

## Life's Simple 7: Vital But Not Easy

Eduardo Sanchez, MD, MPH

In this issue of the *Journal of the American Heart Association (JAHA)*, the study by Enserro et al<sup>1</sup> of 20-year trends in cardiovascular health (CVH) and the impact on subclinical and incident clinical cardiovascular disease (CVD) offers important insight into how CVH changes over time among individuals in a cohort study and the association of those changes with subclinical CVD, clinical CVD, and mortality. CVH is protective is what the study tells us, and the good news is that we have known for a while what it takes to achieve health. Hippocrates is said to have said, "if we could give every individual the right amount of nourishment and exercise, not too little and not too much, we would have found the safest way to health."<sup>2</sup> Centuries later, Breslow and Breslow identified 7 health habits that, on the basis of a 35-year observational study of 7000 people in Alameda County, California, would lead to healthier and longer lives; among the 7 were suggestions to not smoke, to regularly exercise, to eat in moderation, and to maintain healthy weight.<sup>3</sup>

In the study by Enserro et al,<sup>1</sup> the authors use the American Heart Association's (AHA's) definition of ideal CVH: the absence of clinically manifest CVD together with the presence of the 7 metrics that compose Life's Simple 7, which include not smoking, having a healthy diet pattern, adequate physical activity, healthy body weight, and healthy blood pressure, cholesterol, and blood glucose in the absence of pharmacological treatment.<sup>4</sup> The 7 metrics were delineated in 2010, when the AHA set as its 10-year goal a 20% reduction in CVD and stroke mortality by 2020 and a 20% improvement in CVH in all Americans by 2020.<sup>4</sup> The Table lists the 7 metrics of Life's Simple 7 and definitions for poor, intermediate, and ideal status for each of the 7 metrics. The article by Enserro et al<sup>1</sup> makes the sound case that maintaining a high level of CVH confers a healthier and longer life.

The opinions expressed in this article are not necessarily those of the editors or of the American Heart Association.

From the American Heart Association, Dallas, TX.

**Correspondence to:** Eduardo Sanchez, MD, MPH, American Heart Association, 7272 Greenville Ave, Dallas, TX 75231. E-mail: eduardo.sanchez@heart.org  
*J Am Heart Assoc.* 2018;7:e009324. DOI: 10.1161/JAHA.118.009324.

© 2018 The Authors. Published on behalf of the American Heart Association, Inc., by Wiley. This is an open access article under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

CVD continues to be the leading cause of death in the United States, despite a continuous decrease in CVD mortality in the United States from 2007 to 2013.<sup>5</sup> In 2000, the Centers for Disease Control and Prevention identified CVD prevention and tobacco control among the 10 most important public health achievements of the 20th century (1990 to 1999).<sup>6</sup> In 2011, the Centers for Disease Control and Prevention, again, identified tobacco control and CVD prevention among the 10 most important public health achievements for the decade 2001 to 2010.<sup>7</sup>

As Enserro et al<sup>1</sup> point out, CVD is costly. Total direct and indirect costs of CVD in 2012 were \$396 and \$183 billion, respectively.<sup>5</sup> By 2030, the costs are projected to increase to \$918 billion for direct costs and \$290 billion for indirect costs.<sup>8</sup> For payers, CVDs and related conditions are among the leading drivers of medical costs. Two studies, one looking at employee health, comparing CVH level and medical care expenditures, found that a higher level of CVH was associated with lower medical care expenditures.<sup>9,10</sup>

Previous studies have shown the correlation between high CVH and better health outcomes. In 2006, Lloyd-Jones et al found that the absence of established cardiovascular risk factors at 50 years of age was associated with a low lifetime risk for CVD and longer survival.<sup>11</sup> Willis et al observed that higher midlife fitness level might be associated with a lower risk of developing chronic disease outcomes.<sup>12</sup> The study by Enserro et al,<sup>1</sup> however, is the first to look at CVH longitudinally in the United States. It suggests a relationship between sustained high CVH and less CVD and lower mortality. Maintaining high CVH is more cardioprotective than improving and achieving high CVH from a lower initial CVH level.

