dialogues℠ IN CLINICAL PRACTICE

PREVENTION, DETECTION, AND MANAGEMENT OF DIABETES-RELATED COMPLICATIONS

A Practical Guide for Performance Improvement

NEWSLETTER FACULTY

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COMPLIMENTARY CME/CE

This implementation guide is one of the many certified continuing medical education activities available in the series, Performance Improvement Strategies: Diabetes Care. Now in its second year, this series offers a comprehensive collection of activities designed to cover a broad range of topics on diabetes care, with the ultimate goal of helping primary healthcare professionals improve the care of patients with diabetes. For additional information on this certified CME/CE initiative or to view the other available activities, visit www.pi-iq.com/diabetes.

Target Audience
The primary audience for this CME activity is primary care physicians, nurses, nurse practitioners, physician assistants, and pharmacists; the secondary audience is endocrinologists. The activity is also open to other healthcare professionals who are interested in the care of patients with type 2 diabetes.

Series Overview/Statement of Need
Diabetes mellitus is a worldwide epidemic that has created a crisis for the healthcare system and society. Recent findings from large randomized controlled trials provide clear and compelling evidence that intensive treatment of diabetes mellitus and its known risk factors can significantly decrease the development and/or progression of diabetes-related complications. Achieving glycemic control, treating hypertension, and controlling blood lipid levels are the cornerstones of preventing diabetes-related complications and early death. Furthermore, patient participation in the management of this progressive disease is essential for success.

Primary care physicians play a central role in the management of patients with diabetes, providing care for approximately 90% of adult patients with type 2 diabetes. The challenges of keeping abreast of recent advances in glycemic control and the prevention and detection of diabetes-related complications are major barriers to the implementation of optimal management strategies.

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LEARNING OBJECTIVES

Upon completion, participants should be able to:

1. Identify goals and screening recommendations for blood pressure, lipids, and microalbuminuria
2. Discuss clinical guideline recommendations for the management of hypertension, hyperlipidemia, and microalbuminuria in type 2 diabetes and implement these recommendations into practice
3. Implement strategies outlined in clinical guidelines for smoking cessation, comprehensive foot exams, and retinal exams in patients with type 2 diabetes

TABLE OF CONTENTS

INTRODUCTION......3

BLOOD PRESSUE

Key Facts 3
Screening Basics 3
Treatment Basics......4
Practical Considerations 4

LIPID MANAGEMENT

Key Facts 5
Screening Basics 5
Treatment Basics......5
Practical Considerations 5

MICROALBUMINURIA

Key Facts 7
Screening Basics 7
Treatment Basics......7
Practical Considerations 7

SMOKING CESSATION

Key Facts 8
Screening Basics 8
Treatment Basics......8
Practical Considerations 8

FOOT CARE

Key Facts 8
Screening and Prevention Basics 9
Practical Considerations 10

EYE EXAMINATIONS

Key Facts 11
Screening Basics 11
Treatment Basics......12
Practical Considerations 12

CONCLUSION......12

REFERENCES 12

SERIES DESCRIPTION

This implementation guide is one of the many certified continuing medical education activities available in the series, Performance Improvement Strategies: Diabetes Care. Now in its second year, this series offers a comprehensive collection of activities on diabetes care, designed to help primary healthcare professionals improve the care of patients with diabetes.

The performance improvement track of this series guides physicians through a 3-step process of self-assessing current practice, implementing change to current practice, and evaluating the effects of implemented changes. As part of the self-assessment process, healthcare professionals collect data retrospectively from 20 diabetes care visits and choose at least 1 of 3 benchmark areas to improve:

- General diabetes care
- Preventing and managing diabetes-related complications
- Improving glycemic control

Each of the 3 general benchmarks has several specific areas of care that can be the focus of performance improvements. These areas of care align with guideline and consensus statement recommendations to encourage the delivery of evidence-based care.

THE PURPOSE OF THIS GUIDE

Although this guide can benefit all healthcare professionals who manage patients with diabetes, it has primarily been designed to serve as a practical guide for those who are participating in the performance improvement track of this series and who have chosen the diabetes-related complications benchmark as the focus of their improvement plan. With this focus in mind, it will offer targeted recommendations and practical suggestions, tips, and tools that are specifically related to the measurable areas of care collected on the patient data forms: blood pressure management, lipid management, microalbuminuria assessment, smoking cessation, foot care, and eye exams.

This guide is not meant to be a comprehensive review of all diabetes-related complications, nor is it meant to thoroughly discuss the details of pharmacologic interventions (participants seeking this information should refer to the ADA and AACE guidelines, in addition to the prescribing information for individual agents). It focused solely on the specific complications noted above, providing healthcare professionals with practical information and tools that can immediately be applied to their own practice for the benefit of their diabetes patients.

Prevention, Detection, and Management of Diabetes-Related Complications:

A Practical Guide for Performance Improvement

INTRODUCTION

Type 2 diabetes mellitus is a chronic, progressive disease affecting approximately 24 million people in the United States, 6 million of whom are undiagnosed.[1] Complications associated with diabetes include heart disease, stroke, kidney disease, neuropathy, and retinopathy. These complications often have a devastating effect on individuals, families, healthcare systems, and society. Because of its long asymptomatic phase, type 2 diabetes often goes unrecognized for years, and many patients have evidence of existing complications at the time of diagnosis.[2] A recent analysis of national data found that approximately 58% of patients with diabetes have at least one complication.[3]

Although patients with type 2 diabetes have a high risk of developing multiple macrovascular and microvascular complications, landmark studies indicate that it is possible to delay or prevent complications by comprehensively and aggressively managing modifiable risk factors such as hyperglycemia, hypertension, dyslipidemia, and tobacco use.[4,5] In addition, the early identification of patients who have a high risk of peripheral neuropathy and retinopathy can reduce the risk of amputation and vision loss.[6] Recent guidelines from the American Diabetes Association (ADA) and the American Association of Clinical Endocrinologists (AACE) recommend routine screening and focused management to reduce these risk factors and their associated complications.[7,8] Although new directions in chronic disease management are improving clinical approaches to diabetes-related complications, evidence suggests that screening and treatment remain suboptimal for many patients.

WHAT'S INSIDE

This newsletter is designed to be a practical guide to enhance adherence to ADA and AACE guideline recommendations for the recognition and management of select diabetes-related complications. We will cover some of the most challenging complications, including hypertension, lipid management, microalbuminuria, smoking cessation, foot care, and eye exams. We will discuss the rationale behind the guideline recommendations and offer practical advice to improve adherence to these recommendations. We are also providing management tools and helpful forms that you can use in your own practice to better adhere to published guidelines.

