
2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease: Executive Summary

Endorsed by the American Association of Cardiovascular and Pulmonary Rehabilitation, the American Geriatric Society, the American Society of Preventive Cardiology, and the Preventive Cardiovascular Nurses Association

© American College of Cardiology Foundation and American Heart Association

Citation

This slide set is adapted from the 2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease: Executive Summary. Published on [Date], available at: *Journal of the American College of Cardiology* [<https://www.jacc.org/doi/10.1016/j.jacc.2019.03.009>] and *Circulation* [<https://www.ahajournals.org/doi/10.1161/CIR.0000000000000677>]

The full-text guidelines are also available on the following Web sites: ACC (www.acc.org) and AHA (professional.heart.org)

2019 Primary Prevention Writing Committee

Donna K. Arnett, PhD, MSPH, FAHA, Co-Chair

Roger S. Blumenthal, MD, FACC, FAHA, Co-Chair

Michelle A. Albert, MD, MPH, FAHA*

Andrew B. Buroker, Esq†

Zachary D. Goldberger, MD, MS, FACC, FAHA‡

Ellen J. Hahn, PhD, RN*

Cheryl D. Himmelfarb, PhD, RN, ANP, FAHA*

Amit Khera, MD, MSc, FACC, FAHA*

Donald Lloyd-Jones, MD, SCM, FACC, FAHA*

J. William McEvoy, MBBCh, MEd, MHS*

Erin D. Michos, MD, MHS, FACC, FAHA*

Michael D. Miedema, MD, MPH*

Daniel Muñoz, MD, MPA, FACC*

Sidney C. Smith, Jr, MD, MACC, FAHA*

Salim S. Virani, MD, PhD, FACC, FAHA*

Kim A. Williams, Sr, MD, MACC, FAHA*

Joseph Yeboah, MD, MS, FACC, FAHA*

Boback Ziaeian, MD, PhD, FACC, FAHA§

*ACC/AHA Representative, †Lay Representative, § Task Force Performance Measures Representative

Table 1. Applying Class of Recommendation and Level of Evidence to Clinical Strategies, Interventions, Treatments, or Diagnostic Testing in Patient Care*

(Updated August 2015)

CLASS (STRENGTH) OF RECOMMENDATION		LEVEL (QUALITY) OF EVIDENCE†
CLASS I (STRONG)	Benefit >> Risk	LEVEL A
Suggested phrases for writing recommendations:		<ul style="list-style-type: none"> ▪ High-quality evidence‡ from more than 1 RCT ▪ Meta-analyses of high-quality RCTs ▪ One or more RCTs corroborated by high-quality registry studies
<ul style="list-style-type: none"> ▪ Is recommended ▪ Is indicated/useful/effective/beneficial ▪ Should be performed/administered/other ▪ Comparative-Effectiveness Phrases†: <ul style="list-style-type: none"> ◦ Treatment/strategy A is recommended/indicated in preference to treatment B ◦ Treatment A should be chosen over treatment B 		LEVEL B-R (Randomized)
Suggested phrases for writing recommendations:		<ul style="list-style-type: none"> ▪ Moderate-quality evidence‡ from 1 or more RCTs ▪ Meta-analyses of moderate-quality RCTs
<ul style="list-style-type: none"> ▪ Is reasonable ▪ Can be useful/effective/beneficial ▪ Comparative-Effectiveness Phrases†: <ul style="list-style-type: none"> ◦ Treatment/strategy A is probably recommended/indicated in preference to treatment B ◦ It is reasonable to choose treatment A over treatment B 		LEVEL B-NR (Nonrandomized)
Suggested phrases for writing recommendations:		<ul style="list-style-type: none"> ▪ Moderate-quality evidence‡ from 1 or more well-designed, well-executed nonrandomized studies, observational studies, or registry studies ▪ Meta-analyses of such studies
<ul style="list-style-type: none"> ▪ May/might be reasonable ▪ May/might be considered ▪ Usefulness/effectiveness is unknown/unclear/uncertain or not well established 		LEVEL C-LD (Limited Data)
Suggested phrases for writing recommendations:		<ul style="list-style-type: none"> ▪ Randomized or nonrandomized observational or registry studies with limitations of design or execution ▪ Meta-analyses of such studies ▪ Physiological or mechanistic studies in human subjects
CLASS III: No Benefit (MODERATE) <i>(Generally, LOE A or B use only)</i>	Benefit = Risk	LEVEL C-EO (Expert Opinion)
Suggested phrases for writing recommendations:		Consensus of expert opinion based on clinical experience
<ul style="list-style-type: none"> ▪ Is not recommended ▪ Is not indicated/useful/effective/beneficial ▪ Should not be performed/administered/other 		
CLASS III: Harm (STRONG)	Risk > Benefit	
Suggested phrases for writing recommendations:		COR and LOE are determined independently (any COR may be paired with any LOE).
<ul style="list-style-type: none"> ▪ Potentially harmful ▪ Causes harm ▪ Associated with excess morbidity/mortality ▪ Should not be performed/administered/other 		A recommendation with LOE C does not imply that the recommendation is weak. Many important clinical questions addressed in guidelines do not lend themselves to clinical trials. Although RCTs are unavailable, there may be a very clear clinical consensus that a particular test or therapy is useful or effective.
		* The outcome or result of the intervention should be specified (an improved clinical outcome or increased diagnostic accuracy or incremental prognostic information).
		† For comparative-effectiveness recommendations (COR I and IIa; LOE A and B only), studies that support the use of comparator verbs should involve direct comparisons of the treatments or strategies being evaluated.
		‡ The method of assessing quality is evolving, including the application of standardized, widely used, and preferably validated evidence grading tools; and for systematic reviews, the incorporation of an Evidence Review Committee.
		COR indicates Class of Recommendation; EO, expert opinion; LD, limited data; LOE, Level of Evidence; NR, nonrandomized; R, randomized; and RCT, randomized controlled trial.

Top 10 Take-Home Messages

2019 Primary Prevention Guidelines

Top 10 Take Home Messages

1. The most important way to prevent atherosclerotic vascular disease, heart failure, and atrial fibrillation is to promote a healthy lifestyle throughout life.

