



Clinical Insights:
Effective Care for Patients with Chronic Conditions

2009-2010

Clinical Insights

Effective care for patients with asthma

Medications: The following medications may be recommended for patients with asthma, depending on individual circumstances:

- **Long-acting (controller) medications:** To maintain long-term asthma control in patients who will benefit, including patients with persistent asthma and children and infants who require symptomatic treatment two or more times per week.
 - Inhaled corticosteroids are the most potent and consistently effective long-term controller medications for asthma. In general, inhaled corticosteroids are the treatment of choice.
 - For patients treated with inhaled corticosteroids who need additional control, inhaled long-acting beta₂-agonists (LABA) are more effective than leukotriene antagonists (e.g., montelukast). LABAs are appropriate only when used in combination with inhaled corticosteroids.
 - Abruptly stopping long-acting controller medications, particularly inhaled beta₂-agonists, may result in acute worsening of symptoms (withdrawal).
- **Short-acting (rescue) medications:** As needed to promptly relieve acute symptoms.

Demonstrate that patients are using inhalers and/or nebulizers correctly. Use spacers for children and masks/spacers for young children.

Written action plan (either symptom-based or peak flow-based) that includes:

- explicit, patient-specific recommendations for minimizing environmental triggers;
- how to assess changes in airflow obstruction (see “Respiratory monitoring” below), and adjust medication, as appropriate;
- actions to take when medications are ineffective or if an emergency situation arises;
- contacts for securing urgent care, if needed.

Written action plans are particularly recommended for: (1) patients with moderate or severe persistent asthma; (2) those with a history of severe exacerbations; and (3) patients with poorly controlled asthma.

Respiratory monitoring: The nature and intensity of self-monitoring should be individualized, based on such factors as asthma severity, patient’s ability to perceive or report airflow obstruction, availability of peak flow meters, and patient preferences. Either symptom monitoring or peak flow measurement can be effective. Components of respiratory monitoring may include the following, depending on individual needs:

Symptom monitoring: Early recognition of symptoms (cold, cough, chest tightness) and step-up in medications.

- **Peak flow measurement:** Peak flow-based monitoring should be considered for the following:
 - moderate or severe persistent asthma;
 - history of severe exacerbations;
 - patients who poorly perceive airflow obstruction and worsening asthma;
 - patients who prefer this approach.

Peak flow measurement may be done daily, or for two to three-week intervals when symptoms change, as part of a symptom-based action plan. May also be helpful during exacerbations to guide treatment decisions.

- **Spirometry:** At diagnosis, on stabilization of symptoms and peak flow, and during progressive loss of asthma control. (Regular spirometry may not be needed in mild to moderate asthma.)

Trigger identification and avoidance: Including environmental smoke, occupational dusts/chemicals, indoor/outdoor pollution, dust, dander, perfumes, etc.

Smoking cessation: All patients and avoidance of secondary smoke.

Depression: The association between asthma and depression is less strong than for other chronic conditions, such as cardiovascular disease or diabetes. However, screening is always appropriate for patients with any chronic condition. Screening improves the accurate identification of depression in primary care settings, and treatment of depressed adults identified in primary care settings decreases clinical morbidity. Two simple questions may be used as a screening tool (“Over the past two weeks, have you felt down, depressed, or hopeless?” and “Over the past two weeks, have you felt little interest or pleasure in doing things?”). Patients who screen positive (i.e., those who answer yes to either question) should undergo a full diagnostic interview.

Influenza vaccine: Annually for all patients 6 months to 18 years and 50 or older. In addition, any patient with chronic illness and his or her household contacts or caregivers. (Children <6 months should not receive influenza vaccination.) Only healthy, non-pregnant persons aged 2 to 49 may receive either the attenuated influenza vaccine or the inactivated influenza vaccine.

Pneumococcal vaccine: All adults 19 to 64 who have chronic pulmonary diseases, including asthma. A one-time revaccination is recommended five years after the first vaccine for some groups, including (not a complete list) patients with chronic kidney disease, those who are immunocompromised, and those vaccinated before age 65.

The material in this section is based on the following sources:

National Institutes of Health, NHLBI, National Asthma Education and Prevention Program. (2007). Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. Available at: <http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf>

U.S. Preventive Services Task Force. Screening for Depression. Recommendations and Rationale. *Ann Intern Med.* 2002;136 (10):760-764. Available at: <http://www.ahrq.gov/clinic/3rduspstf/depression/depressrr.htm>

Pignone MP, Gaynes BN, Rushton JL, et al. Screening for Depression in Adults: A Summary of the Evidence. AHRQ Publication No. 03-509B. 2002;127-143. Available at: <http://www.ahrq.gov/clinic/3rduspstf/depression/depsum.pdf>

Karasu TB, Gelenberg A, Merriam A, et al. Practice Guideline for the Treatment of Patients with Major Depressive Disorder, Second Edition. American Psychiatric Association; 2000:1-78. Available at: http://www.psychiatryonline.com/pracGuide/loadGuidelinePdf.aspx?file=MDD2e_05-15-06

Fochtmann LJ and Gelenberg AJ. Guideline Watch: Practice Guideline for the Treatment of Patients With Major Depressive Disorder, 2nd Edition. *FOCUS: The Journal of Lifelong Learning in Psychiatry.* 2005;3:34-42. Available at: <http://focus.psychiatryonline.org/cgi/reprint/3/1/34?maxtoshow=&HIT>

Fiore MC, Jaén CR, Baker TB, et al. Clinical Practice Guideline. Treating Tobacco Use and Dependence: 2008 Update. U.S. Department of Health and Human Services. Public Health Service. (2008). Available at: http://www.surgeongeneral.gov/tobacco/treating_tobacco_use08.pdf

