سازمان بهداشت و درمان صنعت نفت

سلامت خانواده

گایدلاین های

اقدامات راهبردی سلامت خانواده در سال ۱۳۹۸

(پزشکی، پرستار و بهداشت خانواده)

- **تغییرات ایجاد شده در مراقبت های درمانی دیابت به صورت کامل در فایل** pdf **موجود می باشد.**
- **عناوین مهم به صورت موردی در این متن به صورت خلاصه ذکر می گردد که با توجه به صفحه و نمودار مشخص شده در فایل اصلی** pdf **قابل دسترسی و مطالعه می باشد.**

Patient-centered Care is the Focus and Priority of the ۲۰۱۹ Standards of Medical Care in Diabetes, Published Today by the American Diabetes Association®

Arlington, Virginia
December ۱۷, ۲۰۱۸

Available in the mobile App and in an abridged format for primary care providers, key Standards of Care updates include new treatment decision pathways, options to decrease cardiovascular disease risk, and a new section on the use of technology

With the evidence from the latest, high-quality diabetes research, the American Diabetes Association's ۲۰۱۹ *Standards of Medical Care in Diabetes (Standards of Care)* include new and revised clinical practice recommendations that put the patient at the center of care. With more treatment algorithms that provide decision support for individualized care, the ۲۰۱۹ *Standards of Care* create a roadmap for therapeutic approaches and medication selection based on each patient's overall health status. The *Standards of Care*'s cardiovascular recommendations, which have been endorsed for the first time by the American College of Cardiology, include updates that aim to reduce heart attacks, strokes, heart failure, and other manifestations of cardiovascular disease; cardiovascular disease is the leading cause of death and disability for people with diabetes. Diabetes technology is now more thoroughly discussed in its own section and includes new recommendations on insulin delivery, blood glucose meters, continuous glucose monitors, automated insulin delivery devices (such as the artificial pancreas) and insulin injection technique.

The ۲۰۱۹ *Standards of Care* provide the latest in comprehensive, evidence-based recommendations for the diagnosis and treatment of children and adults with type ۱, type ۲, or gestational diabetes, strategies to prevent or delay type ۲ diabetes, and therapeutic approaches that can reduce complications and improve health outcomes. The *Standards of Care* are available online today, December ۱۷, at ۲:۰۰ p.m. ET in *Diabetes Care*, and will be published as a supplement to the January ۲۰۱۹ print issue of *Diabetes Care*. The online version of the *Standards of Care*, or the *living Standards of Care*, will continue to be updated in real-time throughout the year with necessary annotations if new evidence or regulatory changes merit immediate incorporation. This ensures that the *Standards of Care* provide all stakeholders (i.e. providers, patients, researchers, health plans, policymakers, etc.) with the most up-to-date components of diabetes care, general treatment goals and tools to evaluate the quality of care.

"The latest evidence-based research continues to provide critical information that can optimize treatment options and improve patient outcomes and quality of life. The new ۲۰۱۹ *Standards of Care* emphasize a patient-centered approach that considers the multiple health and life factors of each person living with diabetes," said ADA's Chief Scientific, Medical and Mission Officer William T. Cefalu, MD. "We are also pleased about our close collaboration with the American College of Cardiology, aligning the ADA's CVD recommendations with the ACC for the first time ever, and also complements our new Know Diabetes by Heart initiative with the American Heart Association. These updated CVD guidelines can help to significantly reduce mortality from CVD, the leading cause of death for people living with diabetes. The ۲۰۱۹ *Standards of Care* affirm the ADA's commitment to providing rapid release of evidence-based recommendations that can

yield improved patient outcomes and reduce complications and health care costs, and we hope providers will continue to download and use the mobile App for easy access to the *Standards of Care* at the point of care."

Important updates and changes to the ۲۰۱۹ *Standards of Care* include:

- **تغییرات و به روز شدن اطلاعات مهم در استانداردهای مراقبتهای دیابت ۲۰۱۹ به شرح زیر می باشد:**

Personalizing diabetes care: **تغییرات مراقبتی دیابت**

- **اهداف مراقبتی در جهت بالا بردن خود مراقبتی بیماری توسط فرد:**
- A new Goals of Care graphic decision cycle details the need for ongoing assessment and shared decision-making to achieve care goals, help reduce therapeutic inertia and improve patient self-management. **(Section ٤, page S٣٥, Figure ٤.١)**
- **متن راهنمای جدید مراقبت های حرفه ای از طریق ارتباط با افراد دیابتی:**
- New text guides health care professionals' use of language to communicate about diabetes with people with diabetes and professional audiences in an informative, empowering, and educational style. **(Section ٤, page S٣٤, Recommendation ٤.١)**
- **سبک زندگی صحیح (رژیم غذایی و فعالیت بدنی) برای افراد دیابتی بالای ۶۵ سال:**
- To address the unique nutritional and physical activity needs and considerations for older adults (>٦٥ years) with diabetes, a new recommendation on lifestyle management is included. **(Section ١٢, page S١٤١, Recommendation ١٢.١٠)**

- **الگوریتم درمانی جدید با ایجاد روش جدیدی از برنامه درمان با انسولین :**
- A new treatment algorithm provides a path for simplifying insulin treatment plans, as well as a new table to help guide providers considering medication simplification and deintensification in older adults (>٦٥ years) with diabetes. **(Section ١٢, pages S١٤٣ – S١٤٤, Figure ١٢.١, and Table ١٢.٢, respectively)**

- **پیشنهادات درمانی برای کودکان و بالغین مبتلا به دیابت نوع ۲:**

- Treatment recommendations for children and adolescents with type ٢ diabetes are significantly expanded to incorporate ADA guidance on youth published in ٢٠١٨, and recommendations now include screening and diagnosis, lifestyle management, pharmacologic treatment, psychosocial factors for consideration, cardiac function and more. **(Section ١٣, pages S١٤٨ – S١٦٤)**
- **راهنمای جدید مدیریت خود مراقبتی در افراد مبتلا به دیابت با وزن بالا:**
- A new graphic provides guidance on the management of new-onset diabetes in overweight youth . **(Section ١٣, page S١٥٧, Figure ١٣.١)**

Diabetes cost and advocacy

- **بررسی** ADA **در جهت اینکه هزینه بالا و نبود انسولین کافی سدی در برابر مدیریت مراقبتی موفق دیابت نباشد:**

- The ADA statement on the rising cost of insulin, Insulin Access and Affordability Working Group: Conclusions and Recommendations, is referenced in the *Standards of Care* advocacy section to reinforce ADA's focus on making sure cost is not a barrier to successful diabetes management. **(Section ١٦, page S١٨٢)**

- **هزینه های مالی در درمان دیابت برای فرد و جامعه :**

- Additional information is also included in the *Standards of Care* focusing on the financial costs of diabetes to individuals and society. **(Section ۱, pages S۷–S۱۲)**

Cardiovascular disease and diabetes **دیابت و بیماری های قلبی – عروقی**

- **برای اولین بار، فصل مدیریت بیماری های قلبی – عروقی در افراد دیابتی توسط دانشگاه قلب و عروق آمریکا تایید شده است:**

- For the first time, the cardiovascular disease management chapter of the *Standards of Care* is endorsed by the American College of Cardiology. (Section ۱۰, pages S۱۰۳ – S۱۲۳)

- **لزوم توجه زیاد به نارسایی قلبی در بیماران دیابتی :**

- The section includes new language to acknowledge heart failure as a major cause of cardiovascular morbidity and mortality in people with diabetes and the need to consider heart failure when determining optimal diabetes care. **(Section ۱۰, pages S۱۰۳–S۱۲۳)**

- **توصیه های به روز شده درباره ی استفاده از داروها برای افراد دیابتی نوع ۲ مبتلا به بیماری های قلبی – عروقی (با نارسایی قلبی یا بدون نارسایی قلبی):**

- Updated recommendations detail the use of sodium–glucose cotransporter ۲ (SGLT-۲) inhibitors or glucagon-like peptide ۱ (GLP-۱) receptor agonists, diabetes medications that have proven cardiovascular benefit for people with type ۲ diabetes and diagnosed CVD, with and without heart failure. **(Section ۱۰, page S۱۱٤, Recommendations ۱۰,۳۹ and ۱۰,٤۰).**

- **توصیه های دارویی برای افراد مبتلا به دیابت نوع ۲ که بیماری مزمن کلیه دارند:**

- A new recommendation outlines the benefits of GLP-۱ receptor agonists and SGLT-۲ inhibitors for people with type ۲ diabetes and chronic kidney disease. **(Section ۱۱, page S۱۲٤, Recommendation ۱۱,۳)**

- **ارزیابی ریسک فاکتورهای قلبی – عروقی در ۱۰ سال آینده در افراد مبتلا به دیابت:**

- The ADA now endorses the use of ACC's atherosclerotic cardiovascular disease (ASCVD) risk calculator, the ASCVD Risk Estimator Plus, for the routine assessment of ۱۰-year ASCVD risk in people with diabetes. **(Section ۱۰, page S۱۰٤)**

"The American College of Cardiology and the American Diabetes Association share a goal to reduce the burden of cardiovascular disease that too often follows a diabetes diagnosis," said American College of Cardiology Vice President Richard Kovacs, MD, FACC. "ACC is proud to stand behind this important document that will provide a roadmap for clinicians to effectively assess and manage cardiovascular disease in patients with diabetes and, in turn, save lives."

Technology and diabetes **دیابت و تکنولوژی**

- **فصل جدیدی از تکنولوژی دیابت شامل توصیه های درمورد وسایل جدید در تزریق انسولین ، اندازه گیری قند خون و...**

- A new section focused on diabetes technology includes new recommendations on insulin delivery (syringes, pens and insulin pumps), blood glucose meters, continuous glucose monitors (real-time and intermittently scanned), and automated insulin delivery devices (such as the artificial pancreas). (**Section ۷, pages S۷۱ – S۸۰)**

- **استفاده از** Telemedicine **به صورت وسیع تر در بیماران مبتلا به دیابت :**

- Telemedicine is becoming more widely available and has the potential to increase access to care for patients with diabetes. The *Standards of Care* addresses remote delivery of health-related services and clinical information via telemedicine. **(Section ۱, pages S۸ – S۹)**

- **روش های صحیح تزریق انسولین:**

- To ensure that insulin is delivered into the proper tissue in the right way for optimal glucose management and safety, discussion on insulin injection technique is included. **(Section ۹, page S۹۱)**

Medical nutrition therapy (diet) **درمان تغذیه ای (رژیم غذایی) پزشکی**

- **تاکید بر خود مراقبتی بیمار بر اساس الگوهای رژیم غذایی فرد:**

- Extending the patient-centered care focus, the *Standards of Care* acknowledge that there is no one-size-fits-all eating pattern, and that a variety of eating patterns can help manage diabetes. It is recommended for patients to be referred to and work with a registered dietitian to create a personalized nutrition plan. **(Section ۵, page S٤٧-٤٨)**

- **توصیه های مبنی بر تاکید مزایای استفاده از آب فراوان و استفاده کمتر از نوشیدنی های شیرین شده :**

- A recommendation is updated to emphasize the benefits of consuming more water and fewer beverages sweetened with either nutritive (caloric) or nonnutritive (noncaloric) sweeteners. **(Section ۵, page S٤۹, Recommendation ۵,۲۳ in Table ۵,۱)**

Pharmacologic approaches and glycemic targets **هدف های گلیسمی و رویکردهای دارویی**

- **توصیه های درمان دارویی در بیماران مبتلا به دیابت نوع ۲ با عوامل زمینه ای و همراه:**

- The recommended pharmacologic treatment for type ۲ diabetes is significantly updated to align with and reflect the new ADA-EASD Consensus Report, specifically consideration of important comorbidities, such as ASCVD, chronic kidney disease and heart failure and key patient factors, such as hypoglycemia risk, body weight, costs and patient preference. **(Section ۹, pages S۹۵ – S۹۶, Figures ۹,۱ and ۹,۲)**

- **استفاده از** GLP–۱ receptor agonist **به جای انسولین برای بیشترین افراد مبتلا به دیابت نوع ۲ که نیاز بیشتر به داروهای کاهش دهنده ی سطح قند خون دارند:**

- The approach to injectable medication therapy is also revised: for patients who require the additional glucose-lowering efficacy of an injectable medication, a GLP-۱ receptor agonist is now recommended as the first choice before insulin for most patients with type ۲ diabetes. **(Section ۹, page S۹۵, Figure ۹,۲)**

- **استفاده از گاباپنتین به عنوان داروی جدید به عنوان درمان در دردهای نوروپاتیک در افراد مبتلا به دیابت:**

- Gabapentin is included as a new medication to be considered for the treatment of neuropathic pain in people with diabetes based on the latest data that indicates strong efficacy and the potential for cost savings. **(Section ۱۱, S۱۳۱, Recommendation ۱۱,۳۱)**

- **یک جدول کمکی در بررسی فاکتورهای اطلاعات مربوط به ریسک کاهش قند خون که ریسک کاهش قند خون مرتبط با درمان را افزایش می دهد:**
- A new table aids in the assessment of hypoglycemia risk details factors that increase the risk of treatment-associated hypoglycemia. **(Section ٤, page S٣٩, Table ٤.٣)**

Updates to the *Standards of Care* are established and revised by the ADA's Professional Practice Committee (PPC). The committee is a multidisciplinary team of ١٥ leading U.S. experts in the field of diabetes care and includes physicians, diabetes educators, registered dietitians and others whose experience includes adult and pediatric endocrinology, epidemiology, public health, lipid research, hypertension, preconception planning and pregnancy care. For the ٢٠١٩ *Standards of Care*, two designated representatives from the American College of Cardiology (ACC) reviewed, provided feedback and endorsed the recommendations for cardiovascular disease and risk management on behalf of the ACC. The PPC performs an extensive, global clinical diabetes literature search each year for the annual *Standards of Care* update, supplemented with input from ADA leaders and staff and the medical community at-large. The online and mobile versions of the *Standards of Care* will include any research updates or policy changes that are approved throughout ٢٠١٩; they are tagged and updated in overlays as the *living Standards of Care*. Members of the PPC must disclose potential conflicts of interest with industry and/or relevant organizations; these disclosures are available on page S١٨٤ of the ٢٠١٩ *Standards of Care*. The complete ٢٠١٩ *Standards of Care* and the ٢٠١٩ *Abridged Standards of Care*, which focuses on the key recommendations for primary care physicians, are all available online at http://care.diabetesjournals.org/content/٤٢/Supplement_١ on December ١٧, ٢٠١٨, at ٢:٠٠ p.m. ET.

About Diabetes Care®

Diabetes Care, a monthly journal of the American Diabetes Association (ADA), is the highest-ranked, peer-reviewed journal in the field of diabetes treatment and prevention. Dedicated to increasing knowledge, stimulating research and promoting better health care for people with diabetes, the journal publishes original articles on human studies in clinical care, education and nutrition; epidemiology, health services and psychosocial research; emerging treatments and technologies; and pathophysiology and complications. *Diabetes Care* also publishes the ADA's recommendations and statements, clinically relevant review articles, editorials and commentaries. Topics covered are of interest to clinically oriented physicians, researchers, epidemiologists, psychologists, diabetes educators and other health care professionals.

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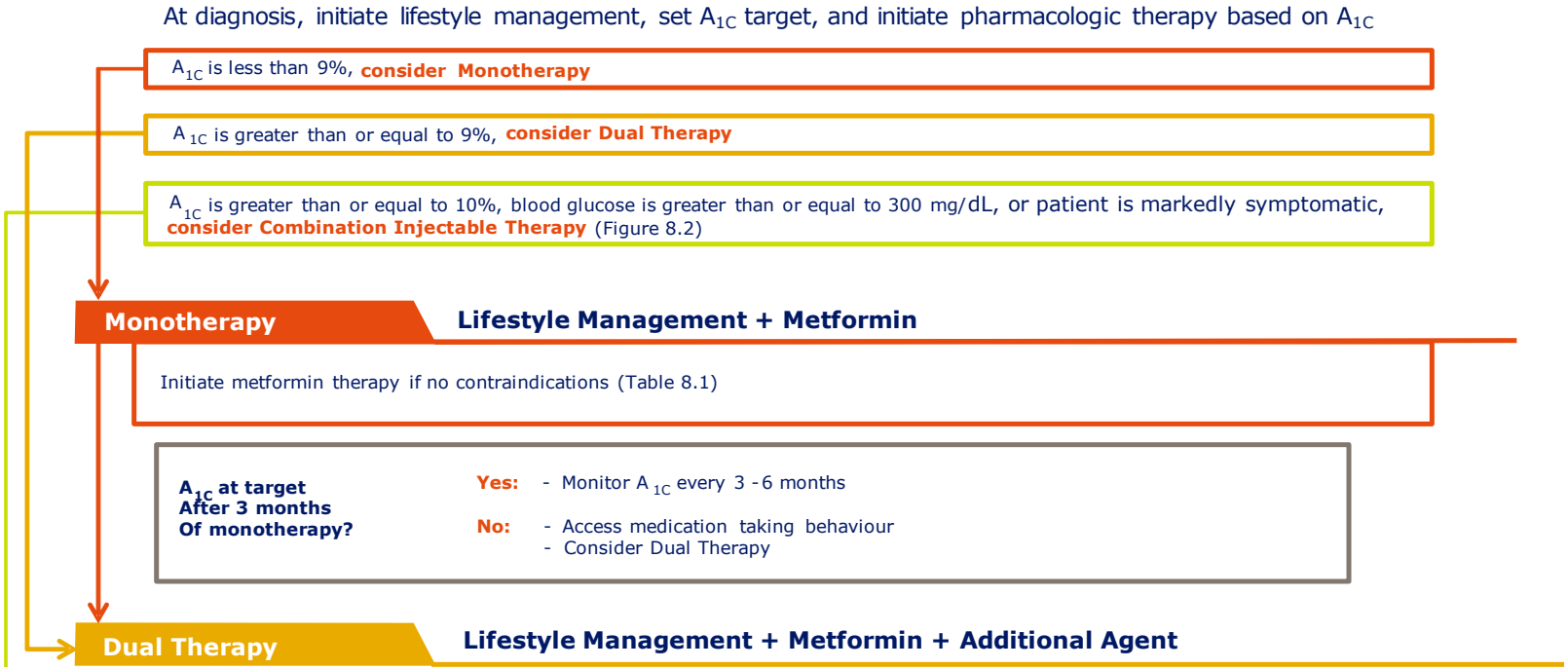
ADA- Standards of Medical Care in Diabetes 2018

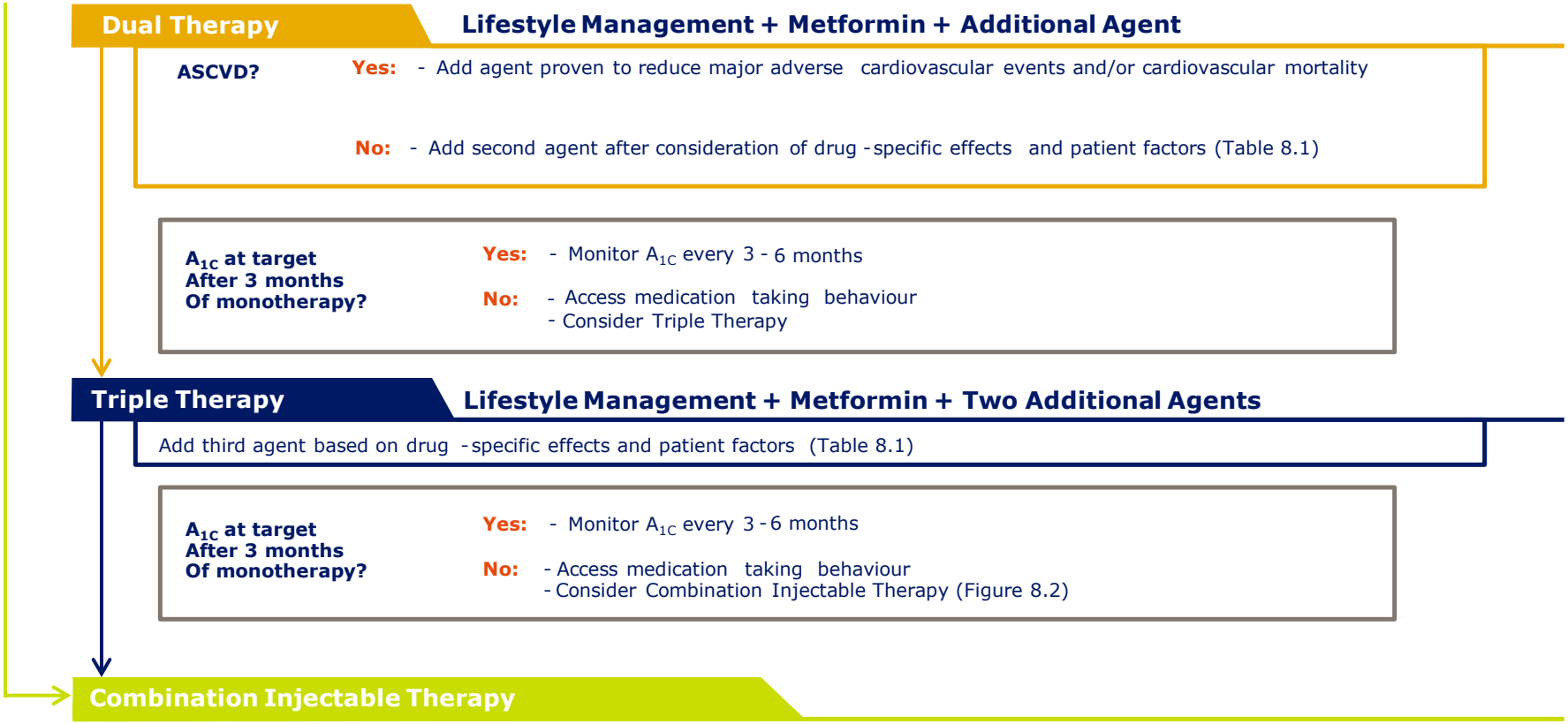
Diabetes Care 2018;41(Suppl. 1):S1–S155

Section 8. Pharmacological approaches to Glycemic Treatment

Antihyperglycemic therapy in type 2 diabetes: general recommendations



Algorithm for antihyperglycemic treatment (Fig. 8.1) was updated to incorporate the new ASCVD recommendation
Diabetes Care 2018;41(Suppl. 1):S1–S155



Algorithm for antihyperglycemic treatment (Fig. 8.1) was updated to incorporate the new ASCVD recommendation
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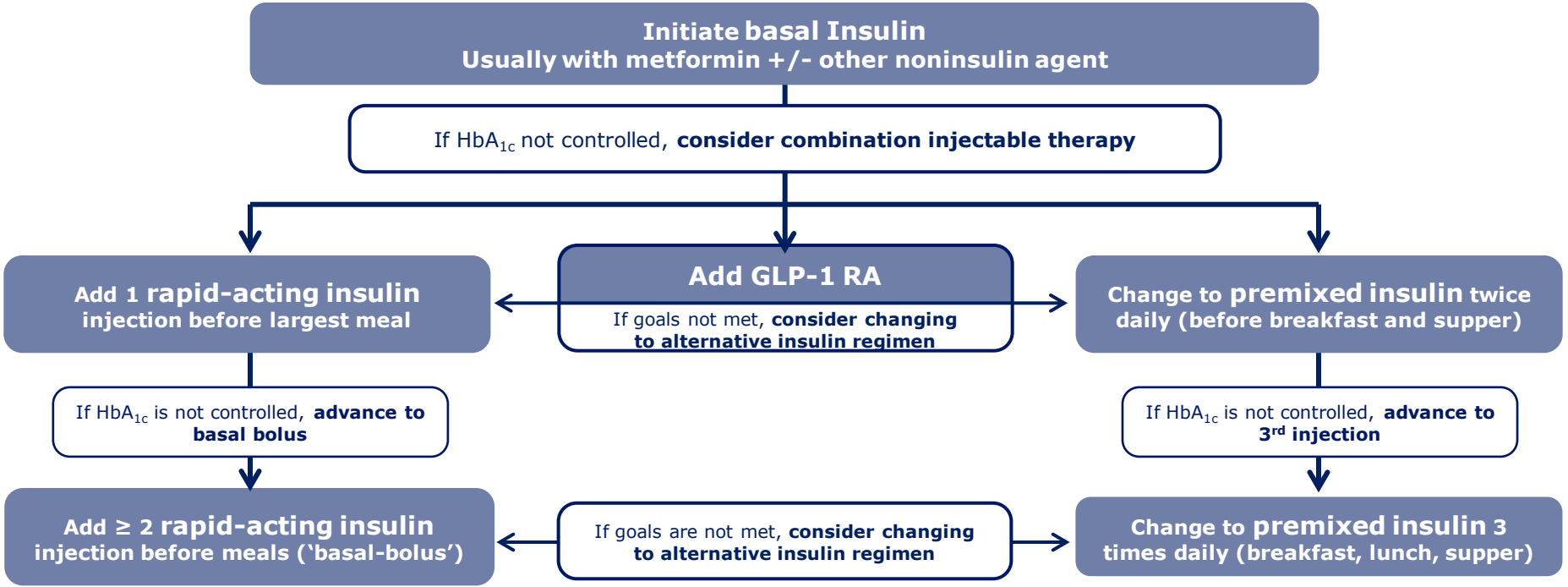
Section 8. Pharmacological approaches to Glycemic Treatment (contd.)

