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

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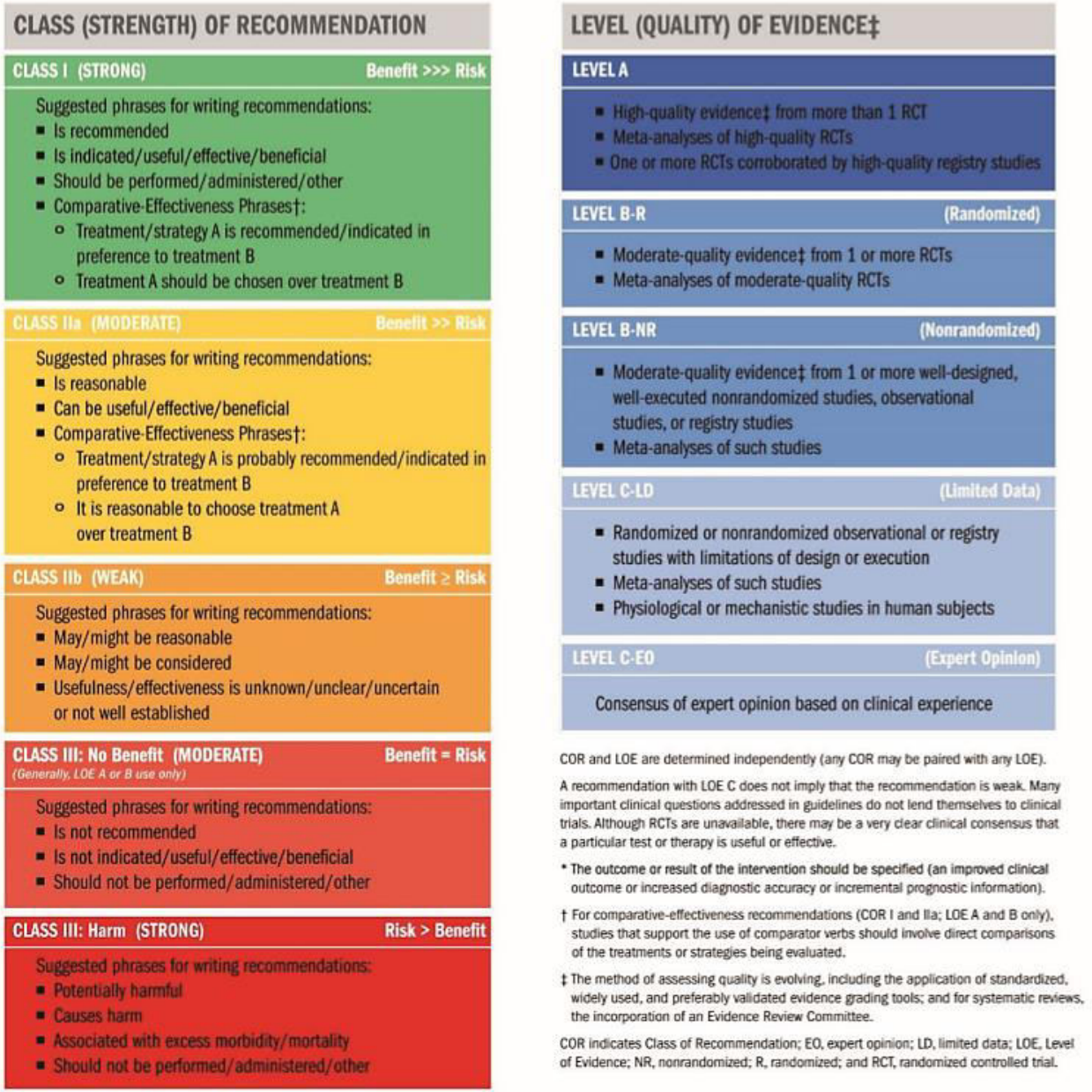
Mục tiêu khuyến cáo

- Phòng ngừa tiên phát, người lớn ≥ 18 tuổi
- Loại bệnh: ASCVD (ie: NMCT cấp, bệnh tim TMCB ổn định, đột quỵ, bệnh ĐM ngoại vi …)