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ACIP Provisional Recommendations for Use of Pneumococcal Vaccines. 2008. Available at: <http://www.cdc.gov/vaccines/recs/provisional/downloads/pneumo-oct-2008-508.pdf>

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Clinical Insights

Effective care for patients with permanent (chronic) atrial fibrillation

These Insights are intended to be used as a guide to the ongoing medical management of patients with long-standing or permanent atrial fibrillation. Atrial fibrillation is classified as paroxysmal, persistent, or permanent (chronic). These Insights are intended to inform the effective care of patients with chronic atrial fibrillation; that is, atrial fibrillation that has persisted >1 year; cardioversion has either not been attempted or has failed. Rhythm control is not superior to rate control, but an individual patient's symptoms may warrant an attempt at rhythm control.

Medications: The following medications, depending on individual circumstances, may be recommended for patients with chronic atrial fibrillation:

- **Anticoagulant/antithrombotic therapy with aspirin or warfarin to reduce stroke risk:** Choice of regimen (aspirin vs. warfarin) should be based on risk stratification (CHADS₂ score — a clinical prediction rule for estimating stroke risk in patients with atrial fibrillation), availability of high-quality monitoring services, and patient preference. (Note: Clopidogrel [Plavix] is not superior to aspirin and does not replace warfarin.) The threshold for use of anticoagulation is controversial, particularly for patients at intermediate stroke risk (3-5 percent per year).
- **Rate control (pharmacological therapy) to maintain hemodynamic stability and/or avoid symptoms, and to prevent long-term cardiomyopathy:** First-line agents are beta blockers or nondihydropyridine calcium channel blockers. A second line agent is digoxin; it is not effective at controlling rate with exertion but is a reasonable choice for sedentary patients and those with heart failure. Amiodarone is also effective but not a primary therapy for rate control.
- **Rate control (nonpharmacologic therapy):** For patients who remain symptomatic despite pharmacological rate control. Options include radiofrequency AV node ablation with permanent pacemaker or AV nodal conduction modification.

Written action plan that includes:

- *For all patients:* Instructions for how to identify and respond to heart rate changes that are persistently outside the patient's target range.
- *For patients on warfarin:* Instructions for consistent dosing and education about potential drug interactions, dietary and activity guidelines, International Normalized Ratio (INR) monitoring, and appropriate response to missed warfarin doses and signs of bleeding. Patients should have access to clinical support systems for addressing out-of-range INR results.

Monitoring:

- *For all patients:* Regular assessment of heart rate, with patient at rest and after exercise.
- *For patients on warfarin:* Routine INR monitoring is required. Goal INR will vary depending on individual circumstances, but the general INR target is 2-3. Attention to potential drug interactions is important.

Smoking cessation: All patients and avoidance of secondary smoke.

Depression: Screening is always appropriate for patients with any chronic condition. Screening improves the accurate identification of depression in primary care settings, and treatment of adults identified in primary care settings decreases clinical morbidity. Two simple questions may be used as a screening tool ("Over the past two weeks, have you felt down, depressed, or hopeless?" and "Over the past two weeks, have you felt little interest or pleasure in doing things?"). Patients who screen positive (i.e., who answer yes to either question) should undergo a full diagnostic interview.

Influenza vaccine: Annually for all patients 6 months to 18 years and 50 or older. In addition, any patient with chronic illness and his or her household contacts or caregivers. (Children <6 months should not receive influenza vaccination.) Only healthy, non-pregnant persons aged 2 to 49 may receive either the attenuated influenza vaccine or the inactivated influenza vaccine.

Pneumococcal vaccine: All adults 65 and older. A one-time revaccination is recommended five years after the first vaccine for some groups, including (not a complete list) patients with chronic kidney disease, those who are immunocompromised, and those vaccinated before age 65.

The material in this section is based on the following sources:

Fuster V, Rydén LE, Cannom DS, et al. ACC/AHA/ESC 2006 Guidelines for the Management of Patients with Atrial Fibrillation: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the European Society of Cardiology Committee for Practice Guidelines (Writing Committee to Revise the 2001 Guidelines for the Management of Patients With Atrial Fibrillation): Developed in Collaboration With the European Heart Rhythm Association and the Heart Rhythm Society. *Circulation*. 2006;114:e257-e354. Available at: <http://circ.ahajournals.org/cgi/content/full/114/7/e257#FN1>

Singer DE, Albers GW, Dalen JE, et al. Antithrombotic Therapy in Atrial Fibrillation. American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition). *Chest*. 2008;133(6):546S-592S. Available at: http://www.chestjournal.org/content/133/6_suppl/546S.abstract?sid=55be4c0d-6380-4a37-8e05-5ee2d0f6c82e

Wyse DG, Waldo AL, DiMarco JP, et al. A Comparison of Rate Control and Rhythm Control in Patients with Atrial Fibrillation. AFFIRM. *NEJM*. 2002;347(23):1825-1832. Available at: <http://content.nejm.org/cgi/reprint/347/23/1825.pdf>

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Fiore MC, Jaén CR, Baker TB, et al. Clinical Practice Guideline. Treating Tobacco Use and Dependence: 2008 Update. U.S. Department of Health and Human Services. Public Health Service. (2008). Available at: http://www.surgeongeneral.gov/tobacco/treating_tobacco_use08.pdf