Figure 8.2—Combination injectable therapy for type 2 diabetes



GLP-1 RA, glucagon-like peptide-1 receptor agonist; T2D, type 2 diabetes; TID, thrice daily

Adapted from American Diabetes Association
Diabetes Care 2017;40(Suppl.1):S64–S74.

Section 2. Classification and Diagnosis of Diabetes

Updates on diagnosis of diabetes with focus on HbA_{1c}

HbA_{1c}

- A_{1C} test should be performed using a method certified by NGSP and standardized to DCCT assay to avoid misdiagnosis or missed diagnosis **B**
- In cases with possibility of A_{1C} assay interference due to hemoglobin variants, an assay without interference or plasma blood glucose criteria should be used to diagnose diabetes **B**
- In conditions associated with increased red blood cell turnover, only plasma blood glucose should be used to diagnose diabetes **B**

Testing for prediabetes and diabetes in asymptomatic adults

- Patients with prediabetes (A_{1C} ≥ 5.7%, IGT, or IFG) should be tested yearly[†]
- Women diagnosed with GDM should have lifelong testing at least every 3 years

Testing for prediabetes and T2D in children and adolescents

- Recommendation was changed suggesting testing for youth who are overweight or obese and have one or more additional risk factors
- Table 2.5 updated accordingly with addition of levels of evidence.

[†]Table 2.3 from Diabetes Care 2018;41(Suppl. 1):S1–S155

DCCT, Diabetes Control and Complications Trial; FPG, fasting plasma glucose; IFG, impaired fasting glucose; IGT, impaired glucose tolerance; GDM, gestational diabetes mellitus; NGSP, National Glycohemoglobin Standardization Program

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Section 2. Classification and Diagnosis of Diabetes (contd.)

Community Screening

- Community screening outside a health care setting is recommended in specific situations where an adequate referral system is established beforehand for positive tests

Post-transplantation diabetes

- Screening of hyperglycemia after organ transplantation and stable on immunosupressive regimens
- OGTT is the gold standard for diagnosis; fasting glucose and/or A_{1C} can identify high-risk patients and may reduce the number of overall OGTTs required
- Insulin is the agent of choice in the hospital setting*
- Among non-insulin agents, side effect profile, possible interactions with the patient's immunosuppression regimen and dose adjustments to be considered.

*After discharge, patients with preexisting diabetes could go back on their pretransplant regimen if they were in good control before transplantation. Those with previously poor control or with persistent hyperglycemia should continue insulin with frequent home self-monitoring of blood glucose to determine when insulin dose reductions may be needed and when it may be appropriate to switch to noninsulin agents

DPP-4is; Dipeptidyl peptidase 4 inhibitors; GDM, gestational diabetes mellitus; T2D, type 2 diabetes; TZDs, thiazolidinediones; OGTT, oral glucose tolerance test

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Section 3. Comprehensive Medical Evaluation and Assessment of Comorbidities

Updates on comprehensive evaluation of diabetes

Table 3.1 is added highlighting the components of comprehensive diabetes medical evaluation

		INITIAL VISIT	EVERY FOLLOW-UP VISIT	ANNUAL VISIT
PAST MEDICAL AND FAMILY HISTORY	**Diabetes history** ▪ Characteristics at onset (e.g., age, symptoms) ▪ Review of previous treatment regimens and response ▪ Assess frequency/cause/severity of past hospitalizations	✓ ✓ ✓		
	Family history ▪ Family history of diabetes in a first-degree relative ▪ Family history of autoimmune disorder	✓ ✓		
	Personal history of complications and common comorbidities ▪ Macrovascular and microvascular ▪ Common comorbidities ▪ Presence of hemoglobinopathies or anemias ▪ High blood pressure or abnormal lipids ▪ Last dental visit ▪ Last dilated eye exam ▪ Visits to specialists	✓ ✓ ✓ ✓ ✓ ✓ ✓	✓	✓ ✓ ✓
	Interval history ▪ Changes in medical/family history since last visit		✓	✓
SOCIAL HISTORY	**Assess lifestyle and behavior patterns** ▪ Eating patterns and weight history ▪ Sleep behaviors and physical activity ▪ Familiarity with carbohydrate counting in type 1 diabetes ▪ Tobacco, alcohol, and substance use ▪ Identify existing social supports	✓ ✓ ✓ ✓ ✓	✓ ✓	✓ ✓
	Interval history ▪ Changes in social history since last visit		✓	✓
MEDICATIONS AND VACCINATIONS	▪ Medication-taking behavior ▪ Medication intolerance or side effects ▪ Complementary and alternative medicine use ▪ Vaccination history and needs	✓ ✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓ ✓
TECHNOLOGY USE	▪ Assess use of health apps, online education, patient portals, etc. ▪ Glucose monitoring (meter/CGM): results and data use ▪ Review insulin pump settings	✓ ✓ ✓	✓ ✓	✓ ✓ ✓
SCREENING	**Psychosocial conditions** ▪ Screen for depression, anxiety, and disordered eating; refer for further assessment or intervention if warranted ▪ Consider assessment for cognitive impairment*	✓ ✓		✓ ✓
	Diabetes self-management education and support ▪ History of dietitian/diabetes educator visits ▪ Screen for barriers to diabetes self-management ▪ Refer or offer local resources and support as needed	✓ ✓ ✓	✓ ✓	✓ ✓ ✓
	Hypoglycemia ▪ Timing of episodes, awareness, frequency and causes	✓	✓	✓
	Pregnancy planning ▪ For women with childbearing capacity, review contraceptive needs and preconception planning	✓	✓	✓

		INITIAL VISIT	EVERY FOLLOW-UP VISIT	ANNUAL VISIT

PHYSICAL EXAMINATION	▪ Height, weight, and BMI; growth/pubertal development in children and adolescents
	▪ Blood pressure determination
	▪ Orthostatic blood pressure measures (when indicated)
	▪ Fundoscopic examination (refer to eye specialist)
	▪ Thyroid palpation
	▪ Skin examination (e.g., acanthosis nigricans, insulin injection or insertion sites, lipodystrophy)
	▪ Comprehensive foot examination
	  • Visual inspection (e.g., skin integrity, callous formation, foot deformity or ulcer, toenails)
	  • Screen for PAD (pedal pulses; refer for ABI if diminished)
	  • Determination of temperature, vibration or pinprick sensation, and 10-g monofilament exam
		✓
		✓
		✓
		✓
		✓
		✓
		✓
		✓
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				✓
				✓

LABORATORY EVALUATION	▪ A1C, if the results are not available within the past 3 months
	▪ If not performed/available within the past year
	  • Lipid profile, including total, LDL, and HDL cholesterol and triglycerides#
	  • Liver function tests#
	  • Spot urinary albumin-to-creatinine ratio
	  • Serum creatinine and estimated glomerular filtration rate†
	  • Thyroid-stimulating hormone in patients with type 1 diabetes#
	  • Vitamin B12 if on metformin (when indicated)
	  • Serum potassium levels in patients on ACE inhibitors, ARBs, or diuretics†
		✓
		✓
		✓
		✓
		✓
		✓
		✓
		✓
			✓	✓
				✓^
				✓
				✓
				✓
				✓
				✓

ASSESSMENT AND PLAN	**Goal setting** ▪ Set A1C/blood glucose target and monitoring frequency ▪ If hypertension diagnosed, establish blood pressure goal ▪ Incorporate new members to the care team as needed ▪ Diabetes education and self-management support needs	✓ ✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓ ✓
	Cardiovascular risk assessment and staging of CKD ▪ History of ASCVD ▪ Presence of ASCVD risk factors (see Table 9.2) ▪ Staging of CKD (see Table 10.1)†	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓
	Therapeutic treatment plan ▪ Lifestyle management ▪ Pharmacologic therapy ▪ Referrals to specialists (including dietitian and diabetes educator) as needed ▪ Use of glucose monitoring and insulin delivery devices	✓ ✓ ✓ ✓	✓ ✓ ✓ ✓	✓ ✓ ✓ ✓

CDC, Centers for Disease Control and Prevention; ACIP, Advisory Committee on Immunization Practices

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Section 3. Comprehensive Medical Evaluation and Assessment of Comorbidities (contd.)

Patient centered collaborative care

- Text was added about the importance of language choice in patient-centered communication to optimize patient health outcomes and health-related quality of life **B**

Immunization

- CDC ACIP recommends influenza, pneumococcal, and hepatitis B vaccinations specifically for people with diabetes. Vaccination against tetanus-diphtheria-pertussis, measles-mumps-rubella, human papillomavirus, and shingles are also important for adults with diabetes

Low testosterone in men

- Consider screening with a morning serum testosterone level in men with diabetes who have symptoms or signs of hypogonadism such as decreased sexual desire (libido) or activity, or erectile dysfunction **B**

Pancreatitis

- Pancreatitis was added to the section on comorbidities.
- Likely bidirectional relationship between prediabetes/diabetes and pancreatitis
- New recommendation was added to consider islet autotransplantation for patients requiring total pancreatectomy for medically refractory chronic pancreatitis to prevent postsurgical diabetes **C**

CDC, Centers for Disease Control and Prevention; ACIP, Advisory Committee on Immunization Practices

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Section 5. Prevention or Delay of Type 2 Diabetes

Recommendations on the use of metformin in prevention of prediabetes

Metformin

- Metformin therapy for prevention of type 2 diabetes should be considered in those with prediabetes, especially for those with BMI ≥35 kg/m^2, those aged <60 years, women with prior GDM **A**
- Metformin, a-glucosidase inhibitors, orlistat, GLP-1 RAs and TZDs not approved by the US FDA specifically for diabetes prevention despite decreased incident diabetes in those with prediabetes
- Metformin has the strongest evidence and demonstrated long-term safety as pharmacologic therapy for diabetes prevention. For other drugs, cost, side effects, and durable efficacy require consideration

GLP-1 RAs, glucagon like peptide-1 receptor agonists; TZDs, thiazolidinediones

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Section 6. Glycemic targets

Highlights the approval and use of flash CGM devices

CGM

- CGM in adults with T1D is no longer limited to those ages 25 and above but has been expanded to all adults (starting at age 18) **A**
- Federal regulatory changes prompted the ADA to include language describing CGM devices that don't require confirmation from finger sticks to make treatment decisions
- Additional information about newly approved intermittent or "flash" CGM device for adult use only was added
- New CGM devices (including intermittent or "flash" CGM) that no longer require confirmatory SMBG for treatment decisions have also been recently approved

HbA_{1c}

- As in Section 2, this section also includes an expanded discussion of the limitations of A_{1C} in certain populations based on the presence of hemoglobin variants, differences in red blood cell turnover rates, ethnicity, and age.

ADA, American Diabetes Association; CGM, continuous glucose monitoring; SMBG, self-monitoring of blood glucose; T1D, type 1 diabetes

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Section 6. Glycemic targets (contd.)

HbA_{1c}

- Table 6.3 on classification of hypoglycemia has been updated. Level 1 hypoglycemia was renamed "hypoglycemia alert value" from "glucose alert value".

Table 6.3–Classification of Hypoglycemia

Level	Glycemic criteria	Recommended treatment	Description
Hypoglycemia alert value (level 1)	≤70 mg/dL (3.9 mmol/L)	Glucose (15–20 g) is the preferred treatment	Sufficiently low for treatment with fast-acting carbohydrate and dose adjustment of glucose-lowering therapy
Clinically significant hypoglycemia (level 2)	≤54 mg/dL (3.0 mmol/L)	Glucagon should be prescribed	Sufficiently low to indicate serious, clinically important hypoglycemia
Severe hypoglycemia (level 3)	No specific glucose threshold	Glucagon should be prescribed	Hypoglycemia associated with severe cognitive impairment requiring external assistance for recovery

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Section 7. Obesity management for the Treatment of Type 2 Diabetes

Updates on the treatment of obesity

HbA_{1C} and BMI

- A recent meta-analysis found that HbA_{1C} changes were not associated with baseline BMI, indicating that obese patients can benefit from the same types of treatments for diabetes as normal weight patients

Table 7.2 on medications approved by the FDA for the treatment of obesity was updated. The updates include:

- Drugs were classified based on short and long term treatment. Phentermine was included in short term treatment. Orlistat, lorcaserin, phentermine/topiramate, naltrexone/bupropion and liraglutide were included in long term treatment
- Lorcaserin extended release tablet was included
- AWP (per month) was updated
- NADAC price was included to provide a second set of cost information

AWP, Average Wholesale Prices; BMI,Body mass index; NADAC, National Average Drug Acquisition Cost

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Section 9. Cardiovascular disease and risk management

A new algorithm was added illustrating the antihypertensive approach in diabetes

Management of hypertension in diabetes patients

- All hypertensive patients with diabetes should monitor their BP at home to help identify masked or white coat hypertension, as well as to improve medication-taking behavior. **B**
- To consider mineralocorticoid receptor antagonist therapy in patients with resistant hypertension

Other updates

- Four major RCTs are summarized and outlined in a new table (Table 9.1) which further provides support to ADA's recommendations that most adults with diabetes and hypertension should have a target blood pressure of <140/90 mmHg and that risk-based individualization to lower targets, such as 130/80 mmHg, may be appropriate for some patients.

RCTs, randomized control trials

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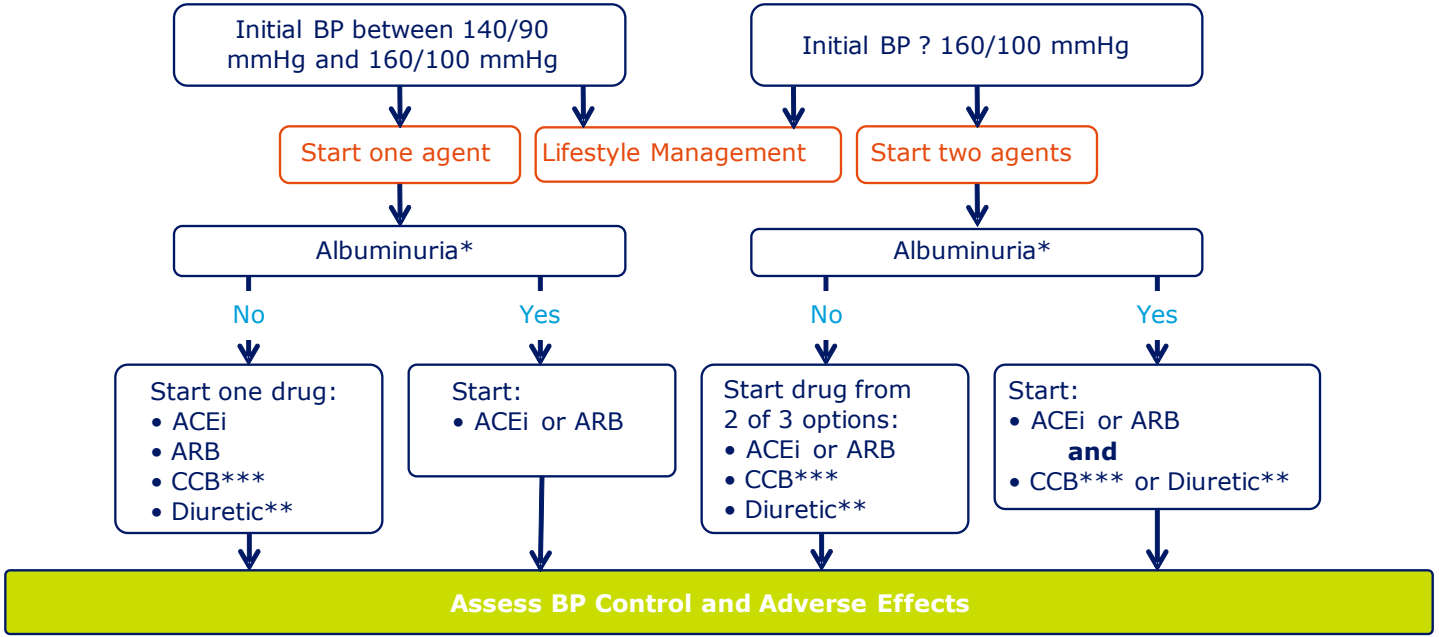
Section 9. Cardiovascular disease and risk management (contd.)

Figure 9.1—Recommendations for the treatment of confirmed hypertension in people with diabetes



ACEi, angiotensin converting enzyme inhibitor; ARB, angiotensin receptor blocker; CCB, calcium channel blocker; UACR, urine albumin creatinine ratio

*ACEi or ARB is suggested to treat hypertension for patients with UACR 30–299 mg/g creatinine and strongly recommended for patients with UACR≥300 mg/g creatinine. **Thiazide-like diuretic; long-acting agents shown to reduce cardiovascular events, such as chlorthalidone and indapamide, are preferred; ***Dihydropyridine calcium channel blocker. BP, blood pressure. This figure can also be found in the ADA position statement "Diabetes and Hypertension"

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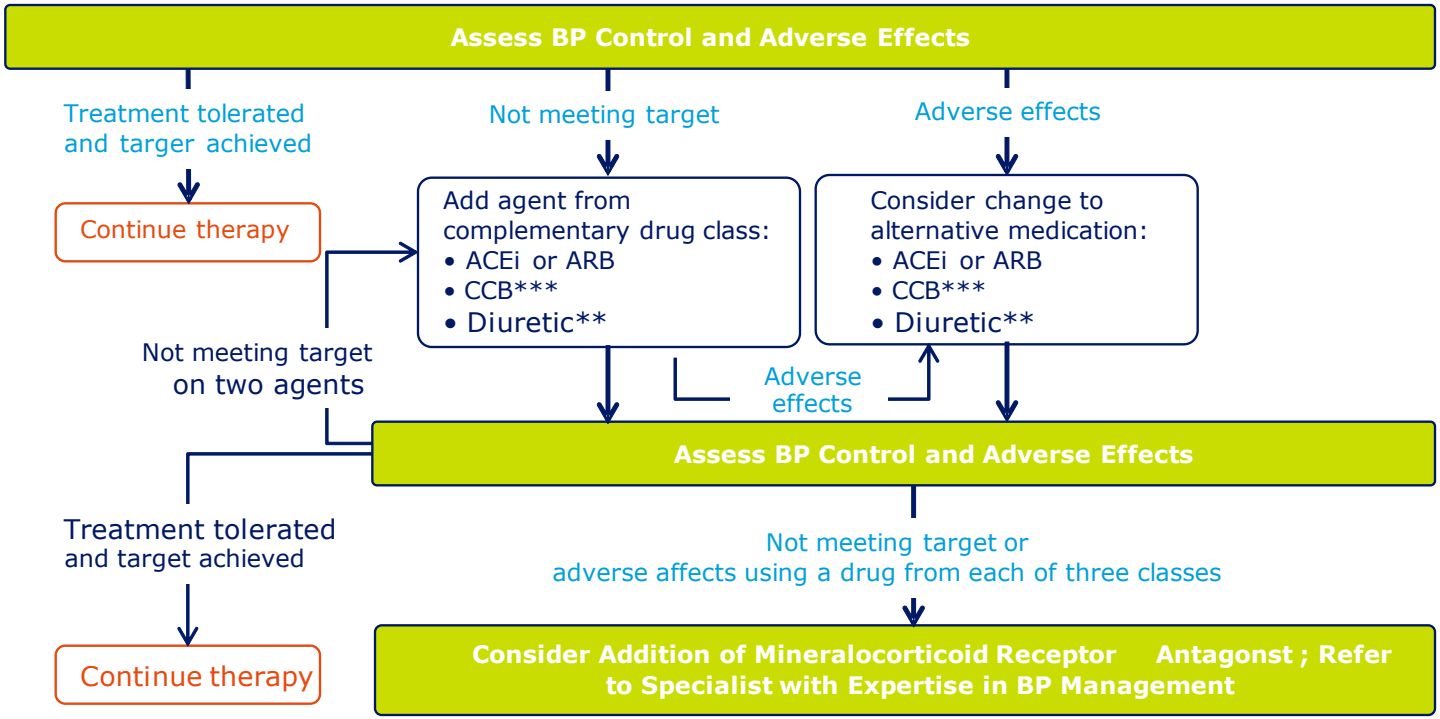

ACEi, angiotensin converting enzyme inhibitor; ARB, angiotensin receptor blocker; CCB, calcium channel blocker; UACR, urine albumin creatinine ratio

*ACEi or ARB is suggested to treat hypertension for patients with UACR 30–299 mg/g creatinine and strongly recommended for patients with UACR≥300 mg/g creatinine. **Thiazide-like diuretic; long-acting agents shown to reduce cardiovascular events, such as chlorthalidone and indapamide, are preferred; ***Dihydropyridine calcium channel blocker. BP, blood pressure. This figure can also be found in the ADA position statement "Diabetes and Hypertension"

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Section 9. Cardiovascular disease and risk management (contd.)

Lipid management

- Recommendations modified to stratify risk based on two categories: those with documented ASCVD and those without
- Studies have shown similar benefits in older versus middle-aged adults and hence, recommendations were consolidated for patients with diabetes 40–75 years **A** and ≥75 years of age **B** without ASCVD to use moderate-intensity statin
- Recommendation was modified to provide additional guidance on adding nonstatin LDL-lowering therapies for patients with diabetes and ASCVD who have LDL cholesterol ≥70 mg/dL despite maximally tolerated statin dose

ASCVD, atherosclerotic cardiovascular disease; CVOT, cardiovascular outcome trial; DPP-4, dipeptidyl peptidase-4; GLP-1 RAs, glucagon-like peptide 1 receptor agonists; LDL, low density lipid; SGLT-2, sodium glucose co-transporter-2; T2D,Type 2 diabetes

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Section 9. Cardiovascular disease and risk management (contd.)

Statin therapy

- Recommendations modified to stratify risk based on two categories: those with documented ASCVD and those without
- Accordingly, Table 9.2 was updated based on the new risk stratification approach and consolidated age-groups

Table 9.2-Recommendations for statin and combination treatment in adults with diabetes

Age	ASCVD	Recommended statin intensity^ and combination treatment*
<40 years	No Yes	None† High • If LDL cholesterol ≥70 mg/dL despite maximally tolerated statin dose, consider adding additional LDL-lowering therapy (such as ezetimibe or PCSK9 inhibitor)#
≥40 years	No Yes	Moderate‡ High • If LDL cholesterol ≥70 mg/dL despite maximally tolerated statin dose, consider adding additional LDL-lowering therapy (such as ezetimibe or PCSK9 inhibitor)

*In addition to lifestyle therapy. ^For patients who do not tolerate the intended intensity of statin, the maximally tolerated statin dose should be used. †Moderate-intensity statin may be considered based on risk-benefit profile and presence of ASCVD risk factors. ASCVD risk factors include LDL cholesterol ≥100 mg/dL (2.6 mmol/L), high blood pressure, smoking, chronic kidney disease, albuminuria and family history of premature ASCVD. ‡High-intensity statin may be considered based on risk-benefit profile and presence of ASCVD risk factors. #Adults aged <40 years with prevalent ASCVD were not well represented in clinical trails of non-statin-based LDL reduction. Before initiating combination lipid-lowering therapy, consider the potential for further ASCVD risk reduction, drug-specific adverse effects and patient preferences
ASCVD, atherosclerotic cardiovascular disease; LDL, low density lipid; PCSK9, Proprotein convertase subtilisin/kexin type 9
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Section 9. Cardiovascular disease and risk management (contd.)