Top 10 Take Home Messages

2. A team-based care approach is an effective strategy for the prevention of cardiovascular disease. Clinicians should evaluate the social determinants of health that affect individuals to inform treatment decisions.

Top 10 Take Home Messages

3. Adults who are 40 to 75 years of age and are being evaluated for cardiovascular disease prevention should undergo 10-year atherosclerotic cardiovascular disease (ASCVD) risk estimation and have a clinician–patient risk discussion before starting on pharmacological therapy, such as antihypertensive therapy, a statin, or aspirin. In addition, assessing for other risk-enhancing factors can help guide decisions about preventive interventions in select individuals, as can coronary artery calcium scanning.

Top 10 Take Home Messages

4. All adults should consume a healthy diet that emphasizes the intake of vegetables, fruits, nuts, whole grains, lean vegetable or animal protein, and fish and minimizes the intake of *trans* fats, red meat and processed red meats, refined carbohydrates, and sweetened beverages. For adults with overweight and obesity, counseling and caloric restriction are recommended for achieving and maintaining weight loss.

Top 10 Take Home Messages

5. Adults should engage in at least 150 minutes per week of accumulated moderate-intensity physical activity or 75 minutes per week of vigorous-intensity physical activity.

Top 10 Take Home Messages

6. For adults with type 2 diabetes mellitus, lifestyle changes, such as improving dietary habits and achieving exercise recommendations, are crucial. If medication is indicated, metformin is first-line therapy, followed by consideration of a sodium-glucose cotransporter 2 inhibitor or a glucagon-like peptide-1 receptor agonist.

Top 10 Take Home Messages

7. All adults should be assessed at every healthcare visit for tobacco use, and those who use tobacco should be assisted and strongly advised to quit.

Top 10 Take Home Messages

8. Aspirin should be used infrequently in the routine primary prevention of ASCVD because of lack of net benefit.

Top 10 Take Home Messages

9. Statin therapy is first-line treatment for primary prevention of ASCVD in patients with elevated low-density lipoprotein cholesterol levels (≥ 190 mg/dL), those with diabetes mellitus, who are 40 to 75 years of age, and those determined to be at sufficient ASCVD risk after a clinician–patient risk discussion.

Top 10 Take Home Messages

10. Nonpharmacological interventions are recommended for all adults with elevated blood pressure or hypertension. For those requiring pharmacological therapy, the target blood pressure should generally be <130/80 mm Hg.

2019 Primary Prevention Guideline

ASCVD Prevention Efforts

Patient-Centered Approaches

Recommendations for Patient-Centered Approaches to Comprehensive ASCVD Prevention

COR	LOE	Recommendations
I	A	<ol style="list-style-type: none">1. A team-based care approach is recommended for the control of risk factors associated with ASCVD.
I	B-R	<ol style="list-style-type: none">2. Shared decision-making should guide discussions about the best strategies to reduce ASCVD risk.
I	B-NR	<ol style="list-style-type: none">3. Social determinants of health should inform optimal implementation of treatment recommendations for the prevention of ASCVD.

Table 2. Example Considerations for Addressing Social Determinants of Health to Help Prevent ASCVD

Topic/Domain	Example Considerations
Cardiovascular risk	<ul style="list-style-type: none"> • Adults should be routinely assessed for psychosocial stressors and provided with appropriate counseling. • Health literacy should be assessed every 4 to 6 y to maximize recommendation effectiveness.
Diet	<ul style="list-style-type: none"> • In addition to the prescription of diet modifications, body size perception, as well as social and cultural influences, should be assessed. • Potential barriers to adhering to a heart-healthy diet should be assessed, including food access and economic factors; these factors may be particularly relevant to persons from vulnerable populations, such as individuals residing in either inner-city or rural environments, those at socioeconomic disadvantage, and those of advanced age*.
Exercise and physical activity	<ul style="list-style-type: none"> • In addition to the prescription of exercise, neighborhood environment and access to facilities for physical activity should be assessed.
Obesity and weight loss	<ul style="list-style-type: none"> • Lifestyle counseling for weight loss should include assessment of and interventional recommendations for psychosocial stressors, sleep hygiene, and other individualized barriers. • Weight maintenance should be promoted in patients with overweight/obesity who are unable to achieve recommended weight loss.

Table 2. Example Considerations for Addressing Social Determinants of Health to Help Prevent ASCVD (cont'd)

Topic/Domain	Example Considerations
Diabetes mellitus	<ul style="list-style-type: none">In addition to the prescription of type 2 diabetes mellitus interventions, environmental and psychosocial factors, including depression, stress, self-efficacy, and social support, should be assessed to improve achievement of glycemic control and adherence to treatment.
High blood pressure	<ul style="list-style-type: none">Short sleep duration (<6 h) and poor-quality sleep are associated with high blood pressure and should be considered. Because other lifestyle habits can impact blood pressure, access to a healthy, low-sodium diet and viable exercise options should also be considered.
Tobacco treatment	<ul style="list-style-type: none">Social support is another potential determinant of tobacco use. Therefore, in adults who use tobacco, assistance and arrangement for individualized and group social support counseling are recommended.

Assessment of Cardiovascular Risk

Recommendations for Assessment of Cardiovascular Risk		
COR	LOE	Recommendations
I	B-NR	<ol style="list-style-type: none">1. For adults 40 to 75 years of age, clinicians should routinely assess traditional cardiovascular risk factors and calculate 10-year risk of ASCVD by using the pooled cohort equations (PCE).
IIa	B-NR	<ol style="list-style-type: none">2. For adults 20 to 39 years of age, it is reasonable to assess traditional ASCVD risk factors at least every 4 to 6 years.
IIa	B-NR	<ol style="list-style-type: none">3. In adults at borderline risk (5% to <7.5% 10-year ASCVD risk) or intermediate risk ($\geq 7.5\%$ to <20% 10-year ASCVD risk), it is reasonable to use additional risk-enhancing factors to guide decisions about preventive interventions (e.g., statin therapy).

