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ACCF/AHA 2009 Performance Measures for Primary Prevention of Cardiovascular Disease in Adults: A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Performance Measures (Writing Committee to Develop Performance Measures for Primary Prevention of Cardiovascular Disease): Developed in Collaboration With the American Academy of Family Physicians; American Association of Cardiovascular and Pulmonary Rehabilitation; and Preventive Cardiovascular Nurses Association: Endorsed by the American College of Preventive Medicine, American College of Sports Medicine, and Society for Women's Health Research

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Preamble

Over the past decade, there has been an increasing awareness that the quality of medical care in the United States is highly variable. In its seminal document dedicated to characterizing deficiencies in delivering effective, timely, safe, equitable, efficient, and patient-centered medical care, the Institute of Medicine described a quality "chasm."[1] Recognition of the magnitude of the gap between the care that is delivered and the care that ought to be provided has stimulated interest in the development of measures of quality of care and the use of such measures for the purposes of quality improvement and accountability.

Consistent with this national focus on healthcare quality, the American College of Cardiology Foundation (ACCF) and the American Heart Association (AHA) have taken a leadership role in developing measures of the quality of care for cardiovascular disease (CVD) in several clinical areas (Table 1). The ACCF/AHA Task Force on Performance Measures was formed in February 2000 and was charged with identifying the clinical topics appropriate for the development of performance measures and assembling writing committees composed of clinical and methodological experts. When appropriate, these committees have included representation from other organizations involved in the care of patients with the condition of focus. The committees are informed about

Table 1. ACCF/AHA Performance Measurement Sets

Topic	Original Publication Date	Partnering Organizations	Status
Chronic heart failure[2]	2005	ACC/AHA—inpatient measures ACC/AHA/PCPI—outpatient measures	Currently undergoing update Currently undergoing update
Chronic stable coronary artery disease[3]	2005	ACC/AHA/PCPI	Currently undergoing update
Hypertension[4]	2005	ACC/AHA/PCPI	Currently undergoing update
ST-elevation and non–ST-elevation myocardial infarction[5]	2006	ACC/AHA	Updated 2008
Cardiac rehabilitation[6]	2007	AACVPR/ACC/AHA	
Atrial fibrillation[7]	2008	ACC/AHA/PCPI	
Primary prevention of cardiovascular disease	2009	ACCF/AHA	
Peripheral arterial disease	2010*	ACCF/AHA/ACR/SCAI/SIR/SVM/SVN/SVS	

ACC indicates American College of Cardiology; ACCF, American College of Cardiology Foundation; AHA, American Heart Association; PCPI, American Medical Association–Physician Consortium for Performance Improvement; AACVPR, American Association of Cardiovascular and Pulmonary Rehabilitation; ACR, American College of Radiology; SCAI, Society for Cardiac Angiography and Interventions; SIR, Society for Interventional Radiology; SVM, Society for Vascular Medicine; SVN, Society for Vascular Nursing; and SVS, Society for Vascular Surgery.

*Planned publication date.

Table 2. Applying Classification of Recommendations and Level of Evidence

ESTIMATE OF CERTAINTY (PRECISION) OF TREATMENT EFFECT	SIZE OF TREATMENT EFFECT →			
	CLASS I *Benefit >>> Risk* Procedure/Treatment **SHOULD** be performed/ administered	**CLASS IIa** *Benefit >> Risk* *Additional studies with focused objectives needed* **IT IS REASONABLE** to perform procedure/administer treatment	**CLASS IIb** *Benefit ≥ Risk* *Additional studies with broad objectives needed; additional registry data would be helpful* Procedure/Treatment **MAY BE CONSIDERED**	**CLASS III** *Risk ≥ Benefit* Procedure/Treatment should **NOT** be performed/administered **SINCE IT IS NOT HELPFUL AND MAY BE HARMFUL**
LEVEL A Multiple populations evaluated* Data derived from multiple randomized clinical trials or meta-analyses	■ Recommendation that procedure or treatment is useful/effective ■ Sufficient evidence from multiple randomized trials or meta-analyses	■ Recommendation in favor of treatment or procedure being useful/effective ■ Some conflicting evidence from multiple randomized trials or meta-analyses	■ Recommendation's usefulness/efficacy less well established ■ Greater conflicting evidence from multiple randomized trials or meta-analyses	■ Recommendation that procedure or treatment is not useful/effective and may be harmful ■ Sufficient evidence from multiple randomized trials or meta-analyses
LEVEL B Limited populations evaluated* Data derived from a single randomized trial or nonrandomized studies	■ Recommendation that procedure or treatment is useful/effective ■ Evidence from single randomized trial or nonrandomized studies	■ Recommendation in favor of treatment or procedure being useful/effective ■ Some conflicting evidence from single randomized trial or nonrandomized studies	■ Recommendation's usefulness/efficacy less well established ■ Greater conflicting evidence from single randomized trial or nonrandomized studies	■ Recommendation that procedure or treatment is not useful/effective and may be harmful ■ Evidence from single randomized trial or nonrandomized studies
LEVEL C Very limited populations evaluated* Only consensus opinion of experts, case studies, or standard of care	■ Recommendation that procedure or treatment is useful/effective ■ Only expert opinion, case studies, or standard of care	■ Recommendation in favor of treatment or procedure being useful/effective ■ Only diverging expert opinion, case studies, or standard of care	■ Recommendation's usefulness/efficacy less well established ■ Only diverging expert opinion, case studies, or standard of care	■ Recommendation that procedure or treatment is not useful/effective and may be harmful ■ Only expert opinion, case studies, or standard of care
Suggested phrases for writing recommendations†	should is recommended is indicated is useful/effective/beneficial	is reasonable can be useful/effective/beneficial is probably recommended or indicated	may/might be considered may/might be reasonable usefulness/effectiveness is unknown/unclear/uncertain or not well established	is not recommended is not indicated should not is not useful/effective/beneficial may be harmful

*Data available from clinical trials or registries about the usefulness/efficacy in different subpopulations, such as gender, age, history of diabetes, history of prior myocardial infarction, history of heart failure, and prior aspirin use. 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. Even though randomized trials are not available, there may be a very clear clinical consensus that a particular test or therapy is useful or effective.

†In 2003, the ACCF/AHA Task Force on Practice Guidelines developed a list of suggested phrases to use when writing recommendations. All guideline recommendations have been written in full sentences that express a complete thought, such that a recommendation, even if separated and presented apart from the rest of the document (including headings above sets of recommendations), would still convey the full intent of the recommendation. It is hoped that this will increase readers' comprehension of the guidelines and will allow queries at the individual recommendation level.

the methodology of performance measure development and are instructed to construct measures for use both prospectively and retrospectively, rely on easily documented clinical criteria, and, where appropriate, incorporate administrative data. The data elements required for the performance measures are linked to existing ACCF/AHA clinical data standards to encourage uniform measurements of cardiovascular care. The writing committees are also instructed to evaluate the extent to which existing nationally recognized performance measures conform to the attributes of performance measures described by the ACCF/AHA and to strive to create measures aligned with acceptable existing measures when this is feasible.

The initial measure sets published by the ACCF/AHA focused primarily on processes of medical care or actions taken by healthcare providers, such as the prescription of a medication for a condition. These process measures are founded on the strongest recommendations contained in the ACCF/AHA clinical practice guidelines, delineating actions taken by clinicians in the care of patients, such as the prescription of a particular drug for a specific condition. Specifically, the writing committees consider as candidates for measures those processes of care that are recommended by the guidelines either as Class I, which identifies procedures/treatments that should be administered, or Class III, which identifies procedures/treatments that should not be administered (Table 2). Class II recommendations are not considered as candidates for performance measures. The methodology guiding the translation of guideline recommendations into process measures has been explicitly delineated by the ACCF/AHA, providing guidance to the writing committees.[8]

Although they possess several strengths, processes of care are limited as the sole measures of quality. Thus, current

ACCF/AHA Performance Measures Writing Committees are instructed to consider structures of care, outcomes, and efficiency as complements to process measures. In developing such measures, the committees are guided by methodology established by the ACC/AHA.[9] Although implementation of measures of outcomes and efficiency is currently not as well established as that of process measures, it is expected that such measures will become more pervasive over time.

Although the focus of the performance measures writing committees is on measures intended for quality improvement efforts, other organizations may use these measures for external review or public reporting of provider performance. Therefore, it is within the scope of the writing committee's task to comment, when appropriate, on the strengths and limitations of such external reporting for a particular CVD state or patient population. Thus, the metrics contained within this document are categorized as either *performance measures* or *test measures*. Performance measures are those metrics that the committee designates as appropriate for use for both quality improvement and external reporting. In contrast, test measures are those that have been deemed appropriate for the purposes of quality improvement but not for external reporting until further validation and testing are performed.

All measures have limitations and pose challenges to implementation that could result in unintended consequences when used for accountability. The implementation of measures for purposes other than quality improvement requires field testing to address issues related but not limited to sample size, frequency of use of an intervention, comparability, and audit requirements. The manner in which these issues is addressed is dependent on several factors, including the method of data collection, performance attribution, baseline performance rates, incentives, and public reporting methods. The ACCF/AHA encourages those interested in implementing these measures for purposes beyond quality improvement to work with the ACCF/AHA to consider these complex issues in pilot implementation projects, to assess limitations and confounding factors, and to guide refinements of the measures to enhance their utility for these additional purposes.

By facilitating measurements of cardiovascular healthcare quality, ACCF/AHA performance measurement sets may serve as vehicles to accelerate appropriate translation of scientific evidence into clinical practice. These documents are intended to provide practitioners and institutions that deliver care with tools to measure the quality of their care and identify opportunities for improvement. It is our hope that application of these performance measures will provide a mechanism through which the quality of medical care can be measured and improved.

Frederick A. Masoudi, MD, MSPH, FACC
Chair, ACCF/AHA Task Force on Performance Measures

1. Introduction

The ACCF/AHA Primary Prevention of Cardiovascular Disease Performance Measures Writing Committee (the Writing Committee) was charged to develop performance measures for the prevention of CVD. These performance measures do not specifically address prevention of stroke, although because risk factors for heart disease and stroke overlap, their use should contribute to the prevention of stroke as well. These measures are intended for adults (18 years of age and older) evaluated in the outpatient setting. The Writing Committee designed most of the measures, including all of the lifestyle measures, to begin at age 18 because we recognize that risk for atherosclerosis accumulates over a lifetime and, although it is never too late to make changes to prevent heart disease, the greatest benefit accrues with early lifestyle changes. The relation between cardiovascular risk factors and the extent and severity of coronary atherosclerosis in the teenage years and earlier is well established on the basis of autopsy studies.[10,11] Evidence from long-term follow-up studies demonstrates that a favorable risk factor profile during the working years is associated with a longer, healthier life and reduced medical care expenses after age 65.[12–17] These observations indicate the value of prevention of risk factors in the first place, beginning in childhood and youth, as called for by the AHA's "Guidelines for Primary Prevention of Atherosclerotic Cardiovascular Disease Beginning in Childhood."[18] Although the greatest long-term benefit occurs with changes early in life, changes in adults are also encouraged because they have been demonstrated to reduce risk and prevent heart disease in both middle-aged and older adults. The Writing Committee also acknowledges that the field of primary prevention is rapidly evolving because of the contributions of observational research, registries, and clinical trials. Hence, modifications to these performance measures for primary prevention will be necessary as the field advances.

The Writing Committee designed the performance measures to be applicable to the broadest possible population. A healthy lifestyle is believed to be beneficial across the entire spectrum of age, race, and sex. With respect to age, however, we recognize that there comes a time when the benefits of screening and treatment to avert future events may be of limited value because life expectancy is limited. Moreover, a number of the investigations establishing the benefits of primary prevention have not included elderly patients. In an effort to balance the competing interests of applying primary prevention as broadly as possible and being consistent with other organizations' age criteria, the Writing Committee recommends the use of the proposed measures for patients older than 18 years of age both for accountability and for public reporting. Certain measures have an upper age limit of 80 years because of a paucity of evidence to support the measure in an older age group. In addition, there may be measurement circumstances in which a narrower target age range is appropriate, and those who implement measures may choose to specify an age range that is less broad.

Certain measures, such as blood pressure control, may not be achievable in all patients. Good blood pressure control is a challenge for providers in selected patient subsets, including those with multiple comorbidities and some older patients with isolated systolic hypertension. In addition, patient adherence to medical regimens varies for many reasons. The Writing Committee recognizes that providers may care for patients with complex medical and socioeconomic conditions for whom attainment of target levels for risk factors is difficult. Thus, target levels for attainment of performance measure goals will vary by patient population and by practice

setting; for internal quality improvement initiatives, they are set by the providers.

1.1. Scope of the Problem

For more than a century, CVD has been the number 1 killer in the United States for all but 1 year (1918, in which there was an influenza pandemic). CVD is the underlying cause of 36.3% of all deaths, or 1 of every 2.8 deaths, in the United States, according to data from 2004. In 2008, an estimated 770 000 Americans suffered a first coronary attack (this includes myocardial infarction and unstable angina). Another 175 000 had a silent, or unrecognized, myocardial infarction. The total cost of CVD and stroke in the United States for 2007 is estimated at $448.5 billion.[19]

Given the magnitude of the problem and the financial burden of CVD, improvements in the quality of primary prevention of cardiovascular disease will lead to substantial improvement in healthcare outcomes. Despite advances and wide publication and dissemination of prevention guidelines in the cardiovascular literature, the inconsistent application of best practices does a disservice to patients and leaves many opportunities for improvement in care and systems. Accountability at the practice level is 1 step toward more consistent application of best practice guidelines and improved clinical outcomes. The size of the performance measure set may place a burden on the practitioner but reflects the complexity of CVD prevention due to its multifactorial pathogenesis. Many practitioners are assuming this burden to ensure the quality of their practice.[20,21] In addition, external groups are engaged in quality performance measurement and reporting. Where logical, the Writing Committee has attempted to distinguish between measures that are appropriate for accountability or public reporting and those that should be used only for internal quality improvement.

1.2. Structure and Membership of the Writing Committee

The members of the Writing Committee included senior clinicians (physicians and an advanced practice nurse) and specialists in internal and family medicine, cardiology, preventive medicine, and epidemiology. The Writing Committee also included representatives from the American Academy of Family Physicians; American Association of Cardiovascular and Pulmonary Rehabilitation; American College of Physicians; Preventive Cardiovascular Nurses Association; and Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division for Heart Disease and Stroke Prevention.

1.3. Disclosure of Relationships With Industry

The work of the Writing Committee was supported exclusively by the ACCF and AHA. Committee members volunteered their time, and there was no commercial support for the development of these performance measures. Meetings of the Writing Committee were confidential and attended only by Writing Committee members and staff. Writing Committee members were required to disclose in writing all financial relationships with industry relevant to this topic according to standard ACCF and AHA reporting policies, and they verbally acknowledged these relationships to the other members (Appendix A).

1.4. Review and Endorsement

Between January 22 and February 22, 2008, the performance measures document underwent a 30-day public comment period, during which ACCF and AHA members and other health professionals had an opportunity to review and comment on the text in advance of its final approval and publication. The official peer and content review of the document was conducted simultaneously with the 30-day public comment period, with 2 peer reviewers nominated by the ACCF and 2 nominated by the AHA. We sought additional comments from clinical content experts and performance measurement experts. See Appendix B for relationships with industry and other entities of the peer reviewers.

The ACCF/AHA 2009 Clinical Performance Measures for Primary Prevention of Cardiovascular Disease in Adults was adopted by the respective boards of directors of the ACCF and AHA in June 2009. These measures will be reviewed for currency once annually and updated as needed. They should be considered valid until either updated or rescinded by the ACCF/AHA Task Force on Performance Measures.

2. Methodology

The development of performance systems involves identification of a set of measures that target a specific patient population observed over a particular time period. To achieve this goal, the ACCF/AHA Task Force on Performance Measures has outlined 5 mandatory sequential steps. Sections 2.1 through 2.5 outline how the Writing Committee addressed these elements.

2.1. Target Population and Care Period

The target population consists of patients 18 years of age or older. We developed exclusion criteria and upper age limits for certain measures to further specify the target population. These performance measures are intended for primary prevention in the adult population and do not address prevention specific to children and adolescents. More information on primary prevention for children and adolescents can be found in the AHA "Guidelines for Primary Prevention of Atherosclerotic Cardiovascular Disease Beginning in Childhood."[18]

The Writing Committee recognizes that there are many opportunities and healthcare settings for primary prevention of CVD. Thus, these performance measures are aimed at any physician or healthcare professional who sees adult patients (age 18 years and older) at risk for CVD. For this document, the outpatient care period is defined as the period of care provided in an outpatient setting. An ongoing relationship with the healthcare professional is critical to both the initiation and eventual success of preventive measures. In addition, any single visit may not provide the opportunity to address the full range of preventive care required, and in general, the Writing Committee recommends that evidence of at least 2 encounters over a period of 1 year be established before the physician is expected to have responsibility for primary CVD prevention. However, certain measures, such as smoking cessation, are so important for prevention that the Writing Committee believed they should occur even in 1 acute visit over a 2-year period.