Antihyperglycemic Therapies and Cardiovascular Outcomes

- Text was modified to describe CVOT data on new diabetes agents and outcomes in people with T2D, providing support for the new ASCVD recommendations
- In patients with T2D and established ASCVD, antihyperglycemic therapy should begin with lifestyle management and metformin and subsequently incorporate an agent proven to reduce major adverse CV events and CV mortality (currently empagliflozin and liraglutide), after considering drug-specific and patient factors
- A new table (Table 9.4) was added to summarize the CVOTs of DPP-4 inhibitors, GLP-1 RAs and SGLT-2 inhibitors highlighting the key inclusion criteria, baseline characteristics, endpoints and CV outcomes

*Cardiovascular death, MI, or stroke

ASCVD, atherosclerotic cardiovascular disease; CV, cardiovascular; CVOT, cardiovascular outcome trial; DPP-4, dipeptidyl peptidase-4; GLP-1 RAs, glucagon-like peptide 1 receptor agonists; LDL, low density lipid; MACE, major adverse cardiovascular events; MI, myocardial infarction; SGLT-2, sodium glucose co-transporter-2; T2D,Type 2 diabetes

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Section 10. Microvascular Complications and Foot Care

Focus on chronic kidney disease and acute kidney injury

Diabetic kidney disease

- New section on AKI has been included highlighting the risk factors, drugs causing AKI and emphasizes the importance of timely identification and treatment to prevent progressive CKD
- Effect of specific glucose-lowering medications on the delay and progression of kidney disease was discussed, with reference to recent CVOTs that assessed secondary renal outcomes

AKI, acute kidney injury; CKD, chronic kidney disease; CVOTs, cardiovascular outcome trials; SGLT-2, sodium glucose cotransporter-2; VEGF, vascular endothelial growth factor

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Section 10. Microvascular Complications and Foot Care (contd.)

A new table has been added (Table 10.1), replacing previous tables 10.1 and 10.2, that combines information on staging chronic kidney disease and the appropriate kidney-related care for each stage

Table 10.1-CKD stages and corresponding focus of kidney-related care

CKD stage†			Focus of kidney-related care			
Stage	**eGFR (mL/min/1.73 m²)**	**Evidence of kidney damage***	**Diagnose cause of kidney injury**	**Evaluate and treat risk factors for CKD progression****	**Evaluate and treat CKD complications *****	**Prepare for renal replacement therapy**
No clinical evidence of CKD	≥60	-				
1	≥90	+	✓	✓		
2	60-89	+	✓	✓		
3	30-59	+/-	✓	✓	✓	
4	15-29	+/-		✓	✓	✓
5	<15	+/-			✓	✓

CKD, chronic kidney disease; eGFR, estimated glomerular filtration rate

†CKD stages 1 and 2 are defined by evidence of kidney damage (+), while CKD stages 3-5 are defined by reduced eGFR with or without evidence of kidney damage (+/-). *Kidney damage is most often manifest as albuminuria (UACR ≥30 mg/g Cr) but can also include glomerluar hematuria, other abnormalities of the urinary sediment, radiographic abnormalitites and other presentations. **Risk factors for CKD progression include elevated blood pressure, glycaemia and albumiuria. ***Refer Table 10.2.

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Section 10. Microvascular Complications and Foot Care (contd.)

A new Table 10.2 was included describing the complications of chronic kidney disease and related medical and laboratory evaluations

Table 10.2-Selected complications of CKD	
Complication	**Medical and laboratory evaluation**
Elevated blood pressure	Blood pressure, weight
Volume overload	History, physical examination, weight
Electrolyte abnormalities	Serum electrolytes
Metabolic acidosis	Serum electrolytes
Anemia	Haemoglobin, iron testing if indicated
Metabolic bone disease	Serum calcium, phosphate, PTH, vitamin 25(OH)D

- Evaluation of elevated blood pressure and volume overload should occur at every possible clinical contact
- Laboratory evaluations are generally indicated every 6-12 months for stage 3 CKD, every 3-5 months for stage 4 CKD and every 1-3 months for stage 5 CKD or as indicated to evaluate symptoms or changes in therapy.

Complications of CKD generally become prevelant when eGFR falls below 60 mL/min/1.73 m2 (stage 3 CKD or greater) and become more common and severe as CKD progresses
CKD, chronic kidney disease; PTH, parathyroid hormone; 25(OH)D, 25-hydroxyvitamin D
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Section 10. Microvascular Complications and Foot Care (contd.)

Diabetic retinopathy

Intravitreous anti–VEGF ranibizumab, which is non-inferior to panretinal laser photocoagulation, is indicated in reducing the risk of vision loss in patients with proliferative diabetic retinopathy **A**

Diabetic foot

A new section was added describing the mixed evidence on the use of hyperbaric oxygen therapy in people with diabetic foot ulcers

AKI, acute kidney injury; CKD, chronic kidney disease; CVOTs, cardiovascular outcome trials; SGLT-2, sodium glucose cotransporter-2; VEGF, vascular endothelial growth factor
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Section 11. Older Adults

Focus on individualized care and prevention of hypoglycemia

Individualized care

- Lower glycemic goals (A_{1C} <7.5%) for those having coexisting chronic illnesses with intact cognitive function and functional status and less stringent glycemic goals (A_{1C}<8.0–8.5%) for those with multiple coexisting chronic illnesses, cognitive impairment, or functional dependence **C**
- Medications with low risk of hypoglycemia to be preferred in older adults at increased risk of hypoglycemia **B**
- Overtreatment of diabetes should be avoided **B**
- Deintensification (or simplification) of complex regimens is recommended to reduce the risk of hypoglycemia, if it can be achieved within the individualized A_{1C} target **B**

CV, cardiovascular

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Section 12. Children and Adolescents

Highlights the importance of strict glycemic control in children and adolescents with T1D and T2D through intensive insulin regimens

T1D

Psychosocial Issues

- Assess youth with diabetes for psychosocial and diabetes-related distress, generally starting at 7–8 years of age **B**

Glycemic control

In view of emerging data on diabetes technologies, additional recommendations were added on the treatment of T1D in children and adolescents

- Majority of children and adolescents with T1D should be treated with intensive insulin regimens, either via MDI or CSII **A**
- Emphasis on SMBG levels multiple times daily, including premeal, prebedtime, and as needed for safety in specific clinical situations such as exercise, driving, or for symptoms of hypoglycemia **B**
- CGM should be considered as an additional tool to improve glycemic control and adherence to the use of device is important for benefits **B**
- Automated insulin delivery systems should be considered to improve glycemic control and reduce hypoglycemia **B**

CSII, continuous subcutaneous insulin infusion; CGM, continuous glucose monitoring; MDI, multiple daily injections; SMBG, self measurement of blood glucose; T1D, type 1 diabetes

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Section 12. Children and Adolescents (contd.)

T1D

Celiac disease

- Screening for celiac disease in T1D should start soon after the diagnosis of diabetes by measuring IgA tissue transglutaminase antibodies and normal total serum IgA levels or, if IgA deficient, IgG tissue transglutamine and deamidated gliadin antibodies **B (changed from E to B)**
- Screening to be repeated within 2 years of diabetes diagnosis and then again after 5 years and more frequently in children who have symptoms or a first-degree relative with celiac disease **B**

Diabetic kidney disease

- A recommendation regarding eGFR was **removed** because of the poor performance of the estimating equation in youth

eGFR, estimating glomerular filtration rate

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Section 12. Children and Adolescents (contd.)

T2D

Section of T2D in children and adolescent was substantially extended with new recommendations

Screening and diagnosis

- Risk-based screening for prediabetes and/or T2D should be considered after the onset of puberty or ≥10 years of age, who are overweight (BMI >85th %) or obese (BMI >95th %) and who have one or more additional risk factors for diabetes **A**
- Tests to be repeated every 3 years minimum **E**, or more frequently if BMI is increasing **C**
- FPG, 2-h plasma glucose during a 75-g OGTT, and A_{1C} can be used to test for prediabetes or diabetes in children and adolescents. **B**

Lifestyle management

- Comprehensive lifestyle programs to be integrated in diabetes management to achieve 7–10% decrease in excess weight in overweight or obese youth with T2D **C**
- Lifestyle intervention should be based on a chronic care model and offered in the context of diabetes care **E**
- To participate in at least 60 min of moderate to vigorous physical activity per day (and strength training on at least 3 days/week) **B** and to decrease sedentary behavior **C**
- Emphasis on consumption of nutrient dense, high-quality foods and decreased consumption of calorie dense, nutrient-poor foods, particularly sugar-added beverages **B**

BMI, body mass index; FPG, fasting plasma glucose; OGTT, oral glucose tolerance test; T2D, type 2 diabetes

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Section 12. Children and Adolescents (contd.)

In T2D

Pharmacologic management

- Initiate pharmacologic therapy, in addition to lifestyle therapy, at diagnosis of T2D **A**
- In metabolically stable patients (A_{1C} <8.5% and asymptomatic), metformin is the initial pharmacologic treatment if renal function is >30 ml/min/1.73 m^2 **A**
- Symptomatic youth with marked hyperglycemia (blood glucose ≥250 mg/dL, A_{1C} ≥8.5%) without ketoacidosis at diagnosis should be treated initially with basal insulin while metformin is initiated and titrated to maximally tolerated dose to achieve A_{1C} goal **E**
- Basal insulin should be initiated when A_{1C} target is not met with metformin monotherapy, or if contraindications or intolerable side effects of metformin develop **E**
- In patients initially treated with basal insulin and metformin who meet glucose targets, basal insulin can be tapered over 2–6 weeks by decreasing the insulin dose by 10–30% every few days **A**
- Use of medications not approved by the US FDA for youth with T2D is not recommended outside of research trials **B**
- All youth with T2D and their families should receive comprehensive diabetes self-management education and support **B**

T2D, type 2 diabetes
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Section 13. Management of Diabetes in Pregnancy

Management of preeclampsia in women with T1D or T2D

Management of GDM or preexisting T1D or T2D

- Insulin is the preferred medication for management of GDM, T1D or T2D. Metformin and glyburide may be used; however, all oral agents lack long-term safety data **A**

Preeclampsia and Aspirin

- Women with T1D or T2D should be prescribed low dose aspirin 60–150 mg/day (usual dose 81 mg/day) from the end of the first trimester until the baby is born in order to lower the risk of preeclampsia **A**

Pregnancy and drug considerations

Level of evidence was updated from the previous version

- In pregnant patients with diabetes and chronic hypertension, BP targets of 120–160/80–105 mmHg are suggested in the interest of optimizing long-term maternal health and minimizing impaired fetal growth **E**
- Potentially teratogenic medications (ACEis, ARBs, statins) should be avoided in sexually active women of childbearing age who are not using reliable contraception **B**

ACEis, angiotensin converting enzyme inhibitors; ARBs, angiotensin receptor blockers; GDM, gestational diabetes mellitus; PCOS, polycystic ovary syndrome; T1D, type 1 diabetes; T2D, type 2 diabetes.

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

GUIDELINES MADE SIMPLE

A Selection of Tables and Figure

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

GUIDELINES MADE SIMPLE

A report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines

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
Cheryl Dennison Himmelfarb, PhD, RN, ANP, FAAN, FAHA, FPCNA
Zachary D. Goldberger, MD, MS, FACC, FAHA
Ellen J. Hahn, PhD, RN, FAAN
Amit Khera, MD, MSc, FACC, FAHA, FASPC
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, FESC, FACP
Salim S. Virani, MD, PhD, FACC, FAHA
Kim A. Williams, Sr, MD, MACC, FAHA, FASNC
Joseph Yeboah, MD, MS, FACC, FAHA
Boback Ziaeian, MD, PhD, FACC, FAHA

The ACC/AHA Task Force on Clinical Practice Guidelines has commissioned this guideline to consolidate existing recommendations and various recent scientific statements, expert consensus documents, and clinical practice guidelines into a single guidance document focused on the primary prevention of ASCVD. However, this guideline also includes newly generated recommendations for aspirin use, exercise and physical activity, and tobacco use, in addition to recommendations related to team-based care, shared decision-making, and assessment of social determinants of health, to create a comprehensive yet targeted ACC/AHA guideline on the prevention of ASCVD.

The following resource contains tables and figures from the 2019 Guideline on the Primary Prevention of Cardiovascular Disease. The resource is only an excerpt from the Guideline and the full publication should be reviewed for more tables and figures as well as important context.

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

GUIDELINES MADE SIMPLE

A report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines

Clinician Tool

Primary Prevention: Lifestyle Changes and Team-Based Care

AMERICAN COLLEGE of CARDIOLOGY

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

(1 of 3)

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.*

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

(2 of 3)

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 meats, refined carbohydrates, and sugar-sweetened beverages. For adults with overweight/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.*

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

(3 of 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 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.*

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.*

Overarching Recommendations for ASCVD Prevention Efforts

Recommendations for Patient-Centered Approaches to ASCVD Prevention

COR	LOE	Recommendations
I	A	1. A team-based care approach is recommended for the control of risk factors associated with ASCVD.
I	B-R	2. Shared decision-making should guide discussions about the best strategies to reduce ASCVD risk.
I	B-NR	3. Social determinants of health should inform optimal implementation of treatment recommendations for the prevention of ASCVD.

Example Considerations for Addressing Social Determinants of Health to Help Prevent ASCVD Events

Topic/Domain	Example Considerations
Cardiovascular risk	• 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	• 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	• In addition to the prescription of exercise, neighborhood environment and access to facilities for physical activity should be assessed.
Obesity and weight loss	• 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.
Diabetes mellitus	• 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	• 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	• 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.

**Advanced age generally refers to age 75 years or older.*

Assessment of Cardiovascular Risk

Risk-Enhancing Factors for Clinician-Patient Risk Discussion

- **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
- **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)

Grundy SM, Stone NJ, Bailey AL, et al. 2018 AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA Guideline on the Management of Blood Cholesterol, Journal of the American College of Cardiology (2018), doi: https://doi.org/10.1016/j.jacc.2018.11.003.

**Optimally, 3 determinations.*

AIDS indicates acquired immunodeficiency syndrome; ABI, ankle-brachial index; 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.

Lifestyle Factors Affecting Cardiovascular Risk

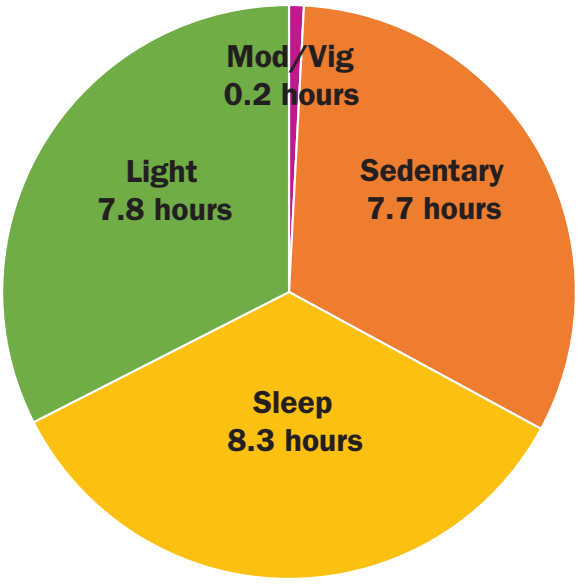
Definitions and Examples of Different Intensity of Physical Activity

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.

Hours Per Day Spent in Various States of Activity

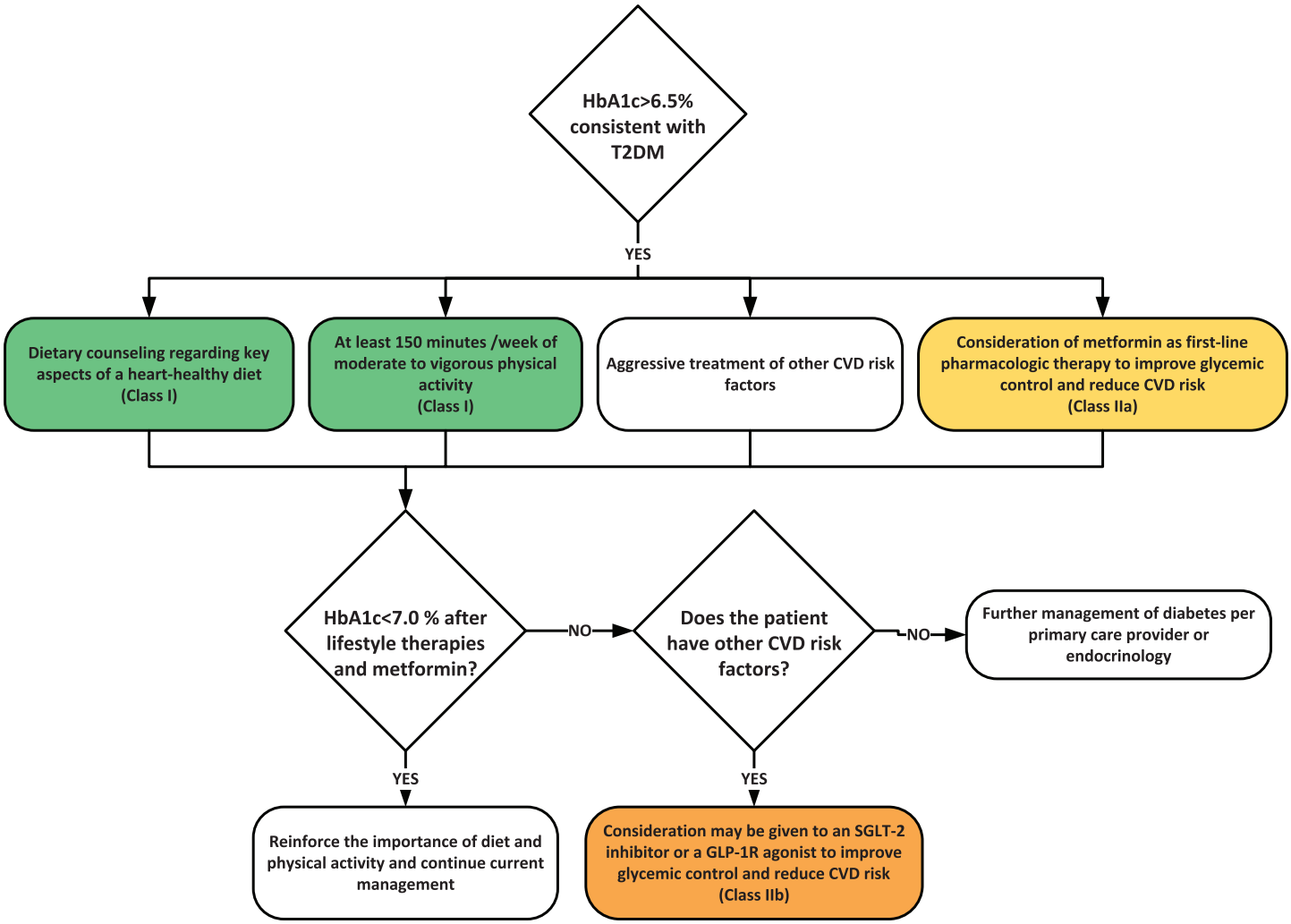


US adults spend >7 hours per day on average in sedentary activities. Replacing sedentary time with other physical activity involves increasing either moderate to vigorous intensity physical activity or light intensity physical activity.

Data derived from NHANES and modified from Young DR, Hivert M-F, Alhassan S, et al. Sedentary behavior and cardiovascular morbidity and mortality: a science advisory from the American Heart Association. Circulation. 2016;134:e262-79.

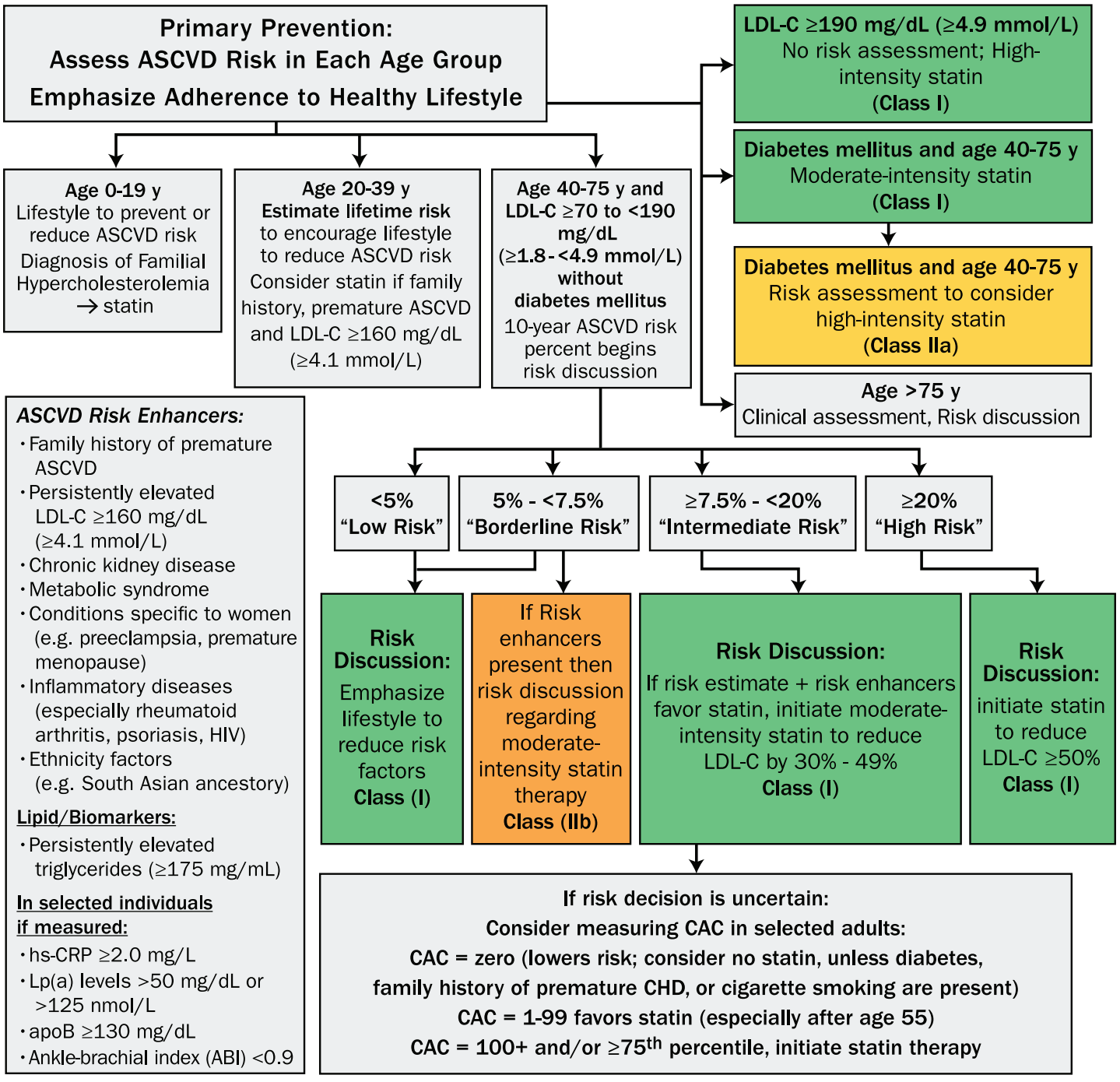
Type II Diabetes Mellitus

Treatment of Type 2 Diabetes for Primary Prevention of Cardiovascular Disease



High Blood Cholesterol

Primary Prevention



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

- Long duration (≥10 years for T2DM or ≥20 years for type 1 diabetes mellitus)
- Albuminuria ≥30 mcg albumin/mg creatinine
- eGFR <60 mL/min/1.73 m2
- Retinopathy
- Neuropathy
- ABI <0.9

Grundy SM, Stone NJ, Bailey AL, et al. 2018 AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA guideline on the management of blood cholesterol: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines [published online ahead of print November 10, 2018]. Circulation. doi: 10.1161/CIR.0000000000000625

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

Selected Examples of Candidates for Coronary Artery Calcium Measurement Who Might Benefit From Knowing Their Coronary Artery Calcium Score Is Zero

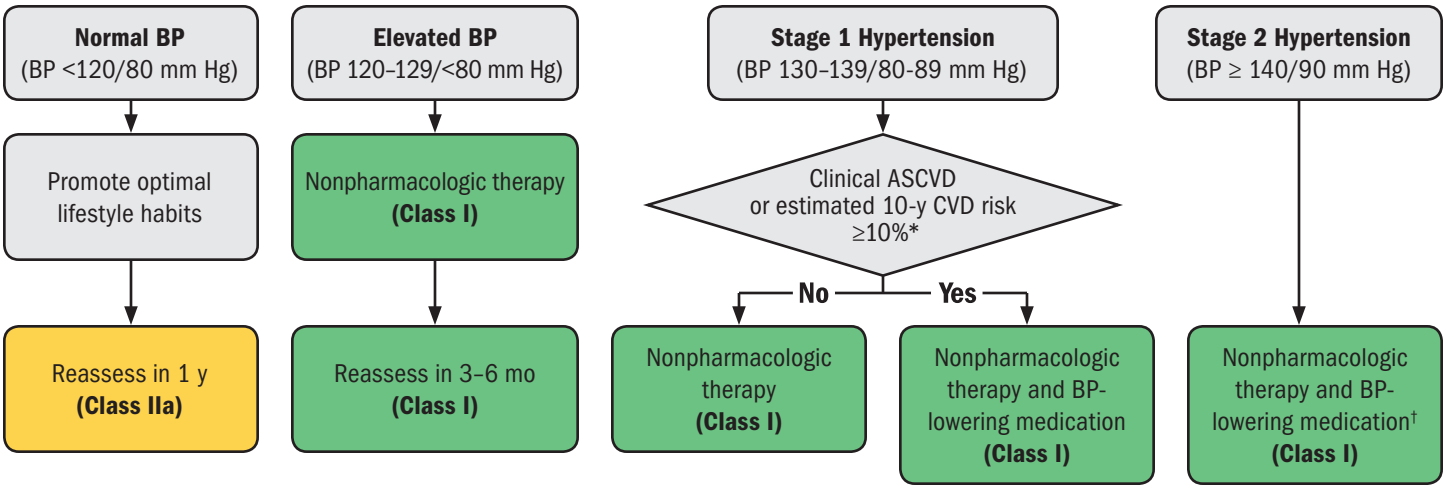
- Patients reluctant to initiate statin who wish to understand their risk and potential for benefit more precisely
- Patients concerned about need to reinstitute statin therapy after discontinuation for statin -associated symptoms
- Older patients (men 55–80 y of age; women 60–80 y of age) with low burden of risk factors 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.