BLOOD PRESSURE

Goals:
- Systolic blood pressure: < 130 mm Hg
- Diastolic blood pressure: < 80 mm Hg

Many patients with diabetes also have hypertension—as many as 75% in certain age, body weight, and ethnic groups.[6] Because hypertension amplifies the effects of hyperglycemia, it is a key factor in the development of both cardiovascular disease (CVD) and microvascular complications of type 2 diabetes.[7,8] Although healthcare professionals are increasingly aware of the importance of managing hypertension in patients with diabetes, only about 36% of patients adhere to ADA blood pressure targets.[9]

KEY FACTS

- Controlling hypertension is pivotal in preventing myocardial infarction, stroke, renal disease, and other diabetes-related complications[7,8]
- Although early studies showed reductions in major cardiovascular events in patients with diabetes who achieved tight blood pressure control, more recent data from the ACCORD study found no evidence of that risk reduction with systolic blood pressure targets of < 120 mm Hg.[10a,10b]
- In hypertensive patients with diabetes, each 10 mm Hg decrease in systolic blood pressure can result in a risk reduction of 12% for any complication related to diabetes, 15% for death related to diabetes, 11% for myocardial infarction, and 13% for microvascular complications[11]

SCREENING BASICS

Guidelines offer the following recommendations for monitoring blood pressure and screening diabetes patients for hypertension[7]:

- Perform blood pressure measurements at EVERY routine office visit, including diabetes-related visits
- If a patient has a systolic blood pressure of 130 mm Hg or higher, or a diastolic blood pressure of 80 mm Hg or higher, confirm the reading on a different day
- Repeat findings of a systolic blood pressure of 130 mm Hg or higher or a diastolic blood pressure of 80 mm Hg or higher are consistent with a diagnosis of hypertension

TREATMENT BASICS

Lifestyle modifications are universally recommended to treat hypertension. The Seventh Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC-7) Report published a helpful list of lifestyle modifications that can prevent and manage hypertension (Table 1).[7,12]

Guidelines offer the following basic treatment recommendations[7]:

- Initial therapy for patients with mild hypertension—defined as a systolic blood pressure 130 to 139 mm Hg and diastolic blood pressure of 80 to 89 mm Hg—should begin with the institution of lifestyle modifications for 3 months; if blood pressure goals are not achieved in this time frame, pharmacologic agents should be added
- Patients with a systolic blood pressure of 140 mm Hg or higher or a diastolic blood pressure of 90 mm Hg or higher should initiate pharmacologic therapy, along with lifestyle modification, upon diagnosis; therapy should include either an angiotensin converting enzyme (ACE) inhibitor or an angiotensin receptor blocker (ARB) unless contraindicated
- If blood pressure goals are not met with these interventions, a diuretic may be added; the type of diuretic depends on the patient's renal status
- If ACE inhibitors, ARBs, or diuretics are used, both serum potassium and kidney function should be monitored on a regular basis
- If the patient is not achieving therapeutic goals on an ACE inhibitor or ARB and a diuretic, a calcium channel blocker or a β-blocker may be added; these drugs may also be considered as alternatives in patients who cannot tolerate ACE inhibitors or ARBs

Most patients with hypertension and type 2 diabetes require one or more agents at maximum doses to attain blood pressure goals.[7] Doses can be increased carefully and progressively, or medications from other classes can be added to achieve goals. If hypertension is not controlled with a 3-drug regimen that includes a diuretic, referral to a hypertension specialist is indicated.[13]

ACE inhibitors and ARBs are contraindicated during pregnancy. Alternative choices of pharmacologic therapy in pregnancy include diltiazem, clonidine, prazosin, methyldopa, and labetalol.[7]

PRACTICAL CONSIDERATIONS

Two aspects of care can lead to improved outcomes in hypertension[13,14]:

- Physician adherence to screening and management guidelines
- Patient adherence to lifestyle modifications and pharmacologic interventions

To improve adherence to guidelines, make sure they are readily available at points of care. For example, copies can be placed in examination rooms, on personal digital assistant (PDA) devices, and in office computer systems.14 Reminders, prompts, and timely lab results are also useful tools that can be placed directly in patient records or entered into electronic medical record (EMR) systems.14 Some other useful tools include:

- **Blood pressure monitoring sheets** in patient charts
- **Laminated pocket cards** that outline guidelines for the appropriate management of hypertension in patients with diabetes (See Tool 1)
- **Reminder systems** to provide patient follow-up either by telephone calls or office visits

Achieving antihypertensive medication adherence can be challenging. It is important to emphasize to patients that even though they may not experience any symptoms, they still have a risk of developing serious and life-threatening complications.[13] Adverse side effects can negatively affect adherence, so patients should be ques-

TABLE 1. Lifestyle Modifications Recommended to Reduce Blood Pressure

MODIFICATION	RECOMMENDATION	REDUCTION EXPECTED IN SYSTOLIC BLOOD PRESSURE
Weight reduction	Maintain a normal body mass index between 18.5 and 24.9 kg/m^2	5-20 mm Hg per 10 kg weight reduction
Physical activity	Engage in 30 minutes of moderate aerobic activity on most days of the week	4-9 mm Hg
DASH (Dietary Approaches to Stop Hypertension) eating plan	Eat a diet rich in fruits, vegetables, and low-fat dairy products; reduce consumption of total and saturated fats	8-14 mm Hg
Dietary sodium restriction	Limit dietary sodium to no more than 2,400 mg/day	2-8 mm Hg
Moderation of alcohol consumption	Limit consumption to no more than 2 drinks per day in men and 1 drink per day in women	2-4 mm Hg

Adapted from The U.S. Department of Health and Human Services. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: the JNC 7 report. NIH Publication No. 03-5233. December 2003.

tioned thoroughly about how they are responding to medications and encouraged to call your office if they experience any negative effects rather than simply discontinuing the treatment.[15]

Home blood pressure monitoring is a tool that can help increase adherence to both pharmacologic and nonpharmacologic therapies because it provides direct feedback to the patient and increases patient participation in self-care.[16,17] One study, for example, found that self monitoring helped patients reach target blood pressure goals and decreased systolic and pulse pressure significantly more than regular office-based measurements.[17] Semi-automatic or automatic inflation oscillometric devices with digital read-outs are the best choices for home monitoring because they are easy to use and results are easy to read.[16] Arm-band monitors are preferable to wrist and finger monitors because they are more accurate. Many different models of home monitors are available, and their accuracy varies widely. For these reasons, local pharmacists may be best equipped to help patients choose the most suitable monitor to meet their needs and budgets.[16]