Class of recommendation



CLASS (STRENGTH) OF RECOMMENDATION

CLASS I (STRONG) — Benefit >>> Risk

Suggested phrases for writing recommendations:
- Is recommended
- Is indicated/useful/effective/beneficial
- Should be performed/administered/other
- Comparative-Effectiveness Phrases†:
  - Treatment/strategy A is recommended/indicated in preference to treatment B
  - Treatment A should be chosen over treatment B

CLASS IIa (MODERATE) — Benefit >> Risk

Suggested phrases for writing recommendations:
- Is reasonable
- Can be useful/effective/beneficial
- Comparative-Effectiveness Phrases†:
  - Treatment/strategy A is probably recommended/indicated in preference to treatment B
  - It is reasonable to choose treatment A over treatment B

CLASS IIb (WEAK) — Benefit ≥ Risk

Suggested phrases for writing recommendations:
- May/might be reasonable
- May/might be considered
- Usefulness/effectiveness is unknown/unclear/uncertain or not well established

CLASS III: No Benefit (MODERATE) — Benefit = Risk
(Generally, LOE A or B use only)

Suggested phrases for writing recommendations:
- 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:
- Potentially harmful
- Causes harm
- Associated with excess morbidity/mortality
- Should not be performed/administered/other

LEVEL (QUALITY) OF EVIDENCE‡

LEVEL A
- High-quality evidence‡ from more than 1 RCT
- Meta-analyses of high-quality RCTs
- One or more RCTs corroborated by high-quality registry studies

LEVEL B-R (Randomized)
- Moderate-quality evidence‡ from 1 or more RCTs
- Meta-analyses of moderate-quality RCTs

LEVEL B-NR (Nonrandomized)
- Moderate-quality evidence‡ from 1 or more well-designed, well-executed nonrandomized studies, observational studies, or registry studies
- Meta-analyses of such studies

LEVEL C-LD (Limited Data)
- 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

LEVEL C-EO (Expert Opinion)

Consensus of expert opinion based on clinical experience

COR and LOE are determined independently (any COR may be paired with any LOE).

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.

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Abbreviations

Abbreviation	Meaning/Phrase
ASCVD	atherosclerotic cardiovascular disease
AU	Agatston units
BMI	body mass index
BP	blood pressure
CHD	coronary heart disease
CKD	chronic kidney disease
CVD	cardiovascular disease
DASH	Dietary Approaches to Stop Hypertension
DBP	diastolic blood pressure
DM	diabetes mellitus
ENDS	electronic nicotine delivery systems
FDA	U.S. Food and Drug Administration
GLP-1R	glucagon-like peptide-1 receptor
HbA1c	hemoglobin A1c
HDL-C	high-density lipoprotein cholesterol
HbA1c	hemoglobin A1c
LDL-C	low-density lipoprotein cholesterol
MI	myocardial infarction
PCE	pooled cohort equations
RCT	randomized controlled trial
SBP	systolic blood pressure
SGLT-2	sodium-glucose cotransporter 2
T2DM	type 2 diabetes mellitus
USPSTF	U.S. Preventive Services Task Force

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Assessment of Cardiovascular Risk (1)

Recommendations for Assessment of Cardiovascular Risk		
COR	**LOE**	**Recommendations**
I	B-NR	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	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	In adults at borderline risk (5% to <7.5% 10-year ASCVD risk) or intermediate risk (≥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).

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Assessment of Cardiovascular Risk (2)

Recommendations for Assessment of Cardiovascular Risk		
COR	**LOE**	**Recommendations**
IIa	B-NR	In adults at intermediate risk (≥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.
IIb	B-NR	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

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Risk-Enhancing factors for clinical - patient risk discussion (1)

Risk-Enhancing Factors
• 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)

*Optimally, 3 determinations

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Risk-Enhancing factors for clinical - patient risk discussion (2)

Risk-Enhancing Factors
• 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 • 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)

AIDS, acquired immunodeficiency syndrome; ASCVD, atherosclerotic cardiovascular disease; eGFR, estimated glomerular filtration rate; HIV, human immunodeficiency virus; and RA, rheumatoid arthritis.

