Prevention of Cardiovascular Disease

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KEYWORDS

- Cardiovascular disease prevention • Risk assessment for cardiovascular disease
- Diets for cardiovascular disease prevention • Life's Simple 7

KEY POINTS

- 90% of cardiovascular disease (CVD) events can be prevented.
- A formal 10-year and lifetime CVD risk assessment should be performed using a global risk calculator.
- Each patient should have an individualized CVD prevention prescription grounded in the American Heart Association Simple 7.
- The patients at the highest risk should have the most intensive prevention interventions.
- Life's Simple 7 include: tobacco avoidance, regular exercise, normal BMI, healthy diet, ideal lipids, ideal glucose, and blood pressure.

INTRODUCTION

Despite decades of significant advances in understanding the pathophysiology and risk factors that contribute to heart disease and stroke, cardiovascular disease (CVD) remains the leading cause of death in the United States and worldwide. One of every three deaths in the United States is from CVD. It kills more people than all forms of cancer and respiratory diseases combined and is the primary killer of women.[1]

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Yet, prevention of CVD is an achievable goal. A rigorous 2010 analysis by the World Health Organization demonstrated that reducing risk factors in young adults and maintaining an optimum risk profile through age 50 could prevent 90% of atherosclerotic CVD events.[2] Unfortunately, data from the National Health and Nutrition Examination Survey indicate that only 1% of the US population maintains such an ideal risk profile into adulthood.[3]

The reasons for this are many, ranging from misinformation and poor implementation of proven preventive strategies by physicians, to patients' misplaced fears of medications or incorrect understanding of ideal dietary and lifestyle choices. Each patient should have an individualized "prescription" for CVD prevention that incorporates modalities to control the seven modifiable cardiovascular risk factors:

1. Tobacco cessation
2. Weight management
3. Physical activity
4. Diet
5. Blood cholesterol
6. Blood glucose
7. Blood pressure

Preventive prescriptions can be viewed as primary, secondary, or primordial.

PRIMARY, SECONDARY, AND PRIMORDIAL PREVENTION

Primary prevention is the prevention of CVD before the onset of any clinical manifestations of disease. Primary prevention assesses individualized risk for disease and targets preventive efforts to reduce clinical events. Secondary prevention is the prevention of recurrent disease after an initial clinical event. Secondary prevention optimizes risk factors and aims to reverse existing CVD.

Primordial prevention involves the early establishment of habits and lifestyle choices that prevent the development of CVD risk factors. Ideally primordial prevention starts in utero, continues through infancy, childhood, adolescence, and into young adulthood through tobacco avoidance, daily activity, healthy diet, and weight management.

RISK ASSESSMENT AND THE USE OF GLOBAL RISK CALCULATORS

Calculating an individual patient's risk for CVD guides the type and intensity of preventive interventions. Currently there are no internationally agreed on guidelines for risk assessment and subsequent interventions.[4] Most guidelines incorporate age, sex, smoking, blood pressure, lipid levels, family history of premature CVD, and ethnicity. Multiple calculators to determine 10-year absolute risk for CVD have been developed and studied internationally. Those currently in use include the American College of Cardiology (ACC)/American Heart Association (AHA) Pooled Cohort Risk Assessment (United States; http://www.cvriskcalculator.com/), the National Vascular Disease Prevention Alliance (Australia; http://www.cvdcheck. org.au), and the QRISK2-2016 score (United Kingdom; https://qrisk.org/2016/). These risk calculators provide lifetime risk calculations and estimations of risk reduction if preventive interventions are successfully implemented. The ACC/ AHA Pooled Cohort equation is the only US CVD risk prediction model with external validation.[5] **Table 1** compares and contrasts results and recommendations from three different risk calculators: (1) Australia's National Vascular Disease Prevention Alliance, (2) UK National Institute for Health and Care Excellence QRISK score, and (3) the ACC/AHA 10-year Pooled Cohort Risk Assessment, in a