LIPID MANAGEMENT

Goals:
- LDL-C: < 100 mg/dL (< 70 mg/dL in individuals with overt CVD)
- HDL-C: > 40 mg/dL in men, > 50 mg/dL in women
- Triglycerides: < 150 mg/dL

Patients with type 2 diabetes have an increased prevalence of dyslipidemia and a higher risk of accelerated atherosclerosis than the general population.[7] Although pathologic studies indicate that atherosclerotic plaque is similar in patients with and without diabetes, the process is more diffuse in patients with diabetes.[7,8] Numerous clinical trials have convincingly shown that pharmacologic therapy for dyslipidemia provides primary and secondary prevention of CVD and deaths in patients with diabetes.[7]

KEY FACTS

- An analysis of 1999-2000 National Health and Nutrition Examination Survey (NHANES) data found that more than 70% of patients with diabetes were not at LDL-C goals[18]
- This analysis also showed that only 3% of patients successfully maintained target levels for all 3 lipid goals (LDL-C, HDL-C, and triglycerides)[18]

SCREENING BASICS

Guidelines offer the following recommendations for screening diabetes patients for dyslipidemia[7]:
- Measure lipids at least annually
- If lipid levels suggest low-risk, testing may be reduced to 2-year intervals

TREATMENT BASICS

Some patients can reach lipid goals with lifestyle changes alone. These lifestyle recommendations should include[7]:
- Decreasing the consumption of saturated fat, trans fat, and cholesterol
- Increasing physical activity
- Initiating a weight-loss program when warranted

Patients who have an inadequate response to lifestyle changes alone after a 3-month period should receive pharmacologic treatment, as should all patients who have CVD or who are over the age of 40 with other CVD risk factors, regardless of baseline lipid levels. Statin therapy is the pharmacologic treatment of choice.[7]

Other pharmacologic therapies that can be used in combination with statins or as single agents in patients who are intolerant to statins include ezetimibe, fibrates, niacin, bile-acid sequestrants, omega-3 fatty acids, and other lipid-modifying agents.[7,8] When used as monotherapy, both nicotinic acid and fibrates have also been shown to decrease rates of CVD events.[7]

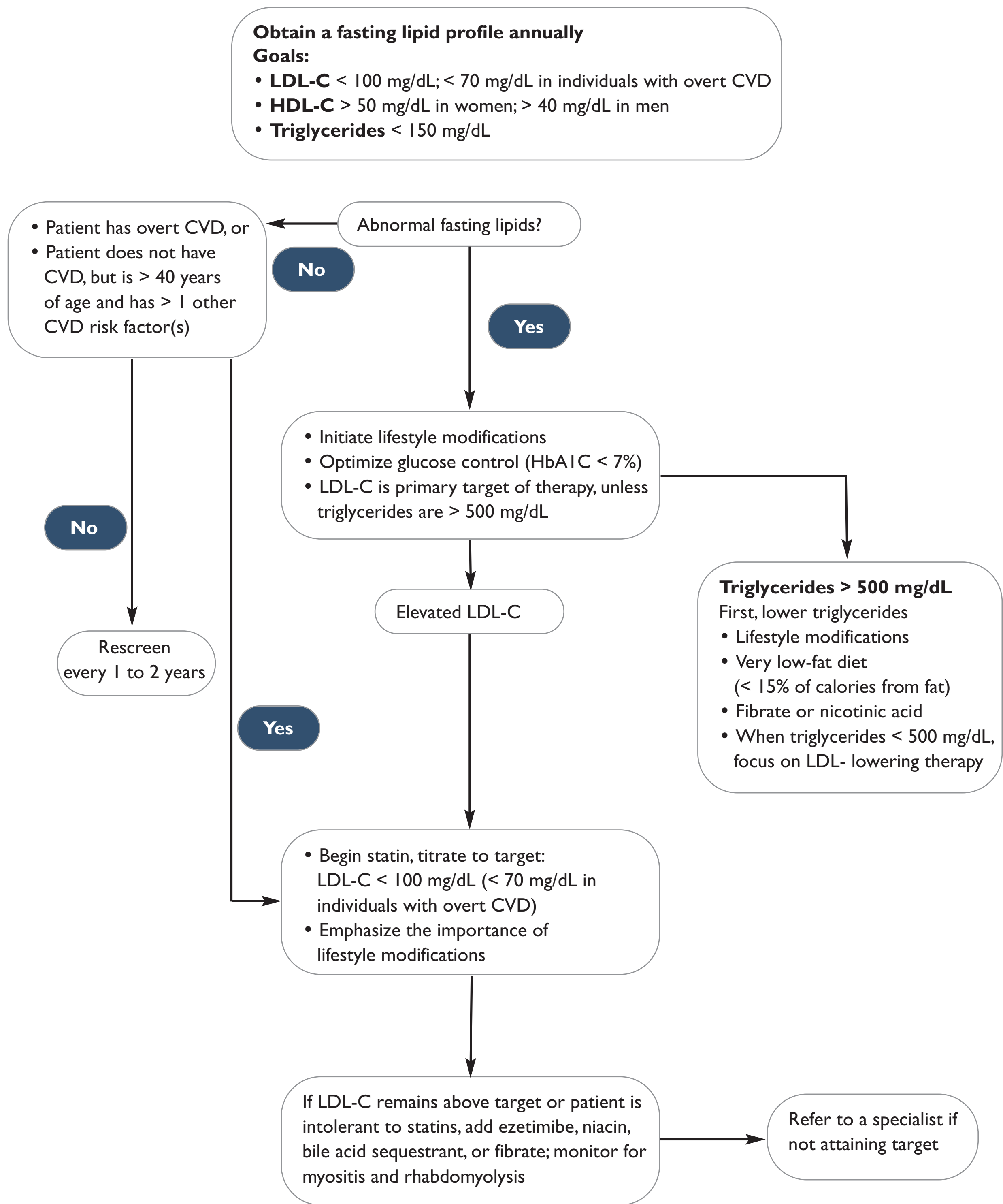
PRACTICAL CONSIDERATIONS

The majority of patients with diabetes fail to reach target lipid levels. The following suggestions can help improve physician adherence to guidelines:
- Provide copies of guidelines on lipid screening and management at points of care and in computer databases
- Use reminders on patient records or diabetes flow sheets to ensure adherence to lipid goals and identify patients with dyslipidemia
- Distribute pocket cards that list target goals for lipid levels and provide standardized treatment algorithms for dyslipidemia. A sample treatment algorithm is presented in Figure 1.
- Keep treatment regimens as simple as possible and provide clear instructions to patients
- Have medical staff contact patients to remind them of follow-up appointments and always follow up with patients who miss appointments