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Risk-Enhancing factors for clinical - patient risk discussion (3)

Risk-Enhancing Factors
• 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

ABI indicates ankle-brachial index; apoB, apolipoprotein B; ASCVD, atherosclerotic cardiovascular disease; Lp(a), lipoprotein (a)

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Lifestyle Factors Affecting Cardiovascular Risks

- Nutrition and Diet
- Exercise and Physical activity

Nutrition and Diet

Recommendations for Nutrition and Diet Referenced studies that support recommendations are summarized in Online Data Supplements 4 and 5.		
COR	**LOE**	**Recommendations**
I	B-R	1. A diet emphasizing intake of vegetables, fruits, legumes, nuts, whole grains, and fish is recommended to decrease ASCVD risk factors (S3.1-1–S3.1-11).
IIa	B-NR	2. Replacement of saturated fat with dietary monounsaturated and polyunsaturated fats can be beneficial to reduce ASCVD risk (S3.1-12, S3.1-13).
IIa	B-NR	3. A diet containing reduced amounts of cholesterol and sodium can be beneficial to decrease ASCVD risk (S3.1-9, S3.1-14–S3.1-16).
IIa	B-NR	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 (S3.1-17–S3.1-24).
III: Harm	B-NR	5. As a part of a healthy diet, the intake of *trans* fats should be avoided to reduce ASCVD risk (S3.1-12, S3.1-17, S3.1-25–S3.1-27).

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Exercise and Physical activity (1)

Recommendations for Exercise and Physical Activity		
COR	**LOE**	**Recommendations**
I	**B-R**	Adults should be routinely counseled in healthcare visits to optimize a physically active lifestyle.
I	**B-NR**	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.

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Exercise and Physical activity (2)

Recommendations for Exercise and Physical Activity		
COR	**LOE**	**Recommendations**
IIa	**B-NR**	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
IIb	**C-LD**	Decreasing sedentary behavior in adults may be reasonable to reduce ASCVD risk

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

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; and mph, miles per hour.

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Other factors affecting cardiovascular risks

- Adults with overweight and obesity
  - Overweight: BMI 25 – 29.9 kg/m^2
  - Obesity: BMI ≥ 30 kg/m^2
  - ↑ ASCVD, heart failure, atrial fibrillation
- Adults with type 2 diabetes mellitus
- Adults with high blood cholesterol
- Adults with high Blood Pressure or Hypertension
- Tobacco use
- Aspirin use

Adults With Overweight and Obesity

Recommendations for Adults With Overweight and Obesity Referenced studies that support recommendations are summarized in Online Data Supplements 8 and 9.		
COR	**LOE**	**Recommendations**
I	B-R	1. In individuals with overweight and obesity, weight loss is recommended to improve the ASCVD risk factor profile (S4.1-1).
I	B-R	2. Counseling and comprehensive lifestyle interventions, including calorie restriction, are recommended for achieving and maintaining weight loss in adults with overweight and obesity (S4.1-1, S4.1-2).
I	C-EO	3. Calculating body mass index (BMI) is recommended annually or more frequently to identify adults with overweight and obesity for weight loss considerations.
IIa	B-NR	4. It is reasonable to measure waist circumference to identify those at higher cardiometabolic risk (S4.1-3–S4.1-6).

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Adults With Type 2 Diabetes Mellitus (1)

Recommendations for Adults With Type 2 Diabetes Mellitus		
COR	**LOE**	**Recommendations**
I	**A**	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**	Adults with T2DM should perform at least 150 minutes per week of moderateintensity 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.

