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A Perspective on the New American College of Cardiology/American Heart Association Guidelines for Cardiovascular Risk Assessment

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Abstract

The recently published American College of Cardiology (ACC)/American Heart Association (AHA) guidelines for cardiovascular risk assessment provide equations to estimate the 10-year and lifetime atherosclerotic cardiovascular disease (ASCVD) risk in African Americans and non-Hispanic whites, include stroke as an adverse cardiovascular outcome, and emphasize shared decision making. The guidelines provide a valuable framework that can be adapted on the basis of clinical judgment and individual/institutional expertise. In this review, we provide a perspective on the new guidelines, highlighting what is new, what is controversial, and potential adaptations. We recommend obtaining family history of ASCVD at the time of estimating ASCVD risk and consideration of imaging to assess subclinical disease burden in patients at intermediate risk. In addition to the adjuncts for ASCVD risk estimation recommended in the guidelines, measures that may be useful in refining risk estimates include carotid ultrasonography, aortic pulse wave velocity, and serum lipoprotein(a) levels. Finally, we stress the need for research efforts to improve assessment of ASCVD risk given the suboptimal performance of available risk algorithms and suggest potential future directions in this regard.

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Assessment of cardiovascular risk is a necessary first step to target therapy toward patients most likely to benefit. It has become evident that baseline atherosclerotic cardiovascular disease (ASCVD) risk is a better predictor of treatment benefit than the degree to which low-density lipoprotein cholesterol (LDL-C) is lowered.[1,2] The recently published American College of Cardiology (ACC)/American Heart Association (AHA) guidelines for cholesterol lowering[3] emphasize that the intensity of risk factor management should match the risk for adverse ASCVD events. In contrast, previous guidelines have favored achieving target LDL-C levels based on the magnitude of estimated cardiovascular risk.[4]

The most recent ACC/AHA guidelines include a new ASCVD risk calculator for use in the clinical setting and address questions relevant to risk assessment using critical review of the available literature. The document includes a disclaimer that the recommendations are not a substitute for clinical judgment and that decisions about care must be individualized for each patient. The guidelines provide a valuable framework that can be adapted on the basis of clinical judgment and individual/institutional expertise. In this review, we provide a perspective on the new guidelines for assessing risk of ASCVD events in adults without known disease, highlighting what is new, what is controversial, and potential future directions (Table 1).

Preventive cardiologists from throughout the Mayo Foundation contributed to this document. A core writing group reviewed the guidelines and existing literature and made modifications based on foundation-wide expertise in cardiovascular risk assessment including imaging, circulating biomarkers, and genetic epidemiology. Input to the draft was provided by each author, and after several revisions, the draft was circulated to a

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wider group. Feedback was incorporated iteratively until consensus was reached.

WHAT IS NEW IN THE GUIDELINES?

New Equation for Estimating 10-Year Risk of ASCVD Events

Population-based studies have identified factors associated with incident adverse cardiovascular events.[7] These risk factors have been included in multivariate risk scores for not only coronary heart disease (CHD) but also stroke, peripheral arterial disease, and heart failure as well as composite cardiovascular disease end points.[8] Most of these risk calculators estimate a patient's probability of having a vascular event over 5 to 10 years.[9] The commonly used risk scores include the Framingham CHD risk score,[10] its derivative, the Adult Treatment Panel III (ATP-III) risk assessment profile,[4] and the European Systematic Coronary Risk Evaluation (SCORE)[11] algorithm for ASCVD death. These risk equations were derived from cohorts that were established decades ago and had limited ethnic diversity.

The new ASCVD risk calculator was developed from several relatively recently established population-based cohorts that included African American or non-Hispanic white participants with at least 12 years of follow-up and with adjudicated end points for fatal or nonfatal myocardial infarction and stroke (Figure 1). The cohorts include the ARIC (Atherosclerosis Risk in Communities) study,[12,13] the Cardiovascular Health Study,[14] and the CARDIA (Coronary Artery Risk Development in Young Adults) study,[15] combined with applicable data from the Framingham and Framingham Offspring study cohorts.[16,17] The strongest predictors of the 10-year risk of "hard" ASCVD events (defined as first occurrence of nonfatal myocardial infarction or CHD death or fatal or nonfatal stroke)[18] were age, sex, race, total cholesterol, high-density lipoprotein cholesterol, systolic blood pressure, blood pressure treatment status, diabetes, and current smoking status. An "app" has been developed that can be used online or on a mobile device to estimate a patient's 10-year ASCVD risk.[19]

Recommended Adjuncts to Refine Risk Estimates

Additional variables were tested for inclusion in the model if they were available in the databases and could be evaluated on the basis of at least 10 years of follow-up, using the framework suggested by Hlatky et al.[20] These variables included diastolic blood pressure, family history of ASCVD, moderate or severe chronic kidney disease (defined as an estimated glomerular filtration rate of <60 mL/min per 1.73 m^2),[21] and body mass index (continuous or categorical). None of these variables significantly improved prediction of 10-year ASCVD events when added to the final base models. The guidelines recommend 4 markers that may be considered by clinicians and patients if uncertainty remains after calculating the 10-year ASCVD risk—family history, high-sensitivity C-reactive protein (hs-CRP), ankle-brachial index (ABI), and coronary artery calcium (CAC) score.

Focus on Hard ASCVD Events

Compared with earlier guidelines, the new risk assessment guidelines attempt to take into account that atherosclerosis is a chronic disease that affects multiple vascular beds. Risk is estimated for "hard" ASCVD events including stroke, myocardial infarction, and death due to stroke or myocardial infarction. "Soft" end points such as those that might be influenced by physician preferences (eg, revascularization

ARTICLE HIGHLIGHTS

- The availability of race- and sex-specific equations for estimating 10-year and lifetime atherosclerotic cardiovascular disease (ASCVD) risk, inclusion of stroke as an adverse cardiovascular outcome, and the emphasis on shared decision making are strengths of the new American College of Cardiology/American Heart Association guidelines for ASCVD risk assessment.
- The guidelines recommend 4 measures that may be considered by clinicians and patients as adjuncts for refining risk estimates—family history of ASCVD, high-sensitivity C-reactive protein, ankle-brachial index, and coronary artery calcium scoring.
- Additional measures that may be useful in risk estimation include carotid ultrasound, aortic pulse wave velocity, and circulating levels of lipoprotein(a).
- Because of the suboptimal performance of available ASCVD risk algorithms, research efforts to improve risk assessment in asymptomatic adults should be intensified.