Table 3. ACCF/AHA Primary Prevention of Cardiovascular Disease Performance Measurement Set: Dimension of Care Measures Matrix

Performance Measure	Risk Assessment	Diagnostics	Patient Education	Treatment	Self-Management/ Compliance	Monitoring of Disease Status
1. Lifestyle/risk factor screening	✓					
2. Dietary intake counseling			✓	✓	✓	
3. Physical activity counseling			✓	✓	✓	
4. Smoking/tobacco use	✓					
5. Smoking/tobacco cessation			✓	✓		
6. Weight/adiposity assessment	✓	✓				✓
7. Weight management			✓	✓	✓	
8. Blood pressure measurement	✓	✓				✓
9. Blood pressure control				✓		✓
10. Blood lipid measurement	✓	✓				✓
11. Blood lipid therapy and control				✓		✓
12. Global risk estimation	✓	✓				✓
13. Aspirin use	✓			✓		

2.2. Dimensions of Care

Given the multiple potential domains of treatment that can be measured, the Writing Committee identified the relevant dimensions of care that should be evaluated. We placed each potential performance measure into the relevant dimension-of-care categories. Performance measures selected for inclusion in the final set and their dimensions of care are summarized in Table 3.

Although the Writing Committee considered a number of additional measures that focus on equally important aspects of care, length and complexity considerations did not allow their inclusion in the present set. Final selection of performance measures was based on (1) the evidence base for a given measure, (2) ease/complexity of measurement, and (3) coverage in other measurement sets. The Writing Committee focused on outcome measures rather than process measures whenever possible. The Writing Committee recognized that for some patients, there are many obstacles to attaining the desired outcome. For example, it is difficult for some patients to attain blood pressures less than 140/90 mm Hg because of medication noncompliance, costs, side effects, or other reasons. To avoid penalizing clinicians who care for such patients, the Writing Committee designed performance measures that give credit for good faith attempts to attain the treatment goal (eg, documentation of the use of at least 2 antihypertensive medications in patients with blood pressures greater than 140/90 mm Hg), as well for attainment of the desired outcome. Such a strategy fulfills the goals of performance measurement by balancing attainment of targets for blood pressure or lipids with recognition of obstacles despite attention to goals. For internal quality improvement purposes, the Writing Committee believed that the standards could be more rigorous. The final set includes both process measures (risk assessment and risk factor counseling) and intermediate outcome measures (blood pressure, cholesterol values).

2.3. Literature Review

The Writing Committee used the 2002 AHA "Guidelines for Primary Prevention of Cardiovascular Disease and Stroke" as the primary source for deriving these measures.[22] In addition, the Writing Committee reviewed other more recent guidelines to consider the most current available evidence. These included the US Preventive Services Task Force's "Guide to Clinical Preventive Services,"[23] the European guidelines on CVD prevention in clinical practice,[24] the AHA's "Evidence-Based Guidelines for Cardiovascular Disease Prevention in Women: 2007 Update,"[25] the Joint British Societies' "Guidelines on Prevention of Cardiovascular Disease in Clinical Practice,"[26] the Third Report of the National Cholesterol Education Program Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III),[27] and the seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure.[28]

2.4. Definition of Potential Measures

Explicit criteria exist for the development of performance measures that accurately reflect quality of care, including defining the numerators and denominators of potential measures and evaluating their applicability, interpretability, and feasibility. To select measures for inclusion in the performance measurement set, the Writing Committee prioritized the recommendations from the 2002 AHA guidelines for primary prevention of CVD and stroke.[22]

The AHA primary prevention guidelines[22] were drafted before the AHA's adoption of a formal rating system regarding the strength of the recommendation and the level of

evidence. That system, adopted by the AHA and the ACCF, enables guideline writing groups to specify the degree to which the benefit of the care is likely to outweigh any potential risk, as well as the level of evidence supporting that conclusion. In general, ACCF/AHA Class I (benefit >>> risk) and Class III (risk greater than or equal to benefit) indications for therapy identify potential dimensions of care and processes for performance measurement; however, not all performance measures must be based on grade A level of evidence (general consistency of direction and magnitude of effect from multiple [3 to 5] randomized trials or meta-analyses with population risk strata evaluated). In particular, when considering interventions to remove harmful exposures (eg, smoking cessation counseling), or to restore norms that existed during earlier phases of human evolution (eg, increased consumption of fruits, vegetables, and whole grains and decreased consumption of animal products), the need to obtain evidence from clinical trials is less obligatory than for recommendations to add a pharmaceutical agent to a patient's regimen. The Writing Committee recognizes that randomized, controlled trials of lifestyle interventions are more difficult to perform than pharmaceutical trials; however, lifestyle behavior change remains the cornerstone of a successful prevention strategy. The recommended performance measures in this document are based on processes of care that are expected to lead to benefit that far outweighs any potential risk based on evidence sufficiently strong to support broad population-wide applicability. For some measures, we needed to make recommendations despite the absence of evidence from randomized, controlled trials that used clinical events and deaths as outcomes.

The Writing Committee recognizes that performance measures imply performance standards, and there are those who may find these implicit standards lower than their own practice standards, particularly with respect to assessment frequency and target intermediate outcomes, such as cholesterol and blood pressure. Physicians using these measures to assess their practice quality are invited to choose more aggressive measure specifications. The measures outlined herein are geared towards the minimum level of acceptable performance rather than optimal care, particularly when used to compare providers or for public reporting.

2.5. Selection of Measures for Inclusion in the Performance Measure Set

From analysis of these recommendations, the Writing Committee identified potential measures relevant to the primary prevention of CVD and then independently evaluated their potential for use as performance measures using 8 exclusion criteria adapted from the "ACCF/AHA Attributes of Performance Measures" (Table 4) and the Sample Performance Measure Survey Form and Exclusion Criteria Definitions (Appendix C). As part of this process, the Writing Committee also evaluated the optimal use of each measure for accountability/public reporting (A/PR) versus internal quality improvement (IQI) only. Member ratings of all the potential measures were collated and discussed by the full Writing Committee to reach consensus about which measures should advance for inclusion in the final measure set and whether any should be designated as IQI measures. Nineteen potential measures were advanced initially for full specification to assess their suitability as performance measures. These were eventually reduced to 13 final measures through an iterative process of repeated surveys within the Writing Committee, additional literature review, and detailed group discussions. The 13 performance measures generally support practices expected to reduce long-term risk of cardiovascular events. However, most patient encounters offer opportunities to maintain low risk among persons not yet exhibiting increased risk. Reinforcement of favorable health behavior patterns is desirable as part of every patient encounter, including those that do not require specific risk-reducing interventions.

Table 4. Summary of ACCF/AHA Attributes of Performance Measures

Consideration	Attribute
Useful in improving patient outcomes	Evidence-based
	Interpretable
	Actionable
Measure design	Denominator precisely defined
	Numerator precisely defined
	Validity type
	• Face*
	• Content†
	• Construct‡
	Reliability
Measure implementation	Feasibility
	• Reasonable effort
	• Reasonable cost
	• Reasonable time period for collection
Overall assessment	Overall assessment of measure for inclusion in measurement set

*The measure intuitively appears to capture what it is intended to capture.

†The extent to which the items comprehensively capture the domain they are intended to measure.

‡The extent to which the measures correlate with other methods of quantifying the underlying construct.

The Writing Committee has designated 2 measures (Global Risk Estimation and Aspirin Use) as appropriate for IQI only. In addition, for some measures, separate numerators and/or denominators that may be used in IQI programs have been specified in addition to numerators/denominators that are appropriate for use in A/PR programs. In making these designations, the Writing Committee weighed a number of factors, including the strength of evidence for the intervention in the primary prevention population; the availability (or lack) of evidence in specific subgroups, such as women or elderly patients; the potential for unintended consequences if used for A/PR (eg, incentives to avoid treating sicker or harder to control patients or to overtreat) and the lack of tested risk models to adjust for variations across provider patient populations (especially for measures of intermediate outcomes, eg, Blood Pressure Control and Blood Lipid Therapy and Control), which could lead to misleading results if used for A/PR. Although these IQI measures represent valuable tools to aid clinicians in improving quality of care

and enhancing outcomes for patients, they are not ready for use in A/PR programs until there is further testing and validation.

3. Primary Prevention of CVD Performance Measures

3.1. Definition of Primary Prevention

For purposes of this document, *primary prevention* is defined as prevention of the first occurrence of CVD. These measures are therefore appropriate for all patients without clinical CVD, including those with diabetes mellitus. This measure set is intended to include asymptomatic individuals with disease identified only by imaging studies. It does not apply to patients who would be included in the existing ACCF/AHA/Physician Consortium coronary artery disease performance measures.[3]

3.2. Brief Summary of the Measurement Set

Table 5 summarizes the ACCF/AHA Primary Prevention of Cardiovascular Disease Performance Measurement Set—those measures with the highest level of evidence and support among the Writing Committee members. Appendix D provides the detailed specifications for each performance measure, including the numerator, denominator, period of assessment, method of reporting, sources of data, rationale, clinical recommendations, and challenges to implementation.

3.3. Data Collection

These performance measures for primary prevention of CVD are ideally intended for prospective use to enhance the quality improvement process but may also be applied retrospectively. We recommend use of a data collection instrument to aid compliance and measurement (Appendix E). Individual institutions may modify the sample instrument or develop a different tool based on local practice and standards.

The burden of collection of accurate data may be greater for certain performance measures because of the inconsistent and potentially incomplete recording of lifestyle screening and counseling. This reporting could be facilitated by inclusion of specific entry fields for history, physical examination, and nonpharmacological interventions (such as counseling, diet, or physical activity prescriptions) in electronic health records. Otherwise, electronic health records or retrospective medical record reviews will miss much of the lifestyle counseling that occurs during routine clinical practice. These would then require prospective data collection as a relatively burdensome means to collect the lifestyle variables. In addition, the Writing Committee recognized that there are different levels of counseling but chose to allow any mention of counseling for lifestyle changes to satisfy these performance measures, to be consistent with the philosophy that these performance measures represent a minimum expectation for good quality care. Other performance measures related to end points that are usually recorded in an electronic health record include physical measurements (body weight, blood pressure), laboratory values (blood lipids), and prescription pharmaceuticals; these would confer relatively low burdens of data collection. Calculation and recording of global risk scores may be enhanced by an electronic health record, which can be designed to automatically calculate the Framingham Risk Score or other global risk scores with availability of the required risk factor data.

Table 5. ACCF/AHA Primary Prevention of Cardiovascular Disease Performance Measurement Set

Performance Measure Name	Measure Description	Designation
1. Lifestyle/risk factor screening	Assessment of lifestyles and risk factors for development of CVD	A/PR IQI
2. Dietary intake counseling	Counseling to eat a healthy diet	A/PR
3. Physical activity counseling	Counseling to engage in regular physical activity	A/PR
4. Smoking/ tobacco use	Risk assessment for smoking and tobacco use behaviors	A/PR IQI
5. Smoking/ tobacco cessation	Cessation intervention for active smoking (tobacco use)	A/PR
6. Weight/ adiposity assessment	Measurement of weight and body mass index and/or waist circumference	A/PR
7. Weight management	Counseling to achieve and maintain ideal body weight	A/PR IQI
8. Blood pressure measurement	Measurement of blood pressure in all patients	A/PR
9. Blood pressure control	Effective blood pressure control or combination therapy for patients with hypertension	A/PR IQI
10. Blood lipid measurement	Fasting lipid profile performed	A/PR IQI
11. Blood lipid therapy and control	Proportion of patients who meet current LDL-C treatment targets **OR** who are prescribed ≥1 lipid lowering medications at maximum tolerated dose	A/PR
12. Global risk estimation	Use of a multivariable risk score to estimate a patient's absolute risk for development of coronary heart disease	IQI
13. Aspirin use	Aspirin in patients without clinical evidence of atherosclerotic disease who are at higher CVD risk	IQI

A/PR indicates accountability/public reporting measures (appropriate for all uses, including internal quality improvement, pay for performance, physician ranking, and public reporting); CVD, Cardiovascular disease; IQI, internal quality improvement measures (recommended for use in internal quality improvement programs only; not appropriate for any other use, eg, pay for performance, physician ranking, or public reporting); and LDL-C, low-density lipoprotein cholesterol.

3.4. Exclusion Criteria and Challenges to Implementation

The Writing Committee added exclusion criteria, recognizing that there are justifiable reasons for not meeting the performance measures. These reasons, which may be due to patient, medical, or system factors, should be recorded on the data collection form. Documentation of such factors should be encouraged to provide data for future research and facilitate

in-depth quality improvement in situations in which there are apparent outliers with respect to the number of patients with medical or patient-centered reasons for exclusion.

Challenges to implementation of the measures are discussed where applicable. In general, the initial challenge facing any measurement effort is inadequate documentation. Discussion of these challenges is not an argument against any individual measure. Rather, these discussions are cautionary notes that draw attention to areas in which additional research may enhance the value of the measures.

4. Discussion

4.1. Sex

The Writing Committee recommends identical screening and advice for men and women for most cardiovascular risk factors, including lifestyle, diet, physical activity, smoking, and blood pressure. Sex-specific age of onset of cardiac risk follows from the varying epidemiology of heart disease in men and women.[22,25,27] For men 35 years of age and older and for women 45 years of age and older, global risk assessment takes into account the sex-specific levels of risk so that interventions are not sex-specific but rather tailored to risk. We have recommended sex-specific assessment of adiposity to target patients with waist circumference of 35 inches or more for women and 40 inches or more for men for additional intervention. For assessment of lipid therapy and control, the risk from a family history of CVD is relegated to male first-degree relatives younger than 55 years of age and female first-degree relatives younger than 65 years of age, whereas the risk associated with low levels of high-density lipoprotein cholesterol is defined as less than 40 mg/dL in men and less than 50 mg/dL in women. We recommend global risk screening for all men 35 years of age or older and for all women 45 years of age or older. Finally, we recommend administration of aspirin as preventive therapy for men with a 10-year coronary heart disease (CHD) risk of 10% or more and for women with 10-year CHD risk of 20% or more, given different thresholds of risk and benefit.[25,27]

4.2. Frequency of Screening

In general, a comprehensive assessment of risk factors should be performed at least every 5 years starting at 18 years of age, and a global risk score should be calculated at least every 5 years starting at the age of 35 years for men and 45 years for women. Those with increased cardiovascular risk, for example, those with diabetes, cigarette smokers, or those with obesity, should have their risk factors and cardiovascular risk assessed more frequently.

4.3. Risk Screening

Numerous observational studies have documented the powerful associations of healthy lifestyle choices, such as healthier diet, greater physical activity, avoidance of smoking, and maintaining a lean body mass, with marked reductions in CVD events.[15,29,30] Although limited data indicate that assessment (alone) of diet and physical activity improves outcomes, and there are concerns regarding the reliability of patient self-report, assessment and documentation of these factors are important means to help the patient and provider understand the patient's risk for CVD, to begin a dialogue regarding healthy lifestyle choices, and to provide specific counseling regarding risk factor reduction to lower overall risk. Although the addition of longitudinal, multicomponent behavioral interventions increases the effectiveness of clinical recommendations alone regarding healthy diet and physical activity, advice alone has been shown to reduce risk factor levels and overall CHD risk.[31,32]

There is no consensus on what constitutes adequate documentation of diet, physical activity, and alcohol use. The Writing Committee believes that physicians and other practitioners should strive to capture the healthy and unhealthy aspects of the patient's habits to provide counseling and observe change over time. Although the Writing Committee did not think that any specific tools should be required for assessment of diet and physical activity, the Committee noted the existence of numerous validated measures that could assist patients and providers in assessing the quality and quantity of diet and physical activity. The numerous dietary instruments range from the extensive Diet History Questionnaire (available at http://riskfactor.cancer.gov/DHQ/) to a simple nutrition history form that a patient can fill out[33] or a simple question regarding how many servings of fruits and vegetables a patient eats on average every day. Likewise, there are a variety of validated instruments to help measure physical activity frequency and intensity, such as the International Physical Activity Questionnaire (available at http://www.ipaq.ki.se/ipaq.htm). Some of these instruments are extensive and are designed for research purposes, but portions of them may be useful to clinicians, and many can be self-administered and are available in a wide variety of languages.

There was not a clear consensus among the Writing Committee members regarding assessment and counseling on alcohol in CVD risk. Likewise, although premature CVD in a patient's first-degree relative is clearly a risk factor for CVD,[34,35] there were concerns regarding the ability of providers to adequately assess and document a family history of CVD given reliance on patient self-report and varying definitions of a positive family history. Therefore, alcohol use and family history were included for use in internal quality improvement only, not for accountability or public reporting. Nonetheless, providers are strongly encouraged to ascertain relevant family history and history of alcohol use as reliably as possible, including verifying diagnoses of premature CVD with review of medical records of first-degree relatives if the patient can obtain them. One widely available tool that can assist patients and providers in ascertaining and updating family history information is the US Surgeon General's Family History Initiative (available at http://www.hhs.gov/familyhistory/). The "My Family Health Portrait" tool on this Web site is intended to make the process of gathering and storing family history information easier and more efficient for both patients and healthcare professionals.