High Blood Pressure

BP Thresholds and Recommendations for Treatment



Best Proven Nonpharmacological Interventions for Prevention and Treatment of Hypertension*

	Nonpharmacological Intervention	Dose	Approximate Impact on SBP	
			Hypertension	Normotension
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
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
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
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
Physical activity	Aerobic	• 90–150 min/wk • 65%–75% heart rate reserve	-5/8 mm Hg	-2/4 mm Hg
	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
	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
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

Whelton PK, Carey RM, Aronow WS, et al. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. J Am Coll Cardiol. 2018;71:e127-248"

**Type, dose, and expected impact on BP in adults with a normal BP and with hypertension.*

†In the United States, 1 "standard" drink contains roughly 14 g of pure alcohol, which is typically found in 12 oz of regular beer (usually about 5% alcohol), 5 oz of wine (usually about 12% alcohol), and 1.5 oz of distilled spirits (usually about 40% alcohol).

‡Detailed information about the DASH diet is available via the NHLBI and Dashdiet.org.

BP indicates blood pressure; DASH, Dietary Approaches to Stop Hypertension; NHLBI, National Heart, Lung, and Blood Institute; and SBP, systolic blood pressure.

Tobacco Use

Highlights of Recommended Behavioral and Pharmacotherapy Tobacco Treatment Modalities*

						NOTE: The FDA has issued a removal of black box warnings about neuropsychiatric events.	
Nicotine replacement (NRT): 5 forms (3 OTC, nasal spray/oral inhaler by prescription) Cigarettes smoked per day (CPD) can guide dosing. 1 CPD = approx. 1-2 mg of nicotine Note: Use caution with all NRT products for patients with recent (≤2 weeks) MI, serious arrhythmia, or angina; patients who are pregnant or breastfeeding; and adolescents.						Bupropion (Zyban [GlaxoSmithKline], Wellbutrin SR [GlaxoSmithKline])	Varenicline (Chantix [Pfizer])
Dosing	**Patch: 21 mg, 14 mg, or 7 mg**	**Gum: 2 mg or 4 mg**	**Lozenge: 2 mg or 4 mg**	**Nasal spray: 10 mg/mL**	**Oral inhaler: 10 10-mg cartridge**	**Tablet: 150 mg SR**	**Tablet: 0.5 mg or 1 mg**
Dose and duration can be titrated on the basis of response	Starting dose: 21 mg for >10 CPD; 14 mg for <10 CPD	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 per day. Chew and park gum*		Starting dose: 1-2 doses/h (1 dose = 2 sprays); maximum of 40 doses/d	Starting dose: Puff for 20 min per cartridge every 1-2 h; maximum 6-16 cartridges/d; taper over 3-6 mo†	150 mg once daily (am) for 3 d; then 150 mg twice daily; may use in combination with NRT	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
Precautions	Local irritation possible; avoid with skin disorders; may remove for sleep if needed	Hiccups/dyspepsia possible; avoid food or beverages 15 min before and after use		Local irritation possible; avoid with nasal or reactive airway disorders	Cough possible; avoid with reactive airway disorders	Avoid with history/ risk of seizures, eating disorders, MAO inhibitors, or CYP 2D6 inhibitor	Nausea common; take with food. Renal dosing required. Very limited drug interactions; near-exclusive renal clearance.

**See Rx for change for greater detail: http://rxforchange.ucsf.edu*

†Chew gum until soft and peppery taste released; then park it between the cheek and teeth for slow nicotine release

Aspirin Use

Recommendations for Aspirin Use

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.
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.
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.

2017 Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults

GUIDELINES MADE SIMPLE

A Selection of Tables and Figures

AMERICAN COLLEGE *of* CARDIOLOGY

Categories of BP in Adults*

BP Category	SBP		DBP
Normal	<120 mm Hg	and	<80 mm Hg
Elevated	120–129 mm Hg	and	<80 mm Hg
Hypertension			
Stage 1	130–139 mm Hg	*or*	80–89 mm Hg
Stage 2	≥140 mm Hg	*or*	≥90 mm Hg

*Individuals with SBP and DBP in 2 categories should be designated to the higher BP category.

Table 6

Corresponding Values of Systolic BP/Diastolic BP for Clinic, Home (HBPM), Daytime, Nighttime, and 24-Hour Ambulatory (ABPM) Measurements.

Clinic	HBPM	Daytime ABPM	Nighttime ABPM	24-Hour ABPM
120/80	120/80	120/80	100/65	115/75
130/80	130/80	130/80	110/65	125/75
140/90	135/85	135/85	120/70	130/80
160/100	145/90	145/90	140/85	145/90

Table 11

Detection of White Coat Hypertension or Masked Hypertension in Patients Not on Drug Therapy

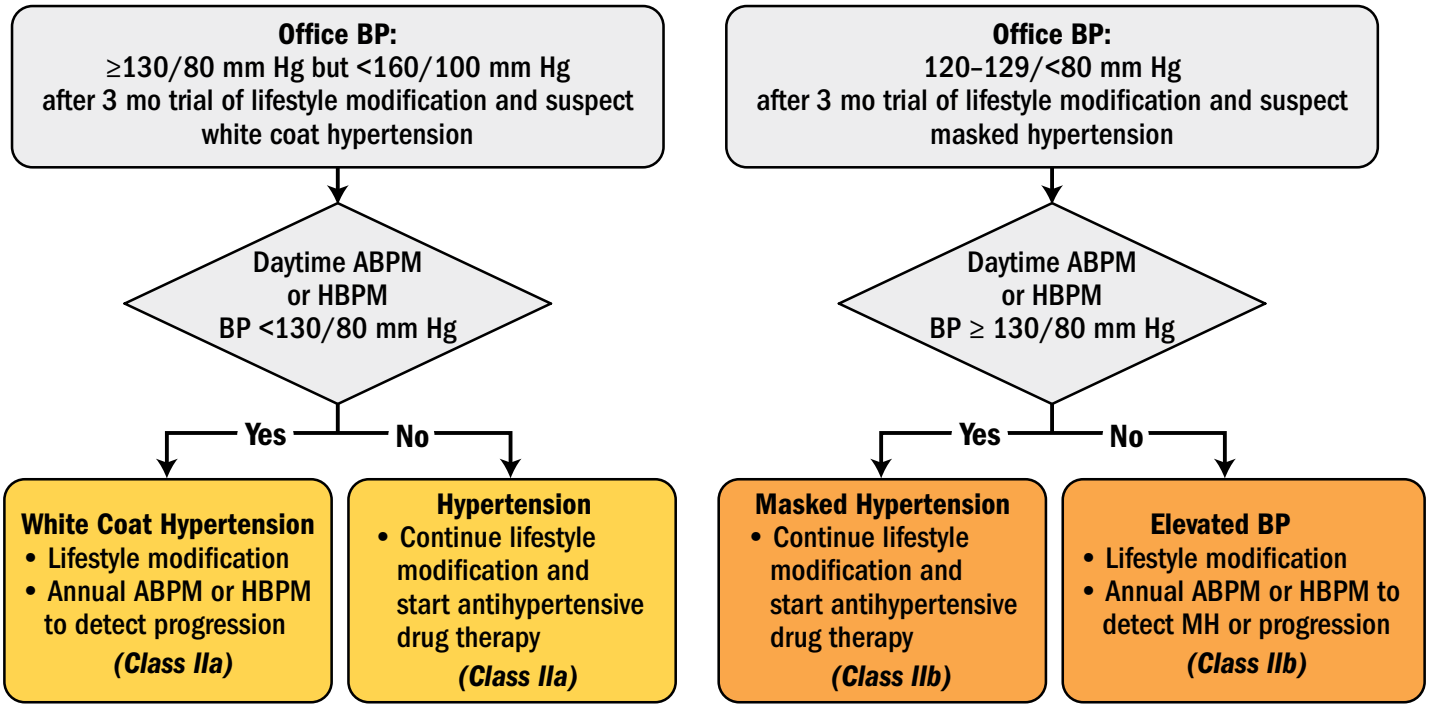


Figure 1

Detection of White Coat Hypertension or Masked Hypertension in Patients on Drug Therapy

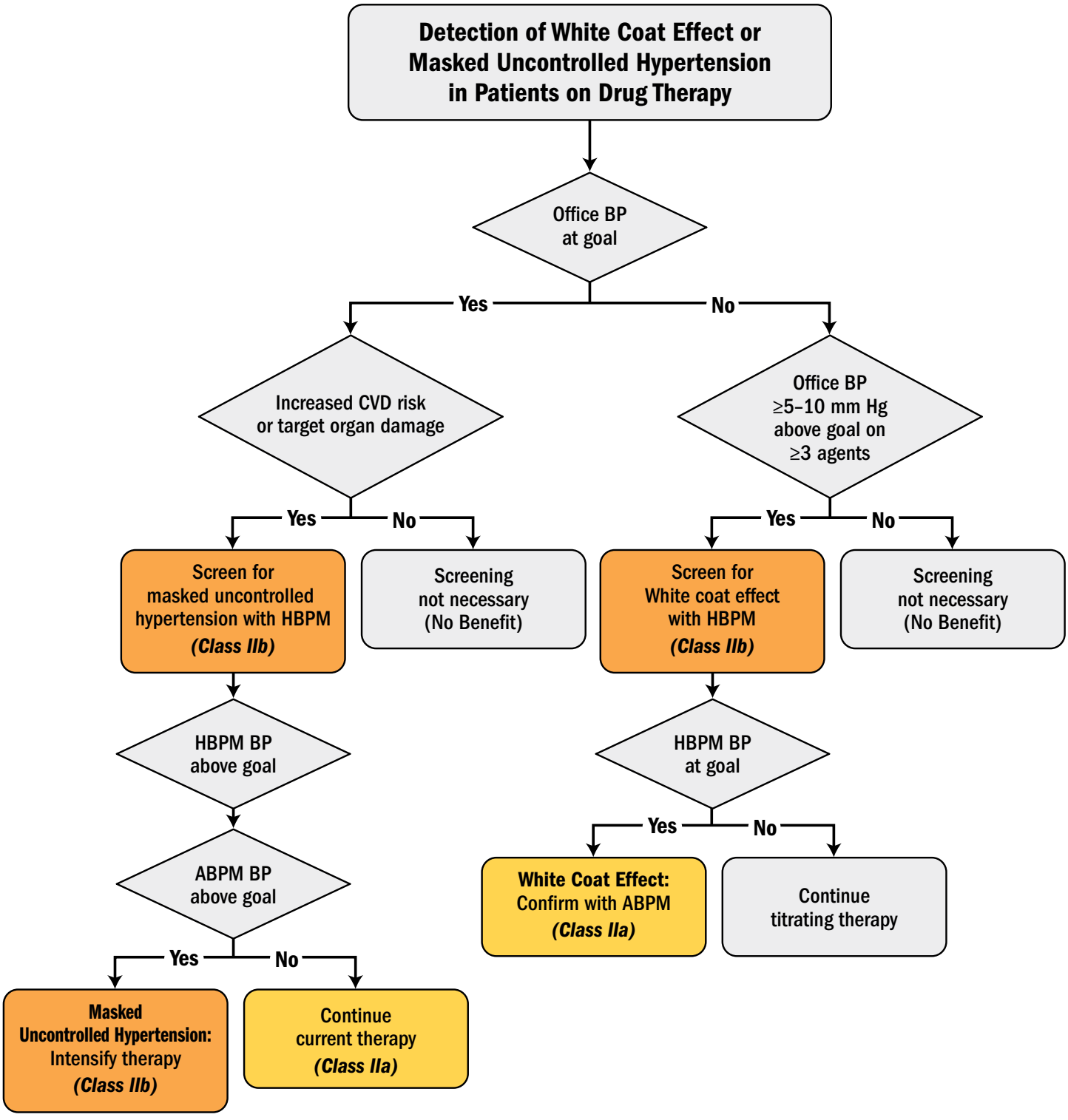


Figure 2

Screening for Secondary Hypertension

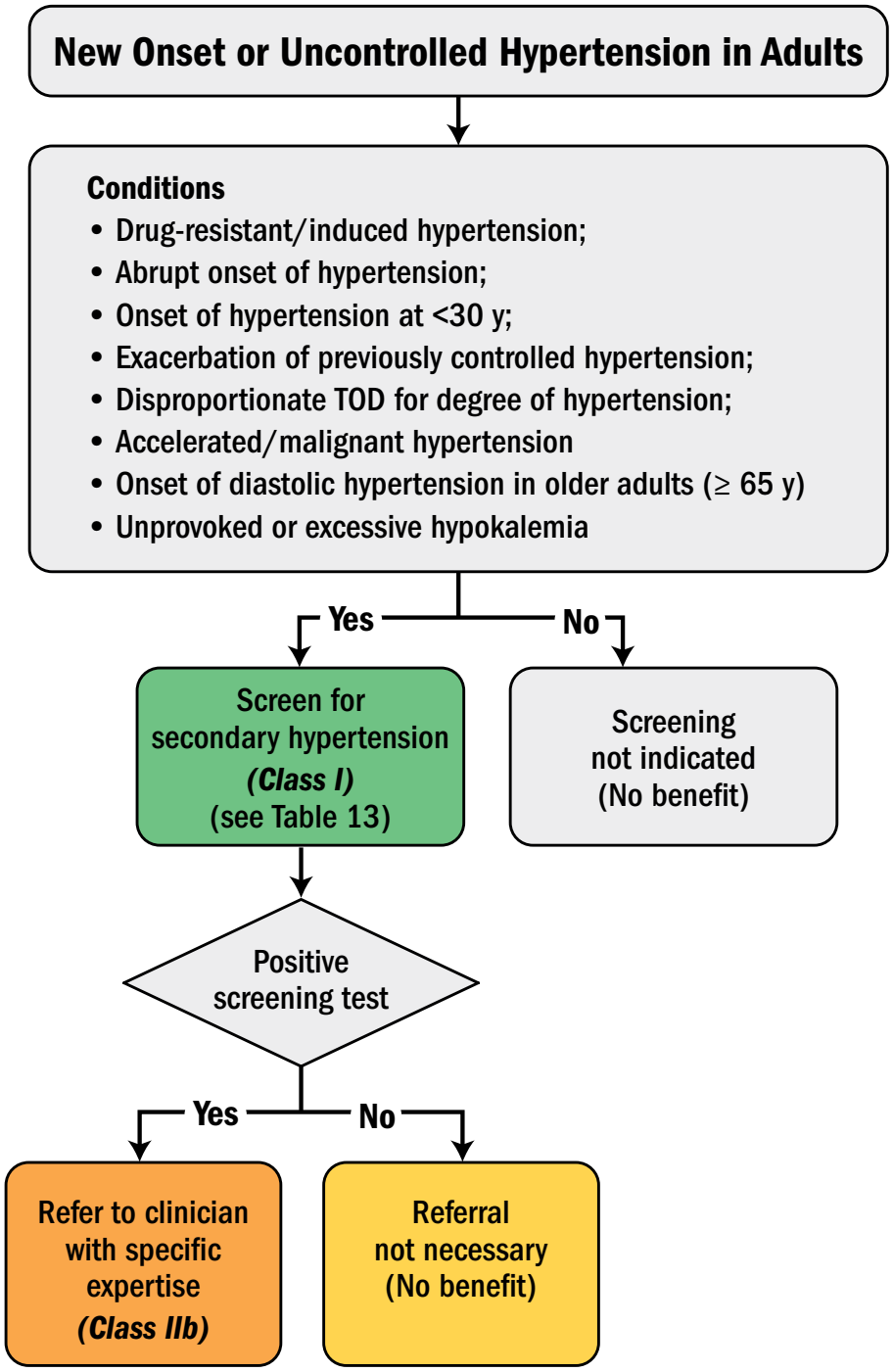


Figure 3

Causes of Secondary Hypertension with Clinical Indications and Diagnostic Screening Tests *(1 of 3)*

	Prevalence	Clinical Indications	Physical Exam	Screening Tests	Additional/ Confirmatory Tests
Common Causes					
Renal parenchymal disease	1%–2%	Urinary tract infections; obstruction, hematuria; urinary frequency and nocturia; analgesic abuse; family history of polycystic kidney disease; elevated serum creatinine; abnormal urinalysis	Abdominal mass (polycystic kidney disease); skin pallor	Renal ultrasound	Tests to evaluate cause of renal disease
Renovascular disease	5%-34%*	Resistant hypertension; hypertension of abrupt onset or worsening or increasingly difficult to control; flash pulmonary edemam (atherosclerotic); early onset hypertension, especially in women (fibromuscular hyperplasia)	Abdominal systolic-diastolic bruit; bruits over other arteries (carotid – atherosclerotic or fibromuscular dysplasia), femoral	Renal Duplex Doppler ultrasound; MRA; abdominal CT	Bilateral selective renal intraarterial angiography
Primary aldosteronism	8%–20%†	Resistant hypertension; hypertension with hypokalemia (spontaneous or diuretic-induced); hypertension and muscle cramps or weakness; hypertension and incidentally discovered adrenal mass; hypertension and obstructive sleep apnea; hypertension and family history of early onset hypertension or stroke	Arrhythmias (with hypokalemia); especially atrial fibrillation	Plasma aldosterone/ renin ratio under standardized conditions (correction of hypokalemia and withdrawal of aldosterone antagonists for 4–6 wk)	Oral sodium loading test (prior to 24 h urine aldosterone) or IV saline infusion test with plasma aldosterone at 4 h of infusion. Adrenal CT scan, Adrenal vein sampling. Trial of mineralocorticoid receptor blockers§
Obstructive sleep apnea‡	25%–50%	Resistant hypertension; snoring fitful sleep; breathing pauses during sleep; daytime sleepiness	Obesity, Mallampati class III–IV; loss of normal nocturnal BP fall	Berlin Questionnaire (8); Epworth Sleepiness Score (9); overnight oximetry	Polysomnography
Drug- or alcohol-induced‖	2%–4%	Sodium-containing antacids; caffeine; nicotine (smoking); alcohol; NSAIDs; oral contraceptives; cyclosporine or tacrolimus; sympathomimetics (decongestants, anorectics); cocaine, amphetamines and other illicit drugs; neuro psychiatric agents; erythro-poiesis stimulating agents; clonidine withdrawal; herbal agents (MaHuang, ephedra)	Fine tremor, tachycardia, sweating (cocaine, ephedrine, MAO inhibitors); acute abdominal pain (cocaine)	Urinary drug screen (illicit drugs)	Response to withdrawal of suspected agent

Uncommon Causes *will be listed in the next two pages*

Causes of Secondary Hypertension with Clinical Indications and Diagnostic Screening Tests *(2 of 3)*

	Prevalence	Clinical Indications	Physical Exam	Screening Tests	Additional/ Confirmatory Tests
Uncommon Causes					
Pheochromocytoma/ paraganglioma	0.1%–0.6%	Resistant hypertension; paroxysmal hypertension or crisis superimposed on sustained hypertension; "spells", BP lability, headache, sweating, palpitations, pallor; positive family history of pheochromocytoma/ paraganglioma; adrenal incidentaloma	Skin stigmata of neurofibromatosis (café-au-lait spots; neurofibromas); orthostatic hypotension	24-h urinary fractionated metanephrines or plasma metanephrines under standard conditions (30' supine position with indwelling IV cannula)	CT or MRI scan of abdomen/pelvis
Cushing's syndrome	<0.1%	Rapid weight gain, especially with central distribution; proximal muscle weakness; depression; hyperglycemia	Central obesity, "moon" face, dorsal and supraclavicular fat pads, wide (1 cm) violaceous striae, hirsutism	Overnight 1 mg dexamethasone suppression test	24-h urinary free cortisol excretion (preferably multiple); midnight salivary cortisol
Hypothyroidism	<1%	Dry skin; cold intolerance; constipation; hoarseness; weight gain	Delayed ankle reflex; periorbital puffiness; coarse skin; cold skin; slow movement; goiter	Thyroid stimulating hormone; free thyroxine	None
Hyperthyroidism	<1%	Warm, moist skin; heat intolerance; nervousness; tremulousness; insomnia; weight loss; diarrhea; proximal muscle weakness	Lid lag; fine tremor of the outstretched hands; warm, moist skin	Thyroid stimulating hormone, free thyroxine	Radioactive iodine uptake and scan
Aortic coarctation (undiagnosed or repaired)	0.1%	Young patient with hypertension (<30 y of age)	BP higher in upper extremities compared to lower extremities; absent femoral pulses; continuous murmur over patient's back, chest, or abdominal bruit; left thoracotomy scar (postoperative)	Echocardiogram	Thoracic and abdominal CT or MRA
Primary hyperparathyroidism	Rare	Hypercalcemia	Usually none	Serum calcium	Serum parathyroid hormone

Uncommon Causes *will continue in the next page*

Causes of Secondary Hypertension with Clinical Indications and Diagnostic Screening Tests *(3 of 3)*

	Prevalence	Clinical Indications	Physical Exam	Screening Tests	Additional/ Confirmatory Tests
Uncommon Causes *(continued from previous page)*					
Congenital adrenal hyperplasia	Rare	Hypertension and hypokalemia; virilization (11-beta-hydroxylase deficiency [11-beta-OH]) incomplete masculinization in males and primary amenorrhea in females (17-alpha-hydroxylase deficiency [17-alpha-OH])	Signs of virilization (11-beta-OH) or incomplete masculinization (17-alpha-OH)	Hypertension and hypokalemia with low or normal aldosterone and renin	11-beta-OH: elevated deoxycorticosterone (DOC), 11-deoxycortisol and androgens 17-alpha-OH: decreased androgens and estrogen; elevated deoxycorticosterone and corticosterone
Mineralocorticoid excess syndromes other than primary aldosteronism	Rare	Early onset hypertension; resistant hypertension; hypokalemia or hyperkalemia	Arrhythmias (with hypokalemia)	Low aldosterone and renin	Urinary cortisol metabolites; genetic testing
Acromegaly	Rare	Acral features, enlarging shoe, glove or hat size; headache, visual disturbances; diabetes mellitus	Acral features; large hands and feet; frontal bossing	Serum growth hormone ≥1 ng/mL during oral glucose load	Elevated age- and sex-matched IGF-1 level; MRI scan of the pituitary

*Depending on the clinical situation (hypertension alone, 5%; hypertension starting dialysis, 22%; hypertension and peripheral vascular disease, 28%; hypertension in the elderly with congestive heart failure, 34%).

†8% in general population with hypertension; up to 20% in patients with resistant hypertension.

‡Although obstructive sleep apnea is listed as a cause of secondary hypertension, RCTs on the effects of continuous positive airway pressure on lowering BP in patients with hypertension have produced mixed results

§May treat patients with resistant hypertension with a MRA whether or not primary aldosteronism is present.