Assessment of Cardiovascular Risk (cont'd)

Recommendations for Assessment of Cardiovascular Risk		
COR	LOE	Recommendations
IIa	B-NR	<p>4. In adults at intermediate risk ($\geq 7.5\%$ to $<20\%$ 10-year ASCVD risk) or selected adults at borderline risk (5% to $<7.5\%$ 10-year ASCVD risk), if risk-based decisions for preventive interventions (e.g., statin therapy) remain uncertain, it is reasonable to measure a coronary artery calcium score to guide clinician–patient risk discussion.</p>
IIb	B-NR	<p>5. For adults 20 to 39 years of age and for those 40 to 59 years of age who have $<7.5\%$ 10-year ASCVD risk, estimating lifetime or 30-year ASCVD risk may be considered.</p>

Table 3. Risk-Enhancing Factors for Clinician-Patient Risk Discussion

Risk-Enhancing Factors
<ul style="list-style-type: none">• Family history of premature ASCVD (males, age <55 y; females, age <65 y)• Primary hypercholesterolemia (LDL-C 160–189 mg/dL [4.1–4.8 mmol/L]; non-HDL-C 190–219 mg/dL [4.9–5.6 mmol/L])*• Metabolic syndrome (increased waist circumference [by ethnically appropriate cutpoints], elevated triglycerides [>150 mg/dL, nonfasting], elevated blood pressure, elevated glucose, and low HDL-C [<40 mg/dL in men; <50 mg/dL in women] are factors; a tally of 3 makes the diagnosis)• Chronic kidney disease (eGFR 15–59 mL/min/1.73 m² with or without albuminuria; not treated with dialysis or kidney transplantation)• Chronic inflammatory conditions, such as psoriasis, RA, lupus, or HIV/AIDS

ABI indicates ankle-brachial index; AIDS, acquired immunodeficiency syndrome; apoB, apolipoprotein B; ASCVD, atherosclerotic cardiovascular disease; eGFR, estimated glomerular filtration rate; HDL-C, high-density lipoprotein cholesterol; HIV, human immunodeficiency virus; LDL-C, low-density lipoprotein cholesterol; Lp(a), lipoprotein (a); and RA, rheumatoid arthritis.

Table 3. Risk-Enhancing Factors for Clinician-Patient Risk Discussion (cont'd)

Risk-Enhancing Factors

- **History of premature menopause (before age 40 y) and history of pregnancy-associated conditions that increase later ASCVD risk, such as preeclampsia**
- **High-risk race/ethnicity** (e.g., South Asian ancestry)
- **Lipids/biomarkers:** associated with increased ASCVD risk
- Persistently elevated,* primary hypertriglyceridemia (≥ 175 mg/dL, nonfasting);
- If measured:
 - **Elevated high-sensitivity C-reactive protein (≥ 2.0 mg/L)**
 - **Elevated Lp(a):** A relative indication for its measurement is family history of premature ASCVD. An Lp(a) ≥ 50 mg/dL or ≥ 125 nmol/L constitutes a risk-enhancing factor, especially at higher levels of Lp(a).
 - **Elevated apoB (≥ 130 mg/dL):** A relative indication for its measurement would be triglyceride ≥ 200 mg/dL. A level ≥ 130 mg/dL corresponds to an LDL-C > 160 mg/dL and constitutes a risk-enhancing factor
 - **ABI (<0.9)**

*Optimally, 3 determinations.

2019 Primary Prevention Guideline

Lifestyle Factors Affecting Cardiovascular Risk

Nutrition and Diet

Recommendations for Nutrition and Diet		
COR	LOE	Recommendations
I	B-R	<ol style="list-style-type: none">1. A diet emphasizing intake of vegetables, fruits, legumes, nuts, whole grains, and fish is recommended to decrease ASCVD risk factors.
IIa	B-NR	<ol style="list-style-type: none">2. Replacement of saturated fat with dietary monounsaturated and polyunsaturated fats can be beneficial to reduce ASCVD risk.
IIa	B-NR	<ol style="list-style-type: none">3. A diet containing reduced amounts of cholesterol and sodium can be beneficial to decrease ASCVD risk.

Nutrition and Diet (cont'd)

Recommendations for Nutrition and Diet		
COR	LOE	Recommendations
IIa	B-NR	<p>4. As a part of a healthy diet, it is reasonable to minimize the intake of processed meats, refined carbohydrates, and sweetened beverages to reduce ASCVD risk.</p>
III-Harm	B-NR	<p>5. As a part of a healthy diet, the intake of <i>trans</i> fats should be avoided to reduce ASCVD risk.</p>

Exercise and Physical Activity

Recommendations for Exercise and Physical Activity		
COR	LOE	Recommendations
I	B-R	<ol style="list-style-type: none">1. Adults should be routinely counseled in healthcare visits to optimize a physically active lifestyle.
I	B-NR	<ol style="list-style-type: none">2. Adults should engage in at least 150 minutes per week of accumulated moderate-intensity or 75 minutes per week of vigorous-intensity aerobic physical activity (or an equivalent combination of moderate and vigorous activity) to reduce ASCVD risk.

Exercise and Physical Activity (cont'd)

Recommendations for Exercise and Physical Activity		
COR	LOE	Recommendations
IIa	B-NR	<p>3. For adults unable to meet the minimum physical activity recommendations (at least 150 minutes per week of accumulated moderate-intensity or 75 minutes per week of vigorous-intensity aerobic physical activity), engaging in some moderate- or vigorous-intensity physical activity, even if less than this recommended amount, can be beneficial to reduce ASCVD risk.</p>
IIb	C-LD	<p>4. Decreasing sedentary behavior in adults may be reasonable to reduce ASCVD risk.</p>

