2013 ACC/AHA Guideline on the Assessment of Cardiovascular Risk

Endorsed by the American Association of Cardiovascular and Pulmonary Rehabilitation, American Society for Preventive Cardiology, American Society of Hypertension, Association of Black Cardiologists, National Lipid Association, Preventive Cardiovascular Nurses Association, and WomenHeart: The National Coalition for Women With Heart Disease

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Citation

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http://circ.ahajournals.org/lookup/doi/10.1161/01.cir.0000437741.48606.98

The full-text guidelines are also available on the following Web sites: ACC (www.cardiosource.org) and AHA (my.americanheart.org)
Acknowledgements

**Methodology Members**
- Harmon S. Jordan, ScD
- Lev Nevo, MD
- Janusz Wnek, PhD

**National Heart, Lung, and Blood Institute**
- Denise Simons-Morton, MD, PhD
Conflict of Interest/Relationships With Industry

- Majority of Work Group members had none. All panel members disclosed COI/RWI information to the full panel in advance of any deliberations
- Members with COI/RWI (N=5/17) prohibited from voting on any aspect of the guideline where a conflict might exist
- All 17 members of the NHLBI Risk Assessment Work Group transitioned to the ACC/AHA Expert Work Group
- Independent contractors performed the systematic review with the assistance of the Expert Panel and provided methodological guidance to the Expert Panel
Classification of Recommendations and Levels of Evidence

A recommendation with Level of Evidence B or C does not imply that the recommendation is weak. Many important clinical questions addressed in the guidelines do not lend themselves to clinical trials. Although randomized trials are unavailable, there may be a very clear clinical consensus that a particular test or therapy is useful or effective.

*Data available from clinical trials or registries about the usefulness/efficacy in different subpopulations, such as sex, age, history of diabetes, history of prior myocardial infarction, history of heart failure, and prior aspirin use.

†For comparative effectiveness recommendations (Class I and IIa; Level of Evidence A and B only), studies that support the use of comparator verbs should involve direct comparisons of the treatments or strategies being evaluated.
NHLBI Charge to the Work Group

• Examine the scientific evidence on risk assessment for initial ASCVD events, and develop an approach for risk assessment that could be used in practice and used or adapted by the risk factor panels in their guidelines
• Specifically, the Work Group was charged with 2 tasks:
  • To develop or recommend an approach to quantitative risk assessment that could be used to guide care; and
  • To use systematic review methodology to pose and address a small number of questions judged to be critical to refining and adopting risk assessment in clinical practice.
NHLBI Charge to the Work Group

To Develop or Recommend an Approach to Quantitative Risk Assessment That Could be Used to Guide Care
Prevention Guideline Flow Chart

Treatment of Blood Cholesterol to Reduce Atherosclerotic Cardiovascular Risk Guideline

Blood Cholesterol Panel
Systematic review of RCTs and meta-analyses of RCTs

Risk Assessment Work Group Guideline
Systematic review of epidemiologic studies and meta-analyses of epidemiologic studies

Lifestyle Management Work Group Guideline
Systematic review of RCTs and observational studies
ASCVD Risk Calculator: Considerations

• Risk Assessment Work Group endorsed the paradigm of 10-year risk estimation
• Existing risk scores vary with regard to:
  • Derivation populations: age, sex, race, birth cohort, and country/region of origin
  • Inputs: traditional RFs ± family history, BMI, socioeconomic status, region, and C-reactive protein
  • Outcomes: CVD death, Total CHD (incl. revasc.), Total CHD, Hard CHD, Total CVD (incl. revasc.), Hard CVD (incl. heart failure)
ASCVD Risk Calculator: Development

- Risk Assessment Work Group judged new risk tool was needed
  - Inclusive of African Americans and with expanded endpoint including stroke
- Sought cohorts representative of the U.S. population as a whole
  - Community- or population-based
  - Whites and African Americans (at a minimum)
  - Recent follow-up data of at least 10 years
    - Reflect more contemporary risk factor trends and event rates, ideally without significant downstream uptake of statins/revascularization
ASCVD Risk Calculator: Development (cont.)