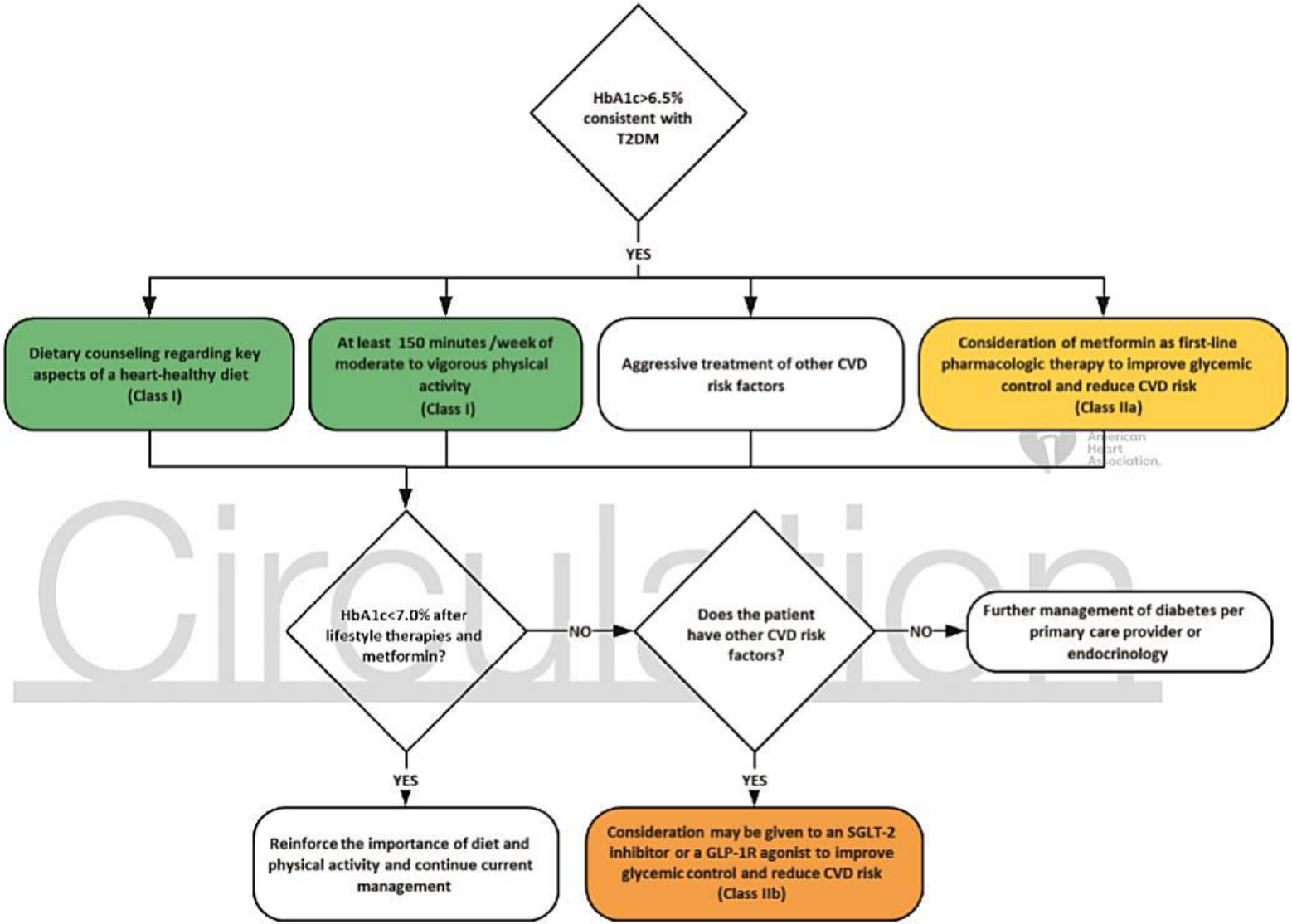
Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Adults With Type 2 Diabetes Mellitus (2)

Recommendations for Adults With Type 2 Diabetes Mellitus		
COR	**LOE**	**Recommendations**
IIa	**B-R**	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.
IIb	**B-R**	For adults with T2DM and additional ASCVD risk factors who require glucoselowering 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.