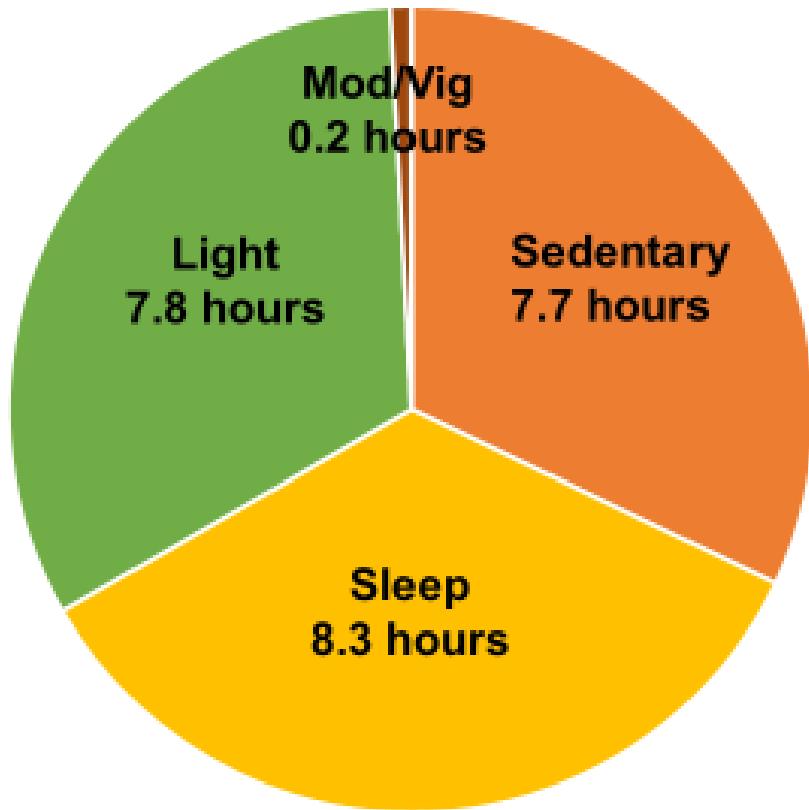
Table 4. Definitions and Examples of Different Intensities of Physical Activity

Intensity	METs	Examples
Sedentary behavior*	1–1.5	Sitting, reclining, or lying; watching television
Light	1.6–2.9	Walking slowly, cooking, light housework
Moderate	3.0 –5.9	Brisk walking (2.4–4 mph), biking (5–9 mph), ballroom dancing, active yoga, recreational swimming
Vigorous	≥6	Jogging/running, biking (≥ 10 mph), singles tennis, swimming laps

*Sedentary behavior is defined as any waking behavior characterized by an energy expenditure ≤ 1.5 METs while in a sitting, reclining, or lying posture. Standing is a sedentary activity in that it involves ≤ 1.5 METs, but it is not considered a component of sedentary behavior.

MET indicates metabolic equivalent; mph, miles per hour.

Figure 1. Hours Per Day Spent in Various States of Activity



U.S. adults spend >7 h/d on average in sedentary activities. Replacing sedentary time with other physical activity involves increasing either moderate- to vigorous-intensity physical activity or light-intensity physical activity.

2019 Primary Prevention Guideline

Other Factors Affecting Cardiovascular Risk

Adults with Overweight and Obesity

Recommendations for Adults with Overweight and Obesity		
COR	LOE	Recommendations
I	B-R	<ol style="list-style-type: none">1. In individuals with overweight and obesity, weight loss is recommended to improve the ASCVD risk factor profile.
I	B-R	<ol style="list-style-type: none">2. Counseling and comprehensive lifestyle interventions, including calorie restriction, are recommended for achieving and maintaining weight loss in adults with overweight and obesity.

Adults with Overweight and Obesity (cont'd)

Recommendations for Adults with Overweight and Obesity		
COR	LOE	Recommendations
I	C-EO	<p>3. Calculating body mass index (BMI) is recommended annually or more frequently to identify adults with overweight and obesity for weight loss considerations.</p>
IIa	B-NR	<p>4. It is reasonable to measure waist circumference to identify those at higher cardiometabolic risk.</p>