- Pooled Cohort Equations
  - Atherosclerosis Risk in Communities (ARIC)
  - Cardiovascular Health Study (CHS)
  - Coronary Artery Risk Development in Young Adults (CARDIA)
  - Framingham Original and Offspring
- Hard ASCVD
  - CHD death, nonfatal MI, fatal/nonfatal stroke
  - Models tested using traditional RFs + newer markers when possible
- Internal and external validation
# ASCVD Risk Calculator: Model Characteristics

<table>
<thead>
<tr>
<th></th>
<th>White Women</th>
<th>AA Women</th>
<th>White Men</th>
<th>AA Men</th>
</tr>
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<tbody>
<tr>
<td>N</td>
<td>11,240</td>
<td>2,641</td>
<td>9,098</td>
<td>1,647</td>
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<td>Age Range</td>
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<tr>
<td>C statistic</td>
<td>0.81</td>
<td>0.82</td>
<td>0.75</td>
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<tr>
<td>Calibration $\chi^2$</td>
<td>6.43</td>
<td>7.25</td>
<td>4.86</td>
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</table>
External Validation: MESA

ASCVD White: MESA

ASCVD Black: MESA

Risk Group

Women
Men

Rate

<.05
.05-.075
.075-.10
.10+
<.05
.05-.075
.075-.10
.10+

Observed (KM-Adj)
Expected

Observed (KM-Adj)
Expected
The ACC and the American Heart Association (AHA), in collaboration with the National Heart, Lung, and Blood Institute and other specialty societies, have released four guidelines focused on the assessment of cardiovascular risk, lifestyle modifications to reduce cardiovascular risk and management of elevated blood cholesterol and body weight in adults.

In order to support the implementation of these guidelines the ACC and AHA have jointly published a new mobile application (app).

The ASCVD Risk Estimator application helps health care providers and patients estimate 10-year and lifetime risks for atherosclerotic cardiovascular disease (ASCVD) using the Pooled Cohort Equations and lifetime risk prediction tools. The ASCVD Risk Estimator provides easy access to recommendations specific to calculated risk estimates. Additionally, the app includes readily accessible guideline reference information for both providers and patients related to therapy, monitoring, and lifestyle.

The app is available on both iTunes (iPhones, iPads) and Google Play (Galaxy, Nexus, other Android devices). Use the links below from your mobile device to download the app.

Download the App From iTunes
Download the App From Google Play
Launch the Web Version
### ASCVD Risk Calculator: Pooled Cohort Equations

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Units</th>
<th>Value</th>
<th>Acceptable range of values</th>
<th>Optimal values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>M or F</td>
<td>M or F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>years</td>
<td>20-79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td>AA or WH</td>
<td>AA or WH</td>
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<td></td>
</tr>
<tr>
<td>Total Cholesterol</td>
<td>mg/dL</td>
<td>130-320</td>
<td>170</td>
<td></td>
</tr>
<tr>
<td>HDL-Cholesterol</td>
<td>mg/dL</td>
<td>20-100</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Systolic BP</td>
<td>mm Hg</td>
<td>90-200</td>
<td>110</td>
<td></td>
</tr>
<tr>
<td>Treatment for High BP</td>
<td>Y or N</td>
<td>Y or N</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td>Y or N</td>
<td>Y or N</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Smoker</td>
<td>Y or N</td>
<td>Y or N</td>
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### ASCVD Risk Calculator: Pooled Cohort Equations (cont.)

<table>
<thead>
<tr>
<th>Risk Factor</th>
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<th>Acceptable range of values</th>
<th>Optimal values</th>
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<td>Sex</td>
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<td>M or F</td>
<td></td>
</tr>
<tr>
<td>Age</td>
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<td>55</td>
<td>20-79</td>
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<tr>
<td>Race</td>
<td>AA or WH</td>
<td>AA</td>
<td>AA or WH</td>
<td></td>
</tr>
<tr>
<td>Total Cholesterol</td>
<td>mg/dL</td>
<td>210</td>
<td>130-320</td>
<td>170</td>
</tr>
<tr>
<td>HDL-Cholesterol</td>
<td>mg/dL</td>
<td>56</td>
<td>20-100</td>
<td>50</td>
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<tr>
<td>Systolic BP</td>
<td>mm Hg</td>
<td>145</td>
<td>90-200</td>
<td>110</td>
</tr>
<tr>
<td>Treatment for High BP</td>
<td>Y or N</td>
<td>Y</td>
<td>Y or N</td>
<td>N</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Y or N</td>
<td>N</td>
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<tr>
<td>Smoker</td>
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<td>N</td>
<td>Y or N</td>
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</tr>
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ASCVD Risk Calculator: 55 Year Old African-American and White Women

African American Women

- 10-Year ASCVD Risk: 7.7%
- Optimal Risk: 1.8%

White Women

- 10-Year ASCVD Risk: 3.6%
- Optimal Risk: 1.4%
Recommendations for Assessment of 10-Year Risk of a First Hard ASCVD Event

The race- and sex-specific Pooled Cohort Equations* to predict 10-year risk of a first hard ASCVD event should be used in non-Hispanic African Americans and non-Hispanic whites, 40 to 79 years of age.

