

# Use of the Coronary Artery Calcium Score in Discussion of Initiation of Statin Therapy in Primary Prevention

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## Abstract

Clinical guidelines for instituting pharmacotherapy for the primary prevention of atherosclerotic cardiovascular disease (ASCVD), specifically lipid management and aspirin, have long been based on absolute risk. However, lipid management in the current era remains challenging to both patients and clinicians in the setting of somewhat discordant recommendations from various organizations. All guidelines endorse the use of statins for primary prevention for those at sufficient absolute risk, and treatment recommendations are generally “risk-based” rather than exclusively targeting specific low-density lipoprotein cholesterol levels. Nonetheless, guidelines differ in relation to the risk threshold for initiation and the intensity of statin treatment. The key concept of the clinician-patient risk discussion introduced in the 2013 American College of Cardiology/American Heart Association cholesterol guidelines is a process that addresses the potential for ASCVD risk reduction with statin treatment, potential for adverse treatment effects, patient preferences, encouragement of heart-healthy lifestyle, and management of other risk factors. However, operationalizing the clinician-patient risk discussion requires effective communication of the most accurate and personalized risk information. In this article, we review our treatment approach for the appropriate use of coronary artery calcium testing in the intermediate-risk patient to guide shared decision making. The decision to initiate or intensify statin therapy may be uncertain across a broad range of estimated 10-year ASCVD risk of 5% to 20%, and coronary artery calcium testing can reclassify risk upward or downward in approximately 50% of this group to inform the risk discussion. We conclude with 2 case-based examples of uncertain risk and uncertain statin therapeutic benefit to illustrate execution of the clinician-patient risk discussion.

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The aim of this article is to review the 2013 American College of Cardiology (ACC)/American Heart Association (AHA) guidelines for the assessment of atherosclerotic cardiovascular disease (ASCVD) risk and the selection of patients for primary prevention with statin therapy for ASCVD risk reduction. We discuss the central tenet of the clinician-patient risk discussion, a process that addresses the potential for ASCVD risk reduction with statin treatment, the potential for adverse treatment effects, patient preferences, encouragement of heart-healthy lifestyle, and management of other risk factors. We review our treatment approach for the use of coronary artery calcium (CAC) measurements in selected patients to help facilitate a more informed risk

discussion. Because atherosclerotic plaque burden is strongly linked to cardiovascular events, assessment of CAC can help patients and clinicians make decisions about matching intensity of preventive therapy to those at increased risk, while potentially offering more flexible treatment options in patients with low atherosclerotic burden. We conclude with 2 case-based examples of operationalizing the clinician-patient risk discussion in clinical practice.

## BURDEN OF ASCVD AND OPPORTUNITIES FOR PREVENTION

Atherosclerotic cardiovascular disease, including both coronary heart disease (CHD) and stroke, was the cause of approximately 1 in 3 deaths in the United States in

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2014,<sup>1</sup> and more than a third of ASCVD deaths occurred among individuals younger than 75 years. Yet, modifiable factors may account for approximately 90% of CHD risk.<sup>2</sup> In their 2020 Strategic Impact Goal statement, the AHA described 7 health metrics (ie, body mass index [BMI; calculated as weight in kilograms divided by height in meters squared], physical activity, diet, smoking, total cholesterol, blood pressure, and blood glucose), collectively known as the Life's Simple 7 criteria, to serve as a marker of ideal cardiovascular health and a framework for decreasing the overall burden of ASCVD.<sup>3</sup>

Intensive risk factor modification and implementation of evidence-based therapies can regress or stabilize existing atherosclerotic plaques<sup>4</sup> and reduce ASCVD outcomes.<sup>5</sup> Some of the most effective interventions for ASCVD risk reduction are lifestyle modifications, which serve as the foundation for all prevention strategies. However, patients with established ASCVD (ie, secondary prevention) and individuals at higher risk for new-onset ASCVD (ie, primary prevention) warrant intensification of preventive efforts with pharmacotherapies (specifically lipid management and aspirin).

### 2013 ACC/AHA ASCVD RISK ESTIMATOR

For nearly 2 decades, clinical decisions for lipid-lowering pharmacotherapy in primary prevention have been predicated on an initial assessment of global absolute risk. For example, the Adult Treatment Panel III guidelines relied on an estimation of 10-year CHD risk using a version of the Framingham Risk Score.<sup>6</sup> More recently, the 2013 ACC/AHA risk assessment guidelines<sup>7</sup> endorse risk factor screening every 4 to 6 years for those aged 20 to 79 years and application of the race- and sex-specific Pooled Cohort Equations (PCE) in asymptomatic adults aged 40 to 79 years to estimate 10-year risk for a first "hard" ASCVD event (myocardial infarction and stroke).

Estimated ASCVD risk by the PCE is directly linked to the 2013 ACC/AHA cholesterol guidelines,<sup>8</sup> which identified 4 groups of patients that would likely benefit from moderate- to high-intensity statin therapy: (1) those with established clinical ASCVD,

(2) those aged 40 to 75 years who have diabetes mellitus, (3) those with low-density lipoprotein cholesterol (LDL-C) levels of 190 mg/dL or higher (to convert to mmol/L, multiply by 0.0259), and (4) those aged 40 to 75 years who have LDL-C levels of 70 to 189 mg/dL and estimated 10-year risk of 7.5% or greater. Initiation of a moderate-intensity statin for those at 5% to 7.5% 10-year risk was also deemed reasonable.

After the release of the 2013 guidelines, however, conflicting reports emerged regarding the accuracy of the ACC/AHA ASCVD risk estimator. Some studies found reasonable calibration in certain populations, particularly those with more social deprivation.<sup>9,10</sup> In contrast, other studies have found overestimation of risk (which could lead to overtreatment among many individuals unlikely to receive net benefit from preventive pharmacotherapies).<sup>11-14</sup> Furthermore, other studies pointed out concern for underestimation of risk (and potential for undertreatment) among individuals with unique risk factors (eg, autoimmune disease) not captured in current risk scoring models.<sup>15</sup> Attempts to incorporate additional information from novel risk factors into existing risk models is limited by understanding the prevalence of those risk factors in specific patient populations.<sup>16</sup>

In essence, these risk calculators work by estimating the average risk in a group of individuals who have similar risk factor profiles, but a given risk score is far more accurate for a population group than it is for any particular individual.<sup>17,18</sup>

### CONCORDANCE AND DISCORDANCE IN LIPID GUIDELINES

Adding to the confusion, in 2016, the US Preventive Services Task Force (USPSTF) published their own recommendations for cholesterol management in primary prevention.<sup>19</sup> The USPSTF recommended, with moderate-grade evidence, that adults aged 40 to 75 years who had an estimated 10-year ASCVD risk of 10% or higher (by the PCE) and at least one major risk factor (ie, hypertension, diabetes, dyslipidemia, or smoking) should be offered a low- to moderate-intensity statin, with a weaker endorsement for the use of low- to

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