Fochtmann LJ and Gelenberg AJ. Guideline Watch: Practice Guideline for the Treatment of Patients with Major Depressive Disorder, 2nd Edition. *FOCUS: The Journal of Lifelong Learning in Psychiatry*. 2005;3:34-42. Available at: <http://focus.psychiatryonline.org/cgi/reprint/3/1/34?maxtoshow=&HIT>

Karasu TB, Gelenberg A, Merriam A, et al. Practice Guideline for the Treatment of Patients with Major Depressive Disorder. Second Edition. American Psychiatric Association; 2000;1-78. Available at: http://www.psychiatryonline.com/pracGuide/loadGuidelinePdf.aspx?file=MDD2e_05-15-06

Pignone MP, Gaynes BN, Rushton JL, et al. Screening for Depression in Adults: A Summary of the Evidence. AHRQ Publication No. 03-509B. 2002;127-143. Available at: <http://www.ahrq.gov/clinic/3rduspstf/depression/depsum.pdf>

U.S. Preventive Services Task Force. Screening for Depression. Recommendations and Rationale. *Ann Intern Med*. 2002;136(10):760-764. Available at: <http://www.ahrq.gov/clinic/3rduspstf/depression/depressrr.htm>

CDC. Recommended Adult Immunization Schedule — United States, 2009. Advisory Committee on Immunization Practices. *MMWR*. 2008;57(53). Available at: <http://www.cdc.gov/mmwr/PDF/wk/mm5753-Immunization.pdf>

ACIP Provisional Recommendations for Use of Pneumococcal Vaccines. 2008. Available at: <http://www.cdc.gov/vaccines/recs/provisional/downloads/pneumo-oct-2008-508.pdf>

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Clinical Insights

Effective care for patients with chronic obstructive pulmonary disease (COPD)

Smoking cessation: All patients and avoidance of secondary smoke.

Medications: Monotherapy with a long-acting bronchodilator or inhaled corticosteroid is recommended for symptomatic patients for reducing exacerbations. Patients with FEV₁ <60 percent predicted may be more likely to derive benefit from treatment than those with higher FEV₁. The following medications may be recommended for patients with COPD, depending on individual patient circumstances, such as response to therapeutic trials:

- **Bronchodilators:** Given as needed or on a regular basis to prevent or reduce symptoms.
 - The principal bronchodilators are short- and long-acting beta₂-agonists and anticholinergics or a combination of these.
 - Although methylxanthines (e.g., theophylline) are not recommended as part of routine care, they may be added or substituted if patients have limited benefit and/or intolerable side effects with bronchodilators and/or inhaled corticosteroids.
 - Abruptly stopping daily-use bronchodilators may result in acute worsening of symptoms (withdrawal).
- **Corticosteroids:** Inhaled corticosteroids (ICS) may reduce frequency of exacerbations and slow declines in health status in severe or very severe COPD with frequent exacerbations (three or more in the past three years). However, several recent trials have shown an increased risk of pneumonia associated with ICS use in patients with severe COPD. Try to limit oral corticosteroid therapy to short-course treatment of exacerbations.

Written symptom response plan for dealing with new, different, or worsening symptoms.

Long-term oxygen therapy can help improve survival in patients with:

- PaO₂ ≤ 55 mm Hg
- SaO₂ ≤ 88 percent
- PaO₂ 55-60 mm Hg with signs of pulmonary hypertension, peripheral edema suggesting heart failure, or polycythemia (hematocrit > 55 percent)

NIPPV: Non-invasive positive pressure ventilation (NIPPV) is particularly beneficial for COPD exacerbations associated with hypercapnia or respiratory failure.

Pulmonary rehabilitation or exercise should be considered for those with symptoms and FEV₁ <50 percent. In patients with severe airway obstruction, pulmonary rehabilitation can reduce hospitalizations and improve health status and exercise capacity. However, the evidence for benefit is less clear for patients with FEV₁ >50 percent predicted. The specific components vary: patient education, self management strategies, nutritional support, respiratory muscle training, and exercise prescription. Benefits of programs lasting at least six weeks can include improved exercise tolerance, decreased dyspnea, and decreased fatigue.

Respiratory monitoring: The primary purposes of spirometry are for diagnosis and determining when to initiate treatment (i.e., when FEV₁ is <60 percent predicted). Patients with FEV₁ <60 percent predicted may be more likely to benefit from regular treatment than those with higher FEV₁. There is less evidence that spirometry is helpful when there is significant change in symptoms or a complication; or that periodic testing is useful to monitor changes over time.

Trigger avoidance: Including environmental smoke, occupational dusts/chemicals, indoor/outdoor pollution.

Surgical treatments: For carefully selected patients, consideration of bullectomy and lung volume reduction surgery may be appropriate.

Depression: Chronic disease is a risk factor for depression. Screening improves the accurate identification of depression in primary care settings, and treatment of depressed adults identified in primary care settings decreases clinical morbidity. Two simple questions may be used as a screening tool (“Over the past two weeks, have you felt down, depressed, or hopeless?” and “Over the past two weeks, have you felt little interest or pleasure in doing things?”). Patients who screen positive (i.e., those who answer yes to either question) should undergo a full diagnostic interview. In addition, anxiety associated with chronic respiratory distress may be a major cause of decreased quality of life for patients with COPD, and appropriate treatment may improve outcomes.

Influenza vaccine: Annually for all patients 6 months to 18 years and 50 or older. In addition, any patient with chronic illness and his or her household contacts or caregivers. (Children <6 months should not receive influenza vaccination.) Only healthy, non-pregnant persons aged 2 to 49 may receive either the attenuated influenza vaccine or the inactivated influenza vaccine.