On the basis of data from 2011 to 2012 National Health and Nutrition Examination Survey, ≈13% of US adults have 5 of the 7 criteria for ideal CVH, 5% have 6 of 7, and virtually 0% have ideal CVH (7 of 7).<sup>5</sup> CVH varies by age and sex and by race and ethnicity.<sup>5</sup> Younger adults have higher percentages of ideal metrics; women, at any age, have higher ideal metrics. Blacks and Hispanics have lower ideal metrics than whites. The changing US demographics, an aging population, and a growing number and percentage of people of color in the United States will affect the overall CVH of adults in the United States over time.

This study, of course, begs the question, how do we attain and maintain high CVH? On an individual level, it seems

**Table.** Life's Simple 7 Definitions of Poor, Intermediate, and Ideal for Each Metric for Adults

Metric	Poor	Intermediate	Ideal
Current smoking	Yes	Former $\leq 12$ mo	Never or quit $>12$ mo
BMI, kg/m <sup>2</sup>	$\geq 30$	25–29.9	$< 25$
Physical activity	None	1–149 min/wk of moderate activity or 1–74 min/wk of vigorous activity or 1–149 min/wk of moderate and vigorous activity	$\geq 150$ min/wk of moderate activity or $\geq 75$ min/wk of vigorous activity or $\geq 150$ min/wk of moderate and vigorous activity
Diet pattern score*	0–1	2–3	4–5
Total cholesterol, mg/dL	$\geq 240$	200–239 or treated to goal	$< 200$
Blood pressure, mm Hg	SBP $\geq 140$ or DBP $\geq 90$	SBP 120–139 or DBP 80–89 or treated to goal	$< 120 / < 80$
Fasting plasma glucose, mg/dL	$\geq 126$	100–125 or treated to goal	$< 100$

Data derived from Lloyd-Jones et al.<sup>4</sup> Copyright ©2010, American Heart Association, Inc. BMI indicates body mass index; DBP, diastolic blood pressure; and SBP, systolic blood pressure. \*Each of the following 5 diet elements is given a score of 1: (1)  $\geq 4.5$  cups/day of fruits and vegetables; (2)  $\geq 2$  servings/week of fish; (3)  $\geq 3$  servings/day of whole grains; (4) no more than 36 oz/wk of sugar-sweetened beverages; and (5) 1500 mg/d of sodium.

simple. Never starting to smoke, maintaining recommended levels of physical activity and healthy eating patterns, and maintaining healthy weight, blood pressure, blood cholesterol, and blood glucose without medications is all it takes. Items easy to list are not as easy to achieve. It will likely take individual and socioecological (population-level) efforts to achieve and maintain high CVH.

From a life course perspective, it is reasonable to think that high CVH in adulthood is more likely when high CVH is present throughout childhood, adolescence, and early adulthood. What happens (or does not happen) in family homes, at schools, in after-school settings, and in communities, places where children and youth spend time, are among the opportunities to achieve or maintain high CVH. Ideally, all children and adolescents would live in homes where no one smokes, healthy food is served, and the family regularly engages in physical activity together, and they would attend no-smoking schools and after-school programs where healthy food is served and daily physical activity is the norm. At a community level, safe places for children to play and engage in physical activity are essential. Also essential are communities where the demand for and the ability to purchase healthy snacks and beverages is the norm.

For adults, household practices (i.e, no smoking, healthy eating, and regular physical activity, such as walks, hikes, bicycle rides, pool time, and yard games) might help the adults and children in families to maintain or achieve and maintain high CVH. In addition, a workplace that is smoke free and offers healthy food options (in vending machines and cafeterias), opportunities to engage in physical activity, and biometric screening for obesity, blood pressure, cholesterol, and blood glucose, for example, can complement individual efforts to achieve high CVH.

