Estimation of Risk for Initial Atherosclerotic Cardiovascular Disease Events
Taking Stock and Moving Forward

In 2013, the American College of Cardiology/American Heart Association published guidelines for atherosclerotic cardiovascular disease (ASCVD) risk assessment.1 They recommended that clinicians calculate ASCVD risk for adult patients and based cholesterol treatment recommendations on these estimates. Persons with severe hypercholesterolemia or those known to have ASCVD were considered to be at high risk for clinical ASCVD, and they fell outside the purview of risk assessment. The remainder, which included most middle-age and older Americans with and without diabetes mellitus, were candidates for ASCVD risk assessment. A reasonable interval has elapsed to evaluate the strategy put forward and to contemplate changes that might improve prevention. Critical issues include how well does the current ASCVD algorithm identify persons who subsequently develop ASCVD events, and can they be improved? Should segments of the US population receive more attention? How can the ASCVD risk estimates be augmented?

The 2013 guidelines provided new functions to estimate ASCVD risk in a 10-year time frame, applicable to millions of American adults 40 to 79 years of age, and the committee also suggested considering 30-year and lifetime risk.1 Several American longitudinal population studies served as data sources for the new ASCVD function. Although these data sources are excellent, they have important limitations. Some of the baseline evaluations in the cohorts that contributed to these risk estimates took place in the 1970s, an era when smoking was more prevalent and treatment of blood pressure and blood cholesterol were less effective. It is also important to note that the 2013 estimates are not confounded by treatment. If a risk function is to be used to decide whether to initiate treatment, then we want estimates for what would happen without treatment. However, using older data has limitations and may not adequately account for progress in ASCVD research.

Prevention of ASCVD has evolved greatly since the 1970s. Clinicians intervene earlier in the natural history of the ASCVD with treatments known to be beneficial. This proactive strategy has led to a large decline in ASCVD mortality and a moderate decline in ASCVD morbidity over the past 30 years. As a result, a new perspective for ASCVD risk estimation has evolved, and a wider angle on assessment and prevention is now in force. For example, adults may be rewarded with employer-sponsored rebates if they do not smoke cigarettes, insurance plans may subsidize health club participation, and modern risk factor management often includes multiple drugs. For example, at the start of the 4227-person MESA study (Multi Ethnic Study of Atherosclerosis) from 2000 to 2002, ≈35% were on hypertension therapy, and 15% were taking lipid-lowering medications. After ≈1 decade of follow-up in MESA, the prevalence of therapy for hypertension was 59% and for lipid therapy was 44%, providing evidence that drop-in prevention therapy during the follow-up interval was common. The MESA results suggest that many adults get their risk factors at least partially treated, which is likely to modify their ASCVD risk during follow-up.

As a consequence, the new algorithm is relatively good at ranking individuals, but some studies have suggested that it overestimates ASCVD risk.2–4 Calibration of the

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

Correspondence to: Peter W.F. Wilson, MD, Atlanta Veterans Affairs Medical Center and Emory Clinical Cardiovascular Research Institute, 1462 Clifton Rd, Atlanta GA 30322. E-mail pwwilson@emory.edu

Key Words: risk assessment ■ risk factors/global assessment ■ risk prediction

© 2016 American Heart Association, Inc.
The 2013 American College of Cardiology/American Heart Association equations with more contemporary data would provide a sensible approach to avoid confounding because of treatment and also improve estimates of the absolute risk of ASCVD.

Another limitation of the current models lies in the fact that most of the data that underlie the ASCVD risk estimates are derived from middle-class white adults. We have much less information about ASCVD risk in adults from urban areas or those without health insurance. The Global Burden of Disease investigators have linked total mortality to lower socioeconomic class, lower income, and ethnic minorities in the United States. Data on ASCVD risk in the United States is relatively limited for blacks, and even less information is available for Hispanics or Asian Americans. With Asian Americans, it is also believed that the ASCVD risk factor burden and rates of clinical ASCVD may differ according to a person’s country of origin: higher ASCVD rates have been observed for South Asians and some Asian Islanders compared with East Asians.

The 10-year risk of ASCVD for individuals <40 years of age is low, and the 2013 American College of Cardiology/American Heart Association risk guidelines did not provide a 10-year risk calculator for this segment of the US population because its use could provide false reassurance. However, flexible tools allowing long-term and lifetime risk estimation in this age group based on combinations of risk factors and for any prespecified time horizon should be developed. Moreover, direct focus on causes of disease might be necessary as prolonged moderate lipid elevations in younger adulthood have been shown to lead to a significant increase of cardiovascular risk at 55 years of age, even after adjustment for other risk factors. Consequently, in this age group, lifestyle and even pharmacologic interventions might be considered to avoid irreparable damage to the arterial wall.

Finally, when considering treatment strategies, it is essential to take into account risk, potential benefit, and possible harm. Not all patients with higher risk experience sufficient treatment benefit, and some of the lower risk patients with higher low-density lipoprotein cholesterol or blood pressure stand to benefit in the longer term. Treatments may include harms, and these need to be weighed against expected benefits. Supplementing the estimates of risk with corresponding estimates of expected benefit and potential harm would meaningfully aid the patient provider discussion advocated by the 2013 American College of Cardiology/American Heart Association guidelines.

DISCLOSURES
Dr Pencina received grants from Regeneron. Dr Wilson reports no conflicts of interest.

AFFILIATIONS
From Atlanta VAMC and Emory Clinical Cardiovascular Research Institute, Atlanta, GA (P.W.F.W.); and Duke Clinical Research Institute, Durham, NC (M.J.P.).

FOOTNOTES
Circulation is available at http://circ.ahajournals.org.

REFERENCES
Estimation of Risk for Initial Atherosclerotic Cardiovascular Disease Events: Taking Stock and Moving Forward
Peter W.F. Wilson and Michael J. Pencina

Circulation. 2016;134:1792-1793
doi: 10.1161/CIRCULATIONAHA.116.025026
Circulation is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2016 American Heart Association, Inc. All rights reserved.
Print ISSN: 0009-7322. Online ISSN: 1524-4539

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circ.ahajournals.org/content/134/23/1792

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Circulation can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Circulation is online at:
http://circ.ahajournals.org/subscriptions/