Table 13

Frequently Used Medications and Other Substances That May Cause Elevated BP*

Agent	Possible Management Strategy
Alcohol	• Limit alcohol to ≤1 drink daily for women and ≤2 drinks for men
Amphetamines (e.g., amphetamine, methylphenidate dexmethylphenidate, dextroamphetamine)	• Discontinue or decrease dose • Consider behavioral therapies for ADHD
Antidepressants (e.g., MAOIs, SNRIs, TCAs)	• Consider alternative agents (e.g., SSRIs,) depending on indication • Avoid tyramine containing foods with MAOIs
Atypical antipsychotics (e.g., clozapine, olanzapine)	• Discontinue or limit use when possible • Consider behavior therapy where appropriate • Lifestyle modification (Section 6.2) • Consider alternative agents associated with lower risk of weight gain, diabetes mellitus, and dyslipidemia (e.g., aripiprazole, ziprasidone).
Caffeine	• Generally limit caffeine intake to <300 mg/d • Avoid use in patients with uncontrolled hypertension • Coffee use in patients with hypertension associated with acute increases in BP; long-term use not associated with increased BP or CVD
Decongestants (e.g., phenylephrine, pseudoephedrine)	• Use for shortest duration possible and avoid in severe or uncontrolled hypertension • Consider alternative therapies (e.g., nasal saline, intranasal corticosteroids, antihistamines) as appropriate
Herbal supplements (e.g., Ma Huang [ephedra], St. John's wort [with MAO inhibitors, yohimbine])	• Avoid use
Immunosuppressants (e.g., cyclosporine)	• Consider converting to tacrolimus, which may be associated with less effects on BP
Oral contraceptives	• Use low-dose (e.g., 20–30 mcg ethinyl estradiol) agents or a progestin-only form of contraception and/or consider alternative forms of birth control where appropriate (e.g., barrier, abstinence, IUD) • Avoid use in women with uncontrolled hypertension
NSAIDs	• Avoid systemic NSAIDs when possible • Consider alternative analgesics (e.g., acetaminophen, tramadol, topical NSAIDs,) depending on indication and risk
Recreational drugs (e.g., "bath salts" [MDPV], cocaine, methamphetamine, etc.)	• Discontinue and/or avoid use
Systemic corticosteroids (e.g., dexamethasone, fludrocortisone, methylprednisolone, prednisone, prednisolone)	• Avoid or limit use when possible • Consider alternative modes of administration (e.g., inhaled, topical) when feasible
Angiogenesis inhibitor (eg. bevacizumab) and tyrosine kinase inhibitors (eg. sunitinib, sorafenif)	• Initiate or intensify antihypertensive therapy

*List is not all-inclusive.

Table 14

Best Proven Nonpharmacologic Interventions for Prevention and Treatment of Hypertension*

	Nonpharmacologic Intervention	Dose	Approximate Impact on SBP	
			Hypertension	Normotension
Weight loss	Weight/body fat	Ideal body weight is best goal but at least 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
Healthy diet	DASH dietary pattern	Diet rich in fruits, vegetables, whole grains, and low-fat dairy products with reduced content of saturated and trans l fat	-11 mm Hg	-3 mm Hg
Reduced intake of dietary sodium	Dietary sodium	<1,500 mg/d is optimal goal but at least 1,000 mg/d reduction in most adults	-5/6 mm Hg	-2/3 mm Hg
Enhanced intake of dietary potassium	Dietary potassium	3,500–5,000 mg/d, preferably by consumption of a diet rich in potassium	-4/5 mm Hg	-2 mm Hg
Physical activity	Aerobic	• 120–150 min/wk • 65%–75% heart rate reserve	-5/8 mm Hg	-2/4 mm Hg
	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
	Isometric Resistance	• 4 x 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
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

*Type, dose, and expected impact on BP in adults with a normal BP and with hypertension.

†In the United States, one "standard" drink contains roughly 14 grams of pure alcohol, which is typically found in 12 ounces of regular beer (usually about 5% alcohol), 5 ounces of wine (usually about 12% alcohol) and 1.5 ounces of distilled spirits (usually about 40% alcohol).

Table 15

Basic and Optional Laboratory Tests for Primary Hypertension

Basic Testing	Fasting blood glucose*
	Complete blood count
	Lipid profile
	Serum creatinine with eGFR*
	Serum sodium, potassium, calcium*
	Thyroid-stimulating hormone
	Urinalysis
	Electrocardiogram
Optional Testing	Echocardiogram
	Uric acid
	Urinary albumin to creatinine ratio

*May be included in a comprehensive metabolic panel

Table 17

Blood Pressure (BP) Thresholds and Recommendations for Treatment and Follow-Up

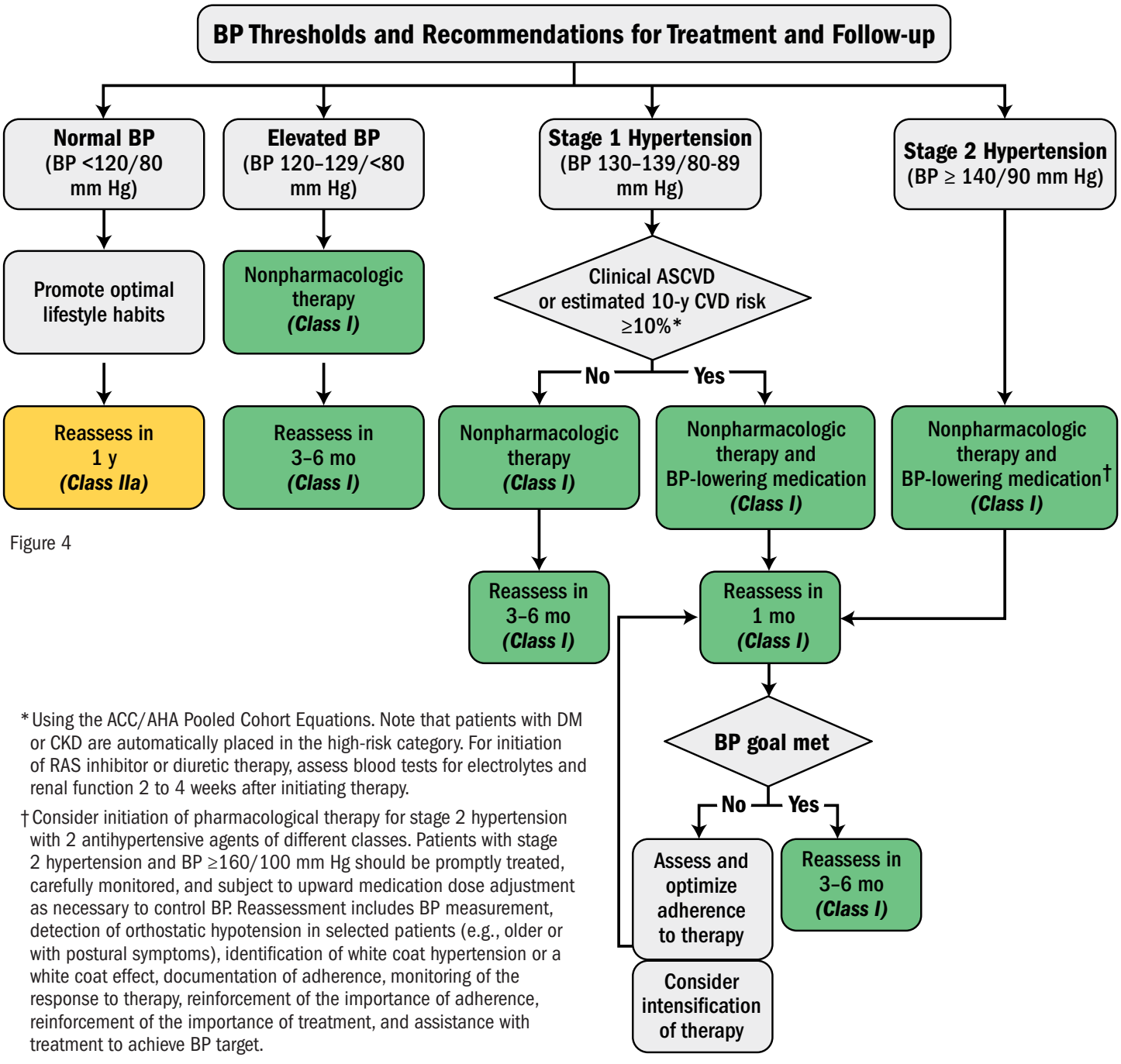


Figure 4

*Using the ACC/AHA Pooled Cohort Equations. Note that patients with DM or CKD are automatically placed in the high-risk category. For initiation of RAS inhibitor or diuretic therapy, assess blood tests for electrolytes and renal function 2 to 4 weeks after initiating therapy.

†Consider initiation of pharmacological therapy for stage 2 hypertension with 2 antihypertensive agents of different classes. Patients with stage 2 hypertension and BP ≥160/100 mm Hg should be promptly treated, carefully monitored, and subject to upward medication dose adjustment as necessary to control BP. Reassessment includes BP measurement, detection of orthostatic hypotension in selected patients (e.g., older or with postural symptoms), identification of white coat hypertension or a white coat effect, documentation of adherence, monitoring of the response to therapy, reinforcement of the importance of adherence, reinforcement of the importance of treatment, and assistance with treatment to achieve BP target.

BP Thresholds for and Goals of Pharmacologic Therapy in Patients with Hypertension According to Clinical Conditions

Clinical Condition (s)	BP Threshold mm Hg	BP Goal mm Hg
General		
Clinical CVD or 10 year ASCVD risk ≥ 10%	≥130/80	<130/80
No clinical CVD and 10 year ASCVD risk <10%	≥140/90	<130/80
Older persons (≥65 years of age; non-institutionalized, ambulatory, community-living adults)	≥130 (SBP)	<130 (SBP)
Specific Comorbidities		
Diabetes mellitus	≥130/80	<130/80
Chronic kidney disease	≥130/80	<130/80
Chronic kidney disease post-renal transplantation	≥130/80	<130/80
Heart failure	≥130/80	<130/80
Stable ischemic heart disease	≥130/80	<130/80
Secondary stroke prevention	≥140/90	<130/80
Secondary stroke prevention (lacunar)	≥130/80	<130/80
Peripheral arterial disease	≥130/80	<130/80

Table 23

Oral Antihypertensive Drugs *(1 of 3)*

Class	Drug	Usual Dose, Range (mg per day)*	Daily Frequency	Comments
Primary Agents				
Thiazide or thiazide-type diuretics	**Chlorthalidone**	12.5–25	1	• Chlorthalidone preferred based on prolonged half-life and proven trial reduction of CVD • Monitor for hyponatremia and hypokalemia, uric acid and calcium levels. • Use with caution in patients with history of acute gout unless patient is on uric acid-lowering therapy.
	Hydrochlorothiazide	25–50	1	
	Indapamide	1.25–2.5	1	
	Metolazone	2.5–10	1	
ACE Inhibitors	**Benazepril**	10–40	1 or 2	• Do not use in combination with ARBs or direct renin inhibitor • Increased risk of hyperkalemia, especially in patients with CKD or in those on K+ supplements or K+-sparing drugs • May cause acute renal failure in patients with severe bilateral renal artery stenosis • Do not use if history of angioedema with ACE inhibitors. • Avoid in pregnancy
	Captopril	12.5–150	2 or 3	
	Enalapril	5–40	1 or 2	
	Fosinopril	10–40	1	
	Lisinopril	10–40	1	
	Moexipril	7.5–30	1 or 2	
	Perindopril	4–16	1	
	Quinapril	10–80	1 or 2	
	Ramipril	2.5–10	1 or 2	
	Trandolapril	1–4	1	
ARBs	**Azilsartan**	40–80	1	• Do not use in combination with ACE inhibitors or direct renin inhibitor • Increased risk of hyperkalemia in CKD or in those on K+ supplements or K+-sparing drugs • May cause acute renal failure in patients with severe bilateral renal artery stenosis • Do not use if history of angioedema with ARBs. Patients with a history of angioedema with an ACEI can receive an ARB beginning 6 weeks after ACEI discontinued. • Avoid in pregnancy
	Candesartan	8–32	1	
	Eprosartan	600–800	1 or 2	
	Irbesartan	150–300	1	
	Losartan	50–100	1 or 2	
	Olmesartan	20–40	1	
	Telmisartan	20–80	1	
	Valsartan	80–320	1	
CCB—dihydropyridines	**Amlodipine**	2.5–10	1	• Avoid use in patients with HFrEF; amlodipine or felodipine may be used if required • Associated with dose-related pedal edema, which is more common in women than men
	Felodipine	5–10	1	
	Isradipine	5–10	2	
	Nicardipine SR	5–20	1	
	Nifedipine LA	60–120	1	
	Nisoldipine	30–90	1	
CCB—nondihydropyridines	**Diltiazem SR**	180–360	2	• Avoid routine use with beta blockers due to increased risk of bradycardia and heart block • Do not use in patients with HFrEF • Drug interactions with diltiazem and verapamil (CYP3A4 major substrate and moderate inhibitor)
	Diltiazem ER	120–480	1	
	Verapamil IR	40-80	3	
	Verapamil SR	120–480	1 or 2	
	Verapamil-delayed onset ER (various forms)	100–480	1 (in the evening)	

Table is continued in the next two pages

Oral Antihypertensive Drugs *(2 of 3)*

Class	Drug	Usual Dose, Range (mg per day)*	Daily Frequency	Comments
Secondary Agents				
Diuretics—loop	**Bumetanide**	0.5–4	2	• Preferred diuretics in patients with symptomatic HF. Preferred over thiazides in patients with moderate-to-severe CKD (e.g., GFR <30 mL/min)
	Furosemide	20–80	2	
	Torsemide	5–10	1	
Diuretics—potassium sparing	**Amiloride**	5–10	1 or 2	• Monotherapy agents minimally effective antihypertensives • Combination therapy of potassium sparing diuretic with a thiazide can be considered in patients with hypokalemia on thiazide monotherapy • Avoid in patients with significant CKD (e.g., GFR <45 mL/min)
	Triamterene	50–100	1 or 2	
Diuretics—aldosterone antagonists	**Eplerenone**	50–100	12	• Preferred agents in primary aldosteronism and resistant hypertension • Spironolactone associated with greater risk of gynecomastia and impotence compared to eplerenone • Common add-on therapy in resistant hypertension • Avoid use with K+ supplements, other K+-sparing diuretics or significant renal dysfunction • Eplerenone often requires twice daily dosing for adequate BP lowering
	Spironolactone	25–100	1	
Beta blockers—cardioselective	**Atenolol**	25–100	12	• Beta blockers are not recommended as first-line agents unless the patient has IHD or HF • Preferred in patients with bronchospastic airway disease requiring a beta blocker • Bisoprolol and metoprolol succinate preferred in patients with HFrEF • Avoid abrupt cessation
	Betaxolol	5–20	1	
	Bisorolol	2.5–10	1	
	Metoprolol tartrate	100–400	2	
	Metoprolol succinate	50–200	1	
Beta blockers—cardioselective and vasodilatory	**Nebivolol**	5–40	1	• Induces nitric oxide-induced vasodilation • Avoid abrupt cessation
Beta blockers—noncardioselective	**Nadolol**	40–120	1	• Avoid in patients with reactive airways disease • Avoid abrupt cessation
	Propranolol IR	160–480	2	
	Propranolol LA	80–320	1	
Beta blockers—intrinsic sympathomimetic activity	**Acebutolol**	200–800	2	• Generally avoid, especially in patients with IHD or HF • Avoid abrupt cessation
	Carteolol	2.5–10	1	
	Penbutolol	10–40	1	
	Pindolol	10–60	2	

Table is continued in the next page

Oral Antihypertensive Drugs *(3 of 3)*

Class	Drug	Usual Dose, Range (mg per day)*	Daily Frequency	Comments
Secondary Agents *(continued from previous page)*				
Beta blockers—combined alpha- and beta-receptor	**Carvedilol**	12.5–50	2	• Carvedilol preferred in patients with HFrEF • Avoid abrupt cessation
	Carvedilol phosphate	20–80	1	
	Labetalol	200–800	2	
Direct renin inhibitor	**Aliskiren**	150–300	1	• Do not use in combination with ACE inhibitors or ARBs • Aliskiren is very long acting • Increased risk of hyperkalemia in CKD or in those on K+ supplements or K+ sparing drugs • May cause acute renal failure in patients with severe bilateral renal artery stenosis • Avoid in pregnancy
Alpha-1 blockers	**Doxazosin**	1–8	1	• Associated with orthostatic hypotension, especially in older adults • May consider as second-line agent in patients with concomitant BPH
	Prazosin	2–20	2 or 3	
	Terazosin	1–20	1 or 2	
Central alpha1-agonist and other centrally acting drugs	**Clonidine oral**	0.1–0.8	2	• Generally reserved as last-line due to significant CNS adverse effects, especially in older adults • Avoid abrupt discontinuation of clonidine, which may induce hypertensive crisis; clonidine must be tapered to avoid rebound hypertension
	Clonidine patch	0.1–0.3	1 weekly	
	Methyldopa	250–1000	2	
	Guanfacine	0.5–2	1	
Direct vasodilators	**Hydralazine**	250-200	2 or 3	• Associated with sodium and water retention and reflex tachycardia; use with a diuretic and bet a blocker • Hydralazine associated with drug-induced lupus-like syndrome at higher doses • Minoxidil associated with hirsutism and requires a loop diuretic. Can induce pericardial effusion
	Minoxidil	5–100	1 -3	

*Dosages may vary from those listed in the FDA approved labeling (available at http://dailymed.nlm.nih.gov/dailymed/index.cfm).

Adapted with permission from Chobanian AV, Bakris GL, Black HR, et al. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: the JNC 7 report. JAMA. 2003; 289:2560-72

Table 18

Heart Failure with Reduced Ejection Fraction (HF*r*EF)

Recommendations for Treatment of Hypertension in Patients with Heart Failure with Reduced Ejection Fraction (HF*r*EF)

Referenced studies that support recommendations are summarized in online Data Supplement 34

COR	LOE	Recommendations
I	C-EO	1. Adults with HF*r*EF and hypertension should be prescribed GDMT* titrated to attain a BP less than 130/80 mm Hg.
III: No Benefit	B-R	2. Nondihydropyridine CCBs are not recommended in the treatment of hypertension in adults with HF*r*EF.

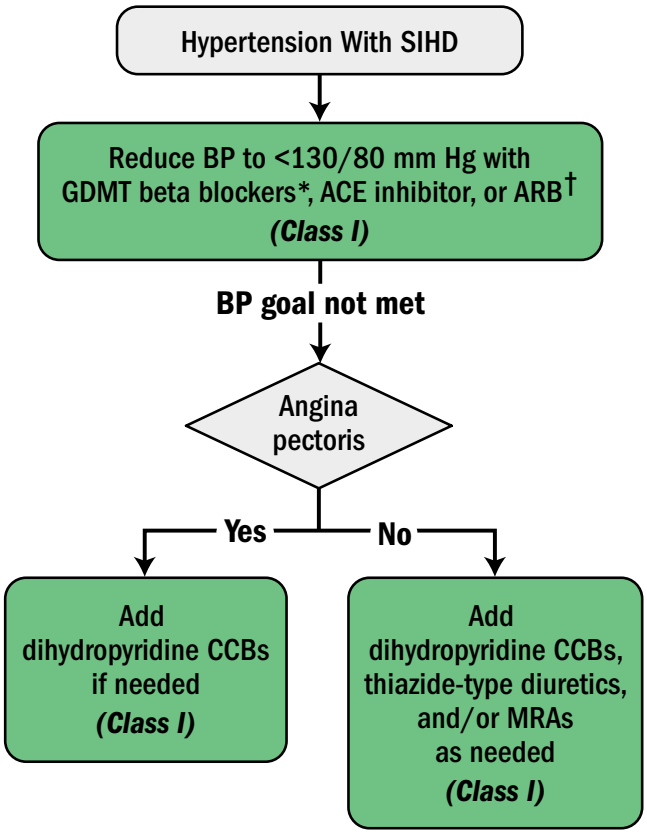
Heart Failure with Preserved Ejection Fraction (HF*p*EF)

Recommendations for Treatment of Hypertension in Patients with Heart Failure with Preserved Ejection Fraction (HF*p*EF)

Referenced studies that support recommendations are summarized in online Data Supplement 35, 36

COR	LOE	Recommendations
I	C-EO	1. In adults with HF*p*EF who present with symptoms of volume overload, diuretics should be prescribed to control hypertension.
I	C-LD	2. Adults with HF*p*EF and persistent hypertension after management of volume overload should be prescribed ACE inhibitors or ARB and beta blockers titrated to attain systolic BP less than 130 mm Hg.

Management of Hypertension in Patients with Stable Ischemic Heart Disease (SIHD)

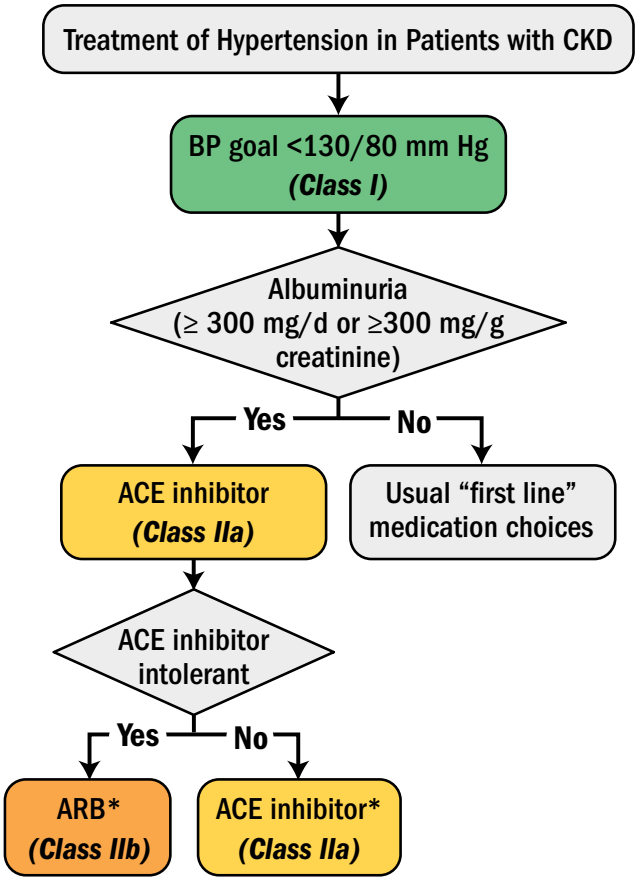


*GDMT beta blockers for BP control or relief of angina include carvedilol, metoprolol tartrate, metoprolol succinate, nadolol, bisoprolol, propranolol, and timolol. Avoid beta blockers with intrinsic sympathomimetic activity. The beta blocker atenolol should not be used because it is less effective than placebo in reducing cardiovascular events.

†If needed for BP control.

Figure 5

Management of Hypertension in Patients with Chronic Kidney Disease



*CKD stage 3 or higher or stage 1 or 2 with albuminuria ≥300 mg/d or ≥300 mg/g creatinine.