Pneumococcal vaccine: All adults 65 and older. All patients, 2 years and older, with chronic cardiovascular or lung conditions (including COPD). A one-time revaccination is recommended five years after the first vaccine for some groups, including (not a complete list) patients with chronic kidney disease, those who are immunocompromised, and those vaccinated before age 65.

The material in this section is based on the following sources:

- Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global Strategy for Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease, Updated 2008. Roisin RR, Rabe KF, Anzueto A, et al. 2008;1-94. Available at: <http://www.goldcopd.org/Guidelineitem.asp?l1=2&l2=1&intId=989>
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- Fiore MC, Jaén CR, Baker TB, et al. Clinical Practice Guideline. Treating Tobacco Use and Dependence: 2008 Update. U.S. Department of Health and Human Services. Public Health Service. (2008). Available at: http://www.surgeongeneral.gov/tobacco/treating_tobacco_use08.pdf
- CDC. Recommended Adult Immunization Schedule — 2009. Advisory Committee on Immunization Practices. *MMWR.* 2008;57(53). Available at: <http://www.cdc.gov/mmwr/PDF/wk/mm5753-Immunization.pdf>
- CDC. Recommended Immunization Schedules for Persons Aged 0–18 Years — United States, 2009. Advisory Committee on Immunization Practices. *MMWR* 2008;57(51&52). Available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5751a5.htm?s_cid=mm5751a5_e
- ACIP Provisional Recommendations for Use of Pneumococcal Vaccines. 2008. Available at: <http://www.cdc.gov/vaccines/recs/provisional/downloads/pneumo-oct-2008-508.pdf>

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Clinical Insights

Effective care for patients with coronary heart disease (CHD)

Medications: The following medications may be recommended for patients with CHD, depending on individual circumstances:

- **ACE inhibitors (or angiotensin-2 receptor blockers, if ACEI not tolerated):** To lower risk of heart attack, stroke, and CHD death.
- **Beta blockers (or calcium-channel blockers, if beta blockers not tolerated):** To lower risk of heart attack, stroke, and CHD death; may also help manage angina.
- **Aspirin (low-dose) and/or other antiplatelet agent:** To lower risk of heart attack. Dual antiplatelet therapy with both clopidogrel and aspirin is recommended for at least one year following drug-eluting stent placement and for at least one month (and ideally up to 12 months) following bare-metal stent placement to reduce risk of in-stent thrombosis.
- **Statins:** To reduce risk of heart attack, stroke, and CHD death.
- **Anti-anginal medications [long- and/or short-acting nitrates, calcium-channel blockers, and/or ranolazine (Ranexa®) in addition to beta blockers]:** As needed to prevent/treat stable angina.

Note: If needed to achieve blood pressure control, diuretics may be added to initial therapy.

Written action plan for responding to new, different, or worsening symptoms.

Management of lipid levels: Measure lipid profile at least annually. Repeat lipid profiles at about four to six weeks after hospitalization and two to three months after initiation of or change in lipid-lowering medications.

Regardless of baseline LDL levels, most patients with CHD will benefit from statin therapy to reduce LDL by 30 to 40 percent.

Some expert guidelines recommend higher doses of statins (as tolerated) to reach specific LDL targets (e.g., below 100 or below 70), based on trials comparing lower doses vs. higher doses of statins. However, based on current evidence, the majority of the benefit of statins is achieved by lowering LDL by 30 to 40 percent.

In patients who have achieved their LDL goal but whose triglycerides are 200-499, some expert guidelines (ATP-III and ACC/AHA) recommend additional therapy (e.g., higher dose statin or add-on fibrates or niacin) to reduce non-HDL cholesterol (total cholesterol minus HDL) to <130 mg/dl (i.e., <target LDL+30).

Currently, no randomized trials have examined whether efforts to achieve either target LDL or target non-HDL cholesterol levels with add-on fibrates or niacin reduces cardiovascular event rates. Trials have shown some benefit for high-dose statins compared with low-dose statins for reducing CVD events, but have not specifically compared adjusting statin dosing to achieve LDL treatment targets.

Blood pressure management to achieve goal <140/90 (<130/80 with comorbid diabetes) with lifestyle changes and medications as needed. Blood pressure should be measured at each physician visit.

Exercise: Encourage 30-60 minutes of activity seven days per week (minimum 5 days per week), as tolerated. Cardiac rehabilitation is recommended for those with recent acute coronary syndrome or revascularization.

Weight management to achieve or maintain BMI 18.5 to 24.9 kg/m². If weight loss is needed, the initial goal should be to gradually reduce body weight by about 10 percent. When waist circumference equals/exceeds 40 inches in men or 35 inches in women, consider lifestyle changes and treatments aimed at elements of the metabolic syndrome, as indicated.

Smoking cessation: All patients and avoidance of secondary smoke.

Depression: Chronic disease in general, and CHD in particular, is a risk factor for depression, and depression is associated with worse prognosis and higher risk of cardiac events in patients with CHD. Screening improves the accurate identification of depression in primary care settings, and treatment of depressed adults identified in primary care settings decreases clinical morbidity. Two simple questions may be used as a screening tool ("Over the past two weeks, have you felt down, depressed, or hopeless?" and "Over the past two weeks, have you felt little interest or pleasure in doing things?"). Patients who screen positive (i.e., those who answer yes to either question) should undergo a full diagnostic interview.

Influenza vaccine: Annually for all patients 6 months to 18 years and 50 or older. In addition, any patient with chronic illness and his or her household contacts or caregivers. (Children <6 months should not receive influenza vaccination.) Only healthy, non-pregnant persons aged 2 to 49 may receive either the attenuated influenza vaccine or the inactivated influenza vaccine.