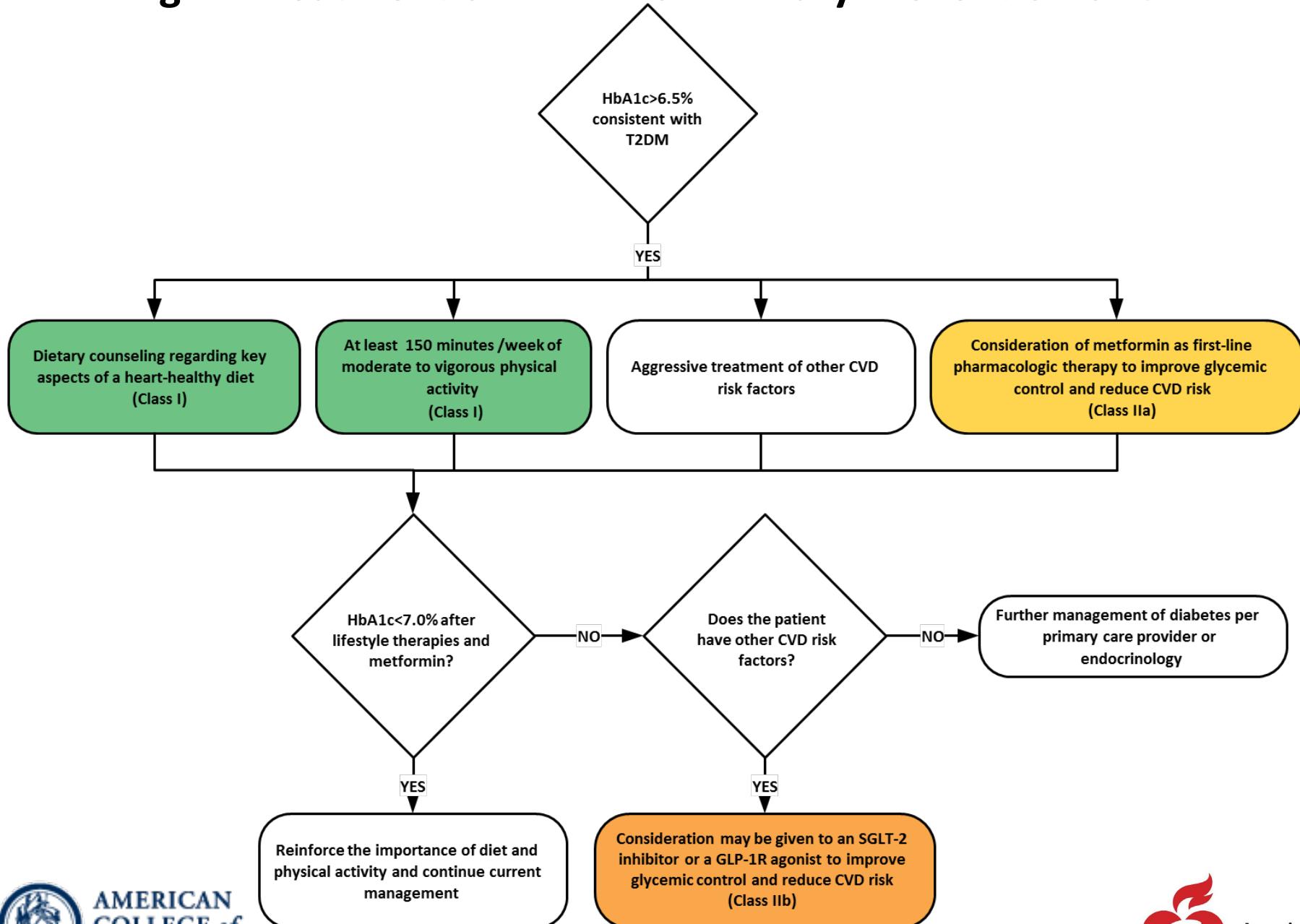
Adults with Type 2 Diabetes Mellitus

Recommendations for Adults With Type 2 Diabetes Mellitus		
COR	LOE	Recommendations
I	A	<ol style="list-style-type: none">1. For all adults with T2DM, a tailored nutrition plan focusing on a heart-healthy dietary pattern is recommended to improve glycemic control, achieve weight loss if needed, and improve other ASCVD risk factors.
I	A	<ol style="list-style-type: none">2. Adults with T2DM should perform at least 150 minutes per week of moderate-intensity physical activity or 75 minutes of vigorous-intensity physical activity to improve glycemic control, achieve weight loss if needed, and improve other ASCVD risk factors.

Adults with Type 2 Diabetes Mellitus (cont'd)

Recommendations for Adults With Type 2 Diabetes Mellitus		
COR	LOE	Recommendations
IIa	B-R	<p>3. For adults with T2DM, it is reasonable to initiate metformin as first-line therapy along with lifestyle therapies at the time of diagnosis to improve glycemic control and reduce ASCVD risk.</p>
IIb	B-R	<p>4. For adults with T2DM and additional ASCVD risk factors who require glucose-lowering therapy despite initial lifestyle modifications and metformin, it may be reasonable to initiate a sodium-glucose cotransporter 2 (SGLT-2) inhibitor or a glucagon-like peptide-1 receptor (GLP-1R) agonist to improve glycemic control and reduce CVD risk.</p>

Fig. 2. Treatment of T2DM for Primary Prevention of CVD



Adults with High Blood Cholesterol

Recommendations for Adults with High Blood Cholesterol		
COR	LOE	Recommendations
I	A	<ol style="list-style-type: none">1. In adults at intermediate risk ($\geq 7.5\%$ to $<20\%$ 10-year ASCVD risk), statin therapy reduces risk of ASCVD, and in the context of a risk discussion, if a decision is made for statin therapy, a moderate-intensity statin should be recommended.
I	A	<ol style="list-style-type: none">2. In intermediate risk ($\geq 7.5\%$ to $<20\%$ 10-year ASCVD risk) patients, LDL-C levels should be reduced by 30% or more, and for optimal ASCVD risk reduction, especially in patients at high risk ($\geq 20\%$ 10-year ASCVD risk), levels should be reduced by 50% or more.

Adults with High Blood Cholesterol (cont'd)

Recommendations for Adults with High Blood Cholesterol		
COR	LOE	Recommendations
I	A	<p>3. In adults 40 to 75 years of age with diabetes, regardless of estimated 10-year ASCVD risk, moderate-intensity statin therapy is indicated.</p>
I	B-R	<p>4. In patients 20 to 75 years of age with an LDL-C level of 190 mg/dL ($\geq 4.9 \text{ mmol/L}$) or higher, maximally tolerated statin therapy is recommended.</p>

Adults with High Blood Cholesterol (cont'd)

Recommendations for Adults with High Blood Cholesterol		
COR	LOE	Recommendations
IIa	B-R	<p>5. In adults with diabetes mellitus who have multiple ASCVD risk factors, it is reasonable to prescribe high-intensity statin therapy with the aim to reduce LDL-C levels by 50% or more.</p>
IIa	B-R	<p>6. In intermediate-risk ($\geq 7.5\%$ to $<20\%$ 10-year ASCVD risk) adults, risk-enhancing factors favor initiation or intensification of statin therapy.</p>

Adults with High Blood Cholesterol (cont'd)