All said, the evidence continues to mount that better CVH, as defined by AHA, confers a lower risk of CVD and premature mortality. From that evidence have come recommendations for clinicians and health professionals to address the 7 components of CVH. The AHA and others are providing clinical care providers and others interested in the health of people with the science-derived evidence about how best to maintain or improve CVH in individuals or groups of people.

The AHA has published clinical practice guidelines on lifestyle management, obesity in adults, cholesterol management, and high blood pressure control.<sup>13–16</sup> The AHA has published policy statements and scientific statements associated with workplace health.<sup>17,18</sup> The AHA supports a policy agenda that promotes CVH.<sup>19</sup> The AHA also provides educational resources “direct to consumer” to raise awareness and educate individuals about CVH, risk factor modification, CVD, and stroke.

In addition to AHA guidelines, the US Preventive Services Task Force has published clinical preventive services recommendations that cover each of the 7 components of Life's Simple 7.<sup>20</sup> Furthermore, the evidence continues to build that changes in policy and practices in schools, workplaces, communities, and clinical settings can complement and perhaps facilitate individual efforts to maintain or change behaviors that will improve an individual's CVH. The Community Preventive Services Task Force has published recommendations (The Community Guide), on the basis of existing evidence, that cover tobacco use prevention and tobacco cessation, nutrition and physical activity recommendations in schools and worksites, obesity interventions, as well as recommendations related to high blood pressure, high cholesterol, and diabetes mellitus.<sup>21</sup>

The analysis by Enserro et al<sup>1</sup> confirms that early high CVH that is maintained (best case) is protective compared with low CVH that stays low over time (worst case). What is

counterintuitive and warrants more analysis is that it appears that starting at high CVH and migrating to low (second best case) may be more protective than starting low and getting to high (third best or second worst). "It's never too late" to benefit from improving CVH may be true, but starting with high CVH may be best, with most benefit from maintaining high CVH but considerable benefit from having been at high CVH. The analysis also shows that ideal CVH decreased mostly because of decreases in the prevalence of ideal body mass index, blood pressure, cholesterol, and blood glucose. These trends have been previously noted,<sup>5</sup> and approaches to address have been previously discussed. Future studies should look at populations in addition to non-Hispanic whites and, where sample size allows, should further subdivide CVH levels from 2 (high and low) to 3 (high, medium, and low) or 4 (very high, high, low, and very low) groups to further discern findings and provide insight into approaches to attain and maintain higher levels of CVH and the benefit derived from doing so.

It is clear that the advice and efforts of health professionals in public health and clinical care should promote achieving good or ideal CVH early in life and maintaining high CVH for as long as possible. The good news is that not smoking, participating in recommended activity levels, eating healthfully as recommended, and achieving and maintaining a healthy weight even while being effectively treated for high blood pressure, high cholesterol, and diabetes mellitus puts a person solidly in the high CVH group and confers some degree of cardioprotection. However, this study suggests that maintaining or achieving CVH early in life and maintaining high CVH is most cardioprotective. Our health promotion and CVD prevention efforts, then, might need to shift to a focus on children, adolescents, young adults, and young families to ensure healthy habits early in life and sustained throughout the life course.

Hippocrates and Breslow and Breslow might say to us, "we told you so."

## Disclosures

None.