Pneumococcal vaccine: All adults 65 and older. All patients, 2 years and older with chronic cardiovascular conditions (including CHD). A one-time revaccination is recommended five years after the first vaccine for some groups, including (not a complete list) patients with chronic kidney disease, those who are immunocompromised, and those vaccinated before age 65.

The material in this section is based on the following sources:

- Smith SC Jr, Allen J, Blair SN, et al. AHA/ACC Guidelines for Secondary Prevention for Patients With Coronary and Other Atherosclerotic Vascular Disease: 2006 Update. *Circulation*. 2006;113:2363-2372. Available at: <http://circ.ahajournals.org/cgi/reprint/113/19/2363>
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Clinical Insights

Effective care for patients with diabetes mellitus (DM)

Medications: The following medications may be recommended for patients with diabetes, depending on individual circumstances:

- **Oral hypoglycemic agents**
- **Insulin**
- **ACE inhibitors (or angiotensin-2 receptor blockers, if ACEI not tolerated):** Reduce blood pressure, slow progression of diabetic nephropathy in those with microalbuminuria or macroalbuminuria, and reduce cardiovascular mortality.
- **Diuretics, beta blockers, and/or calcium-channel blockers:** As needed to control hypertension and reduce cardiovascular events.
- **Statins (and/or other lipid-lowering agents as needed):** Reduce risk of cardiovascular events, including mortality.
- **Aspirin (low-dose) or other antiplatelet agent (i.e., clopidogrel) if aspirin is contraindicated:** Reduce risk of cardiovascular events (stroke, MI) in patients over 40 and those with history of or risk factors for cardiovascular disease (family history of CVD, hypertension, smoking, dyslipidemia, or albuminuria).

Written action plan for responding to hypoglycemia, hyperglycemia, and sick-day management.

Heart disease prevention: Patients with type 2 diabetes are at high risk of developing vascular disease, including coronary heart disease, peripheral vascular disease, and stroke. In those with type 2 diabetes, the mortality benefit from treating hypercholesterolemia and hypertension is greater than the mortality benefit from treating elevated blood glucose. Control of hypertension also reduces the development and progression of diabetic nephropathy and retinopathy.

Blood pressure management for adults: To achieve goal <130/80. Blood pressure (BP) should be measured at each physician visit. Regimens including ACEI (or ARB if ACEI not tolerated) are recommended for patients with hypertension and microalbuminuria or macroalbuminuria.

Blood pressure management for pediatrics: Goal is BP \leq 90th percentile for age, sex, and height, or <130/80, whichever is lower. Treatment for BP >90th percentile should focus on lifestyle changes (including physical activity, weight loss). If BP is consistently >95th percentile for age, sex, and height, or if target BP is not reached with 6 to 12 months of lifestyle changes, medication is recommended in addition to lifestyle changes. Regimens including ACEI (or ARB if ACEI not tolerated) are recommended for patients with hypertension and microalbuminuria or macroalbuminuria.

Management of lipid levels for adults: Regardless of baseline LDL levels, most patients with diabetes will benefit from statins to reduce LDL by ~30 to 40 percent. Some expert guidelines recommend higher doses of statins (as tolerated) to reach specific LDL targets (e.g., below 100 for those without CVD or below 70 for those with CVD). Trials have shown some benefit for high-dose statins compared with low-dose statins for reducing CVD events, but have not specifically compared adjusting statin dosing to achieve LDL targets. The use of combination therapy (statins and other lipid-lowering agents) has not been evaluated for CVD outcomes or safety. Lipid profile should be measured at least annually. Lipid profile may be measured every two years in patients under 40 with low-risk lipid values (LDL <100; HDL >50; TG <150).

- **Patients with diabetes and overt CVD:** Statin therapy is recommended.
- **Patients with diabetes 40 and older without CVD:** Assess risks and consider statin therapy to achieve an LDL reduction of ~30 to 40 percent.
- **Patients with diabetes under 40 without CVD:** Assess risks and consider statin therapy for those at increased risk. There is less evidence to support the use of statins in this group.
- **Type 1 diabetes:** There is little evidence to guide the selection of LDL targets or use of statins in this group. In patients with other cardiovascular risk factors, lipid goals are similar to those for patients with type 2 diabetes.

Management of lipid levels for pediatrics:

- **Type 2:** Assess lipid profile at diagnosis but after glycemic control is achieved. Repeat every two years. LDL goal is below 100.
- **Type 1:** Assess lipid profile soon after diagnosis, but after glycemic control is achieved if there is a family history of high cholesterol (>240) or early coronary heart disease (CVD event before age 55). Otherwise, the initial lipid profile can be done at puberty (age >10). Repeat every 5 years if LDL <100; annually if lipids are abnormal.
- **Type 1 and 2:** After age 10, if LDL levels do not improve with optimal non-pharmacologic treatment, consider statin therapy in those with:
 - LDL 130-159 and additional CVD risk factors (family history, hypertension, smoking);
 - LDL >160.

Glycemic control for adults: A1C levels should be measured twice yearly in patients who are achieving glycemic goals; quarterly in patients who are not achieving goals or for whom therapy has changed.

While most guidelines recommend an A1C target of <7 percent for most non-pregnant adults, this is not appropriate for all patients. There is good evidence that A1C targets around or below 7 percent are associated with lower rates of microvascular and neuropathic complications in type 1 diabetes. Tight control primarily benefits patients with early microvascular and/or neuropathic complications. For other patient groups, A1C targets should be individualized based on discussion about the possible benefits and harms.