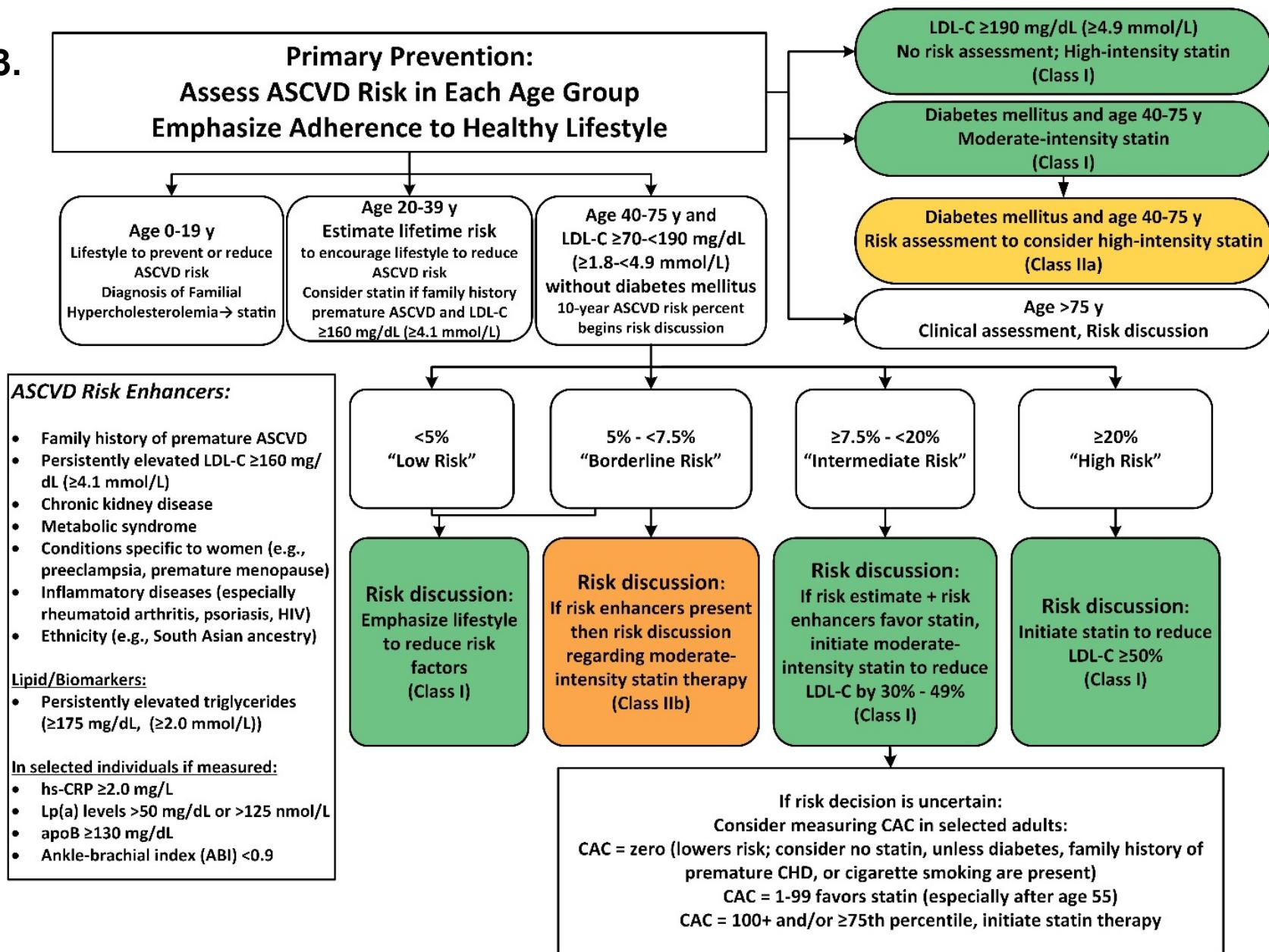
Recommendations for Adults with High Blood Cholesterol

COR	LOE	Recommendations
IIa	B-NR	<p>7. In intermediate-risk ($\geq 7.5\%$ to $<20\%$ 10-year ASCVD risk) adults or selected borderline-risk (5% to $<7.5\%$ 10-year ASCVD risk) adults in whom a coronary artery calcium score is measured for the purpose of making a treatment decision, AND</p> <ul style="list-style-type: none">• If the coronary artery calcium score is zero, it is reasonable to withhold statin therapy and reassess in 5 to 10 years, as long as higher-risk conditions are absent (e.g., diabetes, family history of premature CHD, cigarette smoking);• If coronary artery calcium score is 1 to 99, it is reasonable to initiate statin therapy for patients ≥ 55 years of age;• If coronary artery calcium score is 100 or higher or in the 75th percentile or higher, it is reasonable to initiate statin therapy.

Adults with High Blood Cholesterol (cont'd)

Recommendations for Adults with High Blood Cholesterol		
COR	LOE	Recommendations
IIb	B-R	<p>8. In patients at borderline risk (5% to <7.5% 10-year ASCVD risk), in risk discussion, the presence of risk-enhancing factors may justify initiation of moderate-intensity statin therapy.</p>

Fig. 3.



AMERICAN
COLLEGE *of*
CARDIOLOGY



American
Heart
Association

Table 5. Diabetes-Specific Risk Enhancers That Are Independent of Other Risk Factors in Diabetes Mellitus

Risk Enhancers in Diabetic Patients

- Long duration (≥ 10 years for T2DM (S4.3-36) or ≥ 20 years for type 1 diabetes mellitus (S4.3-16))
- Albuminuria ≥ 30 mcg albumin/mg creatinine (S4.3-37)
- eGFR < 60 mL/min/1.73 m² (S4.3-37)
- Retinopathy (S4.3-38)
- Neuropathy (S4.3-39)
- ABI < 0.9 (S4.3-40, S4.3-41)

ABI indicates ankle-brachial index; eGFR, estimated glomerular filtration rate; and T2DM, type 2 diabetes mellitus.

Table 6. Selected Examples of Candidates for CAC Measurement Who Might Benefit from Knowing Their CAC Score is Zero

CAC Measurement Candidates Who Might Benefit from Knowing Their CAC Score Is Zero

- Patients reluctant to initiate statin who wish to understand their risk and potential for benefit more precisely
- Patients concerned about need to reinstitute statin therapy after discontinuation for statin-associated symptoms
- Older patients (men 55–80 y of age; women 60–80 y of age) with low burden of risk factors (S4.4-42) who question whether they would benefit from statin therapy
- Middle-aged adults (40–55 y of age) with PCE-calculated 10-year risk for ASCVD 5% to <7.5% with factors that increase their ASCVD risk, although they are in a borderline risk group.

Adults with High Blood Pressure or Hypertension

Recommendations for Adults with High Blood Pressure or Hypertension		
COR	LOE	Recommendations
I	A	<p>1. In adults with elevated blood pressure (BP) or hypertension, including those requiring antihypertensive medications nonpharmacological interventions are recommended to reduce BP. These include:</p> <ul style="list-style-type: none">• weight loss,• a heart-healthy dietary pattern,• sodium reduction,• dietary potassium supplementation,• increased physical activity with a structured exercise program; and• limited alcohol.