4.4. Lifestyle Counseling

Consuming a heart-healthy diet (lower in animal products and rich in fruits and vegetables, whole grains, low-fat or nonfat dairy products, fish, legumes, poultry, and lean meats; calorie controlled; and moderate in sodium intake), as well as engaging in regular physical activity, lowers an individual's risk for CVD. Therefore, the Writing Committee strongly

believes that diet and physical activity counseling is the foundation of primary prevention. Such counseling has the potential to either reduce or prevent the development of risk factors, for example, hypertension, hyperlipidemia, obesity, and diabetes. The Writing Committee recognizes that clinical trial evidence related to morbidity and mortality outcomes for lifestyle counseling provided in medical practice settings is not as robust as the evidence for other medical therapies; however, strong evidence supports the importance of diet and activity in the risk of CVD, and accumulated evidence supports the impact of practice-based counseling on behaviors.[36] The Writing Committee believes that a performance measure for lifestyle counseling should be adopted despite the lack of definitive evidence for morbidity and mortality benefits, because such trials are unlikely to be conducted, and efforts to restore biological and evolutionary norms are less likely to introduce harm than are pharmacological interventions. Given that the adoption of lifestyle changes can prevent and treat CVD risk factors, the need for other medical therapies may be reduced or averted entirely. The Writing Committee agreed that unless diet counseling and physical activity counseling are put forward as performance measures, there is no incentive for clinicians to provide such interventions to patients. Yet, the literature provides evidence that patients respond favorably when counseling is provided. In a recent study,[37] physicians who gave brief advice on physical activity and educational materials showed that patients increased physical activity by 18 minutes per week more than control patients at 6 months, and a 4% higher proportion of patients achieved the minimum recommended physical activity level. Furthermore, subgroup analyses showed that individuals 50 years of age and older and those who were given an individual physical activity prescription had even greater success, for example, doubling their minutes per week of moderate or vigorous physical activity.

A problem identified by the Writing Committee is that the clinician's cognitive interactions with patients, for example, counseling, are undervalued and therefore are not reimbursed by third-party payers. However, the creation of an incentive by naming these interactions as performance measures will help identify barriers to effective counseling and improve the value placed on these interventions by the reimbursement system.

The Writing Committee acknowledges the challenges associated with mandating diet and physical activity counseling. First, counseling takes time during an already brief clinician office visit. We encourage clinicians to provide a direct message to patients and to use available resources to help deliver lifestyle information, for example, by giving them printed educational materials, referring patients to www.mypyramid.gov, and handing patients an activity prescription (goal equals 30 minutes of brisk walking 5 days per week). Second, as performance measures, diet and physical activity counseling must be documented. We encourage practices to integrate counseling interventions into electronic medical records or paper form so that such documentation can be expedited. One obvious concern is that compliance with a counseling measure does not provide an understanding of the intensity or quality of the counseling.

4.5. Weight Management

Body mass index and waist circumference are the designated measures for assessment of obesity and abdominal obesity, respectively. Body mass index has been linked with many health outcomes and is the measure most commonly reported in treatment trials. However, studies have also demonstrated the independent contribution of abdominal obesity to cardiovascular risk, particularly in blacks.[38–40] Therefore, the Writing Committee encourages the assessment of both of these simple measurements, but only 1 is necessary to meet the performance standard. At present, there is no evidence that defining and managing patients on the basis of the concept of metabolic syndrome results in reduced morbidity and mortality; hence, we focused on the individual risk factors and not on the concept of the metabolic syndrome.

4.6. Hypertension

Hypertension is a major risk factor for the development of CVD. The evidence linking untreated hypertension to increased cardiovascular morbidity is undisputed. However, literature surveys continue to report suboptimal population-based management of hypertension. For example, in the 1999–2002 National Health and Nutrition Examination Survey of non-Hispanic whites, 62.9% of patients with hypertension were aware of their diagnosis, 48.6% were receiving treatment, and only 29.8% had their hypertension controlled.[41] The Writing Committee elected to develop separate performance measures that evaluate measurement and control.

Published guidelines differ regarding the age at which blood pressure assessment should commence. We elected to use the recommendations of the seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure,[28] which recommends screening beginning at 18 years of age. We chose 140/90 mm Hg as the threshold for satisfactory blood pressure control because it is the target blood pressure suggested by the seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure for the general hypertensive population. We recognize that target blood pressure should be lower for special high-risk populations (such as patients with diabetes or chronic kidney disease). Our selected target represents the minimum degree of control, or floor, that is acceptable as a performance measure. We do not mean to imply that lower targets are not desirable for special populations.

Controversy remains as to the optimal role of specific classes of antihypertensive medication in the treatment of hypertension. For example, the seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure and the European Society of Hypertension differ with regard to preferred agents for initial monotherapy. This area of inquiry continues to evolve. Recognizing that individual physicians may reasonably choose 1 initial strategy over another and still comply with published guidelines, we have chosen not to mandate the use of particular antihypertensive drug classes to satisfy the blood pressure control performance measure. Rather, we require that blood pressure be below the target or that at least 2 medications have been prescribed. This allows for different pharmacological strategies and also recognizes that blood pres-

sure for a subset of patients will remain uncontrolled despite treatment that includes at least 2 medications. We included the latter criterion because we did not wish to penalize physicians whose practices may include more challenging patients or more patients with refractory hypertension due to case-mix issues. If blood pressure is not controlled despite antihypertensive medication, clinicians should assess possible reasons for poor control (eg, patient adherence to recommended treatments) before changing the choice or dose of medication. Both of our blood pressure measures will require electronic or paper medical record reviews. With the exception of patients with hypertension who have filled prescriptions for at least 2 antihypertensive medications, claims data will not adequately capture the information necessary to evaluate these performance measures.

4.7. Lipid Screening and Control

The Writing Committee had an extensive discussion about the appropriate age at which lipid screening should be initiated. The Adult Treatment Panel III guidelines recommend lipid screening from age 20 years onward. The US Preventive Services Task Force recommends lipid screening at age 35 years for all men and at age 45 years for women who are at increased risk for CHD and does not make a recommendation for or against screening in younger individuals who are not at increased risk for CHD. Some Writing Committee members advocated the younger age cutoff, noting that atherosclerosis originates in youth and progresses in young adults; however, many Writing Committee members advocated older age thresholds for lipid screening because of the lack of an evidence base of randomized, controlled trials in younger cohorts documenting that lipid screening at younger ages results in reduction of cardiovascular events in the long term. The Writing Committee adopted the older age thresholds as the minimum standard for accountability/public reporting, whereas the internal quality improvement standard calls for screening at younger ages.

Decisions about lipid-lowering therapy should be based on an individual's risk for CVD rather than solely on sex or age.[27,42] The Writing Committee acknowledges that evidence is limited for women and the elderly.[43,44] Such risk assessment requires comprehensive ascertainment and documentation of lipid and nonlipid risk factors. Data on individual risk factors are best synthesized by validated risk scores, and global risk estimation is thus recommended by current lipid-lowering guidelines and included in the present document as an internal quality improvement measure (see Section 4.9). Given the lack of consensus regarding which global risk assessment instrument most correctly captures risk and which time frame for risk estimation is most appropriate, and because there are no studies to date that directly demonstrate superior patient outcomes with formal risk scoring as opposed to comprehensive risk factor assessment alone, the Writing Committee has chosen not to designate global risk estimation as a performance measure. Ascertainment of the data elements for global risk estimation, however, meets performance measure criteria.

Considerations similar to those discussed in detail in the section on hypertension treatment and control apply to the treatment and control of dyslipidemia. Statins are the mainstay of pharmacological lipid-lowering therapy, but the Writing Committee has chosen not to prescribe certain lipid-lowering regimens in favor of others given the variability of lipoprotein phenotypes and the heterogeneity of patients' tolerance to various medication classes and agents within classes.

4.8. Global Risk Estimation

The current framework for assessment of risk for CHD and the selection of potential patients for drug therapy includes assessment of absolute risk for CHD in the next 10 years based on multivariable equations that include a number of established risk factors. These risk equations have face validity and provide excellent discrimination of high-risk (20% or greater), intermediate-risk (10% to 20%), and low-risk (less than 10%) individuals. Their calibration may vary depending on differences in event rates and prevalence of risk factors between the population from which the equations were derived and the population in which they are being utilized. Limited data indicate that the use of these risk equations improves outcomes[45,46]; this area of research requires further study. Furthermore, most risk equations focus on 10-year risk, whereas it is increasingly recognized that risk for CHD occurs over one's lifespan, and low 10-year predicted risk in a young person may not indicate low lifetime risk.[14] Indeed, 10-year risk estimates are universally low, even in the face of significant risk factor burden,[47–49] in younger men (younger than 35 years of age) and women (younger than 45 years of age). Therefore, several panels[25,27] have recommended consideration of long-term or lifetime risk estimates for younger individuals to help emphasize the importance of early positive lifestyle changes. Lifetime risks may be estimated for individuals 50 years of age or younger with a published simple risk factor stratification scheme.[14]

A number of 10-year risk scores are currently available. Of these, the 1998 Framingham Risk Score[50] has been assessed and validated in the broadest range of populations and has the most years of follow-up. A modification of this risk score was adopted by the third Adult Treatment Panel of the National Cholesterol Education Program for risk assessment for the end point of nonfatal myocardial infarction or coronary death. A newer version of Framingham 10-year risk scores was published recently[51] with the added utility of prediction of 10-year global CVD risk and specific CVD end points (CHD, stroke, heart failure, and peripheral arterial disease). Although the Writing Committee recommends that documentation of the Framingham 10-year risk estimate be the preferred method of assessing compliance with this measure (Appendix F), the use of another risk score is also acceptable if it is relevant to the patient/population. The Adult Treatment Panel III global risk estimates are for hard CHD (fatal CHD or nonfatal myocardial infarction, but excluding angina pectoris), whereas the 1998 Framingham scores that are provided in Appendix F are for total CHD (including angina pectoris), although hard CHD risks can also be derived. The European SCORE (Systematic Coronary Risk Evaluation)[52] estimates fatal CVD risk, whereas the Reynolds Risk Score[53] estimates women's risk for CVD including stroke and revascularization.

4.9. Stroke Risk Assessment

Global risk assessment tools such as the Framingham Stroke Profile for first stroke are also available. Although they have

not been validated as widely as the Framingham CHD risk assessment tool, external validity has been demonstrated in European cohorts.[54–59] On the other hand, the global risk assessment for CHD is widely used and has been adopted in the Adult Treatment Panel III guideline. Although the calculations differ, patients at higher CHD risk will also be at higher risk for stroke. At this time, we recommend use of a global risk assessment tool for CHD or CVD. Consideration may also be given to use of the recent Framingham global CVD risk scores and the stroke-specific score.[51,54,60,61]

4.10. Aspirin Use

Although the benefits of aspirin therapy to prevent myocardial infarction, stroke, and vascular disease death in men and women with established CVD are well known, the use of aspirin in primary prevention is less clear. Among men and women without CVD, there has been little or no benefit for aspirin in reducing CVD death or all-cause death.[62] In a recent meta-analysis of primary prevention studies, there was a significant 12% relative risk reduction in CVD events with aspirin, which was similar across CHD risk categories.[62] Another meta-analysis of individuals without established disease reported a sex-specific reduction in cardiovascular events.[63] Aspirin reduced the risk of myocardial infarction in men and the risk of stroke in women; however, aspirin significantly increased the risk of bleeding in both men and women.[64] Aspirin did not reduce the risk of cardiovascular disease in Japanese patients with diabetes in the primary prevention setting unless they were 65 years of age or older.[65] The use of aspirin for prevention of CVD in patients with diabetes mellitus or peripheral arterial disease remains unclear.[63,65] Thus, in patients without cardiovascular disease, the benefit-risk ratio for aspirin should be carefully weighed since these patients are at lower baseline CVD than patients with known atherosclerotic disease and aspirin increases the risk of bleeding (gastrointestinal bleeding and hemorrhagic stroke). The updated US Preventive Services Task Force statement provides an algorithm that clinicians may sue to assess the potential benefits and risks of aspirin therapy.[23]

The Writing Committee discussed using an age cut point however, because the clinical trial data that examined the use of aspirin for primary prevention according to age cut points were based on subgroup analysis, with fewer events occurring in younger individuals, rather than an effect modification by age, the committee preferred to tailor the use of aspirin according to level of CHD risk, consistent with current guideline recommendations. Recent data suggests that those at highest risk (eg, CHD risk of 20% or greater) may benefit most in terms of absolute risk reduction with aspirin as their absolute risk is high, although they are also at higher risk of bleeding.[62]

Available evidence, primarily from secondary prevention studies, shows that low-dose aspirin (75 to 81 mg/d) is adequate to fully inhibit platelet aggregation, although doses of 81 to 325 mg/d are typically prescribed.[66] Higher doses of aspirin are associated with an increased risk of bleeding. Guidelines differ in aspirin dose recommendations for primary prevention (81 to 325 mg/d); however, all 3 guidelines[22,23,25] agree that aspirin is recommended for patients at high risk for CHD. Healthcare providers should consider documenting adverse effects, for example, bleeding complications, with respect to aspirin dose.

4.11. Diabetes Mellitus

There is increased risk of developing CHD and stroke in both type 1 and type 2 diabetes mellitus. However, opinions are divided as to whether they should be considered as CHD risk equivalents. We believed the available evidence favored classifying diabetes as a risk factor rather than as a CHD equivalent.[67,68]

The literature on the effects of blood glucose control on risk of developing CHD is mixed. There is strong evidence that tight control of glucose in type 1 diabetes mellitus reduces the risk of developing nonfatal myocardial infarction, stroke, and CVD by up to 57%.[69] The evidence for the effectiveness of tight glucose control with regard to primary CVD prevention is negative for type 2 diabetes mellitus and may even be associated with increased risk.[70–73] We therefore elected not to develop performance measures for diabetes, particularly in light of the fact that the National Diabetes Quality Improvement Alliance has already developed such measures.[74] There is very compelling evidence in studies of patients with type 2 diabetes mellitus that tight control of blood pressure and of blood cholesterol significantly reduces the risk of developing CHD.

4.12. Dietary Supplementation

Because of the lack of an established evidence base supporting a primary prevention benefit for antioxidant vitamins, folic acid, coenzyme Q, fish oil capsules, and so on, these were not included in these performance measures.

5. Conclusions

We believe that these measures will provide a useful tool for the shared goal of improving care in the critical arena of primary prevention of CVD. Cardiac risk factor reduction has the added benefit of promoting overall good health, in addition to cardiovascular health. Current federal mandates have made prevention a priority area in health care, recognizing the pivotal role of prevention in good health. We hope that these ACCF/AHA metrics and discussion will help the nation achieve our goal of improving health and health care for all Americans.

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Appendix A

Author Relationships With Industry and Other Entities—ACCF/AHA 2009 Performance Measures for Primary Prevention of Cardiovascular Disease in Adults

Name	Research Grant	Speakers' Bureau/Honoraria/Expert Witness	Stock Ownership/Equity Interests	Consultant/Advisory Board/Steering Committee	Institutional, Organizational or Other Financial Benefit
Dr Rita F. Redberg	None	None	None	None	None
Dr Emelia J. Benjamin	None	None	None	None	None
Dr Vera Bittner	• Atherogenics* • CV Therapeutics* • Merck* • NIH/Abbott joint effort* • Pfizer* • Roche*	None		• Novartis • CV Therapeutics • Reliant Pharmaceuticals • Pfizer	None
Dr Lynne T. Braun	None	• diaDexus • AstraZeneca	None	None	None
Dr David C. Goff, Jr	• Merck*	• Scientific Evidence, Inc*	None	None	• Pfizer • St Jude Medical
Dr Stephen Havas	None	None	None	None	None
Dr Darwin R. Labarthe	None	None	None	None	None
Dr Marian C. Limacher	• Orexigen Therapeutics*	None	None	None	None
Dr Donald M. Lloyd-Jones	None	• Abbott • Merck • Pfizer	None	None	None
Dr Samia Mora	• Merck* • AstraZeneca*	• Pfizer	None	None	None
Dr Thomas A. Pearson	• Sanofi-aventis	• Bayer* • Johnson & Johnson/Merck • Kos Pharmaceuticals • Pfizer • Merck/Schering-Plough • Sanofi-aventis	None		None
Dr Martha J. Radford	None	None	None	None	None
Dr Gerald W. Smetana	None	None	• SafeMed	• Harvard Medical International/Novartis • Pharma Schweiz CME course director	None
Dr John A. Spertus	• BMS/Sanofi-aventis Partnership* • Lilly* • Amgen*	None	• PRISM Technology • CV Outcomes, Inc • Outcomes Instruments, LLC* • Health Outcomes Sciences, LLC • SAQ (copyright)* • KCCQ (copyright)* • PAQ (copyright)*	None	None
Dr Erica W. Swegler	None	• Abbott	None	None	None

CME indicates continuing medical education; KCCQ, Kansas City Cardiomyopathy Questionnaire; NIH, National Institutes of Health; PAQ, personal assessment questionnaire; and SAQ, Seattle Angina Questionnaire.

This table represents the relationships of committee members with industry and other entities that were reported by the authors as relevant to this topic during the document development process. It does not necessarily reflect relationships with industry at the time of publication. A person is deemed to have a significant interest in a business if the interest represents ownership of 5% or more of the voting stock or share of the business entity, or ownership of $10 000 or more of the fair market value of the business entity; or if funds received by the person from the business entity exceed 5% of the person's gross income for the previous year. A relationship is considered to be modest if it is less than significant under the preceding definition. Relationships in this table are modest unless otherwise noted.

*Significant (greater than $10 000) relationship.

