JACC
VOL. 87, NO. 5, 2026
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PUBLISHED BY ELSEVIER

LEADERSHIP PAGE







Calling All Geniuses

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Intellectuals solve problems,
geniuses prevent them.
- Albert Einstein[1]

Despite significant advances in research, screening, and treatment over the past 40 years, cardiovascular (CV) disease remains the number 1 cause of death in the United States and around the world. Globally, 70% of all deaths are due to noncommunicable diseases (NCDs), the vast majority of which are due to CV disease.[2] In the past 30 years, worldwide CV cases have doubled to more than half a billion, with deaths annually numbering almost 19 million, 10 times that due to COVID at its peak in 2020.[3] Based on analysis by the Peterson-Kaiser Family Foundation, this has contributed to a nearly 2-year decline in longevity in 2020 to 2022 in the United States.[4]

Today, the increasing incidence and prevalence of CV risk factors is fueling an expansion in the burden of disease and CV mortality. Due to population aging, unhealthy diets, sedentary lifestyle, and obstacles to health care access, it is anticipated that by the year 2050, 61% of U.S. citizens will have hypertension, 27% will have diabetes, and 61% will have obesity.[5] Driven by these risks, the incidence of ischemic heart disease, myocardial infarction, and heart failure are expected to increase by 31%, 17%, and 33%, respectively by 2060.[6]

Beyond traditional CV risk factors, it is estimated that 80% of health outcomes are a direct result of social drivers of health (SDOH) which include education, employment status, environment, socioeconomic security, community safety, and personal behaviors. From a U.S. public health perspective, CV disease accounts for >$400 billion annually in health care costs and up to $1 trillion per year in lost productivity globally.[7]

Clearly this trajectory is unsustainable and is a clarion call to focus on CV disease prevention with attention well upstream of the typical medical model of risk factor modification for both primary and secondary CV disease prevention. Unfortunately, such an approach may be too late for many.

Autopsy findings from the Bogalusa Heart Study and use of "multi-omic" analysis in the PESA (Progression of Early Subclinical Atherosclerosis) trial demonstrate that atherosclerosis develops in adolescence and early adulthood and accelerates quickly through middle age, with >60% of individuals manifesting evidence of atherosclerotic disease by age 40.[8] CV disease is not just a disease of the elderly and of aging, and prevention requires a strategy that extends across the lifespan.

Despite a clear understanding of pathobiology and contributing socio-environmental factors, much of our focus has been on preventing recurrent events in individuals with manifest CV disease rather than on

The ACC Leadership Pages are an ACC communication channel and do not go through the *JACC* editorial review process.

ISSN 0735-1097/$36.00
https://doi.org/10.1016/j.jacc.2025.08.026

primordial prevention of risk factors and primary prevention of first events. There may be several factors contributing to this hierarchy.

First, for many, an acute CV event may be the first recognition of their actual risk. Second, there is often a lapse in preventive care and messaging during the "no man's land" between routine pediatric wellness care and more episodic care as a young and middle-aged adult. Unfortunately, it is during this important time frame that early presentation of risk factors and early onset of atherosclerotic disease may be insidious and unrecognized.

Third, in the United States, our health care enterprise is dominated by "sick care," with little incentive or capacity for "well care." Fourth, by human nature, many avoid screening because they do not perceive illness and may not want to know that they harbor a "disease," even when proven lifestyle modifications are effective and well-established preventive therapies are available. And last, identification of early disease or risk may have negative implications for insurability, employment, and financial security in our current U.S. health care paradigm.

The need for a more aggressive and effective preventive strategy is also essential when considering today's CV health care workforce crisis.[9] As >11,000 Americans turn 65 years old every day, the number of cardiologists is declining by >400 per year. The Association of American Medical Colleges (AAMC) predicts that there will be a shortage of physicians, overall, of about 86,000, and a shortage of cardiologists of about 4,400 over the next decade as a result of aging physicians, a relatively fixed pipeline of trainees, professional burn out, and a series of unfortunate governmental health policy decisions regarding training dating back to the early 1980s.[10]

Similar if not more profound shortages are being observed in nursing and many allied health fields. Without better prevention and a resulting reduction in the number of new CV cases, there simply will not be enough clinicians to take care of all these new patients in our current models of care delivery.