Intensive glycemic control (target A1C <7 percent) in older patients with long standing type 2 diabetes (more than 8-12 years) has not been shown to significantly reduce cardiovascular complications, and regimens needed to achieve A1C levels <7 percent have been associated with higher risks of severe hypoglycemia and, in one large study, death.

Less stringent targets (e.g., A1C <8 percent) may be appropriate for patients for whom the potential risks (including polypharmacy) of intensive glycemic control may exceed the benefits. This may include:

- frail older adults;
- those with life expectancy <10 years;
- those with advanced macrovascular complications (e.g., stage III or IV heart failure);
- those with extensive comorbid conditions (e.g., metastatic cancer);
- those with history of severe hypoglycemia.

Glycemic control for pediatrics: Some studies suggest that both recurrent severe hypoglycemia and chronic hyperglycemia may impair cognitive development in young children. Glycemic goals in children may need to be modified (i.e., relaxed) in order to achieve control while avoiding hypoglycemic episodes.

Eye care: Dilated and comprehensive eye exams are recommended annually or more frequently if retinopathy is progressing. Less frequent exams (every two to three years) may be considered following one or more normal exams.

- *Type 2 diabetes:* Begin annual screening shortly after diagnosis.
- *Type 1 diabetes:* For adults and children 10 and older with type 1 diabetes, begin annual screening within five years after diagnosis.

Screening is generally not recommended before age 10. Diabetes-related eye disease that is severe enough to threaten vision is rare before puberty, but the duration of diabetes before puberty may increase the risk of diabetic retinopathy, so it is important to consider each case individually.

Renal care: Annual screening tests for microalbuminuria are recommended starting at diagnosis for all patients with type 2 diabetes. In patients with type 1 diabetes, begin annual screening five years after diagnosis. Annual screening is not necessary in patients on ACEI or ARB therapy. Some experts recommend continued annual screening after detection of microalbuminuria (even in patients on ACEI or ARB); however, this recommendation is controversial and not supported by trial evidence. Experts also recommend annual measurement of *serum creatinine* for estimating GFR.

- *Pediatric diabetes:* Begin annual screening once patients reach age 10 and have had diabetes for five years.

Weight management (weight loss equal to ~5 to 10 percent of body weight): Weight loss improves glucose tolerance, reduces blood pressure, improves lipid levels, and reduces cardiovascular risks. Bariatric surgery may be considered in carefully selected patients with type 2 diabetes and BMI ≥ 35 .

Physical activity and nutrition: Encourage aerobic physical activity (30 minutes, 5 days per week). Implement dietary changes as needed to achieve and maintain goals for glycemic control, lipid profile, blood pressure, body mass index, and renal function.

Foot care: Patients, especially those at high risk for foot conditions (e.g., with peripheral vascular disease or neuropathy), should examine their own feet daily. Experts suggest visual inspections at each diabetes office visit and a comprehensive foot examination, including testing for loss of protective sensation, annually.

Smoking cessation: All patients and avoidance of secondary smoke.

Depression: Chronic disease is a risk factor for depression. Screening improves the accurate identification of depression in primary care settings, and treatment of depressed adults identified in primary care settings decreases clinical morbidity. Two simple questions may be used as a screening tool (“Over the past two weeks, have you felt down, depressed, or hopeless?” and “Over the past two weeks, have you felt little interest or pleasure in doing things?”). Patients who screen positive (i.e., those who answer yes to either question) should undergo a full diagnostic interview.

Influenza vaccine: Annually for all patients 6 months to 18 years and 50 or older. In addition, any patient with chronic illness and his or her household contacts or caregivers. (Children <6 months should not receive influenza vaccination.) Only healthy, non-pregnant persons aged 2 to 49 may receive either the attenuated influenza vaccine or the inactivated influenza vaccine.

Pneumococcal vaccine: All adults 65 and older. All patients, 2 years and older, with diabetes. A one-time revaccination is recommended five years after the first vaccine for some groups, including (not a complete list) patients with chronic kidney disease, those who are immunocompromised, and those vaccinated before age 65.

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Clinical Insights

Effective care for patients with heart failure (HF)

Note: The material in these Insights is primarily intended for use in patients with left ventricular systolic dysfunction. Treatment objectives for patients with primarily diastolic dysfunction (i.e., those with diastolic abnormalities of the left ventricle, regardless of ejection fraction or symptoms) are similar at this time; trials are under way to determine optimal evidence-based management strategies for this population. Management approaches differ for patients with HF secondary to valvular causes; these are not discussed here.

Fluid balance: Changes in volume status often precede onset of clinical exacerbations by several days. Patients are advised to record their weight daily. A *written action plan* may instruct patients to notify their physician or adjust medication (diuretic) doses in response to predetermined changes in body weight and/or symptoms.

Medications: The following medications may be recommended for patients with HF, depending on individual circumstances:

- **Diuretics:** Regulate volume status and improve symptoms. Patients who have persistent symptoms despite optimal treatment with other medications may benefit from addition of an aldosterone antagonist (e.g., spironolactone).
- **ACE inhibitors (or angiotensin-2 receptor blockers, if ACEI not tolerated):** Relieve symptoms, improve clinical status, and reduce mortality and hospitalization.
- **Beta blockers:** Reduce symptoms, improve clinical status, and reduce mortality and hospitalization.
- **Digitalis (in many cases):** Improve symptoms, exercise tolerance, and quality of life in patients with severe symptoms.
- **Hydralazine plus a nitrate:**
 - may be added to ACEI and beta blockers in patients who have persistent symptoms;
 - may be reasonable in patients with HF symptoms who cannot take ACEI or ARBs;
 - has been found to reduce mortality in patients of African descent who have persistent symptoms while on ACE inhibitors, beta blockers, and spironolactone. The effect of this combination in other patients who are on standard therapy is not known, but there is no reason to believe that this benefit is limited to patients of African descent.
- **Aspirin (low dose):** When otherwise indicated (i.e., HF of ischemic origin) to reduce risk of cardiovascular events.
- **Statins:** As appropriate for lipid management per National Cholesterol Education Program guidelines.