Figure 6

Management of Hypertension in Patients with Acute Intercerebral Hemorrhage

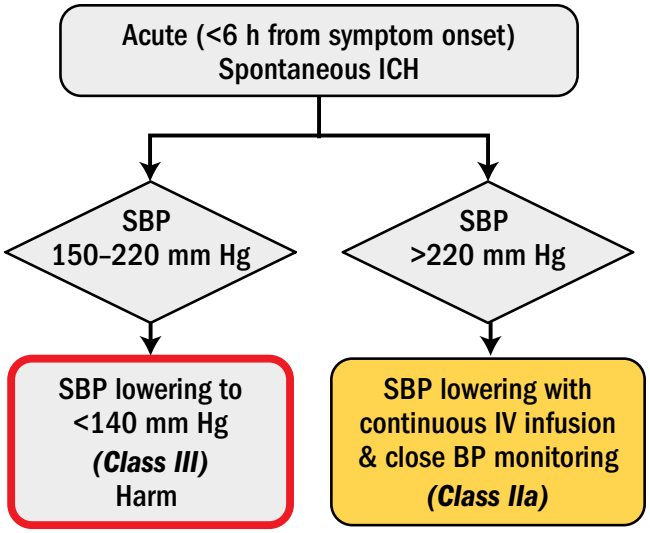


Figure 7

Management of Hypertension in Patients with Acute ischemic Stroke

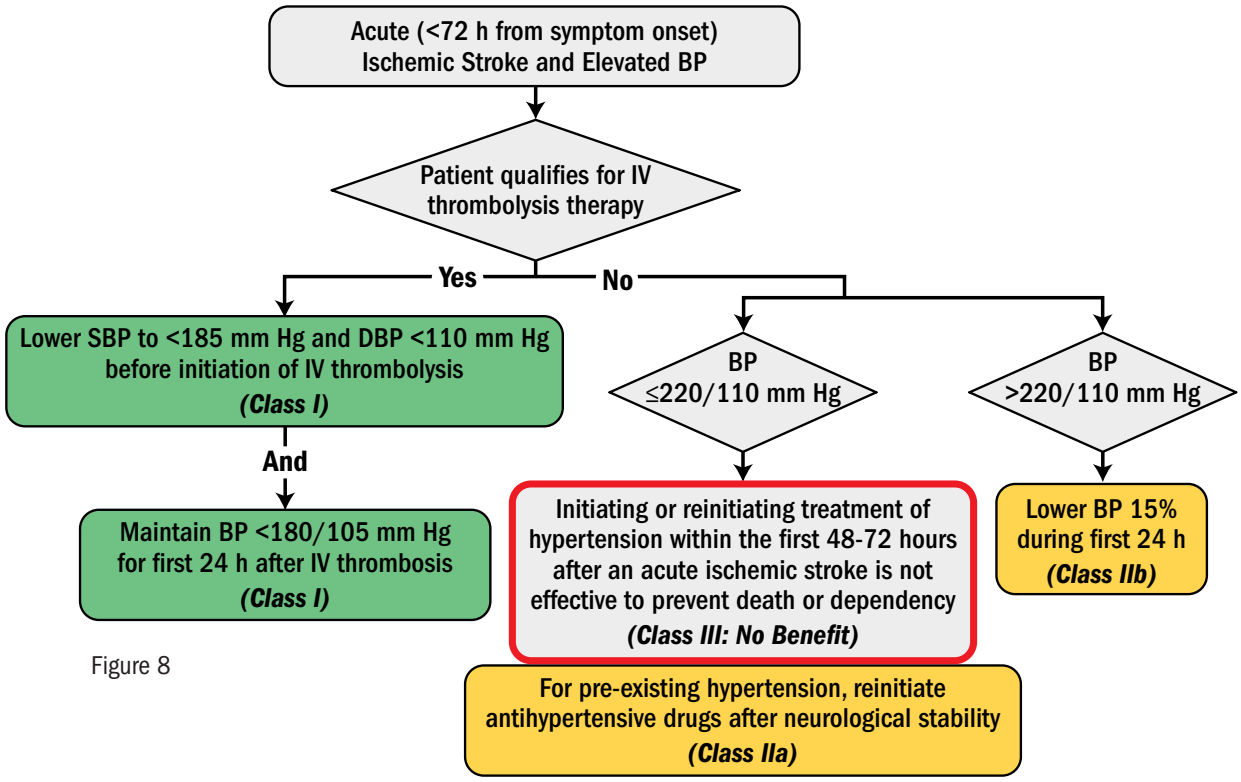


Figure 8

Management of Hypertension in Patients with a Previous History of Stroke (Secondary Stroke Prevention)

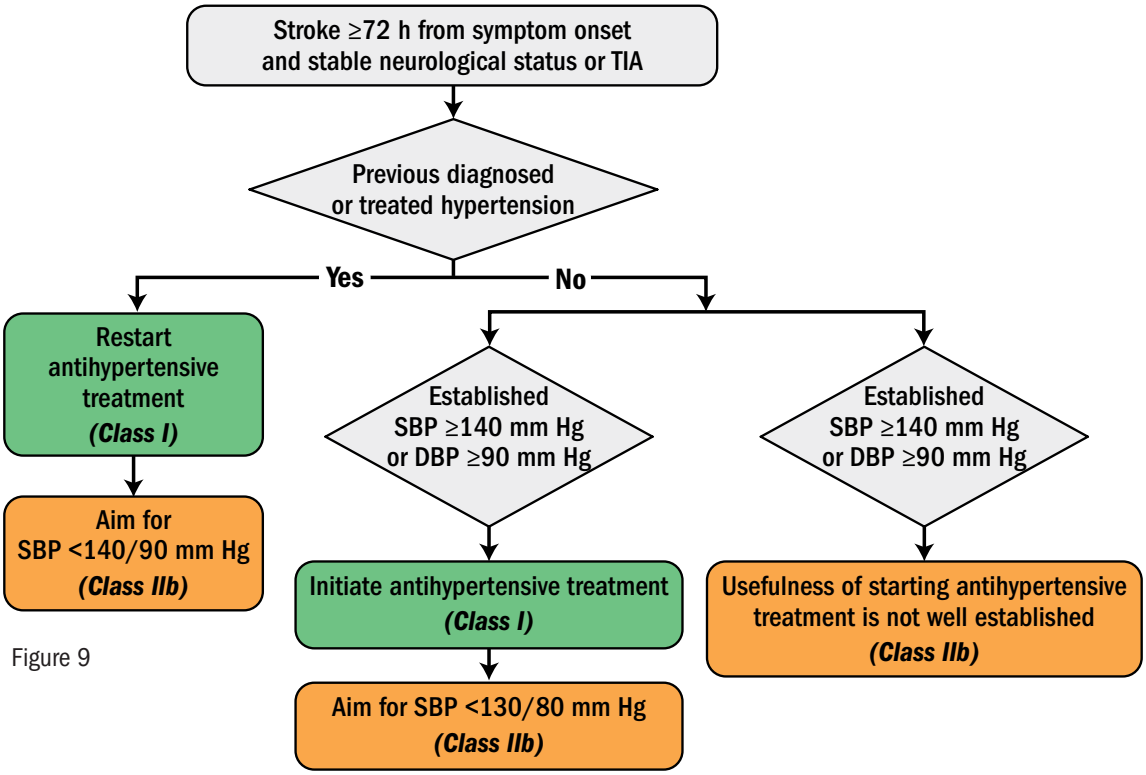


Figure 9

Resistant Hypertension: Diagnosis, Evaluation, and Treatment

Confirm Treatment Resistance

Office SBP/DBP ≥130/80 mm Hg

and

Patient prescribed ≥3 antihypertensive medications at optimal doses, including a diuretic, if possible

or

Office SBP/DBP <130/80 mm Hg but patient requires ≥4 antihypertensive medications

↓

Exclude Pseudo-Resistance

Ensure accurate office BP measurements
Assess for nonadherence with prescribed regimen
Obtain home, work, or ambulatory BP readings to exclude white coat effect

↓

Identify and Reverse Contributing Lifestyle Factors

Obesity
Physical Inactivity
Excessive alcohol ingestion
High salt, low-fiber diet

↓

Discontinue or Minimize Interfering Substances

NSAIDs
Sympathomimetic (e.g., amphetamines, decongestants)
Stimulants
Oral contraceptives
Licorice
Ephedra

↓

Screen for Secondary Causes of Hypertension

Primary aldosteronism (elevated aldosterone/renin ratio)
CKD (eGFR <60 mL/min/1.73 m^2)
Renal artery stenosis (young female, known atherosclerotic disease, worsening kidney function)
Pheochromocytoma (episodic hypertension, palpitations, diaphoresis, headache)
Obstructive sleep apnea (snoring, witnessed apnea, excessive daytime sleepiness)

↓

Pharmacologic Treatment

Maximize diuretic therapy
Add a mineralocorticoid receptor antagonist
Add other agents with different mechanisms of actions
Use loop diuretics in patients with CKD
and/or patients receiving potent vasodilators (e.g., minoxidil)

↓

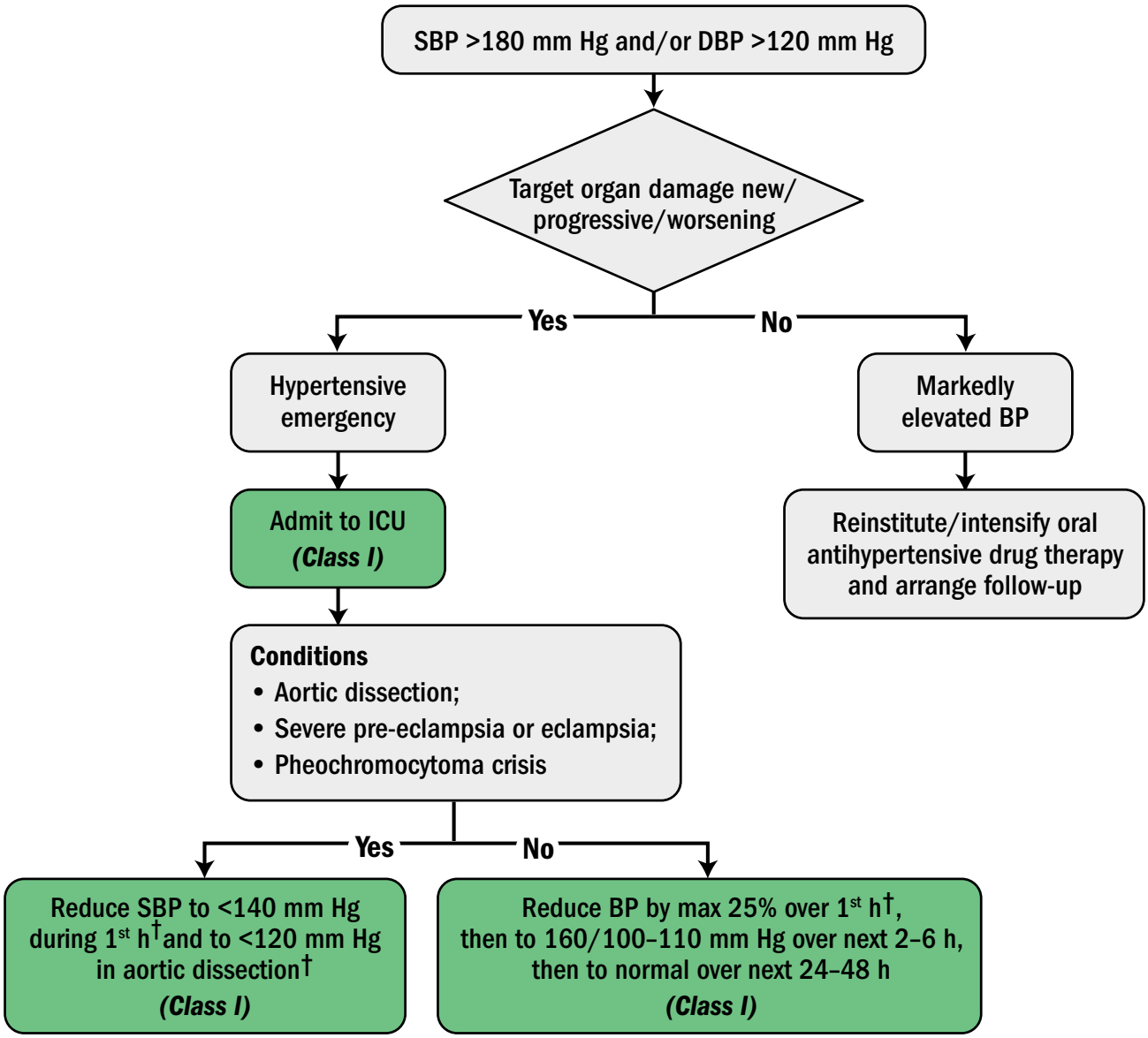
Refer to Specialist

Refer to appropriate specialist for known or suspected secondary cause(s) of hypertension
Refer to hypertension specialist if BP remains uncontrolled after 6 mo of treatment

Adapted with permission from Calhoun DA, Jones D, Textor S, et al. Resistant hypertension: diagnosis, evaluation, and treatment. A scientific statement from the American Heart Association Professional Education Committee of the Council for High Blood Pressure Research. Hypertension. 2008; 51:1403-19

Figure 10

Diagnosis and Management of a Hypertensive Crisis



Use drug(s) specified in Table 19.

†If other comorbidities are present, select a drug specified in Table 20.

Figure 11

Intravenous Antihypertensive Drugs for Treatment of Hypertensive Emergencies *(1 of 2)*

Agent	Drugs	Usual Dose Range	Comments
CCB-dihydropyridines	**Nicardipine**	Initial 5 mg/h, increasing every 5 min by 2.5 mg/h to maximum 15 mg/h.	Contraindicated in advanced aortic stenosis; no dose adjustment needed for elderly.
	Clevidipine	Initial 1–2 mg/h, doubling every 90 s until BP approaches target, then increasing by < double every 5–10 min; maximum dose 32 mg/h; maximum duration 72 h.	Contraindicated in pts with soybean, soy product, egg, and egg product allergy and in pts with defective lipid metabolism (e.g., pathological hyperlipidemia, lipoid nephrosis or acute pancreatitis). Use low-end dose range for elderly pts.
Vasodilators-nitric oxide dependent	**Sodium nitroprusside**	Initial 0.3–0.5 mcg/kg/min; increase in increments of 0.5 mcg/kg/min to achieve BP target; maximum dose 10 mcg/kg/min; duration of treatment as short as possible. For infusion rates ≥4–10 mcg/kg/min or duration >30 min, thiosulfate can be coadministered to prevent cyanide toxicity.	Intra-arterial BP monitoring recommended to prevent "overshoot". Lower dosing adjustment required for elderly. Tachyphylaxis common with extended use. Cyanide toxicity with prolonged use can result in irreversible neurologic changes and cardiac arrest.
	Nitroglycerin	Initial 5 mcg/min; increase in increments of 5 mcg/min every 3–5 min to a maximum of 20 mcg/min.	Use only in pts with acute coronary syndrome and/or acute pulmonary edema. Do not use in volume-depleted pts.
Vasodilators-direct	**Hydralazine**	Initial 10 mg via slow IV infusion (maximum initial dose 20 mg); repeat every 4–6 h as needed.	BP begins to decrease within 10–30 min and the fall lasts 2–4 h. Unpredictability of response and prolonged duration of action do not make hydralazine a desirable first-line agent for acute treatment in most pts.
Adrenergic blockers beta1 receptor selective antagonist	**Esmolol**	Loading dose 500–1,000 mcg/kg/min over 1 min followed by a 50 mcg/kg/min infusion. For additional dosing, the bolus dose is repeated and the infusion increased in 50 mcg/kg/min increments as needed to a maximum of 200 mcg/kg/ min.	Contraindicated in pts with concurrent beta-blocker therapy, bradycardia and/or decompensated HF Monitor for bradycardia. May worsen HF. Higher doses may block beta2 receptors and impact lung function in reactive airway disease.

Table will be continued in the next page

Intravenous Antihypertensive Drugs for Treatment of Hypertensive Emergencies *(2 of 2)*

Agent	Drugs	Usual Dose Range	Comments
Adrenergic blockers-combined alpha1 and nonselective beta receptor antagonist	**Labetalol**	Initial 0.3–1.0 mg/kg dose (maximum 20 mg) slow IV injection every 10 min or 0.4–1.0 mg/kg/h IV infusion up to 3 mg/kg/h. Adjust rate up to total cumulative dose of 300 mg. This dose can be repeated every 4–6 h.	Contraindicated in reactive airways disease or chronic obstructive pulmonary disease. Especially useful in hyperadrenergic syndromes. May worsen HF and should not be given in pts with 2nd or 3rd degree heart block or bradycardia.
Adrenergic blockers-non-selective alpha receptor antagonist	**Phentolamine**	IV bolus dose 5 mg. Additional bolus doses every 10 min as needed to lower BP to target.	Used in hypertensive emergencies induced by catecholamine excess (pheochromocytoma, interactions between monamine oxidase inhibitors and other drugs or food, cocaine toxicity, amphetamine overdose or clonidine withdrawal).
Dopamine1-receptor selective agonist	**Fenoldopam**	Initial 0.1–0.3 mcg/kg/min; may be increased in increments of 0.05–0.1 mcg/kg/min every 15 min until target BP is reached. Maximum infusion rate 1.6 mcg/kg/min.	Contraindicated in pts at risk for increased intraocular pressure (glaucoma) or intracranial pressure and those with sulfite allergy.
Angiotensin converting enzyme inhibitor	**Enalaprilat**	Initial 1.25 mg over a 5 min period. Doses can be increased up to 5 mg every 6 h as needed to achieve BP target.	Contraindicated in pregnancy and should not be used in acute MI or bilateral renal artery stenosis. Mainly useful in hypertensive emergencies associated with high plasma renin activity. Dose not easily adjusted. Relatively slow onset of action (15 min) and unpredictability of BP response.

Table 19

2018 Guideline on the Management of Blood Cholesterol

GUIDELINES MADE SIMPLE

A Selection of Tables and Figures

ACC.org/GMSCholesterol

AMERICAN COLLEGE of CARDIOLOGY

2018 Guideline on the Management of Blood Cholesterol

GUIDELINES MADE SIMPLE

A report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines

Writing Committee:

Scott M. Grundy, MD, PhD, FAHA, Chair
Neil J. Stone, MD, FACC, FAHA, Vice Chair

Alison L. Bailey, MD, FACC, FAACVPR
Craig Beam, CRE
Kim K. Birtcher, MS, PharmD, AACC, FNLA
Roger S. Blumenthal, MD, FACC, FAHA, FNLA
Lynne T. Braun, PhD, CNP, FAHA, FPCNA, FNLA
Sarah de Ferranti, MD, MPH
Joseph Faiella-Tommasino, PhD, PA-C
Daniel E. Forman, MD, FAHA
Ronald Goldberg, MD
Paul A. Heidenreich, MD, MS, FACC, FAHA
Mark A. Hlatky, MD, FACC, FAHA
Daniel W. Jones, MD, FAHA
Donald Lloyd-Jones, MD, SCM, FACC, FAHA
Nuria Lopez-Pajares, MD, MPH
Chiadi E. Ndumele, MD, PhD, FAHA
Carl E. Orringer, MD, FACC, FNLA
Carmen A. Peralta, MD, MAS
Joseph J. Saseen, PharmD, FNLA, FAHA
Sidney C. Smith, Jr, MD, MACC, FAHA
Laurence Sperling, MD, FACC, FAHA, FASPC
Salim S. Virani, MD, PhD, FACC, FAHA
Joseph Yeboah, MD, MS, FACC, FAHA

The purpose of the present guideline is to address the practical management of patients with high blood cholesterol and related disorders. The 2018 Cholesterol Guideline is a full revision of the *2013 ACC/AHA Guideline on the Treatment of Blood Cholesterol* to Reduce Atherosclerotic Cardiovascular Risk in Adults.

The following resource contains tables and figures from the 2018 Guideline for the Management of Blood Cholesterol. The resource is only an excerpt from the Guideline and the full publication should be reviewed for more tables and figures as well as important context.

CITATION: J Am Coll Cardiol. Nov 2018; DOI: 10.1016/j.jacc.2018.11.003

2018 Guideline on the Management of Blood Cholesterol

GUIDELINES MADE SIMPLE

Top 10 Take-Home Messages to Reduce Risk of Atherosclerotic Cardiovascular Disease (ASCVD) through Cholesterol Management

(1 of 3)

1 *In all individuals, emphasize heart-healthy lifestyle across the life-course.*

A healthy lifestyle reduces atherosclerotic cardiovascular disease (ASCVD) risk at all ages. In younger individuals, healthy lifestyle can reduce development of risk factors and is the foundation of ASCVD risk reduction. In young adults 20 to 39 years of age, an assessment of lifetime risk facilitates the clinician–patient risk discussion (see #6) and emphasizes intensive lifestyle efforts. In all age groups, lifestyle therapy is the primary intervention for metabolic syndrome.

2 *In patients with clinical ASCVD, reduce low-density lipoprotein cholesterol (LDL-C) with high-intensity statin therapy or maximally tolerated statin therapy*

The more LDL-C is reduced on statin therapy, the greater will be subsequent risk reduction. Use a maximally tolerated statin to lower LDL-C levels by ≥50%.

3 *In very high-risk ASCVD, use a LDL-C threshold of 70 mg/dL (1.8 mmol/L) to consider addition of nonstatins to statin therapy.*

Very high-risk includes a history of multiple major ASCVD events or 1 major ASCVD event and multiple high-risk conditions. In very high-risk ASCVD patients, it is reasonable to add ezetimibe to maximally tolerated statin therapy when the LDL-C level remains ≥70 mg/dL (≥1.8 mmol/L). In patients at very high risk whose LDL-C level remains ≥70 mg/dL (≥1.8 mmol/L) on maximally tolerated statin and ezetimibe therapy, adding a PCSK9 inhibitor is reasonable, although the long-term safety (>3 years) is uncertain and cost effectiveness is low at mid-2018 list prices.

4 *In patients with severe primary hypercholesterolemia (LDL-C level ≥190 mg/dL [≥4.9 mmol/L]), without calculating 10-year ASCVD risk, begin high-intensity statin therapy without calculating 10-year ASCVD risk.*

If the LDL-C level remains ≥100 mg/dL (≥2.6 mmol/L), adding ezetimibe is reasonable. If the LDL-C level on statin plus ezetimibe remains ≥100 mg/dL (≥2.6 mmol/L) and the patient has multiple factors that increase subsequent risk of ASCVD events, a PCSK9 inhibitor may be considered, although the long-term safety (>3 years) is uncertain and economic value is low at mid-2018 list prices.

"Top Ten Messages" is continued in the next page.

Top 10 Take-Home Messages to Reduce Risk of Atherosclerotic Cardiovascular Disease (ASCVD) through Cholesterol Management *(2 of 3)*

5 *In patients 40 to 75 years of age with diabetes mellitus and LDL-C ≥70 mg/dL (≥1.8 mmol/L), start moderate-intensity statin therapy without calculating 10-year ASCVD risk.*

In patients with diabetes mellitus at higher risk, especially those with multiple risk factors or those 50 to 75 years of age, it is reasonable to use a high-intensity statin to reduce the LDL-C level by ≥50%.

6 *In adults 40 to 75 years of age evaluated for primary ASCVD prevention, have a clinician–patient risk discussion before starting statin therapy.*

Risk discussion should include a review of major risk factors (e.g., cigarette smoking, elevated blood pressure, LDL-C, hemoglobin A1C [if indicated], and calculated 10-year risk of ASCVD); the presence of risk-enhancing factors (see #8); the potential benefits of lifestyle and statin therapies; the potential for adverse effects and drug–drug interactions; consideration of costs of statin therapy; and patient preferences and values in shared decision-making.

7 *In adults 40 to 75 years of age without diabetes mellitus and with LDL-C levels ≥70 mg/dL (≥1.8 mmol/L), at a 10-year ASCVD risk of ≥7.5%, start a moderate-intensity statin if a discussion of treatment options favors statin therapy.*

. Risk-enhancing factors favor statin therapy (see #8). If risk status is uncertain, consider using coronary artery calcium (CAC) to improve specificity (see #9). If statins are indicated, reduce LDL-C levels by ≥30%, and if 10-year risk is ≥20%, reduce LDL-C levels by ≥50%.

"Top Ten Messages" is continued in the next page.

Top 10 Take-Home Messages to Reduce Risk of Atherosclerotic Cardiovascular Disease (ASCVD) through Cholesterol Management *(3 of 3)*

8 *In adults 40 to 75 years of age without diabetes mellitus and 10-year risk of 7.5% to 19.9% (intermediate risk), risk-enhancing factors favor initiation of statin therapy (see #7).*

Risk-enhancing factors include family history of premature ASCVD; persistently elevated LDL-C levels ≥160 mg/dL (≥4.1 mmol/L); metabolic syndrome; chronic kidney disease; history of preeclampsia or premature menopause (age <40 years); chronic inflammatory disorders (e.g., rheumatoid arthritis, psoriasis, or chronic HIV); high-risk ethnic groups (e.g., South Asian); persistent elevations of triglycerides ≥175 mg/dL (≥1.97 mmol/L); and, if measured in selected individuals, apolipoprotein B ≥130 mg/dL, high-sensitivity C-reactive protein ≥2.0 mg/L, ankle-brachial index <0.9 and lipoprotein (a) ≥50 mg/dL or 125 nmol/L, especially at higher values of lipoprotein (a). Risk-enhancing factors may favor statin therapy in patients at 10-year risk of 5-7.5% (borderline risk).