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Treatment of T2DM for Primary Prevention of Cardiovascular Disease



Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Adults With High Blood Cholesterol (1)

Recommendations for Adults With High Blood Cholesterol Referenced studies that support recommendations are summarized in Online Data Supplements 11 and 12.		
COR	**LOE**	**Recommendations**
I	A	**1. In adults at intermediate risk (≥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 (S4.3-2–S4.3-9).** Adapted from recommendations in the 2018 Cholesterol Clinical Practice Guidelines (S4.3-1).
I	A	**2. In intermediate risk (≥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 (≥20% 10-year ASCVD risk), levels should be reduced by 50% or more (S4.3-2, S4.3-5–S4.3-10).** Adapted from recommendations in the 2018 Cholesterol Clinical Practice Guidelines (S4.3-1).
I	A	**3. In adults 40 to 75 years of age with diabetes, regardless of estimated 10-year ASCVD risk, moderate-intensity statin therapy is indicated (S4.3-11–S4.3-19).** Included from recommendations in the 2018 Cholesterol Clinical Practice Guidelines (S4.3-1).

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Adults With High Blood Cholesterol (2)

COR	LOE	Recommendations
I	B-R	4. **In patients 20 to 75 years of age with an LDL-C level of 190 mg/dL (≥4.9 mmol/L) or higher, maximally tolerated statin therapy is recommended (S4.3-2, S4.3-20–S4.3-25).** Included from recommendations in the 2018 Cholesterol Clinical Practice Guidelines (S4.3-1).
IIa	B-R	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 (S4.3-2, S4.3-7).** Included from recommendations in the 2018 Cholesterol Clinical Practice Guidelines (S4.3-1).
IIa	B-R	6. **In intermediate-risk (≥7.5% to <20% 10-year ASCVD risk) adults, risk-enhancing factors favor initiation or intensification of statin therapy (S4.3-7, S4.3-26–S4.3-33).** Adapted from recommendations in the 2018 Cholesterol Clinical Practice Guidelines (S4.3-1).

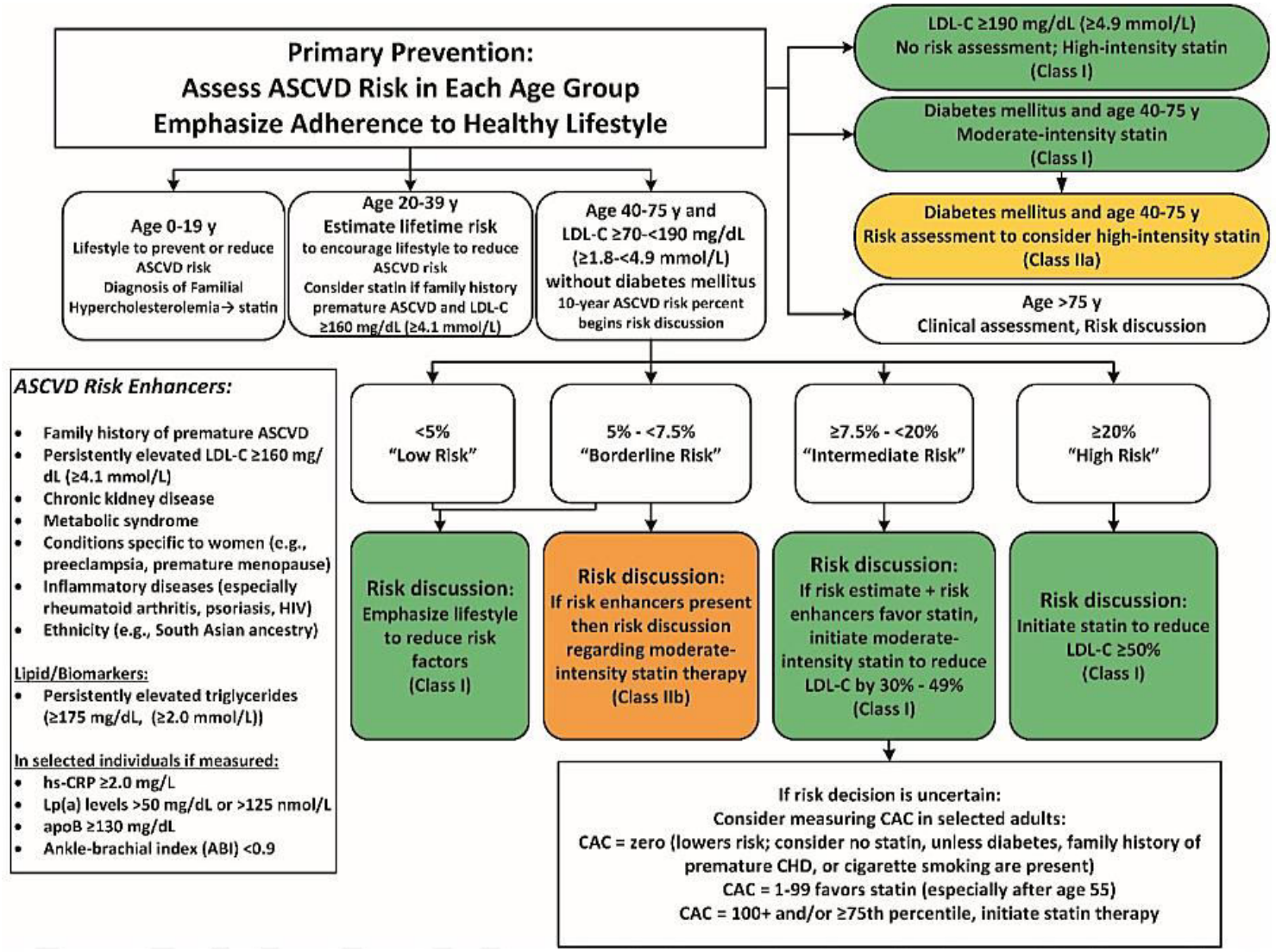
Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Adults With High Blood Cholesterol (3)