Educate patients about the link between diabetes, dyslipidemia, and cardiovascular disease.[19] Many patients are unaware that CVD is a major complication of diabetes. In addition, discuss the significance of total cholesterol, HDL, LDL, and triglyceride levels because this is often a poorly understood subject.[19] Dietary choices that affect the different lipoproteins should also be mentioned.[19] Referral to a registered dietitian or certified diabetes educator can help provide patients with detailed strategies for implementing lifestyle modifications.[7]

Long-term adherence to medications for dyslipidemia can be difficult for many patients with diabetes. This is often due to complicated regimens or cost factors. Discuss cost issues frankly with patients. Stress to

FIGURE 1. Algorithm for Treating Lipid Abnormalities in Type 2 Diabetes



Data derived from American Diabetes Association. Standards of medical care in diabetes—2009. *Diabetes Care*. 2009;32(suppl 1):S13-S60; National Heart, Lung, and Blood Institute, National Institutes of Health. ATP III AT-A-Glance. Quick Desk Reference. NIH Publication No. 01-3305. May 2001. Available at http:/www.nhlbi.nih.gov/guidelines/cholesterol/atglance.pdf.; Texas Diabetes Council. Lipid algorithm for type 1 and type 2 diabetes mellitus in adults. Last updated January 2008. Available at http:/www.dshs.state.tx.us/diabetes/PDF/algorithms/lipid.PDF.

patients that, in diabetes, medications are essential to prevent complications; therefore, patients should not stop medications on their own. Monitor for adverse drug interactions and counsel patients to report any negative side effects and keep taking medications even though they may not be experiencing any overt symptoms of dyslipidemia.[15]

MICROALBUMINURIA

Goal:
- Normal albumin: < 30 µg/mg creatinine

In diabetes, microalbuminuria is the earliest clinical indication of nephropathy. Because of its association with hypertension and hyperglycemia, it also is a marker for cardiovascular risk and other microvascular complications in diabetes.[7]

Abnormal urinary albumin secretion is based on the following values via spot urine collection[7]:
- Microalbuminuria: 30-299 µg/mg creatinine
- Macroalbuminuria: ≥ 300 µg/mg creatinine

Numerous factors are associated with the development of microalbuminuria, including:
- Hypertension
- Hyperglycemia
- High insulin resistance
- Hypercholesterolemia

KEY FACTS

- Microalbuminuria is a well-established marker of increased risk of coronary heart disease, independent of renal disease, diabetes, and hypertension[20]
- Approximately 7% of patients with type 2 diabetes will have microalbuminuria at diagnosis[21]
- Between 20% and 40% of all patients with diabetes will eventually develop nephropathy[22]
- Of patients with overt nephropathy, approximately 20% will eventually develop end-stage renal disease[22]

SCREENING BASICS

Guidelines offer the following recommendations for screening patients with diabetes for microalbuminuria[7]:
- Perform an annual urine test for albumin excretion in all patients with type 2 diabetes, starting at diagnosis
- Serum creatinine should be measured annually to estimate glomerular filtration rate (GFR) and stage chronic kidney disease, if present

Despite guideline recommendations, screening for albuminuria among patients with diabetes remains suboptimal. The TRIAD (Translating Research Into Action for Diabetes) study found that screening for albuminuria occurs in only about 50% of patients with diabetes who are not already using ACE inhibitors or ARBs. Furthermore, of those screened and found to have microalbuminuria, fewer than 50% receive pharmacologic treatment.[23]

TREATMENT BASICS

Optimal glycemic control and blood pressure control are the key elements of preventing and managing microalbuminuria.[8] Thus, the following lifestyle modifications should be recommended[7,22]:
- Initiating a weight loss program if warranted
- Increasing physical activity
- Restricting sodium intake
- Decreasing alcohol intake
- Restricting protein intake to 0.8-1.0 g/kg/day in early kidney disease and to 0.8 g/kg/day in later stages of chronic kidney disease

Patients with micro- or macroalbuminuria should receive treatment with an ACE inhibitor or an ARB.[7] ACE inhibitors have been shown to reduce the incidence of a doubling of serum creatinine concentration (25% risk reduction) and end-stage renal disease (28% risk reduction), exceeding the benefits attributable to reductions in blood pressure alone.[24] In addition, in hypertensive patients with microalbuminuria, both ACE inhibitors and ARBs can delay progression to macroalbuminuria.[7]

ACE inhibitors may have adverse effects, especially early in therapy.[25] Patients may experience cough, headache, dizziness, and hypotension. For those who cannot tolerate ACE inhibitors, ARBs may have fewer adverse effects.[25]

Referral to a nephrologist is appropriate if the etiology of kidney disease is uncertain, if there are difficulties managing the patient, or if renal disease is advanced.[7] For patients receiving ACE inhibitors or ARBs, the periodic monitoring of electrolytes and estimation of GFR is indicated. In addition, patients with nephropathy are at risk of nephropathy-related complications, such as anemia due to erythropoietin deficiency and secondary hyperparathyroidism, and should be monitored for these conditions.[7,8]

PRACTICAL CONSIDERATIONS

The preferred test for screening for microalbuminuria is the random spot test to determine albumin-to-creatinine ratio. This test is easy to obtain and perform, and it is also the most accurate.[7] First void or other morning collections are preferable because of diurnal variation in albumin secretion.[22] Other available tests include 24-hour urine collection or a timed sample collection to test for creatinine. These tests, however, are more difficult to perform and are rarely needed.[7] Albumin-only spot urine tests without measuring for creatinine are not considered accurate.[7]

To eliminate any confusion over which test to order,

standardize lab ordering procedures. Office policy should indicate that the random spot test for albumin-to-creatinine ratio is the preferred test.[26] If a patient tests positive for microalbuminuria on spot collection, the 24-hour urine sample to measure creatinine clearance and protein loss provides the most accurate quantification of nephropathy.[15]

Many different factors can cause variability in albumin excretion. Infections, fever, hyperglycemia, significant hypertension, recent exercise, and congestive heart failure may all cause an elevation in urinary albumin. Therefore, before concluding that abnormalities in albumin excretion are due to pathologic changes, rule out the presence of these factors. In addition, even in patients without any predisposing factors, a diagnosis of microalbuminuria is not based on a single positive test, but on 2 or 3 positive samples over a 3- to 6-month period.[7]

The following strategies can be used to better adhere to guideline recommendations for the screening and management of microalbuminuria[25,26]:

- Chart reminders similar to those used for lipid screening or HbA1C testing
- A prompting system
- Screening and management algorithms placed in treatment rooms at minimal cost (See Figure 2)

If a patient continues to have microalbuminuria despite pharmacologic treatment, combination therapy with a high-dose ACE inhibitor and an ARB may be effective. In addition, β-blockers can lead to a significant reduction in microalbuminuria, independent of their effect on blood pressure.[27]

SMOKING CESSATION

GOAL:
- Current smokers should quit

More than 25% of patients with diabetes are smokers.[28] In diabetes, smoking is associated with the premature development of microvascular complications and a heightened risk of CVD and mortality.[7] Despite the increased risks, smoking cessation does not always receive the attention it warrants, in part because it is a complex and difficult behavior to change.[7]

KEY FACTS

- The risk of CVD among smokers with diabetes is up to 14 times higher than nonsmokers with diabetes[29]
- The risk of microalbuminuria, nephropathy, and neuropathy in patients who smoke is approximately 2 to 12 times higher than the risk in nonsmokers[29]
- Smoking may reduce retinal blood flow and increase the risk of retinopathy[29]
- One study showed that only about 50% of smokers with diabetes have been counseled to quit by a healthcare professional[30]

SCREENING BASICS

Healthcare professionals should question all patients about smoking history and advise all current smokers to quit.

TREATMENT BASICS

Smoking cessation counseling and other forms of treatment should be a routine component of diabetes care.[7] Counseling has been shown to be a cost-effective and helpful tool.[7,31] In addition, some pharmacologic approaches, such as nicotine gum, nicotine patches, bupropion, and varenicline have been shown to more than double the odds of successfully quitting.[31,32]

PRACTICAL CONSIDERATIONS

Strategies to address smoking in patients with diabetes should include systematic methods to identify smokers and routinely assess smoking status at each visit. This information should be included in the patient chart or diabetes flow sheet. In addition, at each visit, primary healthcare professionals should[7,29]:

- Counsel smokers about the risks of tobacco use in diabetes
- Emphasize the health, financial, and social benefits of smoking cessation
- Ask smokers with diabetes whether they are willing to quit; if they are not, discuss their barriers and concerns; if they are, provide cessation counseling and offer pharmacologic interventions
- Provide the patient with a simple "quit smoking" tear sheet to fill out (see Tool 2)
- Provide referrals to additional services, such as smoking cessation classes at a local hospital or clinic
- Follow up with the patient to reinforce positive behavioral changes

Special issues in smokers with diabetes can hinder cessation attempts. Weight gain or the presence of comorbid psychiatric conditions (eg, depression) may require referrals for further education, counseling, or treatment.[30]

FOOT CARE

Goal:
- Aggressively implement preventive measures to reduce the risk of foot complications

KEY FACTS

- For diabetes patients, the lifetime risk of developing a foot ulcer is up to 25%[33]

- Older patients have a higher risk, with 50% having one or more risk factors for foot ulceration[33]

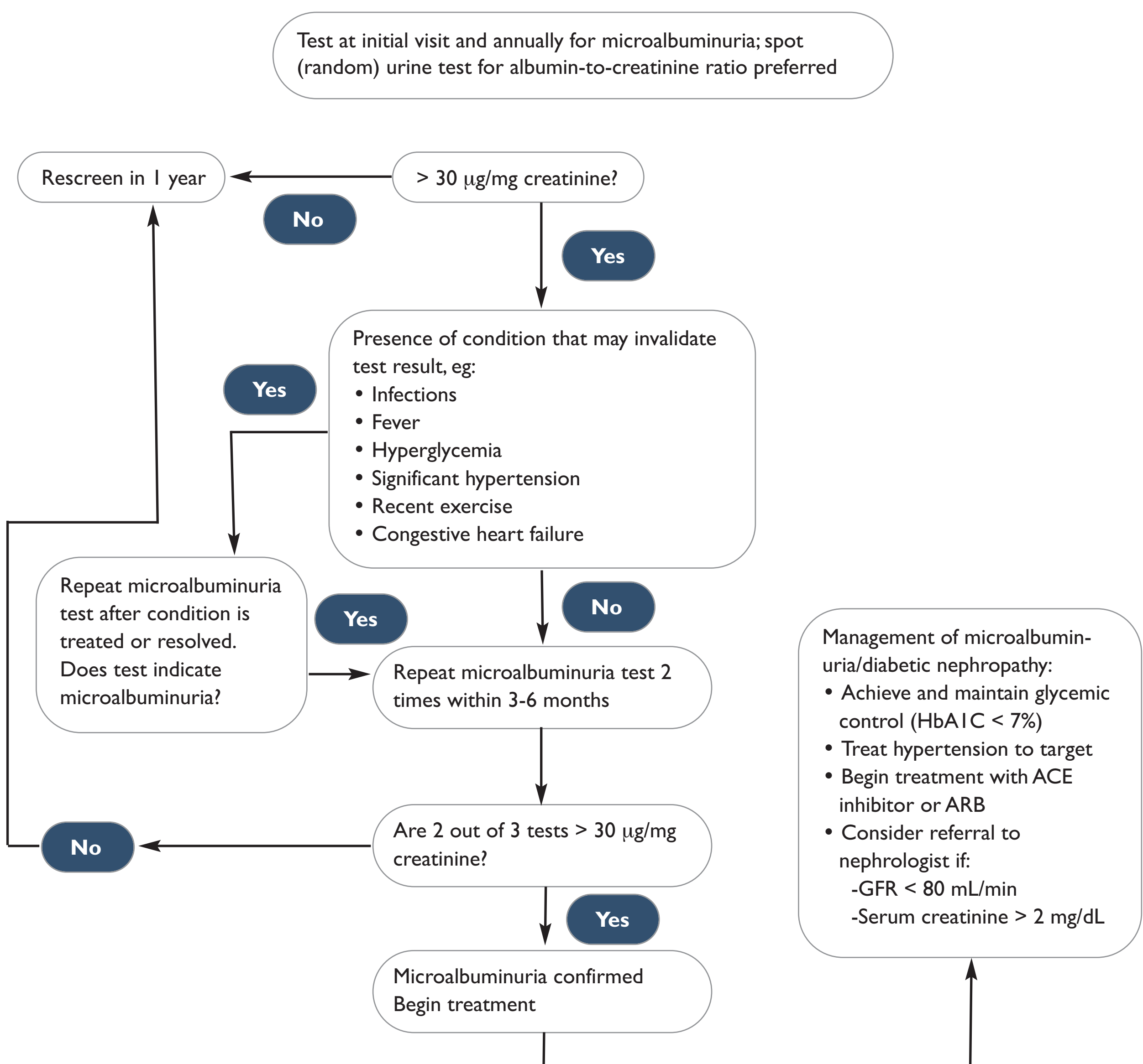
SCREENING AND PREVENTION BASICS

Approximately one-third of patients with diabetes do not receive appropriate screening or examinations.[34] This is unfortunate because comprehensive foot care programs can reduce amputation rates by 45% to 85%.[6]