Use of the sex-specific Pooled Cohort Equations for non-Hispanic whites may be considered for estimation of risk in patients from populations other than African Americans and non-Hispanic whites.

*Derived from the ARIC study, CHS, CARDIA study, Framingham original and offspring cohorts.
NHLBI Charge to the Work Group

To Use Systematic Review Methodology to Pose and Address a Small Number of Questions Judged to be Critical to Refining and Adopting Risk Assessment in Clinical Practice
Systematic Review Process

- CQs relevant to clinical practice
- A priori inclusion/exclusion criteria
- Independent contractor conducted literature search
- Literature search through April, 2011
- Updated search for CQ#1 through September, 2013
Critical Question #1

• CQ1: “What is the evidence with regard to reclassification or contribution to risk assessment when the following are considered in addition to the variables that are in the traditional risk scores?”

  • High-sensitivity C-reactive protein
  • Apolipoprotein B
  • Glomerular filtration rate
  • Microalbuminuria
  • Family history
  • Cardiorespiratory fitness
  • Ankle-brachial index
  • Carotid intima-media thickness
  • Coronary artery calcium score
Recommendations for Use of Newer Risk Markers
After Quantitative Risk Assessment

If, after quantitative risk assessment, a risk-based treatment decision is uncertain, assessment of ≥1 of the following—family history, hs-CRP, CAC score, or ABI—may be considered to inform treatment decision making.†

Routine measurement of carotid intima-media thickness is not recommended in clinical practice for risk assessment for a first ASCVD event.†

†Based on new evidence reviewed during ACC/AHA update of evidence.
The contribution of ApoB, CKD, albuminuria, and cardiorespiratory fitness to risk assessment for a first ASCVD event is uncertain at present.
Critical Question #2

• CQ2: “Are models constructed to assess the long-term (≥15 years or lifetime) risk for a first cardiovascular disease event in adults effective in assessing variation in long-term risk among adults at low and/or intermediate short-term risk, whether analyzed separately or in combination?”
• Developed to assess the utility of long-term and lifetime risk assessment as an adjunct to short-term (10-year) risk assessment
• Especially among those at low 10-year risk
Recommendations for Long-Term Risk Assessment

It is reasonable to assess traditional ASCVD risk factors‡ every 4 to 6 years in adults 20 to 79 years of age who are free from ASCVD and to estimate 10-year ASCVD risk every 4 to 6 years in adults 40 to 79 years of age who are free from ASCVD.

Assessment of 30-year or lifetime ASCVD risk on the basis of traditional risk factors‡ may be considered in adults 20 to 59 years of age who are free from ASCVD and who are not at high short-term risk.

‡Age, sex, total cholesterol, high-density lipoprotein cholesterol, systolic BP, use of antihypertensive therapy, diabetes, and current smoking.
Implementation of Risk Assessment
Work Group Recommendations

Does the patient have existing clinical ASCVD?

Yes

See 2011 AHA/ACC Secondary Prevention Guideline (55) and 2013 Adult Prevention Guidelines:
- Blood Cholesterol (44)
- Obesity (54)
- Lifestyle Management (56)

No

Is the patient <20 y or >79 y of age?

Yes

See 2012 NHLBI Pediatric CV Risk Reduction Guidelines (53) and 2013 Adult Prevention Guidelines:
- Blood Cholesterol (44)
- Obesity (54)
- Lifestyle Management (56)

No

Assess traditional risk factors every 4-6 y in patients 20-79 y of age; estimate 10-y risk in those 40-79 y of age using Pooled Cohort Equations

Elevated 10-y risk (≥7.5%)

Communicate risk data and refer to 2013 Adult Prevention Guidelines:
- Blood Cholesterol (44)
- Obesity (54)
- Lifestyle Management (56)

Low 10-y risk (<7.5%)

Assess 30-y or lifetime risk in those 20-59 y of age; communicate risk data regardless of age and refer to AHA/ACC Lifestyle Guideline (56)

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Evidence Gaps and Future Research Needs

- The Work Group strongly recommends continued research to fill gaps in knowledge
  - Short- and long-term ASCVD risk assessment and outcomes in all age/sex/race groups
  - Optimal communication of ASCVD risk
  - Utility of risk assessment for motivating behavioral change and adherence to therapy
  - Utility of differential information conveyed by short- and long-term risk assessment
  - Utility of novel risk markers and disease screening in short- and long-term risk assessment