COR	LOE	Recommendations
IIa	B-NR	7. In intermediate-risk (≥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 • 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 (S4.3-28, S4.3-34). Adapted from recommendations in the 2018 Cholesterol Clinical Practice Guidelines (S4.3-1).
IIb	B-R	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 (S4.3-28, S4.3-35). Adapted from recommendations in the 2018 Cholesterol Clinical Practice Guidelines (S4.3-1).

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Primary Prevention



Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

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 (S4.3-61) or ≥20 years for type 1 diabetes mellitus (S4.3-16))
• Albuminuria ≥30 mcg albumin/mg creatinine (S4.3-62)
• eGFR <60 mL/min/1.73 m^2 (S4.3-62)
• Retinopathy (S4.3-63)
• Neuropathy (S4.3-64)
• ABI <0.9 (S4.3-65, S4.3-66)

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Coronary Artery Calcium measurement candidates who might benefit from knowing their Coronary artery calcium score is Zero

Coronary Artery Calcium Measurement Candidates Who Might Benefit from Knowing Their Coronary Artery Calcium 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 (S4.3-53) who question whether they would benefit from statin therapy • Middle-aged adults (40–55 y of age) with PCE-calculated 10-year risk of ASCVD 5% to <7.5% with factors that increase their ASCVD risk, although they are in a borderline risk group.

Caveats: If patient is at intermediate risk and if a risk decision is uncertain and a coronary artery calcium score is obtained, it is reasonable to withhold statin therapy unless higher-risk conditions, such as cigarette smoking, family history of premature ASCVD, or diabetes mellitus, are present and to reassess coronary artery calcium score in 5 to 10 years. Moreover, if coronary artery calcium scoring is recommended, it should be performed in facilities that have current technology and expertise to deliver the lowest radiation possible.

ASCVD indicates atherosclerotic cardiovascular disease; LDL-C, low-density lipoprotein cholesterol; and PCE, pooled cohort equations.

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Adults With High Blood Pressure or Hypertension (1)

Recommendations for Adults With High Blood Pressure or Hypertension Referenced studies that support recommendations are summarized in Online Data Supplements 13 and 14.		
COR	**LOE**	**Recommendations**
I	A	**1. In adults with elevated blood pressure (BP) or hypertension, including those requiring antihypertensive medications nonpharmacological interventions are recommended to reduce BP. These include:** • **weight loss (S4.4-2–S4.4-5);** • **a heart-healthy dietary pattern (S4.4-6–S4.4-8);** • **sodium reduction (S4.4-9–S4.4-13);** • **dietary potassium supplementation (S4.4-14–S4.4-18);** • **increased physical activity with a structured exercise program (S4.4-3, S4.4-5, S4.4-11, S4.4-19–S4.4-23); and** • **limited alcohol (S4.4-24–S4.4-29).** Adapted from recommendations in the 2017 Hypertension Clinical Practice Guidelines (S4.4-1).
I	SBP: A DBP: C-EO	**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 (S4.4-30–S4.4-38).** Adapted from recommendations in the 2017 Hypertension Clinical Practice Guidelines (S4.4-1).