Appendix B

Peer Reviewer Relationships With Industry and Other Entities—ACCF/AHA 2009 Performance Measures for Primary Prevention of Cardiovascular Disease in Adults

Name	Representation	Research Grant	Speakers' Bureau/Honoraria/Expert Witness	Stock Ownership/ Equity Interests	Consultant/Advisory Board/Steering Committee	Institutional, Organizational, or Other Financial Benefit
Dr Gerald Fletcher	Official reviewer—AHA	None	None	None	None	None
Dr Lee Green	Official reviewer—ACCF/AHA Task Force on Performance Measures: Lead reviewer	None	None	None	None	None
Dr Laura Hayman	Official reviewer—AHA	None	None	None	None	None
Dr Chittur A. Sivaram	Official reviewer—ACCF Board of Governors	None	• ATS*	None	None	None
Dr Janet Wright	Official reviewer—ACCF Board of Trustees	None	None	None	None	None
Dr Roger Blumenthal	Content reviewer—ACCF Prevention of Cardiovascular Disease Committee	• General Electric (fellowship support)	None	None	None	None
Dr C. Annette DuBard	Content reviewer—individual	None	None	None	None	None
Dr JoAnne M. Foody	Content reviewer—individual	None	• Merck • Pfizer • Novartis • Sanofi-aventis	None	None	None
Dr Patrick McBride	Content reviewer—ACCF Prevention of Cardiovascular Disease Committee	None	• Reliant • Johnson & Johnson	None	None	None

ACC indicates American College of Cardiology; ACCF, American College of Cardiology Foundation; and AHA, American Heart Association.

This table represents the relationships of peer reviewers with industry and other entities that were reported as relevant to this topic during the document development process. It does not necessarily reflect relationships at the time of publication. Names are listed in alphabetical order within each category of review. Participation in the peer review process does not imply endorsement of this document. A person is deemed to have a significant interest in a business if the interest represents ownership of 5% or more of the voting stock or share of the business entity, ownership of $10 000 or more of the fair market value of the business entity, or if funds received by the person from the business entity exceed 5% of the person's gross income for the previous year. A relationship is considered to be modest if it is less than significant under the preceding definition. Relationships in this table are modest unless otherwise noted.

*Significant (greater than $10 000) relationship.

Appendix C

Sample Performance Measure Survey Form and Exclusion Criteria Definitions

Part I: Sample Survey Form

	PERFORMANCE MEASURE SURVEY Please see the definition for each of the criteria below in the enclosed Performance Measure Survey Guide. Indicate your selection by marking X in the appropriate field										
AHA Primary Prevention GUIDELINE RECOMMEN-DATIONS	**A. Insufficient evidence**	**B. Uninter-pretable**	**C. Not actionable**	**D. Unclear patient population**	**E. Not clinically meaningful**	**F. Uncertain feasibility due to data collection effort**	**G. Uncertain feasibility due to cost of data collection**	**H. Uncertain data collection period**	**Other, specify**	**Potential measure? Y/N/ Other**	**Comment**
Recommenda-tion from guideline to be considered as potential measure											
Example: Smoking status, diet, alcohol intake, and physical activity should be assessed at every routine evaluation.											

Appendix C

Sample Performance Measure Survey Form and Exclusion Criteria Definitions

Part II: Exclusion Criteria Definitions

Potential Challenge to Implementation	Considerations
Useful in improving patient outcomes	
1. Insufficient evidence: The scientific basis for the recommendation is not well established.	Considering level of evidence, mark this as a potential challenge to implementation if you believe it is inappropriate to consider as a potential performance measure.
2. Not interpretable: The results of the (potential) measure are not interpretable by practitioners	This is your assessment of the degree to which a provider can clearly understand what the results of a measure based on this recommendation mean and can take action if necessary.
3. Not actionable: The recommendation addresses an area that is not under the practitioner's control.	This is your assessment of the degree to which a provider is empowered and can influence the activities of the healthcare system toward improvement.
Measure design	
4. Unclear patient population	This is your assessment of whether the patient group to whom this recommendation applies (denominator) can be explicitly defined using criteria that are clinically meaningful.
5. Not clinically meaningful	The recommendation does not capture clinically meaningful aspects of care.
6. Uncertain reliability across settings	The recommendation is not likely to be applicable across organizations and delivery settings.
Measure implementation	
7. Uncertain feasibility due to data collection effort: The data required to measure successful implementation of the recommendation cannot be obtained with reasonable effort.	From your perspective, the required data typically can be abstracted from patient charts, or there are national registries or other databases readily available.
8. Uncertain feasibility due to cost of data collection: The data required to measure successful implementation of the recommendation cannot be obtained at reasonable cost.	
9. Uncertain data collection period: The data required to measure successful implementation of the recommendation cannot be obtained within the period allowed for data collection.	
Overall assessment	
10. Overall assessment: Considering your assessment of this recommendation on all dimensions above, rate this recommendation for inclusion in the ACCF/AHA Primary Prevention of Cardiovascular Disease Performance Measure set.	Consider a balance in the continuum of care. Consider overall purpose of the measurement set and the intended user. On the survey form enter: **YES:** This recommendation **should** be considered for further development into a performance measure and inclusion in the ACCF/AHA Primary Prevention of Cardiovascular Disease Performance Measure set. or **NO:** This recommendation should **not** be considered for further development into a performance measure or inclusion in the ACCF/AHA Primary Prevention of Cardiovascular Disease Performance Measure set.

Appendix D
ACCF/AHA 2009 Primary Prevention of Cardiovascular Disease

Performance Measurement Set Specifications

1. Lifestyle/Risk Factor Screening

Assessment of lifestyles and risk factors for development of cardiovascular disease (CVD)

Numerator	**Accountability/Public Reporting:**	**Internal Quality Improvement:**
	Patients for whom assessment of diet and physical activity is documented *at least once* in the past 2 years. Assessment should include *both* of the following: 1) Diet: Include any documentation that diet was assessed. 2) Physical Activity: Include any documentation that level of activity was assessed.	Patients for whom assessment of diet, physical activity, alcohol consumption AND family history of CHD in first-degree relatives (with age at onset) is documented *at least once* in the past 2 years. For internal quality improvement, providers may wish to consider that assessment should include the following: 1) Diet, **AND** 2) Physical Activity: Intensity, frequency, and duration of exercise to allow physician to determine whether the guideline goal of at least 30 minutes of moderate-intensity activity (eg, brisk walking) on most days of the week is being met, **AND** 3) Family history of premature CHD: CHD in male first-degree relative <55 years of age; CHD in female first-degree relative <65 years of age 4) *(Optional)* Alcohol consumption: Number of drinks per day and number of days per week to determine whether goal of no more than 1 drink a day for women and no more than 2 drinks a day for men is being met. The intent is to identify patients who are drinking too much.
Denominator	**Accountability/Public Reporting:**	**Internal Quality Improvement:**
	All patients 18 to 80 years of age at the start of the measurement period.	All patients ≥18 years of age at the start of the measurement period.
Period of Assessment	Two-year measurement period	
Sources of Data	Prospective flow sheet, retrospective medical record review, electronic medical record	

Rationale

Observational studies have shown important associations between diet and physical activity and health outcomes, including total mortality, CVD, and cancer. Clinical trials have demonstrated that changes in diet that result in weight loss or modification of certain dietary components (eg, sodium intake), increases in physical activity, and moderation of alcohol use can have very favorable benefits in reducing or controlling risk factor levels, such as reduction of blood pressure or delaying onset of diabetes. Family history of premature CVD is a risk factor for development of CVD in offspring, independent of potentially shared risk factors. Premature onset of CVD in first-degree relatives may also be an indicator of genetic disorders, such as familial hypercholesterolemia. Assessment of these factors is an important step in understanding a patient's global CVD risk and overall health.

Clinical Recommendation(s)

AHA Guidelines for Primary Prevention of Cardiovascular Disease and Stroke: 2002 Update[22]
Goal: Adults should know the levels and significance of risk factors as routinely assessed by their primary care provider.
Recommendations: Risk factor assessment in adults should begin at age 20 years. Family history of CHD should be regularly updated. Smoking status, diet, alcohol intake, and physical activity should be assessed at every routine evaluation. Blood pressure, body mass index, waist circumference, and pulse (to screen for atrial fibrillation) should be recorded at each visit (at least every 2 years). Fasting

serum lipoprotein profile (or total and HDL cholesterol if fasting is unavailable) and fasting blood glucose should be measured according to patient's risk for hyperlipidemia and diabetes, respectively (at least every 5 years; if risk factors are present, every 2 years).

AHA Scientific Statement: Diet and Lifestyle Recommendations Revision 2006[77]

AHA 2006 diet and lifestyle recommendations for cardiovascular disease risk reduction:

- Balance calorie intake and physical activity to achieve or maintain a healthy body weight.
- Consume a diet rich in vegetables and fruits.
- Choose whole-grain, high-fiber foods.
- Consume fish, especially oily fish, at least twice a week.*
- Limit your intake of saturated fat to <7% of energy, *trans* fat to <1% of energy, and cholesterol to <300 mg/d by choosing lean meats and vegetable alternatives; selecting fat-free (skim), 1%-fat, and low-fat dairy products; and minimizing intake of partially hydrogenated fats.
- Minimize your intake of beverages and foods with added sugars.
- Choose and prepare foods with little or no salt.
- If you consume alcohol, do so in moderation.
- When you eat food that is prepared outside of the home, follow the AHA diet and lifestyle recommendations.

American College of Sports Medicine/AHA: Physical Activity and Public Health: Updated Recommendation for Adults[78]

To promote and maintain health, all healthy adults age 18 to 65 years need moderate-intensity aerobic physical activity for a minimum of 30 minutes on 5 days each week or vigorous-intensity aerobic activity for a minimum of 20 minutes on 3 days each week (*Class I, Level of Evidence A*). Also, combinations of moderate- and vigorous-intensity activity can be performed to meet this recommendation (*Class IIa, Level of Evidence B*).

AHA Guideline: Evidence-Based Guidelines for Cardiovascular Disease Prevention in Women: 2007 Update[25]

Dietary intake: Women should consume a diet rich in fruits and vegetables; choose whole-grain, high-fiber foods; consume fish, especially oily fish,* at least twice a week; limit intake of saturated fat to <10% of energy, and if possible to <7%, cholesterol to <300 mg/d, alcohol intake to no more than 1 drink per day, and sodium intake to <2.3 g/d (approximately 1 tsp salt). Consumption of *trans*-fatty acids should be as low as possible (eg, <1% of energy) *(Class I, Level of Evidence B)*.

Physical activity: Women should accumulate a minimum of 30 minutes of moderate-intensity physical activity (eg, brisk walking) on most, and preferably all, days of the week *(Class I, Level of Evidence B)*.

US Department of Health and Human Services and US Department of Agriculture: Dietary Guidelines for Americans, 2005[79]

Weight management:

- To maintain body weight in a healthy range, balance calories from foods and beverages with calories expended.
- To prevent gradual weight gain over time, make small decreases in food and beverage calories and increase physical activity.

Physical activity:

- Engage in regular physical activity and reduce sedentary activities to promote health, psychological well-being, and a healthy body weight.
  - To reduce the risk of chronic disease in adulthood: Engage in at least 30 minutes of moderate-intensity physical activity, above usual activity, at work or home on most days of the week.
  - For most people, greater health benefits can be obtained by engaging in physical activity of more vigorous intensity or longer duration.
  - To help manage body weight and prevent gradual, unhealthy body weight gain in adulthood: Engage in approximately 60 minutes of moderate- to vigorous-intensity activity on most days of the week while not exceeding caloric intake requirements.
  - To sustain weight loss in adulthood: Participate in at least 60 to 90 minutes of daily moderate-intensity physical activity while not exceeding caloric intake requirements. Some people may need to consult with a healthcare provider before participating in this level of activity.
- Achieve physical fitness by including cardiovascular conditioning, stretching exercises for flexibility, and resistance exercises or calisthenics for muscle strength and endurance.

Alcoholic beverages:

- Those who choose to drink alcoholic beverages should do so sensibly and in moderation—defined as the consumption of up to 1 drink per day for women and up to 2 drinks per day for men.
- Alcoholic beverages should not be consumed by some individuals, including those who cannot restrict their alcohol intake, women of childbearing age who may become pregnant, pregnant and lactating women, children and adolescents, individuals taking medications that can interact with alcohol, and those with specific medical conditions.
- Alcoholic beverages should be avoided by individuals engaging in activities that require attention, skill, or coordination, such as driving or operating machinery.

Method of Reporting

Per Patient:
Documentation that all of the specified risk factors were assessed.

Per Patient Population:
Percentage of patients assessed for all of the specified risk factors.

Challenges to Implementation

- Patient self-report of dietary habits, physical activity, and alcohol consumption, as well as of family history of CVD, is potentially unreliable. Nonetheless, assessment and documentation of these factors are an important means to helping patient and provider understand the patient's risk for CVD, beginning dialogue regarding healthy lifestyle choices, and providing specific counseling regarding these factors to lower overall risk.
- There is no agreement on what constitutes adequate documentation of diet, physical activity, and alcohol use. Practitioners should strive to capture the healthy and unhealthy aspects of the patient's habits to provide counseling and observe change over time.
- Sample sizes may preclude reporting of reliable performance estimates, particularly at the clinician level.

*This diet offers an additional nutritional approach to preventing and treating hypertension. This dietary recommendation would not apply to patients who are vegetarians.

2. Dietary Intake Counseling

Counseling to eat a healthy diet

Numerator	**Accountability/Public Reporting and Internal Quality Improvement** Patients who were advised to eat a healthy diet at least once in the past 2 years. Examples of documentation that the patient was advised to eat a healthy diet, including, but not limited to, *any* of the following: ▪ Eating a variety of fruits, vegetables, grains, low-fat or nonfat dairy products, fish, legumes, poultry, and lean meats ▪ Limiting salt/sodium intake ▪ Referral to nutritionist or dietician ▪ Reinforce healthy eating plan/nutrition goals initiated by registered dietician ▪ Weight reduction ▪ Reducing saturated fats ▪ Diet discussed with patient and literature/brochure provided ▪ Limiting alcohol intake (no more than 2 drinks a day for men and no more than 1 drink a day for women) ▪ DASH diet* ▪ Reducing concentrated carbohydrates or high sugar foods
Denominator	**Accountability/Public Reporting and Internal Quality Improvement** All patients 18 to 80 years of age at the start of the measurement period.
Period of Assessment	Two-year measurement period
Sources of Data	Prospective flow sheet, retrospective medical record review, electronic medical record

Rationale

Virtually all organizations related to prevention of heart disease, stroke, and other chronic dietary-related diseases (diabetes, cancer, obesity) recommend counseling pertaining to consumption of a healthy eating pattern. Of note, the US Preventive Services Task Force (USPSTF) does not recommend universal counseling in primary care settings, but rather only in patients with hyperlipidemia and other known risk factors for cardiovascular and diet-related conditions. Given the small proportion of the population that has been demonstrated to be at low risk (~10% in the Nurses Health Study), the net effect is to support near-universal counseling.

Clinical Recommendation(s)

AHA Guidelines for Primary Prevention of Cardiovascular Disease and Stroke: 2002 Update[22]
Advocate consumption of a variety of fruits, vegetables, grains, low-fat or nonfat dairy products, fish, legumes, poultry, and lean meats. Match energy intake with energy needs and make appropriate changes to achieve weight loss when indicated. Modify food choices to reduce saturated fats (<10% of calories), cholesterol (<300 mg/d), and *trans*-fatty acids by substituting grains and unsaturated fatty acids from fish, vegetables, legumes, and nuts. Limit salt intake to <6 g/d. Limit alcohol intake (≤2 drinks/d in men; ≤1 drink/d in women) among those who drink.

AHA Scientific Statement: Diet and Lifestyle Recommendations Revision 2006[77]
AHA 2006 diet and lifestyle recommendations for cardiovascular disease risk reduction:
- Balance calorie intake and physical activity to achieve or maintain a healthy body weight.
- Consume a diet rich in vegetables and fruits.
- Choose whole-grain, high-fiber foods.
- Consume fish, especially oily fish, at least twice a week.†
- Limit your intake of saturated fat to <7% of energy, *trans* fat to <1% of energy, and cholesterol to <300 mg/d by choosing lean meats and vegetable alternatives; selecting fat-free (skim), 1%-fat, and low-fat dairy products; and minimizing intake of partially hydrogenated fats.
- Minimize your intake of beverages and foods with added sugars.
- Choose and prepare foods with little or no salt.
- If you consume alcohol, do so in moderation.
- When you eat food that is prepared outside of the home, follow the AHA diet and lifestyle recommendations.

US Department of Health and Human Services and US Department of Agriculture: Dietary Guidelines for Americans, 2005[79]
- Consume less than 2,300 mg (approximately 1 tsp of salt) of sodium per day.
- Choose and prepare foods with little salt. At the same time, consume potassium-rich foods, such as fruits and vegetables.
- Individuals with hypertension, blacks, and middle-aged and older adults. Aim to consume no more than 1,500 mg of sodium per day, and meet the potassium recommendation (4700 mg/d) with food.