## References

- Enserro DMV, Ramachandran S, Xanthakis V. Twenty-year trends in the AHA Cardiovascular Health Score and impact on subclinical and clinical cardiovascular disease: the Framingham Offspring Study. *J Am Heart Assoc*. 2018;7:e008741. DOI: 10.1161/jaha.117.008741.
- Hippocrates. [https://www.brainyquote.com/quotes/hippocrates\\_153531](https://www.brainyquote.com/quotes/hippocrates_153531). Accessed April 20, 2018.
- Breslow L, Breslow N. Health practices and disability: some evidence from Alameda County. *Prev Med*. 1993;22:86–95.
- Lloyd-Jones DM, Hong Y, Labarthe D, Mozaffarian D, Appel LJ, Van Horn L, Greenlund K, Daniels S, Nichol G, Tomaselli GF, Arnett DK, Fonarow GC, Ho PM, Lauer MS, Masoudi FA, Robertson RM, Roger V, Schwamm LH, Sorlie P, Yancy CW, Rosamond WD. Defining and setting national goals for cardiovascular health promotion and disease reduction: the American Heart Association's strategic Impact Goal through 2020 and beyond. *Circulation*. 2010;121:586–613.
- Benjamin EJ, Blaha MJ, Chiuve SE, Cushman M, Das SR, Deo R, de Ferranti SD, Floyd J, Fornage M, Gillespie C, Isasi CR, Jiménez MC, Jordan LC, Judd SE, Lackland D, Lichtman JH, Lisabeth L, Liu S, Longenecker CT, Mackey RH, Matsushita K, Mozaffarian D, Mussolino ME, Nasir K, Neumar RW, Palaniappan L, Pandey DK, Thiagarajan RR, Reeves MJ, Ritchey M, Rodriguez CJ, Roth GA, Rosamond WD, Sasson C, Towfighi A, Tsao CW, Turner MB, Virani SS, Voeks JH, Willey JD, Wilkins JT, Wu JH, Alger HM, Wong SS, Muntner P. Heart disease and stroke statistics-2017 update: a report from the American Heart Association. *Circulation*. 2017;135:e146–e603.
- Centers for Disease Control and Prevention. Ten great public health achievements: United States, 1900-1999. *MMWR Morb Mortal Wkly Rep*. 1999;48:241–243.
- Centers for Disease Control and Prevention. Ten great public health achievements: United States, 2001-2010. *MMWR Morb Mortal Wkly Rep*. 2011;60:619–623.
- Heidenreich PA, Trogon JG, Khavjou OA, Butler J, Dracup K, Ezekowitz MD, Finkelstein EA, Hong Y, Johnston SC, Khara A, Lloyd-Jones DM, Nelson SA, Nichol G, Orenstein D, Wilson PWF, Woo YJ. Forecasting the future of cardiovascular disease in the United States: a policy statement from the American Heart Association. *Circulation*. 2011;123:933–944.
- Valero-Elizondo J, Salami JA, Ogunmoroti O, Osondu CU, Aneni EC, Malik R, Spatz ES, Rana JS, Virani SS, Blankstein R, Blaha MJ, Veledar E, Nasir K. Favorable cardiovascular risk profile is associated with lower healthcare costs and resource utilization: the 2012 Medical Expenditure Panel Survey. *Circ Cardiovasc Qual Outcomes*. 2016;9:143–153.
- Osondu CU, Aneni EC, Valero-Elizondo J, Salami JA, Rouseff M, Das S, Guzman H, Younus A, Ogunmoroti O, Feldman T, Agatston AS, Veledar E, Katzen B, Calitz C, Sanchez E, Lloyd-Jones DM, Nasir K. Favorable cardiovascular health is associated with lower health care expenditures and resource utilization in a large us employee population: the Baptist Health South Florida Employee Study. *Mayo Clin Proc*. 2017;92:512–524.
- Lloyd-Jones DM, Leip EP, Larson MG, D'Agostino RB, Beiser A, Wilson PWF, Wolf PA, Levy D. Prediction of lifetime risk for cardiovascular disease by risk factor burden at 50 years of age. *Circulation*. 2006;113:791–798.