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Adults With High Blood Pressure or Hypertension (2)

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 (S4.4-33, S4.4-39–S4.4-42).**
	DBP: C-EO	Adapted from recommendations in the 2017 Hypertension Clinical Practice Guidelines (S4.4-1).
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 (S4.4-43–S4.4-48).**
	DBP: C-EO	Adapted from recommendations in the 2017 Hypertension Clinical Practice Guidelines (S4.4-1).
I	SBP: B-R[SR]	**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 (S4.4-33, S4.4-47, S4.4-49–S4.4-54).**
	DBP: C-EO	Adapted from recommendations in the 2017 Hypertension Clinical Practice Guidelines (S4.4-1).

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

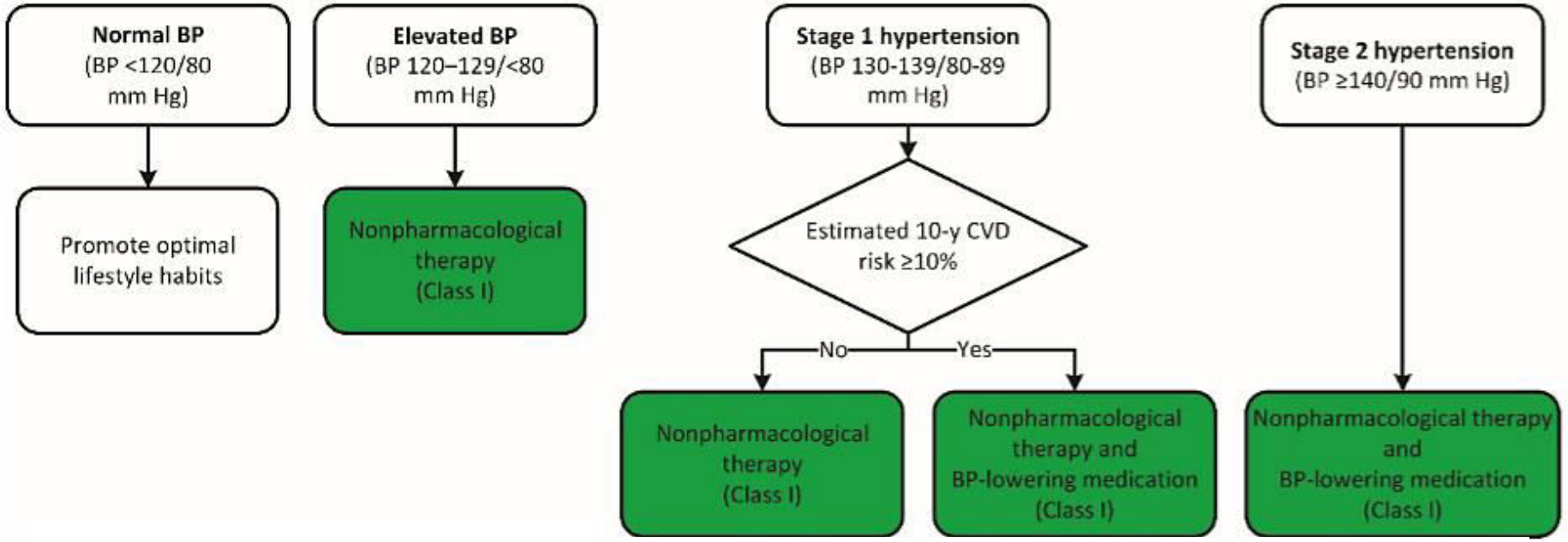
Adults With High Blood Pressure or Hypertension (3)

COR	LOE	Recommendations
I	C-LD	**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 (S4.4-36, S4.4-55–S4.4-58).** Adapted from recommendations in the 2017 Hypertension Clinical Practice Guidelines (S4.4-1).
IIb	SBP: B-NR DBP: C-EO	**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 (S4.4-59–S4.4-62).** Adapted from recommendations in the 2017 Hypertension Clinical Practice Guidelines (S4.4-1).