The ADA offers the following recommendations for assessing foot health in patients with diabetes[7,33]:

- All patients should have an annual comprehensive foot exam, starting at diagnosis
- The annual foot exam should include a visual inspection, an assessment of foot pulses, and a screen for loss of protective sensation
- Ideally, two methods of testing for loss of protective sensation should be performed, a 10-g monofilament pressure sensation (loss of sensation with this test is highly predictive of subsequent ulceration) and one of the following: pin-prick sensation, vibration perception using a tuning fork, ankle reflexes, or vibration perception threshold; combinations of more than 1 test result in a greater than 87% detection rate of diabetic peripheral neuropathy (DPN)

FIGURE 2. Screening and Initial Management of Microalbuminuria in Type 2 Diabetes



Data derived from American Diabetes Association. Nephropathy in diabetes, *Diabetes Care*. 2004;27(suppl 1):S79-S83; American Diabetes Association. Standards of medical care in diabetes—2009. *Diabetes Care*. 2009;32(suppl 1):S13-S60.

- If abnormalities are found during the exam, more frequent evaluation may be advised
- Patients with neuropathy should receive a visual inspection at each visit
- Patients should undergo initial screening for peripheral arterial disease (PAD) that includes an assessment of pedal pulses and history of claudication; thereafter, screen for PAD every 5 years using ankle-brachial systolic pressure index

Neuropathy, deformity, and trauma interact to increase the incidence of foot ulceration.[33] Ulceration risk is increased in patients who have a history of[7]:

- Poor glycemic control
- Peripheral neuropathy, peripheral vascular disease, or diabetic neuropathy
- Previous foot ulcers, foot deformity, or amputation
- Visual impairment

PRACTICAL CONSIDERATIONS

Educate patients about risk factors for foot ulceration and proper foot care. If patients have a risk of developing DPN, teach them the importance and basics of daily foot self-exams. In patients with certain limitations, such as cognitive difficulties or visual impairment, recommend that another individual (eg, a family member or personal care attendant) examine the patient's feet on a regular basis.[7]

The following suggestions can serve as triggers to help incorporate foot exams seamlessly into regular diabetes-related visits[33]:

- Have medical staff place reminders in the patient's record or on the diabetes flow sheet to indicate the need for a foot exam and to identify patients who have a high risk of ulceration
- Have medical staff ask patients to remove socks and shoes before the examining clinician enters the room
- Place posters in exam rooms to prompt patients with diabetes to remove footwear

During a foot evaluation, use a foot exam form (Tool 3) and focus on the following tasks[33]:

- Assess the skin for cracking or dryness, infection (including fungal), sweating, ulceration, calluses, blistering, and bleeding into a callus
- Note any deformities, such as bunions, claw toes, and overlapping toes (they can lead to pressure ulceration); Charcot arthropathy is a commonly overlooked deformity that presents as a unilaterally red, hot, swollen flat foot with a rocker bottom deformity; if Charcot arthropathy is suspected, immediately refer the patient to a specialist
- Perform a neurologic assessment

Neurologic assessment of the foot is accomplished primarily by identifying loss of protective sensation.[33] Five different types of tests can accurately identify loss of protective sensation[33]:

- **10-g monofilament**—In this test, a nylon monofilament buckles when a 10-g force is applied. It should be performed on 4 sites on each foot: the first, third, and fifth metatarsal heads and the plantar surface of the distal hallux. If the patient cannot detect this pressure and accurately identify the site to which it is being applied, it is likely that the patient has lost some degree of large-fiber nerve function.
- **128-Hz tuning fork**—This test is an easy, inexpensive way to test vibratory sensation and is widely used in clinical practice. It is performed bilaterally over the tip of the great toe. The response to the tuning fork is considered abnormal if the patient loses vibratory sensation on the tip of the toe while the clinician can still feel the vibration.
- **Pinprick sensation**—In this test, just enough pressure to deform the skin is applied with a disposable pin proximal to the nail on the dorsal surface of the hallux. The response to this test is considered abnormal if the patient cannot detect the pinprick over either hallux.
- **Ankle reflexes**—To conduct this test, the Achilles

Diabetes Self-Management Education (DSME)

DSME is critical in helping patients implement lifestyle modifications and better adhere to medication regimens.[a] As the primary healthcare professional, you play an important role in initiating conversations with patients about self-care behaviors that can reduce their risk of diabetes-related complications.[b] Although your role is important, referral to a certified diabetes educator or a dietitian with experience in diabetes is usually desireable to help patients incorporate lifestyle changes.[c] In reality, only about 50% of patients with diabetes ever attend a formal DSME class.[d] This is unfortunate, as many health management organizations and insurance companies pay benefits for both medical nutrition therapy and DSME. Maintain a list of referral options for your patients. These can include local hospital outpatient diabetes education programs, freestanding diabetes education centers, or professionals in private practice.[e] For additional information on DSME, please refer to www.PerformanceImprovement-IQ.com/Diabetes2 and view the General Diabetes Care Implementation Guide.

[a]Lebovitz HE, Austin MM, Blonde L, et al. ACE/AACE consensus conference on the implementation of outpatient management of diabetes mellitus: consensus conference recommendations. *Endocr Pract*. 2006;12(Suppl 1):6-12.
[b]Grubbs RS and Sica DA. Taking the pressure off type 2 diabetes mellitus: implementing hypertension guidelines. *Prog Cardiovasc Nurs*. 2007;22(3):159-165.
[c]American Diabetes Association. Standards of medical care in diabetes—2009. *Diabetes Care*. 2009;32(suppl 1):S13-S60.
[d]Strine TW, Okoro CA, Chapman DP, et al. The impact of formal diabetes education on the preventive health practices and behaviors of persons with type 2 diabetes. *Prev Med*. 2005;41(1):79-84.
[e]Boucher J and Evert A. Take a minute to get and give a nutritional message. DOCNews. 2006;3(10):3. Available at http://docnews.diabetesjournals.org/cgi/content/full/3/10/3. Accessed on April 15, 2009.

tendon is stretched until the ankle is in a neutral position and then the ankle is struck with the tendon hammer. If the reflex is absent, they can be retested with reinforcement by asking the patient to hook fingers together and pull. The response is considered abnormal if the reflexes are totally absent either at rest or upon reinforcement.
- **Vibration perception threshold testing (VPT)**—This test is performed using a biothesiometer, a simple handheld instrument that provides a somewhat quantitative assessment of VPT. It is tested by placing the stylus of the device over the dorsal hallux and increasing the amplitude until the patient can detect the vibration. The number at which the patient can detect the vibration should be initiated on a proximal site and then repeated by taking the mean of 3 readings over each hallux. An abnormal response is a VPT greater than 25 V.