The Guide to Clinical Preventive Services 2005: Recommendations of the USPSTF[23]
The USPSTF concludes that the evidence is insufficient to recommend for or against routine behavioral counseling to promote a healthy diet in unselected patients in primary care settings. *Rating: I Recommendation.*
The USPSTF recommends intensive behavioral dietary counseling for adult patients with hyperlipidemia and other known risk factors for cardiovascular and diet-related chronic disease. Intensive counseling can be delivered by primary care clinicians or by referral to other specialists, such as nutritionists or dietitians. *Rating: B Recommendation.*

Method of Reporting

Per Patient:
Whether or not patient was counseled about diet 1 or more times.

Per Patient Population:
Percentage of patients counseled about diet 1 or more times during the 2-year measurement period.

Challenges to Implementation

- Clinicians contend that they provide more dietary counseling than they document in the medical record.
- Unclear documentation of quality of dietary counseling.
- Variability in actual quality of dietary counseling.
- Sample sizes may preclude reporting of reliable performance estimates, particularly at the clinician level.

*Dietary Approaches to Stop Hypertension: A diet rich in fruits, vegetables, and low-fat dairy foods and with reduced saturated and total fat can substantially lower blood pressure. This diet offers an additional nutritional approach to preventing and treating hypertension.[80,81] †This dietary recommendation would not apply to patients who are vegetarians.

3. Physical Activity Counseling

Counseling to engage in regular physical activity

Numerator	**Accountability/Public Reporting and Internal Quality Improvement** Patients who were advised at least once within the past 2 years to engage in regular physical activity, for example, moderate-intensity aerobic physical activity for a minimum of 30 minutes on 5 days each week or vigorous-intensity aerobic activity for a minimum of 20 minutes on 3 days each week.
Denominator	**Accountability/Public Reporting and Internal Quality Improvement** All patients 18 to 80 years of age at the start of the measurement period. **Excluded Populations:** Medical reasons(s) documented by a physician, nurse practitioner, or physician assistant for not providing physical activity counseling; for example, patients who have signs/symptoms of cardiovascular disease (may require exercise test and precise exercise prescription), unstable pulmonary or metabolic disease, or disability that prohibits moderate-intensity physical activity.
Period of Assessment	Two-year measurement period
Sources of Data	Prospective flow sheet, retrospective medical record review, electronic medical record

Rationale

Participation in regular physical activity prevents the development of CHD and reduces risk factors associated with CHD, such as hypertension, type 2 diabetes mellitus, and obesity.

Clinical Recommendation(s)

AHA Guidelines for Primary Prevention of Cardiovascular Disease and Stroke: 2002 Update[22]
Goal: At least 30 minutes of moderate-intensity physical activity on most (and preferably all) days of the week.

Evidence-Based Guidelines for Cardiovascular Disease Prevention in Women: 2007 Update[25]
Women should accumulate a minimum of 30 minutes of moderate-intensity physical activity (eg, brisk walking) on most, and preferably all, days of the week (*Class I, Level of Evidence B*).
Women who need to lose weight or sustain weight loss should accumulate a minimum of 60 to 90 minutes of moderate-intensity physical activity (eg, brisk walking) on most, and preferably all, days of the week (*Class I, Level of Evidence C*).

American College of Sports Medicine/AHA: Physical Activity and Public Health: Updated Recommendation for Adults[78]
To promote and maintain health, all healthy adults age 18 to 65 years need moderate-intensity aerobic physical activity for a minimum of 30 minutes on 5 days each week or vigorous-intensity aerobic activity for a minimum of 20 minutes on 3 days each week (*Class I, Level of Evidence A*). Also, combinations of moderate- and vigorous-intensity activity can be performed to meet this recommendation (*Class IIa, Level of Evidence B*).

Physical Activity and Health: A Report of the US Surgeon General[82]
Adults should engage in vigorous physical activity ≥3 days per week for ≥20 minutes per occasion.

US Department of Health and Human Services and US Department of Agriculture: Dietary Guidelines for Americans, 2005[79]

- Engage in regular physical activity and reduce sedentary activities to promote health, psychological well-being, and a healthy body weight.
  - To reduce the risk of chronic disease in adulthood: Engage in at least 30 minutes of moderate-intensity physical activity, above usual activity, at work or home on most days of the week.
  - For most people, greater health benefits can be obtained by engaging in physical activity of more vigorous intensity or longer duration.
  - To help manage body weight and prevent gradual, unhealthy body weight gain in adulthood: Engage in approximately 60 minutes of moderate- to vigorous-intensity activity on most days of the week while not exceeding caloric intake requirements.
  - To sustain weight loss in adulthood: Participate in at least 60 to 90 minutes of daily moderate-intensity physical activity while not exceeding caloric intake requirements. Some people may need to consult with a healthcare provider before participating in this level of activity.
- Achieve physical fitness by including cardiovascular conditioning, stretching exercises for flexibility, and resistance exercises or calisthenics for muscle strength and endurance.

Method of Reporting

Per patient:
Whether or not patient counseling was provided.

Per patient population:
Percentage of patients who were provided with physical activity counseling during 1 or more visits.

Challenges to Implementation

- Lack of chart documentation of physical activity counseling.
- Sample sizes may preclude reporting of reliable performance estimates, particularly at the clinician level.

4. Smoking/Tobacco Use

Risk assessment for smoking and tobacco use behaviors

Numerator	**Accountability/Public Reporting**	**Internal Quality Improvement**
	Patients who were queried about tobacco use 1 or more times in the past 2 years.[83]	Patients who were queried about tobacco use **AND** exposure to secondhand smoke 1 or more times in the past 2 years.
Denominator	**Accountability/Public Reporting and Internal Quality Improvement**	
	All patients 18 years of age and over at the start of the measurement period[83] **Excluded Populations:** Documented lifelong nonsmokers **NOTE:** Lifelong nonsmoker is defined as those >35 years of age who are not current smokers and who have smoked <100 cigarettes in their lifetime.	
Period of Assessment	Two-year measurement period	
Sources of Data	Prospective flow sheet, retrospective medical record review, electronic medical record	

Rationale

Virtually all healthcare organizations, including the AHA, ACCF, US Department of Health and Human Services, Public Health Service, and USPSTF guidelines, recommend periodic screening for tobacco use for all patients.

Clinical Recommendation(s)

AHA Guidelines for Primary Prevention of Cardiovascular Disease and Stroke: 2002[22]
Goal: Complete cessation. No exposure to environmental tobacco smoke.
Recommendation: Ask about tobacco use status at every visit.

USPSTF[23]
Strongly recommends that clinicians screen all adults for tobacco use. *Grade: A Recommendation.*

Method of Reporting

Per Patient:
Whether or not patient was queried about tobacco use 1 or more times.[83]

Per Patient Population:
Percentage of patients queried about tobacco use 1 or more times during the 2-year measurement period.[83]

Challenges to Implementation

- Research surveying patients supports clinicians' contention that clinicians provide more tobacco counseling than they document in the medical record. Electronic medical records were not associated with significantly better documentation of tobacco counseling.[84]
- Sample sizes may preclude reporting of reliable performance estimates, particularly at the clinician level.

5. Smoking/Tobacco Cessation

Cessation Intervention for Active Smoking (Tobacco Use)

Numerator	**Accountability/Public Reporting or Internal Quality Improvement**
	Patients identified as tobacco users who received cessation intervention.[83] Cessation intervention may include smoking cessation counseling (eg, verbal advice to quit, referral to smoking cessation program or counselor) and/or pharmacological therapy. The type of intervention should be captured explicitly.
Denominator	**Accountability/Public Reporting and Internal Quality Improvement**
	All patients ≥18 years of age at the start of the measurement period identified as tobacco users.[83]
Period of Assessment	Two-year measurement period
Sources of Data	Prospective flow sheet, retrospective medical record review, electronic medical record

Rationale

- Virtually all healthcare organizations, including the AHA, ACCF, US Department of Health and Human Services, Public Health Service, and USPSTF guidelines, recommend counseling for tobacco cessation and avoidance of secondhand smoke exposure for all patients who smoke cigarettes, use tobacco products, or have secondhand smoke exposure.
- In the United States, the smoking prevalence in 2005 was 20.9% of adults.[85] It is estimated that smoking causes approximately 440 000 deaths in the United States annually,[86] which makes smoking one of the leading causes of preventable death.
- A systematic review of randomized trials of medical practitioner smoking cessation advice demonstrates that compared with no advice, brief advice significantly increased the odds of smokers quitting (odds ratio 1.74, 95% confidence interval 1.48 to 20.5).[87]
- Systematic reviews reveal that pharmacological treatments, including antidepressant medications (bupropion)[88] and nicotine partial antagonist treatments (varenicline),[89] significantly improve smoking cessation.

Clinical Recommendation(s)

AHA Guidelines for Primary Prevention of Cardiovascular Disease and Stroke: 2002[22]
Goal: Complete cessation.
Recommendation: In a clear, strong, and personalized manner, advise every tobacco user to quit. Assess the tobacco user's willingness to quit. Assist by counseling and developing a plan for quitting. Arrange follow-up, referral to special programs, or pharmacotherapy.

USPSTF[23]
Strongly recommends that clinicians … provide tobacco cessation interventions for those who use tobacco products. *Grade: A Recommendation.*

Method of Reporting

Per patient:
Whether or not a patient identified as a tobacco user received cessation intervention[83] and type of cessation intervention that was provided, as documented in the medical record.

Per Patient Population:
Percentage of patients identified as tobacco users who received cessation intervention[83] and a breakdown of the type of cessation intervention that was provided, as documented in the medical record.

Challenges to Implementation

- Documentation of provider smoking cessation counseling has not been tightly correlated with actual downstream patient smoking cessation rates.[90]
- More research is needed to improve the effectiveness of smoking cessation strategies in individuals with coexisting diseases.[91]
- Tools to improve documentation of smoking counseling are needed.[84]
- Reimbursement for smoking cessation counseling and treatments is not always available.
- Sample sizes may preclude reporting of reliable performance estimates, particularly at the clinician level.

6. Weight/Adiposity Assessment

Measurement of weight and body mass index and/or waist circumference

Numerator	**Accountability/Public Reporting or Internal Quality Improvement** Patients for whom weight and body mass index (BMI) and/or waist circumference is documented at least once in the past 2 years. **NOTES:** ▪ BMI is calculated as weight (kg)/height squared (m^2). ▪ If patient weighs >350 lb or exceeds the capacity of the scale available, BMI should be recorded as >40 kg/m^2. ▪ See Appendix G for instructions for measuring waist circumference. ▪ See Appendix H for sample BMI table.
Denominator	**Accountability/Public Reporting and Internal Quality Improvement** All patients 18 to 80 years of age at the start of the measurement period with at least 2 visits during the 2-year measurement period. **Excluded Populations:** ▪ Medical reasons(s) documented by a physician, nurse practitioner, or physician assistant that height and/or weight and waist circumference could not be measured. For example, patient is confined to wheelchair and unable to be measured with available equipment. ▪ Documented patient reason(s) that height and/or weight and waist circumference could not be measured. For example, patient refuses.
Period of Assessment	Two-year measurement period
Sources of Data	Prospective flow sheet, retrospective medical record review, electronic medical record

Rationale

BMI and abdominal adiposity (estimated by waist circumference) are correlated with morbidity and mortality related to cardiovascular disease. Assessment of each is needed to assess the degree of overweight and obesity and to guide the efficacy of weight loss management.

Clinical Recommendation(s)

AHA Guidelines for Primary Prevention of Cardiovascular Disease and Stroke: 2002 Update[22]
Goal: Achieve and maintain desirable weight (BMI 18.5–24.9 kg/m^2).
Recommendation: When body mass index is ≥25 kg/m^2, waist circumference at iliac crest level ≤40 inches in men or ≤35 inches in women, initiate weight-management program through caloric restriction and increased caloric expenditure as appropriate. For overweight/obese persons, reduce body weight by 10% in first year of therapy.

NHLBI Obesity Education Initiative Expert Panel on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults. Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults—The Evidence Report[92]

- Practitioners should use the BMI to assess overweight and obesity. Body weight alone can be used to follow weight loss, and to determine efficacy of therapy. *Evidence Category C.*
- The BMI should be used to classify overweight and obesity and to estimate relative risk of disease compared to normal weight. *Evidence Category C.*
- The waist circumference should be used to assess abdominal fat content. *Evidence Category C.*

For adult patients with a BMI of 25 to 34.9 kg/m^2, sex-specific waist circumference cutoffs should be used in conjunction with BMI to identify increased disease risks. *Evidence Category C.*

Method of Reporting

Per Patient:
Whether or not weight and BMI and/or waist circumference is documented at least once in the past 2 years.

Per Patient Population:
Percentage of patients for whom weight and BMI and/or waist circumference is documented at least once in the past 2 years.

Challenges to Implementation

- Many office practices may not yet have routine procedures in place to measure height, weight, and waist circumference and to calculate or record BMI. BMI tables or calculators may not be readily available.
- Sample sizes may preclude reporting of reliable performance estimates, particularly at the clinician level.

7. Weight Management

Counseling to achieve and maintain ideal body weight

Numerator	**Accountability/Public Reporting and Internal Quality Improvement**	
	All patients who were counseled on weight management at least once within the past 2 years. Counseling on weight management may include: ▪ Reducing calorie intake ▪ Increasing physical activity ▪ Referral to a weight management specialist or program (eg, nutritionist, dietician) ▪ Providing literature or self-help materials	
Denominator	**Accountability/Public Reporting**	**Internal Quality Improvement**
	All patients 18 to 80 years of age at the start of the measurement period with BMI ≥30 kg/m^2 or waist circumference >40 inches in men or >35 inches in women.*	All patients ≥18 years of age at the start of the measurement period with BMI >25 kg/m^2.*
	NOTE: ▪ If patient weighs >350 lb or exceeds the capacity of the scale available, BMI should be considered to be >40 kg/m^2.	**NOTE:** Same as for Accountability/Public Reporting
	Excluded populations: ▪ Medical reasons(s) documented by a physician, nurse practitioner, or physician assistant for not providing physical activity counseling; for example, patients with BMI >25 kg/m^2 (>30 kg/m^2 for internal quality improvement) who are not overweight by visual assessment or fat determination (skinfold thickness or other measure) due to high muscularity.	**Excluded populations:** Same as for Accountability/Public Reporting
Period of Assessment	Two-year measurement period	
Sources of Data	Prospective flow sheet, retrospective medical record review, electronic medical record	

Rationale

Weight loss in overweight and obese adults results in improved health status and reduction in subsequent chronic disease, including hypertension, hyperlipidemia, and diabetes, and may extend longevity. *Avoiding the development of overweight or obesity should reduce the likelihood of these health problems over time.*

Clinical Recommendation(s)

USPSTF[93]
(Clinicians should) screen all adult patients for obesity and offer intensive counseling and behavioral interventions to promote sustained weight loss for obese adults. *Grade: B Recommendation.*

NHLBI Obesity Education Initiative Expert Panel on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults. Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults—The Evidence Report[92]
Weight loss and weight maintenance therapy should employ the combination of a low-calorie diet, increased physical activity, and behavior therapy. *Evidence Category A.*

American College of Sports Medicine Position Stand: Appropriate Intervention Strategies for Weight Loss and Prevention of Weight Regain for Adults[94]
Significant health benefits can be recognized with participation in a minimum of 150 minutes (2.5 hours) of moderate intensity exercise per week, and overweight and obese adults should progressively increase to this initial exercise goal. However, there may be advantages to progressively increasing exercise to 200 to 300 minutes (3.3–5 hours) of exercise per week, as recent scientific evidence indicates that this level of exercise facilitates the long-term maintenance of weight loss.

US Department of Health and Human Services and US Department of Agriculture: Dietary Guidelines for Americans, 2005[79]
- To maintain body weight in a healthy range, balance calories from foods and beverages with calories expended.
- To prevent gradual weight gain over time, make small decreases in food and beverage calories and increase physical activity.
- Those who need to lose weight: Aim for a slow, steady weight loss by decreasing calorie intake while maintaining an adequate nutrient intake and increasing physical activity.

Method of Reporting

Per patient:
Whether or not patient counseling and/or referrals were provided.

Per patient population:
Percentage of patients who were provided with weight loss/weight management counseling during 1 or more visits.

Challenges to Implementation

- No standardized reporting mechanisms for documenting weight counseling are currently in place. The availability of additional weight management resources, for example, licensed dietitians or structured weight loss programs, may be limited in certain locations or by financial constraints.
- Sample sizes may preclude reporting of reliable performance estimates, particularly at the clinician level.

*Because BMI and waist circumference norms vary across ethnic groups, it may be appropriate to initiate counseling based on weight alone in some patient populations.

8. Blood Pressure Measurement

Measurement of blood pressure in all patients

Numerator	**Accountability/Public Reporting and Internal Quality Improvement** Patients for whom blood pressure (BP) measurement is recorded at least once in the past 2 years.
Denominator	**Accountability/Public Reporting and Internal Quality Improvement** All patients 18 to 80 years of age at the start of the measurement period. **Excluded Populations:** ▪ Medical reasons(s) documented by a physician, nurse practitioner, or physician assistant that BP could not be measured. ▪ Documented patient reason(s) that BP could not be measured; for example, patient refused BP measurement
Period of Assessment	Two-year measurement period
Sources of Data	Prospective flow sheet, retrospective medical record review, electronic medical record

Rationale

Hypertension is one of the most important risk factors for the development of CVD. Treatment of hypertension reduces cardiovascular risk; therefore, identification of patients with hypertension is an important public health goal. BP measurement allows for the identification of individuals with hypertension. Hypertension is a silent condition, so all adults must be screened. One third of all patients with hypertension are unaware of their diagnosis.[95]

Clinical Recommendation(s)

AHA Guidelines for Primary Prevention of Cardiovascular Disease and Stroke: 2002 Update[22]
Blood pressure should be recorded at each visit (at least every 2 years).

Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC-7)[28]
Begin measurement at age 18 years. Follow-up BP interval based on initial reading:

Initial Reading:	Follow-Up Interval
Normal <120/80	2 years
Prehypertension 120–139/80–89	1 year
Stage 1 hypertension 140–159/90–99	2 months
Stage 2 hypertension ≥160/100	≤1 month

Joint British Societies Guidelines on Prevention of Cardiovascular Disease in Clinical Practice[26]
All adults from 40 years onwards, who have no history of CVD or diabetes, and who are not already on treatment for BP or lipids, should be considered for an opportunistic comprehensive CVD risk assessment in primary care. Younger adults (<40 years) with a family history of premature atherosclerotic disease should also have their cardiovascular risk factors measured. Risk assessment should include ethnicity, smoking habit history, family history of CVD, and measurements of weight, waist circumference, blood pressure, non-fasting lipids (total cholesterol and HDL cholesterol), and non-fasting glucose.

Institute for Clinical Systems Improvement: Healthcare Guideline: Preventive Services for Adults[96]
To detect and monitor hypertension, BP should be measured at least every 2 years for adults with BP <120/80 and every year if BP is 120–139/80–89 mm Hg.

Method of Reporting

Per Patient:
Whether or not BP was measured and recorded during the measurement period.

Per Patient Population:
The percentage of all eligible patients with a measured and recorded BP during the measurement period.

Challenges to Implementation

- Will need to review screening sheets in addition to progress notes to capture all recorded values.
- For practices without electronic medical records, manual chart review will be required.
- Sample sizes may preclude reporting of reliable performance estimates, particularly at the clinician level.

9. Blood Pressure Control

Effective BP control or combination therapy for patients with hypertension

Numerator	**Accountability/Public Reporting**	**Internal Quality Improvement**
	Patients 18 to 80 years of age with hypertension who had a recorded BP reading at their most recent visit of less than or equal to140/90 mm Hg* **OR** who were prescribed ≥2 antihypertensive medications. **NOTE:** Hypertension is defined as systolic BP of ≥140 mm Hg or diastolic BP of ≥90 mm Hg on at least 3 occasions, or both, or taking antihypertensive medication.	Patients 18 years of age and over with hypertension who had a recorded BP reading at their most recent visit of <140/90 mm Hg.*
Denominator	**Accountability/Public Reporting**	**Internal Quality Improvement**
	The most recent visit at which a BP was recorded for patients 18 to 80 years old with a diagnosis of hypertension of at least 6 months' duration. **Excluded Populations:** ▪ Medical reasons(s) documented by a physician, nurse practitioner, or physician assistant for not prescribing an antihypertensive medication; for example, patients with an isolated BP measurement of ≥140/90 mm Hg, patients without hypertension who are taking antihypertensive medication for other reasons (eg, migraine headache), allergy, noncompliance, or other medical reason. Documented patient reason(s) for not prescribing an antihypertensive medication (eg, economic, social, or religious impediments, or other reason for refusal to take antihypertensive medication)	The most recent visit at which a BP was recorded for patients 18 years old and over with a diagnosis of hypertension of at least 6 months' duration. **Excluded Populations:** Same as for Accountability/Public Reporting
Period of Assessment	Measurement year	
Sources of Data	Prospective flow sheet, retrospective medical record review, electronic medical record	

Rationale

For patients with hypertension, successful treatment to achieve a target BP of <140/90 mm Hg reduces cardiovascular risk.

Clinical Recommendation(s)

AHA Guidelines for Primary Prevention of Cardiovascular Disease and Stroke: 2002 Update[22]
Any of the following interventions as stated in the AHA recommendations: Promote healthy lifestyle modification. Advocate lifestyle modification. For persons with renal insufficiency or heart failure, initiate drug therapy if BP is ≥130 mm Hg systolic or 85 mm Hg diastolic (≥80 mm Hg diastolic for patients with diabetes). Initiate drug therapy for those with BP ≥140/90 mm Hg if 6 to 12 months of lifestyle modification is not effective, depending on the number of risk factors present. Add BP medications, individualized to other patient requirements and characteristics (eg, age, race, need for drugs with specific benefits).

Seventh Report of the Joint National Commitee[28]
Thiazide diuretic should be used in drug treatment for most, either alone or combined with drugs from other classes. In specific high-risk conditions, there are compelling indications for the use of other antihypertensive drug classes (angiotensin-converting enzyme inhibitors, angiotensin-receptor blockers, beta-blockers, calcium channel blockers). Two or more antihypertensive medications will be required to achieve goal BP (<140/90 mm Hg, or <130/80 mm Hg) for patients with diabetes and chronic kidney disease. For patients whose BP is >20 mm Hg above the systolic BP goal or >10 mm Hg above the diastolic BP goal, initiation of therapy using 2 agents, one of which usually will be a thiazide diuretic, should be considered; regardless of therapy or care, hypertension will be controlled only if patients are motivated to stay on their treatment plan.

European Society of Hypertension–European Society of Cardiology Guidelines for the Management of Arterial Hypertension[97]
The primary goal of treatment of the patient with high BP is to achieve the maximum reduction in the long-term total risk of cardiovascular morbidity and mortality. On the basis of current evidence from trials, it can be recommended that BP, both systolic and diastolic, be intensively lowered at least <140/90 mm Hg and to definitely lower values, if tolerated, in all hypertensive patients, and <130/80 mm Hg in patients with diabetes, keeping in mind, however, that systolic values <140 mm Hg may be difficult to achieve, particularly in the elderly.

Method of Reporting

Per Patient:
Whether the patient has a BP reading at the most recent visit of ≤140/90 mm Hg **OR** was prescribed ≥2 antihypertensive medications.

Per Patient Population:
The percentage of hypertensive patients whose BP reading at the most recent office visit was ≤140/90 mm Hg **OR** who were prescribed ≥2 antihypertensive medications.

Challenges to Implementation

- For practices without electronic medical records, manual chart review will be required.
- Sample sizes may preclude reporting of reliable performance estimates, particularly at the clinician level.

*Lower targets may be appropriate for selected patient populations, for example, those with diabetes or chronic kidney disease or whose 10-year risk of CHD is >10%.

10. Blood Lipid Measurement

Fasting lipid profile performed

Numerator

Accountability/Public Reporting and Internal Quality Improvement

Patients with at least 1 fasting lipid profile performed within the past 5 years.

Fasting lipid profile consists of a total cholesterol, high-density lipoprotein (HDL) cholesterol (HDL-C), and triglyceride measurement. Low-density lipoprotein (LDL) cholesterol (LDL-C) can be measured directly or calculated by the Friedewald equation in patients with triglycerides <300 mg/dL. Non–HDL-C is calculated as total cholesterol minus HDL-C.

Denominator

Accountability/Public Reporting

- All men 35 to 80 years of age at the start of the measurement period with at least 2 visits during the measurement period **AND**
- All women 45 to 80 years of age at the start of the measurement period with ≥1 risk factors* for CHD with at least 2 visits during the measurement period

*Risk factors include:

- Diabetes
- Current cigarette smoking
- Hypertension (untreated systolic BP ≥140 mm Hg or diastolic BP ≥90 mm Hg, or taking antihypertensive medication)
- Family history of premature CHD (CHD in male first-degree relative <55 years of age; CHD in female first-degree relative <65 years of age)

Excluded Populations:

- Medical reasons(s) documented by a physician, nurse practitioner, or physician assistant for not performing a fasting lipid profile.
- Documented patient reason(s) for not performing a fasting lipid profile (eg economic, social, or religious impediments, or other reason for refusal).

Internal Quality Improvement

All patients 18 years of age and over at the start of the measurement period with ≥1 risk factors* for CHD with at least 2 visits during the measurement period

*Risk factors include:

- Diabetes
- Current cigarette smoking
- Hypertension (untreated systolic BP ≥140 mm Hg or diastolic BP ≥90 mm Hg, or taking antihypertensive medication)
- Family history of premature CHD (CHD in male first-degree relative <55 years of age; CHD in female first-degree relative <65 years of age)

Excluded Populations:

- Medical reason(s) documented by a physician, nurse practitioner, or physician assistant for not performing a fasting lipid profile.
- Documented patient reason(s) for not performing a fasting lipid profile (eg, economic, social, or religious impediments, or other reason for refusal).

Period of Assessment

Five-year measurement period

Sources of Data

Prospective flow sheet, retrospective medical record review, electronic medical record

Rationale

Detection of cholesterol disorders and other CHD risk factors occurs primarily through clinical case finding. Risk factors (including cholesterol disorders) can be detected and evaluated as part of a person's workup for any medical problem.[27]

Clinical Recommendation(s)

AHA Guidelines for Primary Prevention of Cardiovascular Disease and Stroke: 2002 Update[22]
Fasting serum lipoprotein profile (or total and HDL-C if fasting is unavailable) should be measured according to patient's risk for hyperlipidemia and diabetes, respectively (at least every 5 years; if risk factors are present, every 2 years).

Third Report of the National Cholesterol Education Program Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III)[27]

Routine cholesterol testing should begin in young adulthood (≥20 years of age).

A fasting lipoprotein profile including major blood lipid fractions, that is, total cholesterol, LDL-C, HDL-C, and triglyceride, should be obtained at least once every 5 years in adults age ≥20 years. … More frequent measurements are required for person with multiple risk factors or, in those, with 0 or 1 risk factor, if the LDL level is only slightly below the goal level.

Evidence-Based Guidelines for Cardiovascular Disease Prevention in Women: 2007 Update[25]
Evaluation of Cardiovascular Disease Risk:
Labs including fasting lipoproteins and glucose.

Screening for Lipid Disorders in Adults: USPSTF Recommendation Statement[98]
Screening men:

- The USPSTF strongly recommends screening men age ≥35 years for lipid disorders. *Rating: A Recommendation*.
- The USPSTF recommends screening men age 20 to 35 years for lipid disorders if they are at increased risk for coronary heart disease. *Rating: B Recommendation*.

Screening women at increased risk:

- The USPSTF strongly recommends screening women age ≥45 years for lipid disorders if they are at increased risk for coronary heart disease. *Rating: A Recommendation.*
- The USPSTF recommends screening women age 20 to 45 years for lipid disorders if they are at increased risk for coronary heart disease. *Rating: B Recommendation*.

Screening young men and all women not at increased risk:

- The USPSTF makes no recommendation for or against routine screening for lipid disorders in men age 20 to 35 years or in women age ≥20 years who are not at increased risk for coronary heart disease. *Rating: C Recommendation.*

Method of Reporting

Per Patient:
Whether the patient had a fasting lipid profile performed within the 5-year period.

Per Patient Population:
Percentage of eligible patients who had a fasting lipid profile performed within the 5-year period.

Challenges to Implementation

- For patients who have changed providers within the 5-year time frame, it may not always be possible to determine whether and when a lipid profile was performed. If the provider cannot determine when and whether prior testing has been performed, a fasting lipid profile should be performed within the first year.
- Sample sizes may preclude reporting of reliable performance estimates, particularly at the clinician level.

11. Blood Lipid Therapy and Control

Proportion of patients who meet current LDL-C treatment targets OR who are prescribed ≥1 lipid-lowering medications at maximum tolerated dose

Numerator	**Accountability/Public Reporting and Internal Quality Improvement** Patients whose most recent LDL-C was: ▪ Less than 190 mg/dL (**women**) (if <2 of the risk factors* below are present or global risk is low [<10%]) **OR** ▪ Less than 160 mg/dL (**men**) (if <2 of the risk factors below are present or global risk is low [<10%]) **OR** ▪ Less than 130 mg/dL (if ≥2 of the risk factors below are present or global risk is intermediate [10% to 20%]) **OR** ▪ Less than 100 mg/dL (if global risk is high [>20%]) **OR** ▪ Who were prescribed ≥1 lipid-lowering medications at the maximum tolerated dose. Risk factors*: ▪ Age ≥45 years (men) or ≥55 years (women) ▪ Low HDL-C (<40 mg/dL in men, <50 mg/dL in women) ▪ Diabetes ▪ Current cigarette smoking ▪ Hypertension (untreated systolic BP ≥140 mm Hg or diastolic BP ≥90 mm Hg, or taking antihypertensive medication) ▪ Family history of premature CHD (CHD in male first-degree relative <55 years of age; CHD in female first-degree relative <65 years of age) **NOTE:** Global risk categories: <10% (low risk), 10% to 20% (intermediate risk), >20% (high risk) based on Framingham algorithm
Denominator	**Accountability/Public Reporting and Internal Quality Improvement** All patients 18 to 80 years of age at the start of the measurement period who have a lipid profile and risk factor assessment documented within the measurement period. **Excluded Populations:** ▪ Patients with any other vascular disease that would be considered CHD equivalents, including peripheral arterial disease, carotid artery disease, and abdominal aortic aneurysm. ▪ Medical reasons(s) documented by a physician, nurse practitioner, or physician assistant for not prescribing or not titrating a lipid-lowering medication (eg, allergy, adverse effects, poor adherence, comorbidities, or other medical reason). ▪ Documented patient reason(s) for not prescribing a lipid-lowering medication (eg, economic, social, or religious impediments, or other reason for refusal to take lipid-lowering agents).
Period of Assessment	Measurement year
Sources of Data	Prospective flow sheet, retrospective medical record review, electronic medical record

Rationale

The basic principle that guides cholesterol-lowering intervention is that the intensity of treatment is directly related to the degree of risk for CHD events.[25] For persons with higher LDL-C (≥130 mg/dL), clinical trials document the efficacy of LDL lowering to reduce risk for CHD in primary prevention (A1, B1), particularly when LDL-C levels are reduced to <130 mg/dL (A1).[25] Adult Treatment Panel III [ATP III], page 3200).

Clinical Recommendation(s)

AHA Guidelines for Primary Prevention of Cardiovascular Disease and Stroke: 2002 Update[22]
Primary goal: LDL-C <160 mg/dL if ≤1 risk factor is present; LDL-C <130 mg/dL if ≥2 risk factors are present and 10-year CHD risk is <20%; or LDL-C <100 mg/dL if ≥2 risk factors are present and 10-year CHD risk is ≥20%.
Secondary goals (if LDL-C is at goal range): If triglycerides are >200 mg/dL, then use non-HDL-C as a secondary goal: non-HDL-C <190 mg/dL for ≤1 risk factor; non-HDL-C <160 mg/dL for ≥2 risk factors and 10-year CHD risk ≤20%; non-HDL-C <130 mg/dL for ≥2 risk factors and 10-year CHD risk >20%.

Third Report of the NCEP Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III)[27]

Management of LDL Cholesterol in Persons Beginning With 10-Year Risk Assessment[27]

10-Year Risk	LDL Goal	LDL Level at Which to Initiate TLC	LDL Level at Which to Consider Drug Therapy (After TLC)
>20%	<100 mg/dL	≥100 mg/dL	Start drug therapy simultaneously with dietary therapy
10%–20%	<130 mg/dL	≥130 mg/dL	≥130 mg/dL
<10%: Multiple (2+) risk factors	<130 mg/dL	≥130 mg/dL	≥160 mg/dL
0–1 risk factor	<160 mg/dL	>160 mg/dL	>190 mg/dL†

Evidence-Based Guidelines for Cardiovascular Disease Prevention in Women: 2007 Update[25]

- Utilize LDL-C–lowering therapy if LDL-C level is ≥130 mg/dL with lifestyle therapy and there are multiple risk factors and 10-year absolute risk of 10% to 20% (*Class I, Level of Evidence B*).
- Utilize LDL-C–lowering therapy if LDL-C level is ≥160 mg/dL with lifestyle therapy and multiple risk factors, even if 10-year absolute risk is <10% (*Class I, Level of Evidence B*).
- Utilize LDL-C–lowering therapy if LDL-C is ≥190 mg/dL regardless of the presence or absence of other risk factors or CVD on lifestyle therapy (*Class I, Level of Evidence B*).

Method of Reporting

Per Patient:
Whether the patient is at LDL-C target (as specified by ATP III) or is undergoing intensive lipid-lowering therapy.

Per Patient Population:
Percentage of eligible patients at LDL-C targets (as specified by ATP III) or who are undergoing intensive therapy.

Challenges to Implementation

- Patient characteristics, including severity of the dyslipidemia, comorbidities, response to therapy, and adherence to therapy, preclude attainment of ATP III goals in all patients. Achievement of control among 80% of patients for a given provider should be the goal for this measure.
- Goal attainment and intensity of therapy may be difficult to extract from routine office records, and patient eligibility for this measure may be difficult to determine owing to the complexity of the data elements needed for appropriate risk stratification (eg, complete risk factor data, LDL-C levels, age, gender, exclusion of CHD equivalents).
- Sample sizes may preclude reporting of reliable performance estimates, particularly at the clinician level.

*Subtract 1 risk factor, if HDL-C ≥60 mg /dL. †Drug therapy optional for LDL-C 160 to 189 mg/dL (after dietary therapy).
TLC indicates therapeutic lifestyle changes.