Adults with High Blood Pressure or Hypertension (cont'd)

Recommendations for Adults with High Blood Pressure or Hypertension		
COR	LOE	Recommendations
I	SBP: A DBP: C-EO	<p>2. In adults with an estimated 10-year ASCVD risk* of 10% or higher and an average systolic BP (SBP) of 130 mm Hg or higher or an average diastolic BP (DBP) of 80 mm Hg or higher, use of BP-lowering medications is recommended for primary prevention of CVD.</p>

Adults with High Blood Pressure or Hypertension (cont'd)

Recommendations for Adults with High Blood Pressure or Hypertension		
COR	LOE	Recommendations
I	SBP: B-R ^{SR}	3. In adults with confirmed hypertension and a 10-year ASCVD event risk of 10% or higher, a BP target of less than 130/80 mm Hg is recommended.
	DBP: C-EO	
I	SBP: B-R ^{SR}	4. In adults with hypertension and chronic kidney disease, treatment to a BP goal of less than 130/80 mm Hg is recommended.
	DBP: C-EO	

Adults with High Blood Pressure or Hypertension (cont'd)

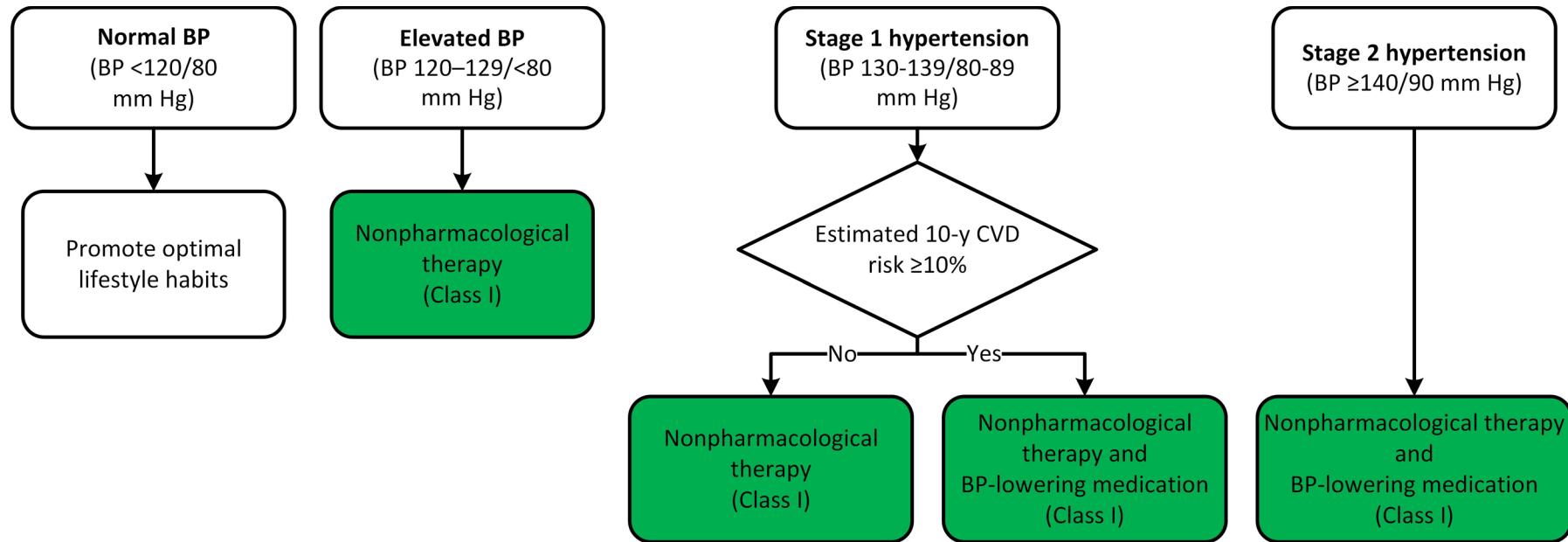
Recommendations for Adults with High Blood Pressure or Hypertension		
COR	LOE	Recommendations
I	SBP: B-R ^{SR} DBP: C-EO	<p>5. In adults with T2DM and hypertension, antihypertensive drug treatment should be initiated at a BP of 130/80 mm Hg or higher, with a treatment goal of less than 130/80 mm Hg.</p>
I	C-LD	<p>6. In adults with an estimated 10-year ASCVD risk <10% and an SBP of 140 mm Hg or higher or a DBP of 90 mm Hg or higher, initiation and use of BP-lowering medication are recommended.</p>

Adults with High Blood Pressure or Hypertension (cont'd)

Recommendations for Adults with High Blood Pressure or Hypertension

COR	LOE	Recommendations
IIb	SBP: B-NR DBP: C-EO	<p>7. In adults with confirmed hypertension without additional markers of increased ASCVD risk, a BP target of less than 130/80 mm Hg may be reasonable.</p>

Figure 4. BP Thresholds and Recommendations for Treatment



BP indicates blood pressure; and CVD, cardiovascular disease.

Table 7. Best Proven Nonpharmacological Interventions For the Prevention and Treatment of Hypertension

	Nonpharmacological Intervention	Goal	Approximate Impact on SBP		
			Hypertension	Normotension	Reference
Weight loss	Weight/body fat	Best goal is ideal body weight, but aim for at least a 1-kg reduction in body weight for most adults who are overweight. Expect about 1 mm Hg for every 1-kg reduction in body weight.	-5 mm Hg	-2/3 mm Hg	(S4.4-2)
Healthy diet	DASH dietary pattern‡	Consume a diet rich in fruits, vegetables, whole grains, and low-fat dairy products, with reduced content of saturated and total fat.	-11 mm Hg	-3 mm Hg	(S4.4-7, S4.4-8)
Reduced intake of dietary sodium	Dietary sodium	Optimal goal is <1500 mg/d, but aim for at least a 1000-mg/d reduction in most adults.	-5/6 mm Hg	-2/3 mm Hg	(S4.4-12, S4.4-10)
Enhanced intake of dietary potassium	Dietary potassium	Aim for 3500–5000 mg/d, preferably by consumption of a diet rich in potassium.	-4/5 mm Hg	-2 mm Hg	(S4.4-14)

Table 7. Best Proven Nonpharmacological Interventions For the Prevention and Treatment of Hypertension (cont'd)

	Nonpharmacological Intervention	Goal	Approximate Impact on SBP		
			Hypertension	Normotension	Reference
Physical activity	Aerobic	<ul style="list-style-type: none"> • 90–150 min/wk • 65%–75% heart rate reserve 	-5/8 mm Hg	-2/4 mm Hg	(S4.4-19, S4.4-20)
	Dynamic resistance	<ul style="list-style-type: none"> • 90–150 min/wk • 50%–80% 1 rep maximum • 6 exercises, 3 sets/exercise, 10 repetitions/set 	-4 mm Hg	-2 mm Hg	(S4.4-19)
	Isometric resistance	<ul style="list-style-type: none"> • 4 × 2 min (hand grip), 1 min rest between exercises, 30%–40% maximum voluntary contraction, 3 sessions/wk • 8–10 wk 	-5 mm Hg	-4 mm Hg	(S4.4-21, S4.4-63)
Moderation in alcohol intake	Alcohol consumption	<p>In individuals who drink alcohol, reduce alcohol† to:</p> <ul style="list-style-type: none"> • Men: ≤2 drinks daily • Women: ≤1 drink daily 	-4 mm Hg	-3 mm Hg	(S4.4-20, S4.4-24, S4.4-25)

Treatment of Tobacco Use

Recommendations for Treatment of Tobacco Use		
COR	LOE	Recommendations
I	A	<ol style="list-style-type: none">1. All adults should be assessed at every healthcare visit for tobacco use and their tobacco use status recorded as a vital sign to facilitate tobacco cessation.
I	A	<ol style="list-style-type: none">2. To achieve tobacco abstinence, all adults who use tobacco should be firmly advised to quit.