9 *In adults 40 to 75 years of age without diabetes mellitus and with LDL-C levels ≥70 mg/dL- 189 mg/dL (≥1.8-4.9 mmol/L), at a 10-year ASCVD risk of ≥7.5% to 19.9%, if a decision about statin therapy is uncertain, consider measuring CAC.*

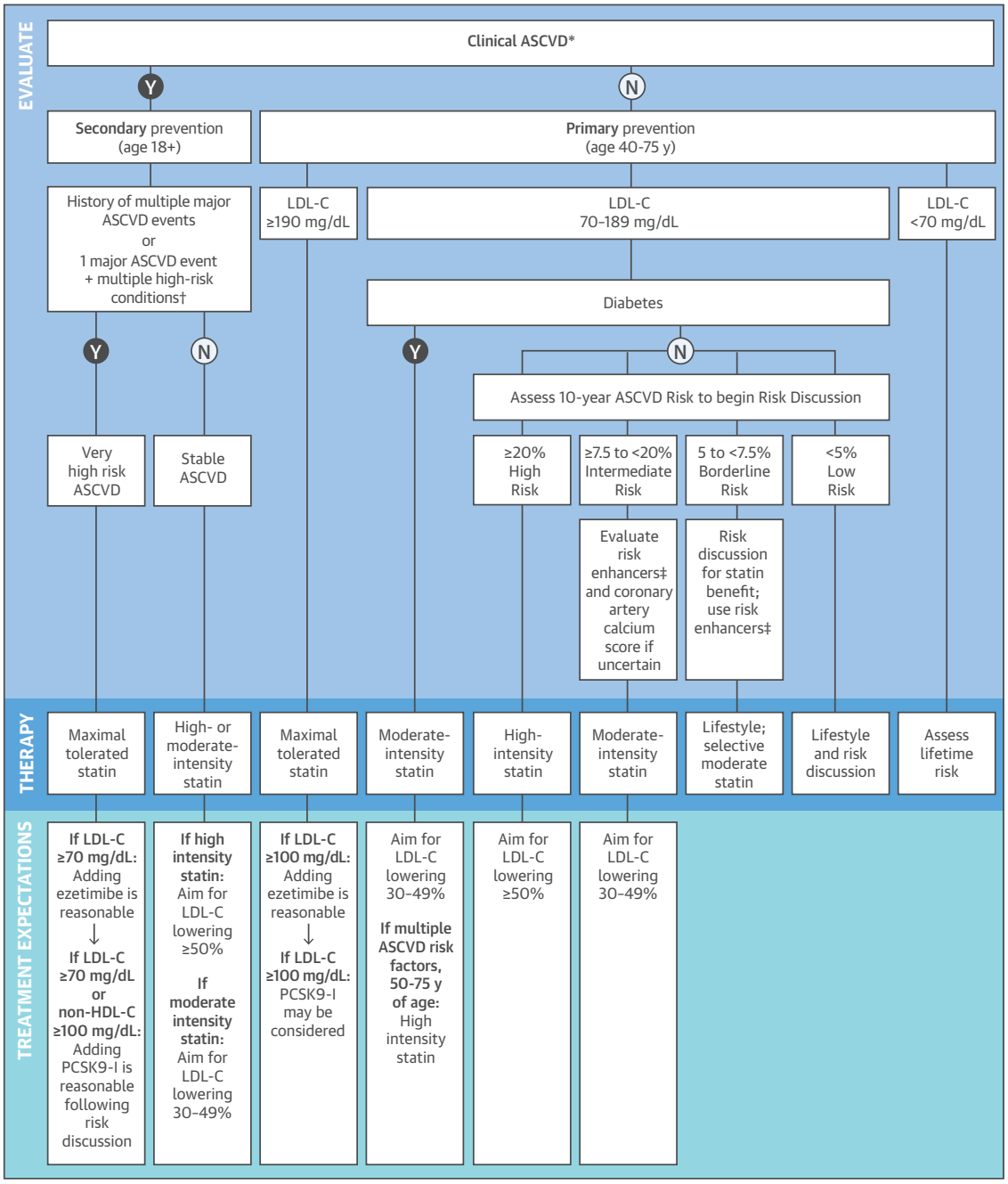
If CAC is zero, treatment with statin therapy may be withheld or delayed, except in cigarette smokers, those with diabetes mellitus, and those with a strong family history of premature ASCVD. A CAC score of 1 to 99 favors statin therapy, especially in those ≥55 years of age. For any patient, if the CAC score is ≥100 Agatston units or ≥75th percentile, statin therapy is indicated unless otherwise deferred by the outcome of clinician–patient risk discussion.

10 *Assess adherence and percentage response to LDL-C–lowering medications and lifestyle changes with repeat lipid measurement 4 to 12 weeks after statin initiation or dose adjustment, repeated every 3 to 12 months as needed.*

Define responses to lifestyle and statin therapy by percentage reductions in LDL-C levels compared with baseline. In ASCVD patients at very high-risk, triggers for adding nonstatin drug therapy are defined by threshold LDL-C levels ≥70 mg/dL (≥1.8 mmol/L) on maximal statin therapy (see #3).

Overview of Primary and Secondary ASCVD Prevention

This tool provides a broad overview of the 2018 Cholesterol Guideline.
Please refer to the full guideline document for specific recommendations.



* **Clinical ASCVD** consists of acute coronary syndromes, those with history of myocardial infarction, stable or unstable angina or coronary other arterial revascularization, stroke, TIA, or peripheral artery disease including aortic aneurysm, all of atherosclerotic origin.

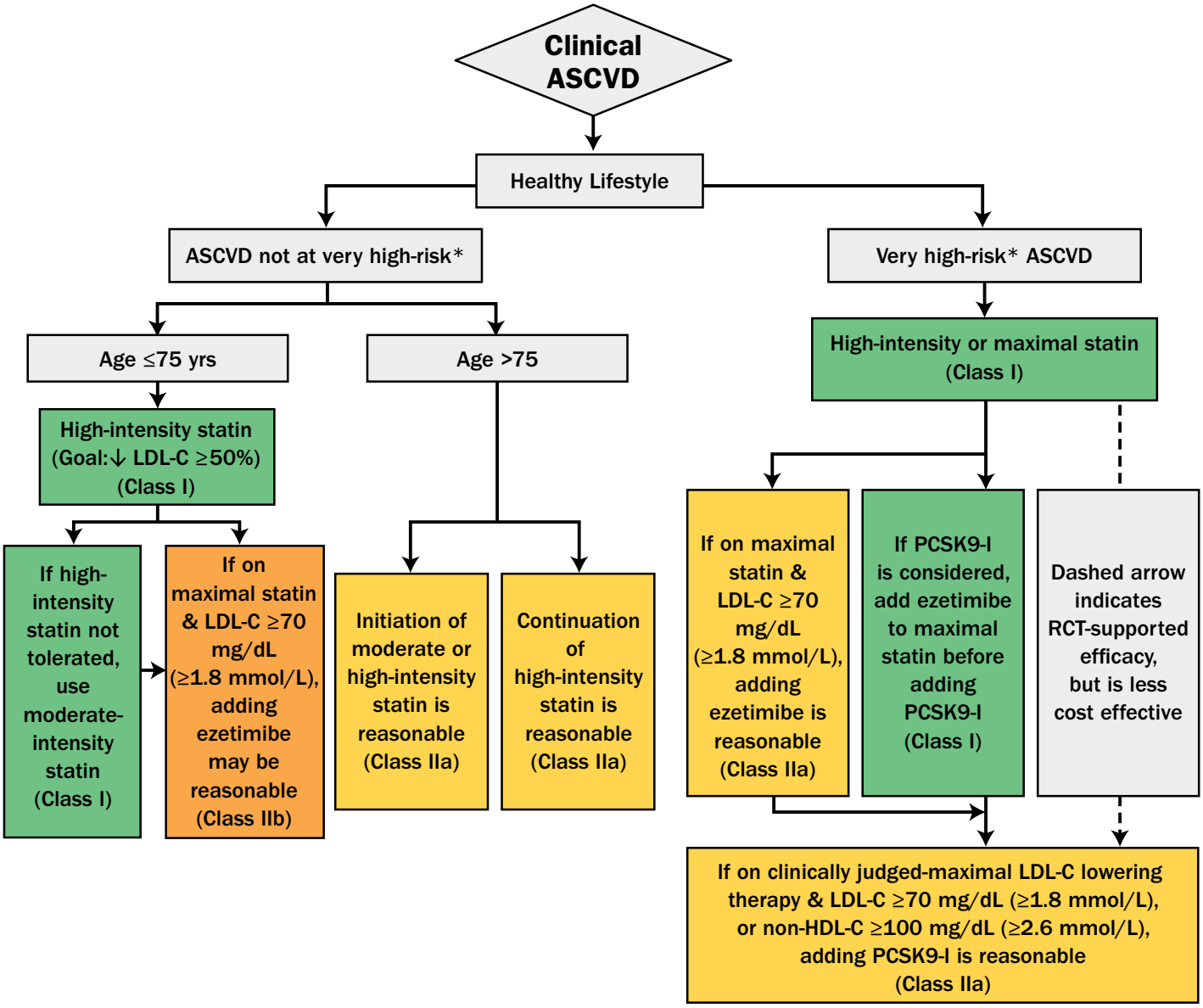
† **Major ASCVD events:** Recent ACS, history of MI, history of Ischemic stroke, symptomatic PAD; **High-Risk Conditions:** ≥65 y of age, heterozygous FH, hx of HF, prior CABG or PCI, DM, HTN, CKD, current smoking, persistently elevated LDL-C≥100 mg/dL.

‡ **Risk Enhancers:** Family history of premature ASCVD, persistently elevated LDL-C ≥160 mg/dl, chronic kidney disease, metabolic syndrome, conditions specific to women (e.g. pre-eclampsia, premature menopause), inflammatory disease (especially psoriasis, RA, or HIV), ethnicity (e.g. South Asian ancestry), Lipid/biomarkers; persistently elevated triglycerides (≥175 mg/dL), if measured: hs-CRP ≥2.0 mg/L, Lp(a) levels ≥50 mg/dL or ≥125 nmol/l, apoB ≥130 mg/dL especially at higher levels of Lp(a), ABI <0.9.

Secondary ASCVD Prevention

First Statin Benefit Group

Figure 1:
Secondary Prevention in Patients with Clinical ASCVD



*Very high-risk includes a history of multiple major ASCVD events or 1 major ASCVD event and multiple high-risk conditions (**Table 4** on following page).

Figure 1

Secondary ASCVD Prevention

First Statin Benefit Group

Very High-Risk for Future ASCVD Events*

Table 4

Major ASCVD Events
Recent acute coronary syndrome (within the past 12 months)
History of myocardial infarction (other than recent acute coronary syndrome event listed above)
History of ischemic stroke
Symptomatic peripheral arterial disease (history of claudication with ankle brachial index <0.85, or previous revascularization or amputation)
High-Risk Conditions
Age ≥65 years
Heterozygous familial hypercholesterolemia
History of prior coronary artery bypass surgery or PCI outside of the major ASCVD event(s)
Diabetes Mellitus
Hypertension
Chronic kidney disease (eGFR 15-59 mL/min/1.73 m^2)
Current smoking
Persistently elevated LDL-C (LDL-C ≥100 mg/dL (≥2.6 mmol/L)) despite maximally tolerated statin therapy and ezetimibe
History of congestive heart failure

*Very High Risk includes a history of multiple major ASCVD events or one major ASCVD event and multiple high-risk conditions.

Severe Hypercholesterolemia

Second Statin Benefit Group

Recommendations for Primary Severe Hypercholesterolemia [LDL-C ≥190 mg/dL (≥4.9 mmol/L)]

COR	LOE	Recommendations
I	B-R	1. 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.
IIa	B-R	2. In patients 20 to 75 years of age with an LDL-C level of 190 mg/dL (≥4.9 mmol/L) or higher who achieve less than 50% reduction in LDL-C while receiving maximally tolerated statin therapy and/or have an LDL-C level of 100 mg/dL (≥2.6 mmol/L) or higher, ezetimibe therapy is reasonable.
IIb	B-R	3. In patients 20 to 75 years of age with a baseline LDL-C ≥190 mg/dL (≥4.9 mmol/L), who achieve less than a 50% reduction in LDL-C levels and have fasting triglycerides ≤300 mg/dL (≤3.4 mmol/L) while taking maximally tolerated statin and ezetimibe therapy, the addition of a bile acid sequestrant may be considered.
IIb	B-R	4. In patients 30 to 75 years of age with heterozygous FH and with an LDL-C level of 100 mg/dL (≥2.6 mmol/L) or higher while taking maximally tolerated statin and ezetimibe therapy, the addition of a PCSK9 inhibitor may be considered.
IIb	C-LD	5. In patients 40 to 75 years of age with a baseline LDL-C level of 220 mg/dL (≥5.7 mmol/L) or higher who achieve an on-treatment LDL-C level of 130 mg/dL (≥3.4 mmol/L) or higher while receiving maximally tolerated statin and ezetimibe therapy, the addition of a PCSK9 inhibitor may be considered.
Value Statement: Uncertain Value (B-NR)		6. Among patients with FH without evidence of clinical ASCVD taking maximally tolerated statin and ezetimibe therapy, PCSK9 inhibitors provide uncertain value at mid-2018 US list prices.

Diabetes Mellitus in Adults

Third Statin Benefit Group

Diabetes-specific Risk Enhancers That Are Independent of Other Risk Factors in Diabetes

Table 5

- Long duration (≥10 years for type 2 diabetes or ≥ 20 years for type 1 diabetes)
- Albuminuria ≥30 mcg albumin/mg creatinine
- eGFR <60 ml/min/1.73 m^2
- Retinopathy
- Neuropathy
- ABI <0.9

Primary Prevention Over The Life Span

Fourth Statin Benefit Group

Primary Prevention

Primary Prevention:
Assess ASCVD Risk in Each Age Group
Emphasize Adherence to Healthy Lifestyle

Age 0-19 y
Lifestyle to prevent or reduce ASCVD risk
Diagnosis of Familial Hypercholesterolemia → statin

Age 20-39 y
Estimate lifetime risk
to encourage lifestyle to reduce ASCVD risk
Consider statin if family history, premature ASCVD and LDL-C ≥160 mg/dL (≥4.1 mmol/L)

Age 40-75 y and LDL-C ≥70 to <190 mg/dL (≥1.8 - <4.9 mmol/L) without diabetes mellitus
10-year ASCVD risk percent begins risk discussion

LDL-C ≥190 mg/dL (≥4.9 mmol/L)
No risk assessment; High-intensity statin
(Class I)

Diabetes mellitus and age 40-75 y
Moderate-intensity statin
(Class I)

Diabetes mellitus and age 40-75 y
Risk assessment to consider high-intensity statin
(Class IIa)

Age >75 y
Clinical assessment, Risk discussion

ASCVD Risk Enhancers:
- Family history of premature ASCVD
- Persistently elevated LDL-C ≥160 mg/dL (≥4.1 mmol/L)
- Chronic kidney disease
- Metabolic syndrome
- Conditions specific to women (e.g. preeclampsia, premature menopause)
- Inflammatory diseases (especially rheumatoid arthritis, psoriasis, HIV)
- Ethnicity factors (e.g. South Asian ancestory)

Lipid/Biomarkers:
- Persistently elevated triglycerides (≥175 mg/mL)

In selected individuals if measured:
- hs-CRP ≥2.0 mg/L
- Lp(a) levels >50 mg/dL or >125 nmol/L
- apoB ≥130 mg/dL
- Ankle-brachial index (ABI) <0.9

<5% "Low Risk"

5% - <7.5% "Borderline Risk"

≥7.5% - <20% "Intermediate Risk"

≥20% "High Risk"

Risk Discussion:
Emphasize lifestyle to reduce risk factors
Class (I)

If Risk enhancers present then risk discussion regarding moderate-intensity statin therapy
Class (IIb)

Risk Discussion:
If risk estimate + risk enhancers favor statin, initiate moderate-intensity statin to reduce LDL-C by 30% - 49%
Class (I)

Risk Discussion:
initiate statin to reduce LDL-C ≥50%
Class (I)

If risk decision is uncertain:
Consider measuring CAC in selected adults:
CAC = zero (lowers risk; consider no statin, unless diabetes, family history of premature CHD, or cigarette smoking are present)
CAC = 1-99 favors statin (especially after age 55)
CAC = 100+ and/or ≥75th percentile, initiate statin therapy

Figure 2

Treatment Considerations

Risk-enhancing Factors for Clinician-Patient Risk Discussion

- **Family history of premature ASCVD;** (males <55 years; females <65 years)
- **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, elevated TG (>175 mg/dL, elevated BP, elevated glucose, low HDL-C (<40 mg/dL in men, <50 mg/dL in women) are factors; tally of 3 makes the diagnosis)
- **Chronic kidney disease** (eGFR 15- 59 ml/min per 1.73 m^2 with or without albuminuria; not treated with dialysis or kidney transplantation)
- **Chronic inflammatory conditions** such as psoriasis, rheumatoid arthritis (RA) or human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS)
- **History of premature menopause (before age 40) and history of pregnancy-associated conditions that increase later ASCVD risk such as pre-eclampsia**
- **High-risk ethnicities** (e.g. South Asian ancestry)
- **Lipid/Biomarkers:** Associated with increased ASCVD risk

  -Persistently* elevated, primary hypertriglyceridemia (≥175 mg/dl);

  -If measured:

  - **High-sensitivity C-reactive protein** - (≥2.0 mg/L)
  - **Elevated lipoprotein (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 apo B ≥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**

AIDS indicates acquired immunodeficiency syndrome; ABI, ankle-brachial index; 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.

*Optimally, 3 determinations

Primary Prevention Over The Life Span

Fourth Statin Benefit Group

Checklist for Clinician-Patient Shared Decision Making for Initiating Therapy

Table 7

Checklist Item	Recommendation

ASCVD Risk Assessment	• Assign to statin treatment group; use ASCVD risk estimator plus*
	  ◦ In lower risk primary prevention adults 40-75 years with LDL-C ≥70 mg/dL (≥1.8 mmol/L).
	  ◦ Not needed in secondary prevention, LDL-C ≥190 mg/dL (≥4.9 mmol/L) and those 40-75 years with diabetes.
	• Assess other patient characteristics which influence risk. See Risk Enhancing Factors *(Section 4.4.1.3 and Table 6)*
	• Assess coronary artery calcium *(section 4.4.1.4)* if risk decision uncertain and additional information is needed to clarify ASCVD risk
	  ◦ Use decision tools to explain risk (ASCVD risk estimator plus- http://tools.acc.org/ASCVD-Risk-Estimator-Plus, Mayo Clinic Statin Choice Decision Aid)

Lifestyle Modifications	• Review lifestyle habits (diet, physical activity, weight/BMI, tobacco use) • Endorse a healthy lifestyle and provide relevant advice/materials/referrals (CardioSmart, AHA Life's Simple 7, NLA Patient Tear Sheets, PCNA Clinicians' Lifestyle Modification Toolbox, cardiac rehab, dietitian, smoking cessation program)
Potential Net-Clinical Benefit of Pharmacotherapy	• Recommend statins as first-line therapy • Consider the combination of statin and non-statin therapy in select patients • Discuss potential risk reduction from lipid-lowering therapy • Discuss the potential for adverse effects/drug-drug interactions
Cost Considerations	• Discuss potential out-of-pocket cost of therapy to the patient (e.g., insurance plan coverage, tier level, copayment)
Shared Decision Making	• Encourage patient to verbalize what was heard (personal ASCVD risk, available options and their risk/benefit) • Invite the patient to ask questions, express values/preferences, state ability to adhere to lifestyle changes and medications • Refer patients to trustworthy materials to aid in their understanding of issues regarding risk decisions • Collaborate with the patient to determine therapy and follow-up plan

*ASCVD Risk Predictor Plus is available at: http://tools.acc.org/ASCVD-Risk-Estimator-Plus/#!/calculate/estimate/

AHA indicates American Heart Association; ASCVD, atherosclerotic cardiovascular disease; CAC, coronary artery calcium; CKD, chronic kidney disease; HIV, human immunodeficiency virus; LDL-C, low-density lipoprotein cholesterol; and NLA, National Lipid Association.

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Primary Prevention Over the Life span

Fourth Statin Benefit Groups

Selected Examples of Candidates for Coronary Artery Calcium Measurement Who Might Benefit from Knowing CAC Score is Zero

Table 8

1. Patients reluctant to initiate statin who wish to understand their risk and potential for benefit more precisely

2. Patients concerned about need to re-institute statin therapy after discontinuation for statin associated symptoms

3. Older patients (men 55 to 80; women 60-80 years old) with low burden of risk factors who question whether they would benefit from statin therapy

4. Middle-aged adults (40-55 years old) with PCE calculated 10-year risk for ASCVD 5 to <7.5% with factors that increase their ASCVD risk, even though they are in a borderline risk group

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

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

Treatment Considerations

High-, Moderate-, and Low-Intensity Statin Therapy*

Table 3

	High-Intensity	Moderate-Intensity	Low-Intensity
LDL-C Lowering†	≥50%	30% to 49%	<30%
Statins	**Atorvastatin (40 mg‡) 80 mg** **Rosuvastatin 20 (40 mg)**	**Atorvastatin 10 mg (20 mg)** **Rosuvastatin** (5 mg) **10 mg** **Simvastatin 20–40 mg§**	Simvastatin 10 mg
	–	**Pravastatin 40 mg (80 mg)** **Lovastatin 40 mg** (80 mg) Fluvastatin XL 80 mg **Fluvastatin 40 mg BID** Pitavastatin 1–4 mg	**Pravastatin 10–20 mg** **Lovastatin 20 mg** Fluvastatin 20–40 mg

BID indicates twice daily; FDA, U.S. Food and Drug Administration; LDL-C, low-density lipoprotein cholesterol; RCT, randomized controlled trial; VOYAGER, an indiVidual patient data meta-analysis Of statin therapY in At risk Groups: Effects of Rosuvastatin, atorvastatin and simvastatin; and XL, extended release.

Percent LDL-C reductions with the primary statin medications used in clinical practice (atorvastatin, rosuvastatin, simvastatin) were estimated using the median reduction in LDL-C from the VOYAGER database (13). Reductions in LDL-C for other statin medications (fluvastatin, lovastatin, pitavastatin, pravastatin) were identified according to FDA-approved product labeling in adults with hyperlipidemia, primary hypercholesterolemia, and mixed dyslipidemia.

Boldface type indicates specific statins and doses that were evaluated in RCTs, and the Cholesterol Treatment Trialists'2010 meta-analysis. All these RCTs demonstrated a reduction in major cardiovascular events.

Italic type indicates statins and doses that have been approved by the FDA but were not tested in the RCTs reviewed.

*Percent reductions are estimates from data across large populations. Individual responses to statin therapy varied in the RCTs and should be expected to vary in clinical practice.

†LDL-C lowering that should occur with the dosage listed below each intensity.

‡Evidence from 1 RCT only: downtitration if unable to tolerate atorvastatin 80 mg in the IDEAL (Incremental Decrease through Aggressive Lipid Lowering) study.

§Although simvastatin 80 mg was evaluated in RCTs, initiation of simvastatin 80 mg or titration to 80 mg is not recommended by the FDA because of the increased risk of myopathy, including rhabdomyolysis.