12. Global Risk Estimation

Use of a multivariable risk score to estimate a patient's absolute risk for development of CHD

Numerator	**Internal Quality Improvement Only – This measure is not suitable for Accountability/Public Reporting** Patients for whom 10-year risk of CHD (assessed with a multiple risk score*) is recorded *at least once* in the past 5 years.
Denominator	**Internal Quality Improvement Only – This measure is not suitable for Accountability/Public Reporting** All men 35 to 80 years of age and women 45 to 80 years of age at the start of the measurement period who are free of CHD at the start of the measurement period who have at least 1 of the following risk factors: ▪ Diabetes ▪ Current cigarette smoking ▪ Hypertension (untreated systolic BP ≥140 mm Hg or diastolic BP ≥90 mm Hg, or taking antihypertensive medication) ▪ Elevated total cholesterol (≥240 mg/dL) or LDL-C (≥130 mg/dL) ▪ Low HDL-C (<40 mg/dL in men, <50 mg/dL in women) ▪ Family history of premature CHD (CHD in male first-degree relative <55 years of age; CHD in female first-degree relative <65 years of age) **Excluded populations:** Patients older than the upper limit of age allowed in risk-assessment tool calculation (varies depending on risk score used).
Period of Assessment	Five-year measurement period
Sources of Data	Prospective flow sheet, retrospective medical record review, electronic medical record

Rationale

Current clinical practice guidelines emphasize matching the intensity of prevention efforts to the absolute risk for development of CVD. To estimate absolute risk for disease among asymptomatic individuals, multivariable risk prediction equations, or risk scores, have been developed. These risk scores typically include established risk factors such as age, sex, total cholesterol (and sometimes LDL-C) levels, HDL-C levels, systolic (and sometimes diastolic) BP level, diabetes status, and smoking status. Multivariable risk scores tend to estimate and quantify predicted risk more accurately than schemes based solely on risk factor counting. Clinical practice guidelines have incorporated absolute risk estimation using multivariable risk scores into algorithms for decision making with regard to treatment for primary prevention of CVD. Immediate drug therapy with lipid-lowering agents and/or aspirin is recommended for patients with absolute risk estimates above certain thresholds. To determine whether a patient exceeds treatment thresholds, measurement of component risk factors and use of a multivariable risk equation are needed. This measure was limited to men ≥35 years of age and women ≥45 years of age to be consistent with current lipid guidelines and to reflect the fact that 10-year risk estimates for CVD are universally low in younger men and women, which indicates that they would not reach treatment thresholds. Other methods for longer-term and lifetime risk estimation in younger adults at low short-term risk are discussed in the text.

Clinical Recommendation(s)

AHA Guidelines for Primary Prevention of Cardiovascular Disease and Stroke: 2002 Update[22]
All adults ≥40 years of age should know their absolute risk of developing CHD.
Goal: As low risk as possible.
Recommendations: Every 5 years (or more frequently if risk factors change), adults, especially those ≥40 years of age or those with ≥2 risk factors, should have their 10-year risk of CHD assessed with a multiple risk score. Risk factors used in global risk assessment include age, sex, smoking status, systolic (and sometimes diastolic) BP, total (and sometimes LDL) cholesterol, HDL-C,[12,28] and in some risk scores, diabetes.[29,30] Persons with diabetes or 10-year risk >20% can be considered at a level of risk similar to a patient with established cardiovascular disease (CHD risk equivalent). Equations for calculation of 10-year stroke risk are also available.

AHA Guideline: Evidence-Based Guidelines for Cardiovascular Disease Prevention in Women: 2007 Update[25]
The 2004 guidelines emphasized the importance of recognizing the spectrum of CVD and thus classified women as being at high risk, intermediate risk, lower risk, and optimal risk. Classification was based on clinical criteria and/or the Framingham global risk score.[50] These criteria are still used to help guide lipid therapy. The 2007 update recommends a scheme for a general approach to the female patient that classifies her as at high risk, at risk, or at optimal risk. ... Healthcare providers should take several factors into consideration, including medical and lifestyle history, Framingham risk score, family history of CVD, and other genetic conditions (eg, familial hypercholesterolemia), as they make decisions about the aggressiveness of preventive therapy.

Third Report of the NCEP Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (ATP III)[27]
The guiding principle of ATP III is that the intensity of LDL-lowering therapy should be adjusted to the individual's absolute risk for CHD. … ATP III's primary approach to risk assessment for persons without CHD or CHD risk equivalents is to count the number of major risk factors for CHD. For persons with multiple (2+) risk factors, a second step is to carry out 10-year risk assessment for CHD.

There are 2 essential reasons for estimating 10-year risk in persons with multiple risk factors: (a) to identify those who have a 10-year risk >20% (CHD risk equivalent), and (b) to identify those with borderline high LDL-C who have a 10-year risk of 10% to 20%. Both groups are candidates for more intensive LDL-lowering therapy than was recommended in ATP II. An alternative approach, which gives similar though not identical results, is to begin with 10-year risk assessment, followed by counting of risk factors in persons with a 10-year risk for CHD <10%. This sequence is recommended by advocates of "global risk assessment." The sequence of risk assessment depends on personal choice. It should be noted that beginning with 10-year risk assessment is consistent with approaches recently proposed in other guidelines…. It should be noted that the Framingham equations for 10-year CHD risk are not intended to be used to track changes in risk over time as risk factors are modified. The 10-year risk calculation is intended to be performed at the outset to help guide decisions about the intensity of therapy.

The Guide to Clinical Preventive Services: Recommendations of the USPSTF[23]

- Decisions about aspirin therapy should take into account overall risk for coronary heart disease. Risk assessment should include asking about the presence and severity of the following risk factors: age, sex, diabetes, elevated total cholesterol levels, low levels of HDL-C, elevated BP, family history (in younger adults), and smoking. Tools that incorporate specific information on multiple risk factors provide more accurate estimation of cardiovascular risk than categorizations based simply on counting the numbers of risk factors.
- Clinicians should consider the patient's overall cardiovascular risk profile … in making treatment decisions [regarding hypertension].
- Treatment decisions should take into account overall risk of heart disease rather than lipid levels alone. Overall risk assessment should include the presence and severity of the following risk factors: age, gender, diabetes, elevated blood pressure, family history (in younger adults), and smoking.

European Guidelines on Cardiovascular Disease Prevention in Clinical Practice: Third Joint Task Force of European and Other Societies on Cardiovascular Disease Prevention in Clinical Practice[24]

In asymptomatic, apparently healthy subjects, preventive actions should be guided in accordance with the total CVD risk level. Practitioners should use total CVD risk estimates when decisions are taken to intensify preventive actions, that is, when dietary advice should be more specified, when the physical activity prescription should be more individualized, when drugs should be prescribed, dosages adapted or combinations started to control risk factors; these decisions should usually not be based on the level of any one risk factor alone; neither should they be linked to only one arbitrary cut point from the continuous total CVD risk distribution.

Method of Reporting

Per Patient:

Whether or not the patient's estimated absolute risk for CVD was documented.

Per Patient Population:

Percentage of patients for whom absolute CVD risk was estimated during the measurement period.

Challenges to Implementation

- There are several validated multivariable risk scores available, including the following:
  1) The current Framingham risk score[50] (Appendix F) for prediction of 10-year risk for all CHD events (incident angina pectoris, coronary insufficiency, myocardial infarction, and CHD death);
  2) The ATP III Risk Assessment Tool[27] (online at http://hp2010.nhlbihin.net/atpiii/calculator.asp?usertype=prof; downloadable version for desktop or Palm at http://hp2010.nhlbihin.net/atpiii/riskcalc.htm) for prediction of 10-year risk for hard CHD events (incident nonfatal myocardial infarction or CHD death);
  3) The European HeartScore Programme[52] (online at http://www.heartscore.org) for prediction of 10-year risk for all fatal atherosclerotic CVD events.
  4) Reynolds Risk Score for CVD risk estimation in women[53]

  It is unclear at present whether 1 risk score should be favored over another. Practitioners may wish to use a risk score that has been derived or validated in a population similar to their patient population or one that is tailored to the outcomes for which an individual patient may be at risk.

- The established CVD risk factors, when combined into multivariable risk scores, provide excellent discrimination of those at higher risk for CVD and CHD. However, the precision of the absolute risk estimate (ie, calibration) derived from multivariable models is known to vary from population to population. Models such as the Framingham risk score provide excellent discrimination and calibration for most white and black populations studied to date. Framingham risk equations tend to overestimate the actual risk in Hispanic-American and Asian-American populations studied to date. It is recommended that risk equations be recalibrated for the population-specific rates of disease in the population to which they are being applied (compared with the source population, eg, Framingham) in order to provide more accurate calibration.[99] These observations may have some impact on the utility of applying multivariable risk scores in clinical practice.
- Assessment and documentation of a global risk estimate for CVD or CHD requires that all of the component elements of the risk score were measured within a recent time frame. Recommendations regarding measurement of all risk score components (ie, smoking status, blood lipid measurement, BP measurement, diabetes screening) are found elsewhere in the document, and each recommendation falls within the recommended 5-year period of measurement for this performance measure.
- Sample sizes may preclude reporting of reliable performance estimates, particularly at the clinician level.

*The ATP III global risk estimates are for hard CHD (excludes angina pectoris), whereas the 1998 Framingham scores that are in Appendix F are for total CHD, although a hard CHD percentage can be derived. Other risk scores (eg, the European SCORE or the Reynolds Risk Score) are for CVD (as opposed to CHD) and thus include stroke.

13. Aspirin Use

Aspirin use in patients without clinical evidence of atherosclerotic disease who are at higher CVD risk

Numerator	**Internal Quality Improvement Only—This measure is not suitable for Accountability/Public Reporting** Patients who were advised to use aspirin.
Denominator	**Internal Quality Improvement Only—This measure is not suitable for Accountability/Public Reporting** All men age 35 to 80 years and women age 45 to 80 years at the start of the measurement period without clinical evidence of CVD but who are at higher CVD risk* (10-year CHD risk≥20%). **Excluded Populations:** ▪ Medical reasons(s) documented by a physician, nurse practitioner, or physician assistant for not advising aspirin use (eg, risk outweighs benefit, allergy, risk of bleeding, noncompliance, or other medical reason). ▪ Documented patient reason(s) for not advising aspirin use (eg, economic, social, or religious impediments, or other reason for refusal to take aspirin).
Period of Assessment	Measurement year
Sources of Data	Prospective flow sheet, retrospective medical record review, electronic medical record

Rationale

In patients without clinical atherosclerotic disease, the benefit-risk ratio for aspirin should be weighed carefully, because these patients are at lower baseline CVD risk than patients with known atherosclerotic disease, and aspirin increases the risk of bleeding (gastrointestinal bleeding and hemorrhagic stroke). The updated USPSTF statement provides an algorithm that clinicians may use to assess the potential benefits and risks of aspirin therapy.[100] There has been little or no benefit for aspirin in reducing CVD death or all-cause death in patients without atherosclerotic disease (men or women).[57,58] Clinical trials in patients without established atherosclerotic disease have shown that in men, aspirin reduces the risk of myocardial infarction but not stroke, and in women, aspirin reduces the risk of stroke but not myocardial infarction.[63] The use of aspirin for prevention of CVD in patients with diabetes mellitus or peripheral artery disease remains unclear.[60] There has been little or no benefit for aspirin in reducing CVD death or all-cause death in patients without atherosclerotic disease (men or women).[63] Given these considerations, the Writing Committee recommends this as a quality improvement measure instead of a performance measure at this time.

Aspirin dosage: Current guidelines offer mixed recommendations regarding the dose of aspirin, ranging from not mentioning the dose[101] to advocating doses up to 325 mg/d.[25] Currently available data support the use of doses of 75 to 160 mg/d, because these doses are as effective for CVD prevention and are associated with lower bleeding rates than higher doses.[66] Clinical practices may want to consider recording the dose of aspirin used for tracking purposes.

Clinical Recommendation(s)

AHA Guidelines for Primary Prevention of Cardiovascular Disease and Stroke 2002 Update[22]
Low-dose aspirin in persons at higher CHD risk (especially those with 10-year risk of CHD ≥10%).

USPSTF: Aspirin for the Primary Prevention of Cardiovascular Events[101]
The USPSTF concluded that the balance of benefits and harms is most favorable in patients at high risk for CHD (those with a 3-year risk ≥3% [ie, 10-year risk ≥6%]) but is also influenced by patient preferences.

USPSTF: Aspirin for the Prevention of Cardiovascular Disease[100]
This recent statement from the USPSTF provides an algorithm to estimate the benefit-risk ratio for aspirin use.

Evidence-Based Guidelines for Cardiovascular Disease Prevention in Women: 2007 Update[25]
Class I
Aspirin therapy (75–325 mg/d) should be used in high-risk women (established CHD, CVD, peripheral arterial disease, abdominal aortic aneurysm, chronic renal disease, diabetes, or 10-year risk >20%) unless contraindicated *(Level of Evidence: A)*.
If a high-risk woman is intolerant of aspirin therapy, clopidogrel should be substituted *(Level of Evidence: B)*.

AHA/ADA Statement: Primary Prevention of Cardiovascular Disease in Patients With Diabetes Mellitus[102]
Aspirin therapy 75 to 162 mg/d should be recommended as a primary prevention strategy in those with diabetes at increased cardiovascular risk, including those who are >40 years of age or who have additional risk factors (family history of CVD, hypertension, smoking, dyslipidemia, or albuminuria). People with aspirin allergy, bleeding tendency, existing anticoagulant therapy, recent gastrointestinal bleeding, and clinically active hepatic disease are not candidates for aspirin therapy. Other antiplatelet agents may be a reasonable alternative for patients with high risk.

Method of Reporting

Per patient:
Whether or not patient is advised to use aspirin.

Per patient population:
Percentage of all eligible patients who are at higher CVD risk (eg, men with 10-year CHD risk of ≥20%) who were advised to use aspirin.

Challenges to Implementation

- This measure relies on determining 10-year CHD risk by global risk assessment with ATP III guidelines; however, other scores for assessing global risk may be used.
- Aspirin is an over-the-counter medication, and its use may not be extractable from administrative data, because it may not be documented in the medical record. Clinical practices should consider improving their documentation for over-the-counter medications such as aspirin if documentation is poor.
- Sample sizes may preclude reporting of reliable performance estimates, particularly at the clinician level.

*CHD risk scores obtained from Adult Treatment Panel III (ATP III) guidelines[27]; other global risk scores may be substituted (see Measure 12. Global Risk Estimation).

Appendix E

Sample Prospective Data Collection Flow Sheet

American College of Cardiology Foundation and American Heart Association
Primary Prevention of Cardiovascular Disease Performance Measurement Set

SAMPLE

Today's Date _____/ _____/ ___ **Date of last visit** _____/ _____/ _____

Patient Name or Code _____ **Birth Date** _____ / _____ / _____

Medical History

Age: ____ years	*†‡**Family History of Premature CHD**: ____ (Y/N) (CHD in male first-degree relative <55 years; CHD in female first-degree relative <65 years)	*†‡**Diabetes:** ____ (Y/N)	**Gender:** ☐ Male ☐ Female
Check below if patient is: ☐ †**Age 45 or older and male** ☐ †**Age 55 or older and female**	**Optional** Chronic renal disease: ____ (Y/N) (Glomerular filtration rate < 60 mL/min/1.73 m^2.)	*†‡**Hypertension**: ____ (Y/N) (Systolic BP of 140 mm Hg or greater or a diastolic BP of 90 mm Hg or greater on at least three occasions, or both, or taking anti-hypertensive medication.)	**Vascular Disease**: ____ (Y/N) (Peripheral arterial disease, carotid artery disease, or abdominal aortic aneurysm)

Lifestyle Factors*(complete for all patients)*

Tobacco Use:

☐ Never smoked
☐ Former smoker
Date quit: ____/_____ (month, if known/year)
☐ *‡†**Current smoker**

Intervention: Complete if patient is current smoker:

☐ Patient was advised to quit smoking
☐ Referred for smoking cessation counseling
☐ Medication prescribed: _____
(eg, bupropion, varenicline, nicotine patches, gum, or lozenges)
☐ Other _____

Physical Activity:
(Intensity, frequency, and duration of exercise daily/weekly):
_____
_____

Goal: At least 30 minutes of moderate-intensity physical activity (such as brisk walking) on most (and preferably all) days of the week.

Patient reports usually meeting the physical activity goal:
☐ Yes
☐ No

If no, was patient advised to increase physical activity to reach goal?
☐ Yes
☐ No

Optional Exposure to Secondhand Tobacco Smoke:
(Someone at home or at work smokes in presence of patient)
☐ Yes
☐ No

Optional Alcohol Use:
☐ Never
☐ 1–2 drinks/day
☐ >2 drinks per day

1 drink = 4 oz wine, 2 oz spirits, or 1 beer

Diet Assessment:
☐ Was the patient's usual diet discussed?