*ACC/AHA pooled cohort equations to estimate 10-year risk of ASCVD.

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

BP Thresholds and Recommendations for Treatment



Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Best Proven Nonpharmacological Interventions for Prevention and Treatment of Hypertension (1)

	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	(S4.4-10, S4.4-12)
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)

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Best Proven Nonpharmacological Interventions for Prevention and Treatment of Hypertension (2)

Physical activity	Aerobic	• 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	• 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	• 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, S4.4-78)
Moderation in alcohol intake	Alcohol consumption	In individuals who drink alcohol, reduce alcohol‡ to: • Men: ≤2 drinks daily • Women: ≤1 drink daily	-4 mm Hg	-3 mm Hg	(S4.4-20, S4.4-24, S4.4-25)

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Treatment of Tobacco Use

Recommendations for Treatment of Tobacco Use Referenced studies that support recommendations are summarized in Online Data Supplements 15 and 16.		
COR	**LOE**	**Recommendations**
I	A	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 (S4.5-1).
I	A	2. To achieve tobacco abstinence, all adults who use tobacco should be firmly advised to quit (S4.5-2).
I	A	3. In adults who use tobacco, a combination of behavioral interventions plus pharmacotherapy is recommended to maximize quit rates (S4.5-2, S4.5-3).
I	B-NR	4. In adults who use tobacco, tobacco abstinence is recommended to reduce ASCVD risk (S4.5-4, S4.5-5).
IIa	B-R	5. To facilitate tobacco cessation, it is reasonable to dedicate trained staff to tobacco treatment in every healthcare system (S4.5-1).
III: Harm	B-NR	6. All adults and adolescents should avoid secondhand smoke exposure to reduce ASCVD risk (S4.5-6).

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Recommended Behavioral and Pharmacotherapy Tobacco Treatment Modalities for Prescribers (1)

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
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. Chew and park gum*	Hiccups/dyspepsia possible; avoid food or beverages 15 min before and after use
Lozenge	2 mg or 4 mg		
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

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Recommended Behavioral and Pharmacotherapy Tobacco Treatment Modalities for Prescribers (2)

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.

*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.*

†Timing of assessment relates to ICD-10 coding.

‡Dose and duration can be titrated on the basis of response (S4.5-21).

§See Rx for Change for greater detail: http://rxforchange.ucsf.edu) (S4.5-35).

‖The FDA has issued a removal of black box warnings about neuropsychiatric events (S4.5-20, S4.5-21).

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.

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Aspirin Use

Recommendations for Aspirin Use Referenced studies that support recommendations are summarized in Online Data Supplements 17 and 18.		
COR	**LOE**	**Recommendations**
IIb	A	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 (S4.6-1–S4.6-8).
III: Harm	B-R	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 (S4.6-9).
III: Harm	C-LD	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 (S4.6-10).

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Top 10 Take-Home Messages for the Primary Prevention of Cardiovascular Disease (1)

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

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Top 10 Take-Home Messages for the Primary Prevention of Cardiovascular Disease (2)

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, processed meats, refined carbohydrates, and sweetened beverages. For adults with *overweight and obesity*, counseling and caloric restriction are recommended for achieving and *maintaining weight loss*.
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.
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.

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

Top 10 Take-Home Messages for the Primary Prevention of Cardiovascular Disease (3)

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.*
8. *Aspirin should be used infrequently* in the routine primary prevention of ASCVD because of lack of net benefit.
9. *Statin therapy is first-line treatment* for primary prevention of ASCVD in patients with elevated lowdensity 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.
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*.

Source: Arnett DK et al. 2019 ACC/AHA Guideline on the Primary Prevention of CVD. *Circulation* 2019

ASCVD Risk Estimator

http://tools.acc.org/ascvd-risk-estimator-plus/#!/calculate/estimate/