PAD is a significant factor in foot ulcers and recurrent wounds.[33] The posterior tibial and dorsalis pedis pulses should be palpated and noted as either present or absent, or, preferably, graded in terms of strength (trace, +1 to +4). If pulses are absent or there are other signs of vascular disease such as claudication, nonhealing ulcers, or rest pain, perform ankle brachial pressure index testing. This is a simple test to assess vascular insufficiency to the lower limbs using a standard Doppler probe for blood pressure measurement at the ankle. The ankle/brachial pressure index is calculated by dividing the systolic pressure at the ankle by the higher of the 2 brachial systolic pressures. An index above 0.9 is normal.[33]

After the exam, calculate the foot risk category and enter it on the foot exam form:

- **Risk category 1**—No loss of pressure sensation, no PAD, no deformity
- **Risk category 2**—Loss of pressure sensation with or without deformity
- **Risk category 3**—PAD with or without loss of pressure sensation
- **Risk category 4**—Previous ulcer or amputation

Patients in risk categories 1 and 2 can be followed-up annually and every 3 to 6 months (respectively) by either a generalist or a specialist. Patients in risk categories 3 and 4 should be seen by a specialist every 2 to 3 and 1 to 2 months (respectively). The sample foot exam form accompanying this implementation guide has a section for risk categorization (Tool 3).

The Importance of Charting

Accurate charting is an important aspect of medical practice that can help provide high quality care and improve patient adherence and outcomes.[a,b] In addition, it also has the added benefit of offering an enhanced level of legal protection to healthcare professionals.[b]

One 2005 report from a primary care practice highlighted the positive effects that improved charting can have on the delivery of guidelines-based care to diabetes patients.[a] This practice served more than 500 patients with diabetes and examined how charting improvements on national benchmarks for HbA1C levels, LDL levels, and foot exams could bring physicians closer to Diabetes Physician Recognition Program standards of care. Interestingly, initial reports showed that although physicians were reporting that they were doing foot exams, few were documenting this action in the chart. By focusing on properly documenting HbA1C testing, LDL-C testing, and foot exams in the electronic medical record (EMR), the percentage of patients receiving these assessments improved; LDL monitoring rose from 32% in 2001 to 91% in 2005, and physician adherence to documenting foot exams rose from 1% in 2001 to 80% in 2005.[a] Statistical feedback offered by the EMR system played a large role in improving physician behavior, but the improvements in charting formed the foundation of improving the quality of care provided to patients with diabetes.

[a]Helm R, Slawson J, Damitz B, et al. Beyond charting: using your EHR's data to improve quality. *Fam Pract Manag*. 2005;12(5):90-92. Available at www.aafp.org/fpm/20050500/90beyo.html. Last accessed May 7, 2009.
[b]Stimpfel N. Quality medical charts: the importance of proper medical record documentation. TransforMed, 2007. Available at www.transformed.com/workingPapers/QualityMedicalCharts.pdf. Last accessed May 7, 2009.

EYE EXAMINATIONS

Goal:
- Reduce the risk or slow the progression of retinopathy

Diabetes is the leading cause of new cases of blindness among adults aged 20 to 74 years, and most individuals with type 2 diabetes will eventually develop retinopathy.[6,35] Optimizing glycemic control and blood pressure are the cornerstones of preventing diabetic retinopathy.[7] Results from the UKPDS found that improved glycemic control significantly reduced the risk of developing retinopathy, nephropathy, and neuropathy. In addition, intensive glycemic control significantly reduced rates of retinopathy compared with standard therapy.[4] Controlling blood pressure to less than 150/85 mm Hg with the use of ACE inhibitors or β-blockers can also reduce the progression of retinopathy.[36]

KEY FACTS

- In the UKPDS 50, 37% of patients had evidence of retinopathy at initial diagnosis[35]
- Of those who did not initially have evidence of retinopathy at diagnosis, by 6 years, 41% had developed at least one microaneurysm[34]

SCREENING BASICS

Diabetic retinopathy has few symptoms until visual loss develops. Therefore, early detection and treatment can

effectively prevent its progression and reduce vision loss.[37a] The ADA offers the following screening recommendations[7,37b]:

- Patients with type 2 diabetes should have an initial comprehensive, dilated eye exam shortly after diagnosis
- An ophthalmologist experienced in diagnosing and managing diabetic retinopathy should perform the exam
- Exams should generally be conducted annually; however, if the patient has one or more normal exams, an evaluation every 2 to 3 years may be acceptable
- Any patient with retinopathy should be referred to an ophthalmologist without delay because laser photocoagulation treatment can reduce the risk of severe vision loss by 50%
- More frequent examinations may be indicated if retinopathy is progressing rapidly
- Although high-quality fundus photographs can detect most cases of clinically significant diabetic retinopathy (when interpreted by a trained eye care professional), it is not a recommended substitute for a comprehensive eye exam, which should be performed upon initial diagnosis of diabetes and at regular intervals thereafter as recommended by an eye care professional.

