency, effective communication, supplements, and medications. The sessions are designed around active engagement and participation. Each weekly session includes evidence-based education, the practice of Tai Chi, and the sharing of a whole-food, plant-based potluck meal.

We Offer the Following General Guidelines

Aerobic Exercise: 4-6 sessions per week, 30-60 minutes per session

Light Weights: 1-2 sessions per week, 15-30 minutes per session

Nutrition: Whole-food, plant-based diet; walk away from the standard American diet

Stress Management: 15-30 minutes per day with multiple options, including, for example, tai chi, yoga, meditation bio- feedback (Heart Math), reading, writing, music, religion, playing with a pet et al.

Community Involvement: The goal is to avoid isolation and enhance one's support system

It is unfortunate that stress management and addressing psychological risk factors has not been more universally highlighted as a key feature in CHD prevention [14].

Elephant in the Room

A chronic condition is a physical or mental health condition that lasts more than one year and causes functional restrictions and/or requires ongoing monitoring or treatment. As of 2014, 60 percent of American adults had at least one chronic condition, and 42 percent had more than one chronic condition [15]. Coronary Heart Disease is a chronic condition.

According to the CDC [16], "90% of the nation's 2017 $3.5 trillion in annual health expenditures are for people with mostly preventable chronic medical conditions and chronic mental health conditions," and we know that just a fraction of those dollars go toward prevention.

In Stephen Covey's book, 7 Habits of Highly Effective People, habit #5 is "First Seek to Understand, Then be Understood. In 2019, we have a deep understanding of the risks and outcomes associated with CHD. However, the Elephant that exists is a big disconnect between this deep understanding and the transference of this understanding to the general public and healthcare industry which would result in higher levels of education and funding for CHD prevention.

A Catch-22 is a paradoxical situation from which there is no escape because of contradictory rules or limitations. The term was coined by Joseph Heller in his 1961 novel, Catch-22. The protagonist, John Yossarian, a US Army Air Force bombardier, wants to be psychologically grounded from dangerous combat. To be grounded he must request evaluation by a flight surgeon and be found insane and therefore, unfit to fly. The catch is that if he was insane, he would not be requesting an evaluation. So if he requests an evaluation, the Army considers him to be sane and he must continue to fly.

The catch-22 as it applies to prevention in healthcare is that even if one correctly concludes that prevention should take center stage, the Healthcare Industrial Complex will line up against it, because if prevention works, there will be fewer healthcare dollars flowing to crisis intervention, which is what hospitals, drug and device manufacturers, providers and insurers depend on. Our healthcare system prefers paying for treatments of chronic disease rather than preventing them [17].

Some think that insurers should embrace prevention, "The payers that effectively encourage the use of preventive health care will begin to see savings" [18]. But these saving would take years to show up and data shows that many Americans change health insurers every year. For example, in 2018, there were 66.1 million total job separations (the sum of quits, layoffs, discharges, and other separations) [19]. A job separation generally means loss of one's employer-based insurance. In addition, there are millions who stay employed, but have to find new insurers because their employer changes insurance companies. In light of such wholesale short-term turnover, insurance companies have little incentive to plan for the long-term benefits of spending on prevention.

The Future of Coronary Heart Disease Prevention – Glimmers of Hope

Our healthcare delivery system, our politicians, the private business community and most of the public currently lack the collective will or the appetite to go all in on Coronary Heart Disease Prevention which would be best served by a coordinated, comprehensive, all hands on deck approach [20,21]. Beyond the positive steps and vision of the Million Heart Initiative, Life's Simple 7 and Cardiac Rehabilitation, what lights our path forward?

Finland offers an example of a prevention blueprint [22]. In the early 1970s, the province of North Karelia, which had the highest heart attack rate in the world, launched the North Karelia Project aimed at improved CHD mortality. From 1972 to 2014, in the middle age population, coronary mortality was reduced by 84%. About 2/3 of the mortality decline was explained by risk factor changes and 1/3 by improvement of new treatments developed since 1980s. How did they do it? There was a committed government mandate and large community support with cadres of boots on the ground promoting face to face communication. The project changed people's lifestyles, moving food production and consumption from animal-based toward plant- based and altering restaurant and home menus. 60% of males *vs.* 12% of females smoked in the 1960s, with rates in males dropping to 16% in 2016. Cholesterol levels dropped 21%, salt intake in men decreased from 13 grams/day to 9.5 grams, systolic and diastolic blood pressures dropped about 10% and exercise increased.

Already mentioned was the Affordable Care Act of 2011 which covers multiple Preventive Care Services without co pay or coinsurance [23]. In 2018, the House of Representatives passed H.R. 4978, The Chronic Disease Management Act, which would allow for patients to receive preventive services by requiring high-deductible insurance plans to cover prevention before the deductible is met.

A 2019 Washington Post Article by Laura Reiley [24] outlines details of Latin America's war on obesity. Successful initiatives include laws on food labeling and advertising and taxes on sugar-sweetened beverages. In one example, Chile requires that black stop signs be displayed on the front of packages with foods that are high in added sugar, saturated fats, calories and/or sodium. Foods with black stop signs cannot be used in schools or child-targeted marketing.