Other new challenges contributing to increased risk of CV disease have arisen reflecting industrialization and changes in lifestyle. Air pollution, largely from combustion of fossil fuels, and, to a lesser extent, from large scale natural fires, is associated with triggering vascular inflammation and instability of nonobstructive atherosclerotic plaque.[11]

Similarly, microplastics and nanoplastics from ubiquitous packaging and other common consumer goods appear to increase the risk of acute coronary and cerebrovascular events 4-fold, as demonstrated in patients undergoing carotid endarterectomy.[12] A recent European population study looking at the relationship of dietary intake of ultraprocessed foods suggests a 10% increase in all-cause mortality for each 10% increase in total energy consumption attributable to ultraprocessed foods.[13]

From a medical model perspective, we have well tested, evidence-based strategies and interventions for primary prevention. Clinical practice guidelines, numerous CV disease risk calculators and artificial intelligence enabled analytics, effective medications such as statins, novel diabetes drugs, and time-tested antihypertensives constitute a robust toolkit for CV specialists and primary care providers alike to effectively reduce the risk of a primary or secondary CV event.

The practicality of such an approach may even be made simpler by combining low doses of multiple preventive agents into 1 inexpensive, easy-to-take "polypill."[14] However, a practical limitation of these effective agents and strategies has been a failure to adequately implement their use. This may be a result of limited access to care or medication, ineffectiveness of our complex health delivery system, practical knowledge gap among clinicians as to when and how to institute preventive therapies, as well as patient reluctance or mistrust of medical guidance. Efforts to "redesign" care delivery and apply "implementation science" may help close these gaps.

Early initiation of evolving innovative pharmacotherapies and genetic therapies holds great promise to effectively mitigate CV disease risk and reduce CV events at scale. Specifically targeted small interfering RNA (siRNA) molecules can markedly reduce production of risk enhancing proteins such as proprotein convertase subtilisin/kexin type 9 (PCSK9), lipoprotein(a), and angiotensinogen through a process of "gene silencing."[15] CRISPR gene editing may even be able to eliminate CV disease processes or risk.[16] The potential benefits of these novel agents will also depend on our ability as a medical community to effectively demonstrate and communicate the safety of gene-based therapies to an often-hesitant population.

Ironically, such advanced technological developments may be the easy part when it comes to prevention. Interventions that may have the greatest impact, at least in primordial prevention and public health, may be the most difficult to implement; specifically changes in personal behaviors, regulatory environmental policy, changes within the food industry, education policy, living space planning, health care financing reform, etc. Accordingly, organizations like the American College of Cardiology

(ACC) will need to expand and intensify their advocacy efforts and create effective partnerships with other medical societies and specialties (eg, pediatrics and primary care), academia, industry, nongovernmental organizations, local communities, and the public at large to effectuate change.

In addition to proactive public policies and innovative therapies, it will be necessary to rethink when we initiate CV disease preventive strategies and how we deliver them, especially given the limitations and pressures on our current system of care in the United States. Early education and advancement of healthy "knowledge, attitudes, and habits" that may contribute to primordial prevention have been shown to be feasible, sustainable, and scalable in preschool-aged children in vulnerable communities in the FAMILIA (Family-Based Approach in a Minority Community Integrating Systems-Biology for Promotion of Health) trial.[17] By taking preventive interventions outside the traditional clinic setting, trained community health workers can extend the effectiveness of CV risk reduction and adherence to preventive medications with greater reach and lower cost.

The mission of the ACC is to transform CV care and improve heart health for all. Foundational to this goal is the need to prevent disease, not just to treat its end stages. As advocated by Peter Attia, MD, in his book "Outlive," we need to focus on prevention to promote "healthspan" rather than just "lifespan." The ACC has many assets to help move the needle on CV prevention, including research to produce actionable knowledge, an extensive multidisciplinary educational portfolio, trusted clinical guidelines, a motivated and creative membership, clinical registry data, and an effective federal and state advocacy program.

However, this may not be enough. Changes in CV training core competencies, certification and maintenance of certification that include greater emphasis on CV disease prevention and health promotion; improved access to preventive care; operational modernization and transformation of care delivery systems; integration of preventive services into nontraditional sites of health care such as schools, businesses, places of worship, and the home; as well as enhanced advocacy efforts and professional society collaboration will all be necessary to address the root causes of CV disease well upstream of our current approach.

Recognizing the magnitude of the problem, significant unmet need, urgency, and opportunities for rapid innovation, the ACC Board of Trustees (BOT) has empaneled a Presidential Task Force to inform the BOT's strategic decision making and allocation of resources to optimize the College's Comprehensive Prevention portfolio. As charged, the Task Force is directing a detailed, deep-dive environmental scan, conducting an inventory of all current ACC prevention assets, assessing gaps in prevention programs, identifying key collaborators and partners, as well as interviewing content experts and key stakeholders both inside and outside the College. Output of the Task Force is to provide a blueprint for the College to intentionally, comprehensively, and strategically coordinate efforts to improve and expand CV preventive care starting at the earliest stages of risk across the continuum of care.

In this endeavor, it may be that the collective effort, talent, resources, and inclusivity of the ACC and the entire house of cardiology is what defines the genius needed to effectively prevent CV disease and improve heart health.

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