Treatment Considerations

Statin Associated Side Effects (SASE)
(1 of 2)

Table 11

Statin Associated Side Effects	Frequency	Predisposing Factors	Quality of Evidence
Statin Associated Muscle Symptoms (SAMS) • Myalgias (CK normal)	Infrequent (1%–5%) in RCTs/frequent (5%–10%) in observational studies and clinical setting	Age, female, low BMI, high- risk medications (CYP3A4 inhibitors, OATP1B1 inhibitors), comorbidities (HIV, renal, liver, thyroid, pre-existing myopathy), Asian descent, excess alcohol, high levels of physical activity and trauma.	RCTs cohorts/observational
• Myositis/Myopathy (CK >ULN) with concerning symptoms/objective weakness	Rare		RCTs cohorts/observational
• Rhabdomyolysis (CK >10xULN + renal injury)	Rare		RCTs Cohorts/observational
• Statin-associated autoimmune myopathy (SAAM) (HMGCR Ab's, incomplete resolution)	Rare		Case reports
New onset Diabetes Mellitus	Depends on population; more frequent if diabetes mellitus risk factors such as BMI ≥30, fasting blood sugar ≥100 mg/dL; metabolic syndrome or A1c ≥6% are present	Diabetes risk factors/ metabolic syndrome High-intensity statin therapy	RCTs/Meta-analyses

Table 11 *is continued in the next page. For references please see page 18.*

Treatment Considerations

Statin Associated Side Effects (SASE)
(2 of 2)

Table 11 *(continued from previous page)*

Statin Associated Side Effects	Frequency	Predisposing Factors	Quality of Evidence
Liver • Transaminase elevation 3xULN	Infrequent		RCTs/cohorts/observational Case reports
• Hepatic Failure	Rare		
CNS • Memory/Cognition	Rare/Unclear		Case reports; no increase in memory/cognition problems in three large scale RCTs
Cancer	No definite association		RCTs/meta-analyses
Other • Renal Function • Cataracts • Tendon Rupture • Hemorrhagic Stroke • Interstitial Lung Disease • Low Testosterone	 Unclear/unfounded Unclear Unclear/unfounded Unclear Unclear/unfounded Unclear/unfounded		

CK indicates creatine kinase; HIV, human immunodeficiency virus; HMGCR, 3-hydroxy-3-methyl-glutaryl-coenzyme A reductase; SAMS, statin-associated muscle symptoms; SAAM, statin-associated autoimmune myopathy; SASE, statin associated side effects; and ULN, upper limit of normal. "

Special Populations

Normal and Abnormal Lipid Values in Childhood*†

Table 9

	Acceptable	Borderline	Abnormal
TC	<170 mg/dL (<4.3 mmol)	170-199 mg/dL (4.3-5.1 mmol)	≥200 mg/dL (≥5.1 mmol)
Triglycerides: 0-9 y	<75 mg/dL (<0.8 mmol)	75-99 mg/dL (0.8-1.1 mmol)	≥100 mg/dL (≥1.1 mmol)
Triglycerides: 10-19 y	< 90 mg/dL (<1.0 mmol)	90-129 mg/dL (1.0-1.5 mmol)	≥130 mg/dL (≥1.4 mmol)
HDL-C	>45 mg/dL (>1.2 mmol)	40-45 mg/dL (1.0-1.2 mmol)	<40 mg/dL (<1.0 mmol)
LDL-C	<110 mg/dL (<2.8 mmol)	110-129 mg/dL (2.8-3.3 mmol)	≥130 mg/dL (≥3.4 mmol)
Non-HDL-C	<120 mg/dL (<3.1 mmol)	120-144 mg/dL (3.1-3.7 mmol)	≥145 mg/dL (≥3.7 mmol)

HDL-C indicates high-density lipoprotein cholesterol; LDL-C, low-density lipoprotein cholesterol; NCEP, National Cholesterol Education Program; SI, Système international d'unités (International System of Units); and TC, total cholesterol.

Values given are in mg/dL. To convert to SI units, divide the results for TC, LDL-C, HDL-C, and non-HDL-C by 38.6; for triglycerides, divide by 88.6.

*Values for plasma lipid and lipoprotein levels are from the NCEP Expert Panel on Cholesterol Levels in Children. Non-HDL-C values from the Bogalusa Heart Study are equivalent to the NCEP Pediatric Panel cutpoints for LDL-C.

†The cutpoints for high and borderline high represent approximately the 95th and 75th percentiles, respectively. Low cutpoints for HDL-C represent approximately the 10th percentile.

Special Populations

Ethnicity Issues in Evaluation, Risk Decisions, and Treatment of ASCVD Risk *(1 of 3)*

Table 10

Ethnic/racial groupings	Asian-Americans*	Hispanic/Latino-Americans†	Blacks	Comments
Evaluation				
ASCVD Issues informed by ethnicity	South Asian and East Asian ASCVD risk varies by country of origin; Individuals from South Asia (see below) have increased ASCVD risk	Race and country of origin together with socioeconomic status and acculturation level may explain risk factor burden more precisely. e.g. ASCVD risk is higher among individuals from Puerto Rico than from Mexico.	ASCVD risk assessment in black women shows increased ASCVD risk compared to their otherwise similar white counter-parts	Heterogeneity in risk according to racial/ethnic groups and within racial/ethnic groups. Native American/Alaskan populations have high rates of risk factors for ASCVD compared to non-hispanic whites.
Lipid issues informed by ethnicity	Lower levels of HDL-C compared to whites Higher prevalence of LDL-C among Asian Indians, Filipinos, Japanese, and Vietnamese compared to whites. An increased prevalence of high TGs was seen in all Asian American subgroups	Hispanic/Latino women have higher prevalence of low HDL-C compared to Hispanic/Latino men	Higher levels of HDL-C and lower levels of triglycerides (TG) than in Non-Hispanic Whites or Mexican-Americans.	All ethnic groups appear to be at greater risk for dyslipidemia, but important to identify those with more sedentary behavior and less favorable diet.
Metabolic issues informed by ethnicity	Increased Metabolic Syndrome (MetS) seen with lower waist circumference than in whites. DM develops at a lower lean body mass and at earlier age (19-21) Majority of risk in South Asians explained by known risk factors, especially those related to insulin resistance	DM disproportionately present compared to whites and blacks. Increased prevalence MetS, DM in Mexican Americans compared to whites & Puerto Ricans.	Increased DM and hypertension	Increased prevalence of DM. Features of MetS vary by ethnicity. Waist circumference, not weight, should be used to determine abdominal adiposity when possible

Table 10 is continued in the next page. For footnotes please refer to pages 21 and 22.

Special Populations

Ethnicity Issues in Evaluation, Risk Decisions, and Treatment of ASCVD Risk *(2 of 3)*

Table 10 *(continued from previous page)*

Ethnic/racial groupings	Asian-Americans*	Hispanic/Latino-Americans†	Blacks	Comments
Risk Decisions				
Pooled Cohort Equations (PCE)	No separate PCE available; use PCE for whites. PCE may underestimate ASCVD risk in South Asians PCE may overestimate risk in East Asians	No separate PCE available; use PCE for non-Hispanic whites. If African American ancestry also, then use PCE for blacks	Use PCE for blacks	Country specific race/ethnicity, along with socio-economic status, may affect estimation of risk of PCE
Coronary Artery Calcium (CAC) Score	In terms of CAC burden, South Asian men were similar to non-Hispanic white men, but higher CAC when compared to blacks, Latinos and Chinese Americans. South Asian women had similar CAC to whites and other ethnic women, although CAC burden higher in older age	CAC predicts similarly in whites and those who identify as Hispanic/Latino	In MESA, CAC score was highest in whites and Hispanic men, with blacks having significantly lower prevalence and severity of CAC.	Risk factor differences in MESA between ethnicities didn't fully explain variability in CAC However, CAC predicted ASCVD events over and above traditional risk factors in all ethnicities
Treatment *(will continue in the next page)*				
Lifestyle counseling (Utilize principles of Mediterranean & DASH diets)	Utilize lifestyle counseling to recommend a heart healthy diet consistent with racial/ethnic preferences to avoid weight gain, and address BP and lipids	Utilize lifestyle counseling to recommend a heart healthy diet consistent with racial/ethnic preferences to avoid weight gain, address BP and lipids	Utilize lifestyle counseling to recommend a heart healthy diet consistent with racial/ethnic preferences to avoid weight gain, address BP and lipids	Need to disaggregate Asian and Hispanic/Latino groups due to regional differences in lifestyle preferences. Challenge is to avoid increased sodium, sugar and calories as groups acculturate

Table 10 is continued in the next page.

CK, creatine kinase; DASH, Dietary Approaches to Stop Hypertension; DM, type 2 diabetes mellitus; MESA, Multi-Ethnic Study of Atherosclerosis; MetS, metabolic syndrome; and PCE, pooled cohort equations.

Footnotes are continued in the next page.

Special Populations

Ethnicity Issues in Evaluation, Risk Decisions, and Treatment of ASCVD Risk *(3 of 3)*

Table 10 *(continued from previous page)*

Ethnic/racial groupings	Asian-Americans*	Hispanic/Latino-Americans†	Blacks	Comments
Treatment *(continued)*				
Intensity of Statin therapy and Response to LDL-C lowering	Japanese patients may be sensitive to statin dosing. In an open-label, randomized primary prevention trial, Japanese participants had a reduction in CVD events with low-intensity doses of pravastatin as compared to placebo. In a secondary prevention trial, Japanese participants with CAD benefitted from a moderate-intensity doses of pitavastatin.	No sensitivity to statin dosage compared to non-Hispanic white or black individuals	No sensitivity to statin dosage compared to non-Hispanic white individuals	Using a lower statin intensity in Japanese patients may give results similar to those seen with higher intensities in non-Japanese patients
Safety	Higher rosuvastatin plasma levels in Japanese, Chinese, Malay, and Asian-Indians compared to whites. FDA recommends a lower starting dose (5 mg of rosuvastatin in Asians vs. 10 mg in whites). Caution urged as dose uptitrated.	No specific safety issues with statins related to Hispanic/Latino ethnicity	Baseline serum CK values are higher in blacks than in whites. The 95th percentile race/ethnicity specific and sex-specific serum CK normal levels are available for assessing changes in serum CK.	Clinicians should take Asian ethnicity into account when prescribing dose of rosuvastatin (see package insert). In adults of East Asian descent, other statins should be used preferentially over simvastatin.

*The term Asian characterizes a diverse portion of the world's population. Individuals from Bangladesh, India, Nepal, Pakistan, and Sri Lanka make up most of the South Asian group. Individuals from Japan, Korea, and China make up most of the East Asian group.

†The term Hispanics/Latinos in the United States characterizes a diverse population group. This includes white, black, and Native American races. Their ancestry goes from Europe to America, including among these, individuals from the Caribbean, Mexico, Central and South America

2013 AHA/ACC/TOS Guideline for the Management of Overweight and Obesity in Adults

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

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American Heart Association.

NHLBI Grading the Strength of Recommendation

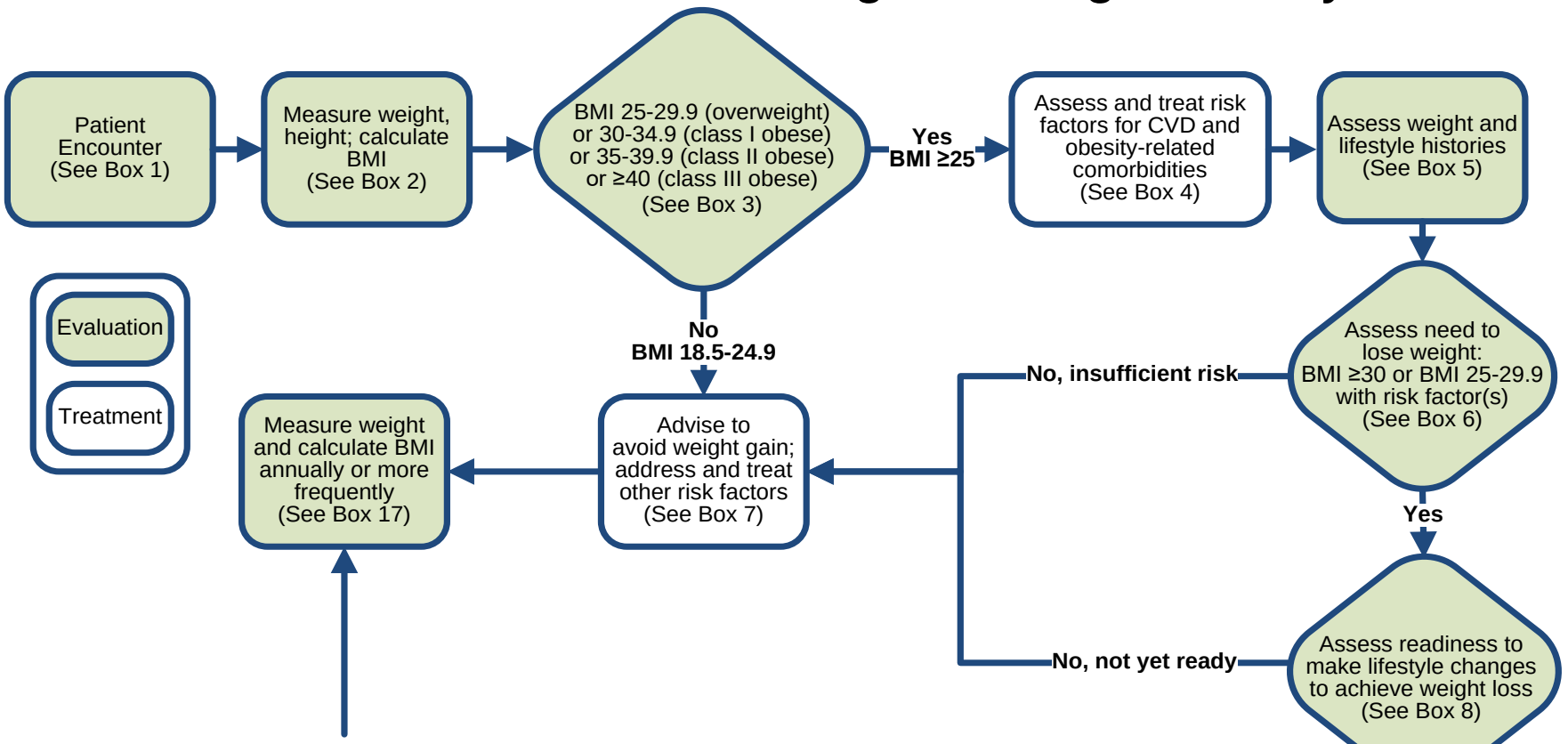
Grade	Strength of Recommendation
A	**Strong recommendation:** There is high certainty based on evidence that the net benefit is substantial.
B	**Moderate recommendation:** There is moderate certainty based on evidence that the net benefit is moderate to substantial, or there is high certainty that the net benefit is moderate.
C	**Weak recommendation:** There is at least moderate certainty based on evidence that there is a small net benefit.
D	**Recommendation against:** There is at least moderate certainty based on evidence that it has no net benefit or that risks/harms outweigh benefits.
E	**Expert opinion ("There is insufficient evidence or evidence is unclear or conflicting, but this is what the Panel recommends.")**Net benefit is unclear. Balance of benefits and harms cannot be determined because of no evidence, insufficient evidence, unclear evidence, or conflicting evidence, but the Panel thought it was important to provide clinical guidance and make a recommendation. Further research is recommended in this area.
N	**No recommendation for or against ("There is insufficient evidence or evidence is unclear or conflicting.")** Net benefit is unclear. Balance of benefits and harms cannot be determined because of no evidence, insufficient evidence, unclear evidence, or conflicting evidence, and the Panel thought no recommendation should be made. Further research is recommended in this area.

Quality Rating the Strength of Evidence

Quality Rating	Type of Evidence
High	• Well-designed, well-executed RCTs that adequately represent populations to which the results are applied and directly assess effects on health outcomes • Met-analyses of such studies. Highly certain about the estimate of effect. Further research is unlikely to change the Panel's confidence in the estimate of effect.
Moderate	• RCTs with minor limitations affecting confidence in, or applicability of, the results. • Well-designed, well-executed nonrandomized controlled studies and well-designed, well-executed observational studies. • Meta-analyses of such studies. Moderately certain about the estimate of effect. Further research may have an impact on the Panel's confidence in the estimate of effect and may change the estimate.
Low	• RCTs with major limitations. • Nonrandomized controlled studies and observational studies with major limitations affecting confidence in, or applicability of, the results. • Uncontrolled clinical observations without an appropriate comparison group (e.g., case series, case reports). • Physiological studies in humans. • Meta-analyses of such studies. Low certainty about the estimate of effect. Further research is likely to have an impact on the Panel's confidence in the estimate of effect and is likely to change the estimate.

Treatment Algorithm

The Chronic Care Model of Weight Management by PCPs



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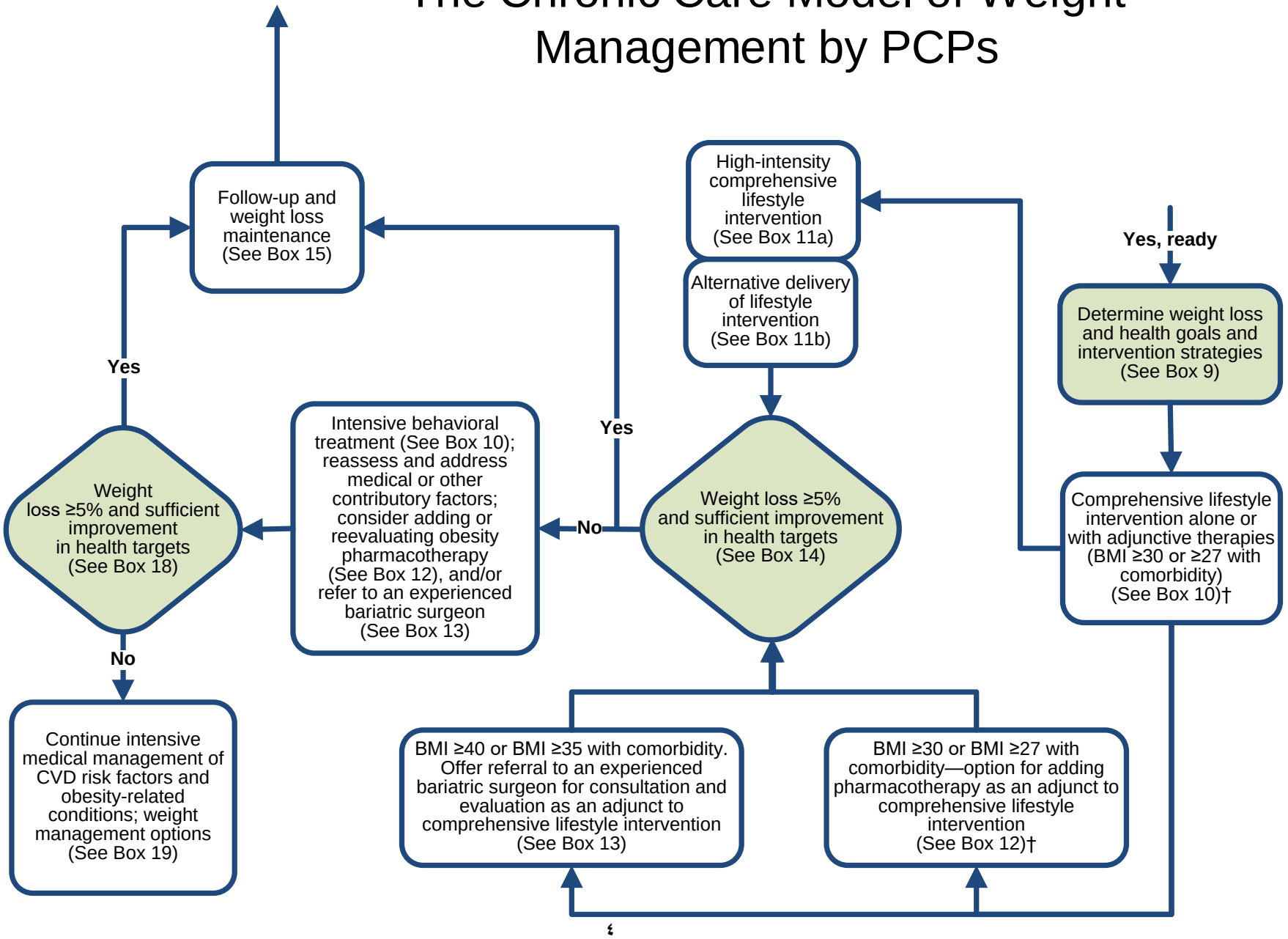
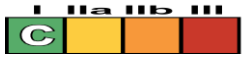
Treatment Algorithm

The Chronic Care Model of Weight Management by PCPs



Recommendation ١



١a. Measure height and weight and calculate BMI at annual visits or more frequently.

١b. Use the current cut points for overweight (BMI ٢٥,٠-٢٩,٩ kg/m^{٢}) and obesity (BMI ≥٣٠ kg/m^{٢}) to identify adults who may be at elevated risk of CVD and the current cut points for obesity (BMI ≥٣٠ kg/m^{٢}) to identify adults who may be at elevated risk of mortality from all causes.

١c. Advise overweight and obese adults that the greater the BMI, the greater the risk of CVD, type ٢ diabetes, and all-cause mortality.

١d. Measure waist circumference at annual visits or more frequently in overweight and obese adults. Advise adults that the greater the waist circumference, the greater the risk of CVD, type ٢ diabetes, and all-cause mortality. The cut points currently in common use (from either NIH/NHLBI or WHO/IDF) may continue to be used to identify patients who may be at increased risk until further evidence becomes available.

Recommendation ٢

Counsel overweight and obese adults with cardiovascular risk factors (high BP, hyperlipidemia, and hyperglycemia), that lifestyle changes that produce even modest, sustained weight loss of ٣٪–٥٪ produce clinically meaningful health benefits, and greater weight losses produce greater benefits.

a. Sustained weight loss of ٣٪–٥٪ is likely to result in clinically meaningful reductions in triglycerides, blood glucose, hemoglobin A١c, and the risk of developing type ٢ diabetes.

b. Greater amounts of weight loss will reduce BP, improve LDL-C and HDL-C, and reduce the need for medications to control BP, blood glucose and lipids as well as further reduce triglycerides and blood glucose.

Recommendation ٣a

Prescribe a diet to achieve reduced calorie intake for obese or overweight individuals who would benefit from weight loss, as part of a comprehensive lifestyle intervention. Any one of the following methods can be used to reduce food and calorie intake:

a. Prescribe ١,٢٠٠–١,٥٠٠ kcal/d for women and ١,٥٠٠–١,٨٠٠ kcal/d for men (kilocalorie levels are usually adjusted for the individual's body weight);

b. Prescribe a ٥٠٠-kcal/d or ٧٥٠-kcal/d energy deficit; or

c. Prescribe one of the evidence-based diets that restricts certain food types (such as high-carbohydrate foods, low-fiber foods, or high-fat foods) in order to create an energy deficit by reduced food intake.

Recommendation ٣b

Prescribe a calorie-restricted diet for obese and overweight individuals who would benefit from weight loss, based on the patient's preferences and health status, and preferably refer to a nutrition professional* for counseling. A variety of dietary approaches can produce weight loss in overweight and obese adults, as presented in CQ٣, ES٢.

Recommendation ٤

٤a. Advise overweight and obese individuals who would benefit from weight loss to participate for ≥٦ months in a *comprehensive lifestyle program* that assists participants in adhering to a lower-calorie diet and in increasing physical activity through the use of behavioral strategies.

٤b. Prescribe on-site, high-intensity (i.e., ≥١٤ sessions in ٦ months) comprehensive weight loss interventions provided in individual or group sessions by a trained interventionist.

٤c. Electronically delivered weight loss programs (including by telephone) that include personalized feedback from a trained interventionist† can be prescribed for weight loss but may result in smaller weight loss than face-to-face interventions.

٤d. Some commercial-based programs that provide a comprehensive lifestyle intervention can be prescribed as an option for weight loss, provided there is peer-reviewed published evidence of their safety and efficacy.

٤e. Use a very-low-calorie diet (defined as <٨٠٠ kcal/d) only in limited circumstances and only when provided by trained practitioners in a medical care setting where medical monitoring and high-intensity lifestyle intervention can be provided. Medical supervision is required because of the rapid rate of weight loss and potential for health complications.

٤f. Advise overweight and obese individuals who have lost weight to participate long term (≥١ year) in a comprehensive weight loss maintenance program.

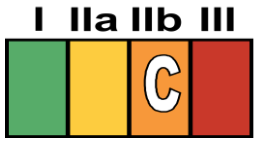
٤g. For weight loss maintenance, prescribe face-to-face or telephone-delivered weight loss maintenance programs that provide regular contact (monthly or more frequently) with a trained interventionist† who helps participants engage in high levels of physical activity (i.e., ٢٠٠–٣٠٠ min/wk), monitor body weight regularly (i.e., weekly or more frequently), and consume a reduced-calorie diet (needed to maintain lower body weight).

Recommendation ٥

٥a. Advise adults with a BMI ≥٤٠ kg/m٢ or BMI ≥٣٥ kg/m٢ with obesity-related comorbid conditions who are motivated to lose weight and who have not responded to behavioral treatment with or without pharmacotherapy with sufficient weight loss to achieve targeted health outcome goals that bariatric surgery may be an appropriate option to improve health and offer referral to an experienced bariatric surgeon for consultation and evaluation.

No Recommendation

٥b. For individuals with a BMI <٣٥ kg/m٢, there is insufficient evidence to recommend for or against undergoing bariatric surgical procedures.



٥c. Advise patients that choice of a specific bariatric surgical procedure may be affected by patient factors, including age, severity of obesity/BMI, obesity-related comorbid conditions, other operative risk factors, risk of short- and long-term complications, behavioral and psychosocial factors, and patient tolerance for risk, as well as provider factors (surgeon and facility).