- Willis BL, Gao A, Leonard D, Defina LF, Berry JD. Midlife fitness and the development of chronic conditions in later life. *Arch Intern Med*. 2012;172:1333–1340.
- Eckel RH, Jakicic JM, Ard JD, de Jesus JM, Houston Miller N, Hubbard VS, Lee IM, Lichtenstein AH, Loria CM, Millen BE, Nonas CA, Sacks FM, Smith SC Jr, Svetkey LP, Wadden TA, Yanovski SZ. 2013 AHA/ACC guideline on lifestyle management to reduce cardiovascular risk: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *J Am Coll Cardiol*. 2014;63:2960–2984.
- Jensen MD, Ryan DH, Apovian CM, Ard JD, Comuzzie AG, Donato KA, Hu FB, Hubbard VS, Jakicic JM, Kushner RF, Loria CM, Millen BE, Nonas CA, Pi-Sunyer FX, Stevens J, Stevens VJ, Wadden TA, Wolfe BM, Yanovski SZ. 2013 AHA/ACC/TOS guideline for the management of overweight and obesity in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and The Obesity Society. *J Am Coll Cardiol*. 2014;63:2985–3023.
- Stone NJ, Robinson JG, Lichtenstein AH, Bairey Merz CN, Blum CB, Eckel RH, Goldberg AC, Gordon D, Levy D, Lloyd-Jones DM, McBride P, Schwartz JS, Shero ST, Smith SC Jr, Watson K, Wilson PWF, Eddleman KM, Jarrett NM, LaBresh K, Nevo L, Wnek J, Anderson JL, Halperin JL, Albert NM, Bozkurt B, Brindis RG, Curtis LH, DeMets D, Hochman JS, Kovacs RJ, Ohman EM, Pressler SJ, Selke FW, Shen W-K, Smith SC Jr, Tomaselli GF. 2013 ACC/AHA guideline on the treatment of blood cholesterol to reduce atherosclerotic cardiovascular risk in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *Circulation*. 2014;129:S1–S45.
- Whelton PK, Carey RM, Aronow WS, Casey DE Jr, Collins KJ, Dennison Himmelfarb C, DePalma SM, Gidding S, Jamerson KA, Jones DW, MacLaughlin EJ, Muntner P, Ovbigele B, Smith SC Jr, Spencer CC, Stafford RS, Taler SJ, Thomas RJ, Williams KA Sr, Williamson JD, Wright JT Jr. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APHA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: Executive Summary: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Hypertension*. 2017;71:e13–e115.
- Arena R, Arnett DK, Terry PE, Li S, Isaac F, Mosca L, Braun L, Roach WH Jr, Pate RR, Sanchez E, Carnethon M, Whitsel LP. The role of worksite health screening: a policy statement from the American Heart Association. *Circulation*. 2014;130:719–734.
- Fonarow GC, Calitz C, Arena R, Baase C, Isaac FW, Lloyd-Jones D, Peterson ED, Pronk N, Sanchez E, Terry PE, Volpp KG, Antman EM. Workplace wellness recognition for optimizing workplace health: a presidential advisory from the American Heart Association. *Circulation*. 2015;131:e480–e497.

19. Labarthe DR, Goldstein LB, Antman EM, Arnett DK, Fonarow GC, Alberts MJ, Hayman LL, Khera A, Sallis JF, Daniels SR, Sacco RL, Li S, Ku L, Lantz PM, Robinson JG, Creager MA, Van Horn L, Kris-Etherton P, Bhatnagar A, Whitsel LP. Evidence-based policy making: assessment of the American Heart Association's strategic policy portfolio: a policy statement from the American Heart Association. *Circulation*. 2016;133:e615–e653.
20. US Preventive Services Task Force. <https://www.uspreventiveservicestaskforce.org/BrowseRec/Index>. Accessed April 20, 2018.

21. Community Preventive Services Task Force. <https://www.thecommunityguide.org>. Accessed April 20, 2018.

---

**Key Words:** cardiovascular disease • cardiovascular disease prevention • cardiovascular health • Editorial • Life's Simple 7 • morbidity • mortality