The 2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease tells us, "The most important way to prevent atherosclerotic vascular disease, heart failure and atrial fibrillation is to promote a healthy lifestyle throughout life" [25]

Conclusion

In the United States, the economics of healthcare for insurers, doctors, hospitals, and pharmaceutical companies depends on people getting sick. Financial incentives are not aligned to encourage prevention and health-promotion. To change this paradigm requires a consensus commitment to changes in public policy, redirecting healthcare dollars from disease management to building infrastructure that incentivizes behavior modification and addresses educational, racial, and income disparities. Borrowing from Hillel the Elder (110 BC-10 CE), "If not now, when?"

References

1. Heart Disease Facts, Centre for Heart Disease Control and Prevention. 2017.
2. Greenland P, Knoll MD, Stamler J, Neaton JD, Dyer AR, et al. (2003) Major risk factors as antecedents of fatal and nonfatal coronary heart disease events. JAMA 290: 891-897.
3. Yusuf S, Hawken S, Ôunpuu S, Dans T, Avezum A, et al. (2004) Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): Case-control study. The Lancet. 364: 937-952.
4. Ford ES, Ajani UA, Croft JB, Critchley JA, Labarthe DR, et al. (2007) Explaining the decrease in US deaths from coronary disease, 1980–2000. N Engl J Med 356: 2388-2398.
5. CDC: U.S. Deaths from Heart Disease, Cancer on the Rise. 2016.
6. Nemetz PN, Smith CY, Bailey KR, Roger VL, Edwards WD, et al.(2016) Trends in coronary atherosclerosis: a tale of two population subgroups. Am j med 129: 307-314.
7. Lloyd-Jones D M, Hong Y, Labarthe D, Mozaffarian D, Appel LJ, et al. (2010) Defining and setting national goals for cardiovascular health promotion and disease reduction: The American Heart Association's strategic Impact Goal through 2020 and beyond. Circ 121: 586-613.
8. Tomaselli GF, Harty MB, Horton K, Schoeberl M (2011) American Heart Association and the Million Hearts Initiative. A Presidential Advisory from the AHA. Circ 124: 1795-1799.
9. Folsom AR, Yatsuya H, Nettleton J, Lutsey PL, Cushman M, et al. (2011) Community Prevelance of Ideal Cardiovascular Health by the AHA Definition and Relation to Cardiovascular Disease Incidence. J Am Coll Cardiol 57: 1690-1696.
10. Younus A, Aneni EC, Spatz ES, Osondu CU, Roberson L, et al. (2016) A systematic review of the prevalence and outcomes of ideal cardiovascular health in US and Non-US populations. Mayo Clin Proc 91: 649-670.
11. Lavie CJ, Milani RV (2011) Cardiac rehabilitation and exercise training in secondary coronary heart disease prevention. Prog Cardiovasc Dis 53: 397-403.
12. Freeman AM, Taub PR, Lo HC, Ornish D (2019) Intensive cardiac rehabilitation: An underutilized resource. Curr Cardiol Rep 21: 19.
13. Katzenberg C, Silva E, Young MJ, Gilles G (2018) Outcomes in a community-based intensive cardiac rehabilitation program: Comparison with hospital-based and academic programs. Am J Med 131: 967–971.
14. Rozanski A, Blumenthal JA, Davidson KW, Saab PG, Kubzansky L (2005) The epidemiology, pathophysiology, and management of psychosocial risk factors in cardiac practice: The emerging field of behavioral cardiology. J Am Coll Cardiol 45: 637-651.
15. Buttorff C, Ruder T, Bauman M (2017) Multiple Chronic Conditions in the United States. Rand Corporation.
16. Health and Economic Costs of Chronic Diseases. Centre for Heart Disease Control and Prevention. 2019.
17. Goetzel RZ (2009) Do Prevention or Treatment Services Save Money? The Wrong Debate. Health Affairs 28: 37-41.
18. Thomas Beaton (2017) How Preventive Healthcare Services Reduce Spending for Payers, Health Prayer Intelligence.
19. Job Openings and Labor Turnover Survey News Release (Bureau Labor Stats). 2020.
20. Thorpe KE (2005) The Rise In Health Care Spending And What To Do About It; Disease prevention/health promotion are key to slowing the rise in health care spending. Health Affairs 24: 1436-1444.
21. Knapper JT, Ghasemzadeh N, Khayata M, Patel SP, Quyyumi AA (2015) Time to Change our Focus; Defining Promoting and Impacting Cardiovascular Health. J Am Coll Cardiol 66: 960-971.
22. Vartiainen E (2018) The North Karelia Project: Cardiovascular disease prevention in Finland, Global Cardiology Science and Practice 2: 13.
23. Preventive care benefits for adults. Health Care.gov.
24. Reiley L (2019) Latin America's war on obesity could be a model for U.S. Harvard Medical School.
25. Arnett DK, Blumenthal RS, Albert MA, Buroker AB, Goldberger ZD, et al. (2019) ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease. JACC 74: 177-232.