Treatment of Tobacco Use (cont'd)

Recommendations for Treatment of Tobacco Use		
COR	LOE	Recommendations
I	A	<p>3. In adults who use tobacco, a combination of behavioral interventions plus pharmacotherapy is recommended to maximize quit rates.</p>
I	B-NR	<p>4. In adults who use tobacco, tobacco abstinence is recommended to reduce ASCVD risk.</p>

Treatment of Tobacco Use (cont'd)

Recommendations for Treatment of Tobacco Use		
COR	LOE	Recommendations
IIa	B-R	<p>5. To facilitate tobacco cessation, it is reasonable to dedicate trained staff to tobacco treatment in every healthcare system.</p>
III: Harm	B-NR	<p>6. All adults and adolescents should avoid secondhand smoke exposure to reduce ASCVD risk.</p>

Table 8. Highlights of Recommended Behavioral and Pharmacotherapy Tobacco Treatment Modalities

Timing of Behavioral Interventions†		
<3 min of tobacco status assessment with cessation counseling at each clinic encounter	>3-10 min of tobacco status assessment with cessation counseling at each clinic encounter	>10 min of tobacco status assessment with cessation counseling at each clinic encounter

†Timing of assessment relates to ICD-10 coding.

Table 8. Highlights of Recommended Behavioral and Pharmacotherapy Tobacco Treatment Modalities (cont'd)

Treatment	Dosing‡	Precautions
NRT*		
Patch	21 mg, 14 mg, or 7 mg	Starting dose: 21 mg for >10 CPD; 14 mg for <10 CPD Local irritation possible; avoid with skin disorders; may remove for sleep if needed
Gum	2 mg or 4 mg	Starting dose: 4 mg if first tobacco use is ≤30 min after waking; 2 mg if first tobacco use is >30 min after waking; maximum of 20 lozenges or 24 pieces of gum/d. Hiccups/dyspepsia possible; avoid food or beverages 15 min before and after use
Lozenge	2 mg or 4 mg	>30 min after waking; maximum of 20 lozenges or 24 pieces of gum/d. Chew and park gum*

*CPD can guide dosing. 1 CPD is ≈1-2 mg of nicotine. Note: Use caution with all NRT products for patients with recent (≤ 2 wk) MI, serious arrhythmia, or angina; patients who are pregnant or breastfeeding; and adolescents.

‡Dose and duration can be titrated on the basis of response

Table 8. Highlights of Recommended Behavioral and Pharmacotherapy Tobacco Treatment Modalities (cont'd)

Treatment	Dosing‡		Precautions
NRT*			
Nasal spray	10 mg/mL	Starting dose: 1-2 doses/h (1 dose=2 sprays); maximum of 40 doses/d	Local irritation possible; avoid with nasal or reactive airway disorders
Oral inhaler	10, 10-mg cartridge	Starting dose: Puff for 20 min/cartridge every 1-2 h; maximum 6-16 cartridges/d; taper over 3-6 mo§	Cough possible; avoid with reactive airway disorders

*CPD can guide dosing. 1 CPD is ≈1-2 mg of nicotine. Note: Use caution with all NRT products for patients with recent (≤ 2 wk) MI, serious arrhythmia, or angina; patients who are pregnant or breastfeeding; and adolescents.

‡Dose and duration can be titrated on the basis of response

Table 8. Highlights of Recommended Behavioral and Pharmacotherapy Tobacco Treatment Modalities (cont'd)

Treatment	Dosing‡	Precautions	
Other 			
Bupropion (Zyban [GlaxoSmithKline], Wellbutrin SR [GlaxoSmithKline])	150 mg SR	150 mg once daily (am) for 3 d; then 150 mg twice daily; may use in combination with NRT (S4.5-21)	Avoid with history/risk of seizures, eating disorders, MAO inhibitors, or CYP 2D6 inhibitor
Varenicline (Chantix [Pfizer])	0.5 mg or 1 mg	0.5 mg once daily (am) for 3 d; then 0.5 mg twice daily for 4 d; then 1 mg twice daily (use start pack followed by continuation pack) for 3-6 mo	Nausea common; take with food. Renal dosing required. Very limited drug interactions; near-exclusive renal clearance.

‡Dose and duration can be titrated on the basis of response

§ See Rx for Change for greater detail: <http://rxforchange.ucsf.edu>)

||The FDA has issued a removal of black box warnings about neuropsychiatric events

am indicates morning; CPD, cigarettes smoked per day; FDA, U.S. Food and Drug Administration; ICD-10, *International Classification of Diseases, Tenth Revision*; MAO, monoamine oxidase; NRT, nicotine replacement; and SR, sustained release.

Aspirin Use

Recommendations for Aspirin Use		
COR	LOE	Recommendations
IIb	A	<ol style="list-style-type: none">1. Low-dose aspirin (75-100 mg orally daily) might be considered for the primary prevention of ASCVD among select adults 40 to 70 years of age who are at higher ASCVD risk but not at increased bleeding risk.
III: Harm	B-R	<ol style="list-style-type: none">2. Low-dose aspirin (75-100 mg orally daily) should not be administered on a routine basis for the primary prevention of ASCVD among adults >70 years of age.
III: Harm	C-LD	<ol style="list-style-type: none">3. Low-dose aspirin (75-100 mg orally daily) should not be administered for the primary prevention of ASCVD among adults of any age who are at increased risk of bleeding.