Blood pressure management: To achieve goal <130/80, if tolerated. In trials, optimal outcomes are seen at SBP 110 to 130. Blood pressure should be measured at each physician visit. Particularly in elderly patients, care should be taken to avoid postural hypotension. *Note: Neither JNC-VII nor 2005 ACC/AHA HF guideline specifies a particular BP goal.*

Management of lipid levels with therapeutic lifestyle changes and medications, if needed, in accordance with recommended guidelines. Based on current evidence, the majority of the benefit of statins for patients with co-morbid CHD and CHD-risk equivalents is achieved by lowering LDL by 30 percent to 40 percent. Lipid profile should be measured at least annually.

Exercise: Aerobic exercise (20-45 minutes, three to five days per week; supervised as appropriate), if tolerated, to increase exercise tolerance and lessen symptoms. Alternatively, several short periods per day, as tolerated.

Smoking cessation: All patients and avoidance of secondary smoke.

Devices: In selected patients with clinical indications, consideration of cardiac resynchronization therapy (CRT) and/or implantable cardioverter-defibrillators (ICD) placement may be appropriate.

Depression: Chronic disease is a risk factor for depression. Screening improves the accurate identification of depression in primary care settings, and treatment of depressed adults identified in primary care settings decreases clinical morbidity. Two simple questions may be used as a screening tool (“Over the past two weeks, have you felt down, depressed, or hopeless?” and “Over the past two weeks, have you felt little interest or pleasure in doing things?”). Patients who screen positive (i.e., those who answer yes to either question) should undergo a full diagnostic interview. In addition, anxiety associated with chronic respiratory distress may be a major cause of decreased quality of life for patients with HF, and appropriate treatment may improve outcomes.

Influenza vaccine: Annually for all patients 6 months to 18 years and 50 or older. In addition, any patient with chronic illness and his or her household contacts or caregivers. (Children <6 months should not receive influenza vaccination.) Only healthy, non-pregnant persons aged 2 to 49 may receive either the attenuated influenza vaccine or the inactivated influenza vaccine.

Pneumococcal vaccine: All adults 65 and older. All patients, 2 years and older, with chronic cardiovascular conditions (including HF). A one-time revaccination is recommended five years after the first vaccine for some groups, including (not a complete list) patients with chronic kidney disease, those who are immunocompromised, and those vaccinated before age 65.

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Clinical Insights

Effective care for patients with primary prevention of stroke

Individuals with hypertension, diabetes, and atherosclerotic vascular disease (CHD, HF, peripheral vascular disease) are at increased risk of stroke. Management approaches (e.g., use of statins) for these other conditions can also reduce stroke risk.

Primary prevention, including:

Individualized risk assessment: Use of a stroke risk assessment tool (e.g., Framingham Stroke Profile) to estimate risk of first stroke and guide appropriate use of interventions to modify risk factors and/or further diagnostic testing. Risk assessment should include screening for hypertension and diabetes as per established guidelines. Note that age and sex are important nonmodifiable risk factors.

Depending on individual circumstances, management of the following modifiable risk factors can reduce the risk of first stroke:

Blood pressure management, in patients with hypertension (>140/90) or isolated systolic hypertension (SBP >160 and DBP <90) in older adults, according to established guidelines (i.e., JNC-7, which defines optimal BP as <120/80).

Smoking cessation: All patients and avoidance of secondary smoke.

Diabetes screening and management, with emphasis on tight control of hypertension (target <130/80) in patients with diabetes. It is not clear that intensive glycemic control (i.e., target A1C <7 percent) reduces stroke risk. (ACCORD/ADVANCE showed no difference in stroke rates for intensive vs. traditional glycemic control.) For individuals with additional cardiovascular risk factors (e.g., age >40, elevated LDL, etc.), a statin is recommended.

For patients with atherosclerotic vascular disease, management of these other conditions can reduce stroke risk.

Antithrombotic/anticoagulant therapy:

- *Aspirin:* To reduce risk of cardiovascular events (including but not specific to stroke) in patients in whom the risk is high enough (i.e., 10-year cardiovascular risk 6 to 10 percent) to outweigh the risks of treatment.
- *Atrial fibrillation with valvular disease:* Anticoagulation (warfarin).
- *Atrial fibrillation, nonvalvular (permanent):* Choice of regimen (aspirin vs. warfarin) should be based on risk stratification (e.g., the CHADS₂ score, a clinical prediction rule for estimating stroke risk in patients with atrial fibrillation), availability of high-quality monitoring services, and patient preference. The threshold for use of anticoagulation is controversial, particularly for patients at intermediate stroke risk (3 to 5 percent per year).
- *Patients with mechanical heart valves (with or without atrial fibrillation):* Anticoagulation, with target level depending on location of valves and other patient factors.

Management of lipid levels with therapeutic lifestyle changes and medications, if needed, in accordance with recommended guidelines (i.e., NCEP).

Physical activity: Recommendations according to established guidelines (i.e., >30 minutes of moderate-intensity physical activity most days of the week).

Weight management: According to established guidelines. Weight reduction lowers blood pressure.