Optional Global Risk Estimation *(Complete for all men age 35 and over and all women age 45 and over with at least 1 of the risk factors marked with an asterisk [*]).*

10-year CHD risk = _____ %
(from worksheet in Appendix F) (Also available at:
http://www.framinghamheartstudy.org/risk/coronary.html)

Optional Aspirin *(Complete if patient is male with 10-year CHD risk of ≥10% **OR** female with 10-year CHD risk of ≥20%)*

☐ Patient advised to use aspirin (preferably low dose)

☐ Medical or patient reason(s) for not advising aspirin use *(MD, DO, NP, or PA only)*:
_____
_____

Cardiac Medications (antihypertensives, lipid-lowering medications, and aspirin; smoking cessation medications)

Name	Dosage	When taken	Reason taken (e.g., high blood pressure)

Allergies:

Physical Exam Findings

Height: ____ inches	Blood Pressure: ___/____ mm Hg
Weight: _____ lbs.	Medical or patient reason(s) BP could not be measured *(MD, DO, NP, or PA only):*
BMI: _____ kg/m^2 (from table)	*Complete if BP is > 140/90 mm Hg:* Two or more antihypertensive medications prescribed? ☐ Yes ☐ No
Waist Circumference: _____ inches	☐ Medical or patient reason(s) no (or only 1) antihypertensive medication ordered *(MD, DO, NP, or PA only):* _____
Medical or patient reason(s) that height and/or weight and waist circumference could not be measured *(MD, DO, NP, or PA only):* _____	

_Diet Counseling *(Complete for all patients)*

Goal: An overall healthy eating pattern:
- Lots of fruits, vegetables,
- Whole grains,
- Low-fat or nonfat dairy products,
- Fish, legumes, poultry, and lean meats.
- Limit salt intake
- Limit alcohol intake (≤2 drinks/d in men, ≤1 drink/d in women) among those who drink.

☐ Patient was advised to eat a healthy diet

☐ Specific dietary recommendations (e.g., no added salt, decrease saturated fat, diabetic or DASH diet, decreased cholesterol intake): _____ _____

☐ Referred to nutritionist or dietician

☐ Diet discussed with patient and literature/brochure provided

Weight Management *(Complete if BMI >30 kg/m^2 OR waist circumference >40 inches in men or >35 inches in women.)*

☐ Patient was advised to lose weight

☐ Specific recommendations: _____ (e.g., reducing calorie intake, increasing physical activity)

☐ Referred to weight management specialist or program, e.g., nutritionist or dietician

Medical reason(s) that weight management counseling was not provided *(MD, DO, NP, or PA only):*

Fasting Lipid Profile *(Complete for all men age 35 and over and all women age 45 and over with at least 1 of the risk factors marked with a* ‡ **under medical history in first section)**

Enter date of most recent fasting lipid profile: ___/___/_____

Results	*Check all that apply:*
Total cholesterol: _____ mg/dL	☐ ***Total cholesterol is ≥240 mg/dL)***
LDL-C: _____ mg/dL	☐ **LDL-C is ≥130 mg/dL***
HDL-C: _____ mg/dL	☐ **HDL-C is <40 mg/dL if patient is male OR <50 mg/dL if patient is female†**

Medical or patient reason(s) that fasting lipid profile was not performed *(MD, DO, NP, or PA only):*

Blood Lipid Management
(complete if LDL-C is:
- Greater than or equal to 190 mg/dL (**women**) [and <2 of the risk factors marked with† under medical history above are present or global risk is low (<10%)] **OR**
- Greater than or equal to 160 mg/dL (**men**) [and <2 of the risk factors marked with† under medical history above are present or global risk is low (<10%)] **OR**
- Greater than or equal to 130 mg/dL [and ≥2 of the risk factors marked with† under medical history above are present or global risk is intermediate (10% to 20%)] **OR**
- Greater than or equal to 100 mg/dL [and global risk is high (>20%)]

NOTE: Subtract 1 risk factor† if HDL-C ≥60 mg/dL

At least 1 lipid-lowering medication prescribed at maximum tolerated dose?

☐ Yes

☐ No

☐ Medical or patient reason(s) no lipid-lowering medication was prescribed *(MD, DO, NP, or PA only):* _____

NOTE: Items marked "optional" are for internal quality improvement only.

Appendix F

Coronary Heart Disease Risk Prediction

Men

Step 1

Age		
Years	LDL Pts	Chol Pts
30-34	-1	[-1]
35-39	0	[0]
40-44	1	[1]
45-49	2	[2]
50-54	3	[3]
55-59	4	[4]
60-64	5	[5]
65-69	6	[6]
70-74	7	[7]

Step 2

LDL - C		
(mg/dl)	(mmol/L)	LDL Pts
<100	<2.59	-3
100-129	2.60-3.36	0
130-159	3.37-4.14	0
160-190	4.15-4.92	1
≥190	≥4.92	2

Cholesterol		
(mg/dl)	(mmol/L)	Chol Pts
<160	<4.14	[-3]
160-199	4.15-5.17	[0]
200-239	5.18-6.21	[1]
240-279	6.22-7.24	[2]
≥280	≥7.25	[3]

Step 3

HDL - C			
(mg/dl)	(mmol/L)	LDL Pts	Chol Pts
<35	<0.90	2	[2]
35-44	0.91-1.16	1	[1]
45-49	1.17-1.29	0	[0]
50-59	1.30-1.55	0	[0]
≥60	≥1.56	-1	[-2]

Step 4

Blood Pressure					
Systolic (mm Hg)	Diastolic (mm Hg) <80	80-84	85-89	90-99	≥100
<120	0 [0] pts				
120-129		0 [0] pts			
130-139			1 [1] pts		
140-159				2 [2] pts	
≥160					3 [3] pts

Note: When systolic and diastolic pressures provide different estimates for point scores, use the higher number

Step 5

Diabetes		
	LDL Pts	Chol Pts
No	0	[0]
Yes	2	[2]

Step 6

Smoker		
	LDL Pts	Chol Pts
No	0	[0]
Yes	2	[2]

(sum from steps 1-6)

Step 7

Adding up the points	
Age	_____
LDL-C or Chol	_____
HDL - C	
Blood Pressure	_____
Diabetes	_____
Smoker	_____
Point total	_____

(determine CHD risk from point total)

Step 8

CHD Risk			
LDL Pts Total	10 Yr CHD Risk	Chol Pts Total	10 Yr CHD Risk
<-3	1%		
-2	2%		
-1	2%	[<-1]	[2%]
0	3%	[0]	[3%]
1	4%	[1]	[3%]
2	4%	[2]	[4%]
3	6%	[3]	[5%]
4	7%	[4]	[7%]
5	9%	[5]	[8%]
6	11%	[6]	[10%]
7	14%	[7]	[13%]
8	18%	[8]	[16%]
9	22%	[9]	[20%]
10	27%	[10]	[25%]
11	33%	[11]	[31%]
12	40%	[12]	[37%]
13	47%	[13]	[45%]
≥14	≥56%	[≥14]	[≥53%]

(compare to average person your age)

Step 9

Comparative Risk			
Age (years)	Average 10 Yr CHD Risk	Average 10 Yr Hard* CHD Risk	Low** 10 Yr CHD Risk
30-34	3%	1%	2%
35-39	5%	4%	3%
40-44	7%	4%	4%
45-49	11%	8%	4%
50-54	14%	10%	6%
55-59	16%	13%	7%
60-64	21%	20%	9%
65-69	25%	22%	11%
70-74	30%	25%	14%

Key	
Color	Relative Risk
green	Very low
white	Low
yellow	Moderate
rose	High
red	Very high

Women

Step 1

Age		
Years	LDL Pts	Chol Pts
30-34	-9	[-9]
35-39	-4	[-4]
40-44	0	[0]
45-49	3	[3]
50-54	6	[6]
55-59	7	[7]
60-64	8	[8]
65-69	8	[8]
70-74	8	[8]

Step 2

LDL - C		
(mg/dl)	(mmol/L)	LDL Pts
<100	<2.59	-2
100-129	2.60-3.36	0
130-159	3.37-4.14	0
160-190	4.15-4.92	2
≥190	≥4.92	2

Cholesterol		
(mg/dl)	(mmol/L)	Chol Pts
<160	<4.14	[-2]
160-199	4.15-5.17	[0]
200-239	5.18-6.21	[1]
240-279	6.22-7.24	[1]
≥280	≥7.25	[3]

Step 3

HDL - C			
(mg/dl)	(mmol/L)	LDL Pts	Chol Pts
<35	<0.90	5	[5]
35-44	0.91-1.16	2	[2]
45-49	1.17-1.29	1	[1]
50-59	1.30-1.55	0	[0]
≥60	≥1.56	-2	[-3]

Step 4

Blood Pressure				
Systolic (mm Hg)	Diastolic (mm Hg) <80	80-84	85-89	90-99	≥100
<120	-3 [-3] pts				
120-129		0 [0] pts			
130-139			0 [0] pts		
140-159				2 [2] pts	
≥160					3 [3] pts

* Note: When systolic and diastolic pressures provide different estimates for point scores, use the higher number

Step 5

Diabetes		
	LDL Pts	Chol Pts
No	0	[0]
Yes	4	[4]

Step 6

Smoker		
	LDL Pts	Chol Pts
No	0	[0]
Yes	2	[2]

(sum from steps 1-6)

Step 7

Adding up the points	
Age	_____
LDL-C or Chol	_____
HDL - C	
Blood Pressure	_____
Diabetes	_____
Smoker	_____
Point total	_____

(determine CHD risk from point total)

Step 8

CHD Risk			
LDL Pts Total	10 Yr CHD Risk	Chol Pts Total	10 Yr CHD Risk
≤-2	1%	[≤-2]	[1%]
-1	2%	[-1]	[2%]
0	2%	[0]	[2%]
1	2%	[1]	[2%]
2	3%	[2]	[3%]
3	3%	[3]	[3%]
4	4%	[4]	[4%]
5	5%	[5]	[4%]
6	6%	[6]	[5%]
7	7%	[7]	[6%]
8	8%	[8]	[7%]
9	9%	[9]	[8%]
10	11%	[10]	[10%]
11	13%	[11]	[11%]
12	15%	[12]	[13%]
13	17%	[13]	[15%]
14	20%	[14]	[18%]
15	24%	[15]	[20%]
16	27%	[16]	[24%]
≥17	≥32%	[≥17]	[≥27%]

(compare to average person your age)

Step 9

Comparative Risk			
Age (years)	Average 10 Yr CHD Risk	Average 10 Yr Hard* CHD Risk	Low** 10 Yr CHD Risk
30-34	<1%	<1%	<1%
35-39	<1%	<1%	1%
40-44	2%	1%	2%
45-49	5%	2%	3%
50-54	8%	3%	5%
55-59	12%	7%	7%
60-64	12%	8%	8%
65-69	13%	8%	8%
70-74	14%	11%	8%

Key	
Color	Relative Risk
green	Very low
white	Low
yellow	Moderate
rose	High
red	Very high

CHD score sheet for men using total cholesterol or LDL-C categories. Uses age, total cholesterol (or LDL-C), HDL-C, blood pressure, diabetes, and smoking. Estimates risk for CHD over a period of 10 years based on Framingham experience in men 30 to 74 years of age at baseline. Average risk estimates are based on typical Framingham subjects, and estimates of idealized risk are based on optimal blood pressure, total cholesterol 160 to 199 mg/dL (or LDL-C 100 to 129 mg/dL), HDL-C of 45 mg/dL in men, no diabetes, and no smoking. Use of the LDL-C categories is appropriate when fasting LDL-C measurements are available. Risk estimates were derived from the experience of the Framingham Heart Study, a predominantly white population in Massachusetts.

CHD indicates cardiovascular heart diease; chol, cholesterol; HDL-C, high-density lipoprotein cholesterol; LDL-C, low-density lipoprotein cholesterol; and Pts, patients.

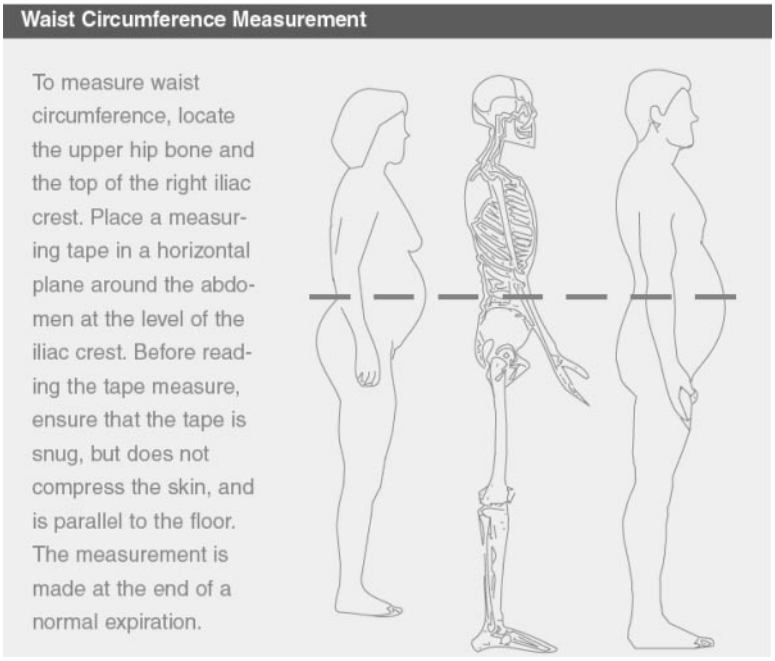
Adapted from Wilson et al,[50] with permission from Lippincott Williams & Wilkins. Copyright 1998, American Heart Association.

*Hard CHD events exclude angina pectoris.

**Low risk was calculated for a person the same age, optimal blood pressure, LDL-C 100–129 mg/dL or cholesterol 160–199 mg/dL. HDL-C 45 mg/dL for men or 55 mg/dL for women, nonsmoker, no diabetes.

Appendix G

Measuring Waist Circumference



Reprinted from NIH Publication No. 00-4084.[103]

Appendix H

BMI Table

BMI	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
Height (inches)	Body Weight (lb)																																			
58	91	96	100	105	110	115	119	124	129	134	138	143	148	153	158	162	167	172	177	181	186	191	196	201	205	210	215	220	224	229	234	239	244	248	253	258
59	94	99	104	109	114	119	124	128	133	138	143	148	153	158	163	168	173	178	183	188	193	198	203	208	212	217	222	227	232	237	242	247	252	257	262	267
60	97	102	107	112	118	123	128	133	138	143	148	153	158	163	168	174	179	184	189	194	199	204	209	215	220	225	230	235	240	245	250	255	261	266	271	276
61	100	106	111	116	122	127	132	137	143	148	153	158	164	169	174	180	185	190	195	201	206	211	217	222	227	232	238	243	248	254	259	264	269	275	280	285
62	104	109	115	120	126	131	136	142	147	153	158	164	169	175	180	186	191	196	202	207	213	218	224	229	235	240	246	251	256	262	267	273	278	284	289	295
63	107	113	118	124	130	135	141	146	152	158	163	169	175	180	186	191	197	203	208	214	220	225	231	237	242	248	254	259	265	270	278	282	287	293	299	304
64	110	116	122	128	134	140	145	151	157	163	169	174	180	186	192	197	204	209	215	221	227	232	238	244	250	256	262	267	273	279	285	291	296	302	308	314
65	114	120	126	132	138	144	150	156	162	168	174	180	186	192	198	204	210	216	222	228	234	240	246	252	258	264	270	276	282	288	294	300	306	312	318	324
66	118	124	130	136	142	148	155	161	167	173	179	186	192	198	204	210	216	223	229	235	241	247	253	260	266	272	278	284	291	297	303	309	315	322	328	334
67	121	127	134	140	146	153	159	166	172	178	185	191	198	204	211	217	223	230	236	242	249	255	261	268	274	280	287	293	299	306	312	319	325	331	338	344
68	125	131	138	144	151	158	164	171	177	184	190	197	203	210	216	223	230	236	243	249	256	262	269	276	282	289	295	302	308	315	322	328	335	341	348	354
69	128	135	142	149	155	162	169	176	182	189	196	203	209	216	223	230	236	243	250	257	263	270	277	284	291	297	304	311	318	324	331	338	345	351	358	365
70	132	139	146	153	160	167	174	181	188	195	202	209	216	222	229	236	243	250	257	264	271	278	285	292	299	306	313	320	327	334	341	348	355	362	369	376
71	136	143	150	157	165	172	179	186	193	200	208	215	222	229	236	243	250	257	265	272	279	286	293	301	308	315	322	329	338	343	351	358	365	372	379	386
72	140	147	154	162	169	177	184	191	199	206	213	221	228	235	242	250	258	265	272	279	287	294	302	309	316	324	331	338	346	353	361	368	375	383	390	397
73	144	151	159	166	174	182	189	197	204	212	219	227	235	242	250	257	265	272	280	288	295	302	310	318	325	333	340	348	355	363	371	378	386	393	401	408
74	148	155	163	171	179	186	194	202	210	218	225	233	241	249	256	264	272	280	287	295	303	311	319	326	334	342	350	358	365	373	381	389	396	404	412	420
75	152	160	168	176	184	192	200	208	216	224	232	240	248	256	264	272	279	287	295	303	311	319	327	335	343	351	359	367	375	383	391	399	407	415	423	431
76	156	164	172	180	189	197	205	213	221	230	238	246	254	263	271	279	287	295	304	312	320	328	336	344	353	361	369	377	385	394	402	410	418	426	435	443

BMI indicates body mass index.
Adapted from: NIH Publication No. 00-4084.[103]

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