Carotid endarterectomy, in carefully selected individuals; (i.e., those with high-grade asymptomatic carotid stenosis and life expectancy of at least five years in settings where the peri-procedural risk [i.e., within 30 days] of stroke and death is <3%).

- Patient selection should be guided by assessment of the patient's overall health, life expectancy, and preferences.
- Older age (>80 years) and other comorbidities (such as coronary heart disease and diabetes) can greatly increase the short-term risk of death or stroke due to carotid surgery, and alter the risk-benefit ratio.
- Screening for asymptomatic carotid stenosis is not recommended.

Depression: Screening is always appropriate for patients with any chronic condition. Screening improves the accurate identification of depression in primary care settings, and treatment of adults identified in primary care settings decreases clinical morbidity. Two simple questions may be used as a screening tool ("Over the past two weeks, have you felt down, depressed, or hopeless?" and "Over the past two weeks, have you felt little interest or pleasure in doing things?"). Patients who screen positive (i.e., who answer yes to either question) should undergo a full diagnostic interview.

Influenza vaccine: Annually for all patients 6 months to 18 years and 50 or older. In addition, any patient with chronic illness and his or her household contacts or caregivers. (Children <6 months should not receive influenza vaccination.) Only healthy, non-pregnant persons aged 2 to 49 may receive either the attenuated influenza vaccine or the inactivated influenza vaccine.

Pneumococcal vaccine: All adults 65 and older. A one-time revaccination is recommended five years after the first vaccine for some groups, including (not a complete list) patients with chronic kidney disease, those who are immunocompromised, and those vaccinated before age 65.

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Clinical Insights

Effective care for secondary prevention of stroke in patients with prior transient ischemic attack (TIA) or stroke

The following approaches are appropriate for all patients with ischemic stroke or TIA, regardless of mechanism. About 20 percent of ischemic strokes are associated with cardiogenic cerebral embolism; about half of these occur in patients with a history of atrial fibrillation. (A full discussion of secondary prevention strategies in patients with cardioembolic strokes secondary to conditions such as valvular heart disease, cardiomyopathy, and acute myocardial infarction is outside the scope of this review; see the AHA/ASA Guidelines for Prevention of Stroke in Patients with Ischemic Stroke or TIA.)

Risk factor control, including:

Blood pressure management: All patients, including those with no history of hypertension, according to established guidelines (i.e., JNC-7). In general, target BP <140/90 is appropriate; however, the optimal target is uncertain, and benefits are seen with reductions of about 10/5 mm Hg from baseline. Choice of agents should be individualized; available data support the use of diuretics alone or combined with an ACE inhibitor.

- *Diabetes:* More rigorous blood pressure control should be considered in patients with diabetes (target <130/80); a regimen that includes an ACE inhibitor or ARB is recommended for those with hypertension.

Management of lipid levels according to established guidelines for patients with coronary heart disease (CHD). (For established guidelines refer to *Management of lipid levels* section of the Clinical Insights: Effective Care for Patients with CHD). For those with atherosclerotic ischemic stroke or TIA and without known CHD, statins are recommended and reduce recurrent stroke rates.

Antiplatelet therapy: Aspirin, alone or with extended-release dipyridamole, or clopidogrel alone, as appropriate based on individual patient characteristics and preferences.

Cardioembolic stroke and atrial fibrillation: Warfarin therapy is recommended (aspirin for those who cannot take warfarin). There is no evidence that increasing the intensity of anticoagulation or adding another antiplatelet agent offers additional protection against future ischemic events.

Smoking cessation: All patients and avoidance of secondary smoke.

Reduce alcohol consumption: In patients who consume >five alcoholic beverages per day.

Weight management: Weight reduction may be considered with goal BMI of 18.5 to 24.9 or waist circumference <35 women and <40 men. Weight reduction lowers blood pressure.

Physical activity: For those capable, at least 30 minutes of moderate-intensity physical activity on most days. For those with disability after stroke, a supervised rehabilitation program is recommended.

For patients with TIA or stroke and documented carotid artery disease:

- **Continued maximal medical therapy:** As outlined above.
- **Carotid endarterectomy:** In appropriately selected patients with symptomatic carotid stenosis (>50 percent):
 - In patients with history of carotid TIA or stroke in the past 12 months, carotid endarterectomy reduces the risk of subsequent stroke in facilities where the surgery has a 30-day stroke and death rates <6 percent.
 - Recommendation for carotid endarterectomy should consider patient age, sex, comorbidities, severity of initial symptoms, and preferences. Older age (>80 years) and other comorbidities (such as coronary artery disease and diabetes) can greatly increase the short-term risk of death or stroke due to carotid surgery and alter the risk-benefit ratio.

Depression: Screening is always appropriate for patients with any chronic condition. Screening improves the accurate identification of depression in primary care settings, and treatment of adults identified in primary care settings decreases clinical morbidity. Two simple questions may be used as a screening tool (“Over the past two weeks, have you felt down, depressed, or hopeless?” and “Over the past two weeks, have you felt little interest or pleasure in doing things?”). Patients who screen positive (i.e., who answer yes to either question) should undergo a full diagnostic interview.

Influenza vaccine: Annually for all patients 6 months to 18 years and 50 or older. In addition, any patient with chronic illness and his or her household contacts or caregivers. (Children <6 months should not receive influenza vaccination.) Only healthy, non-pregnant persons aged 2 to 49 may receive either the attenuated influenza vaccine or the inactivated influenza vaccine.

Pneumococcal vaccine: All adults 65 and older. A one-time revaccination is recommended five years after the first vaccine for some groups, including (not a complete list) patients with chronic kidney disease, those who are immunocompromised, and those vaccinated before age 65.

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