Despite these guidelines, approximately 33% of patients with diabetes do not receive annual dilated eye examinations.[34]

TREATMENT BASICS

Once retinopathy has been detected, the primary treatment option is laser photocoagulation therapy, and timely treatment can prevent vision loss in many patients with severe retinopathy or macular edema.[7,38] In advanced cases of retinopathy, vitrectomy can sometimes prevent further vision loss and blindness.[38]

PRACTICAL CONSIDERATIONS

The role of the primary healthcare professional is to ensure that patients with type 2 diabetes are referred to an ophthalmologist for a dilated retinal exam because the early identification and treatment of diabetic retinopathy can prevent vision loss.[7] Never wait to refer to an ophthalmologist until a patient complains of blurred vision because this can indicate permanent retinal injury.[39]

Simply telling a patient to get an eye examination, however, is likely to result in poor follow-through. The absence of symptoms, fear of discovering eye damage, and reluctance to attending yet another appointment may contribute to poor adherence.[39] To improve adherence, consider providing the patient with a direct referral to an ophthalmologist that includes the eye specialist's name, address, and phone number.[39]

To ensure that information is provided back to you from the ophthalmologist[39]:

- Provide a referral letter that indicates the reason for the visit and includes an eye exam form to be mailed or faxed directly to your office (consider using Tool 4, a sample referral and eye exam form that accompanies this guide)
- If a response is not obtained within a reasonable amount of time, have your office staff follow up by contacting both the patient and the eye care specialist
- Continue to work collaboratively with the ophthalmologist to ensure compliance with any recommended treatment plans or follow-ups

Patients should receive education about the importance of eye examinations, even if they are not experiencing any vision problems.[39]

CONCLUSION

The majority of patients with type 2 diabetes will eventually develop complications such as hypertension, dyslipidemia, microalbuminuria, foot problems, or retinopathy. By taking practical steps to adhere to clinical recommendations and encouraging patients to implement lifestyle modifications, it is possible to prevent or delay the onset of these complications. Simple clinical tools such as diabetes flow sheets, record reminders, and management algorithms can aid primary healthcare professionals in providing high-quality diabetes care. Appropriate patient follow-up, whether for missed appointments or to assess medication side effects and adherence, can also keep patients actively involved in self-care. In addition, providing timely referrals to diabetes educators, dietitians, eye care specialists, and others can further maximize clinical outcomes in type 2 diabetes.

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ADDITIONAL RESOURCES

Now available at www.pi-iq.com/diabetes.

PERFORMANCE IMPROVEMENT STRATEGIES: DIABETES CARE

This PI CME activity is approved through the **American Board of Internal Medicine's (ABIM) Approved Quality Improvement (AQI) Pathway** and is eligible for 20 points toward the Self-Evaluation of Practice Performance requirement of Maintenance of Certification (MOC).

IMPLEMENTATION GUIDES

Three practical guides to help you implement performance improvements in your practice:

- General Diabetes Care
- Diabetes-Related Complications
- Improving Glycemic Control

PATIENT EDUCATION WEB SITE

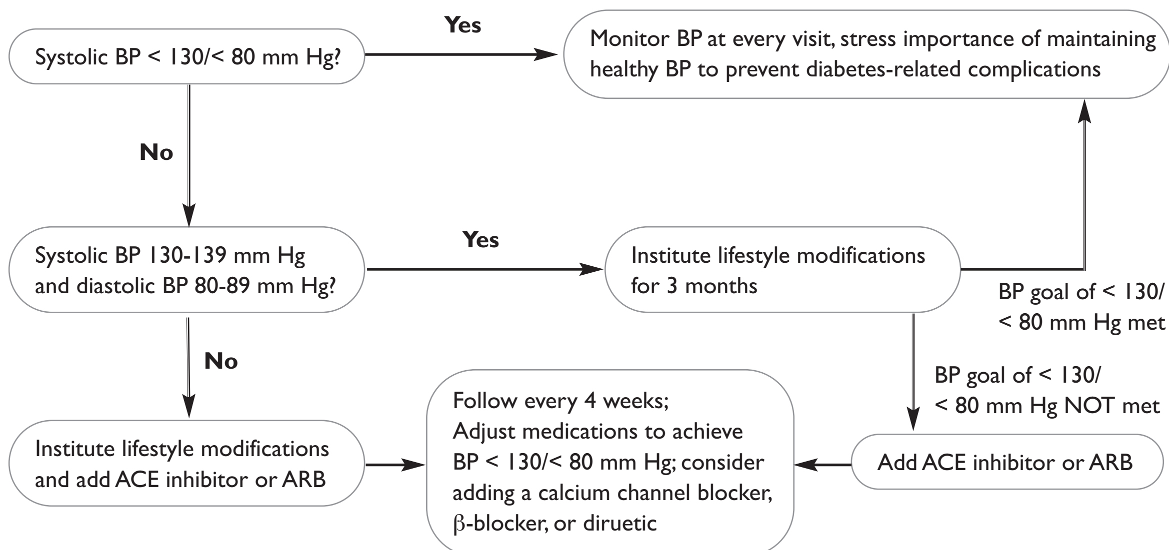
www.MyDiabetesGoals-IQ.com is designed to reinforce your in-practice education. Contact us today to request a complimentary prescription pad to use as a tool for referring your patients to this online resource.

Questions? Call (toll-free) **866 858 7434**, e-mail **concierge@med-iq.com**, or visit **www.pi-iq.com/diabetes**.

TOOL 1. Pocket Card: Hypertension Management in Diabetes

HYPERTENSION SCREENING RECOMMENDATIONS FOR PATIENTS WITH TYPE 2 DIABETES
Screening:
At every visit
Target Goals:
Systolic BP < 130 mm Hg
Diastolic BP < 80 mm Hg
For Patients Not Meeting Goals:
• Ask about diet and physical activity • Assess patient's willingness to change • Discuss exercise, sodium restriction, and the DASH diet • Help the patient set realistic goals • Schedule a follow-up appointment

FOLD HERE



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TOOL 2. Quit Smoking Plan

MY PERSONAL QUIT SMOKING PLAN

Get ready to quit

- Think about how you will benefit from not smoking
- Set a quit date in the next 2-3 weeks and stick to it
- On your quit day, get rid of all cigarettes, ashtrays, and lighters in your home, workplace, and car

Ask for help

- Tell your family, friends, and coworkers you are quitting and ask them to support you
- Ask smokers not to smoke around you
- For free help, call the National Cancer Institute's Smoking Quitline at 1-877-44U-QUIT (1-877-448-7848)
- For free information about help available within your state, call 1-800-QUITNOW(1-800-784-8669)

Learn new skills to help you quit

- Think of things you can do when you feel like smoking, such as brushing your teeth or drinking a glass of water
- Learn a new way to relax, such as going for a walk or playing a sport
- Plan to do something fun every day

Think about "slips" in a new light

- Tell yourself if you have a slip, you will not give up
- Think of a slip as a mistake not a failure
- Set a new time or date to get back on track

My Quit Date: ______________________________

1. I want to quit smoking because:

____

____

____

2. Family and friends who support my decision to quit:

____

____

____

3. Situations that make me want to smoke:

____

____

____

4. Things I can do when I want to smoke:

____

____

____

5. When I quit, I will reward myself by:

____

____

____

QUITTING SMOKING IS ONE OF THE BEST THINGS YOU CAN DO FOR YOURSELF!

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TOOL 3. Annual Foot Exam Form

Name:____ Date:__________________________ ID #:___________________________________

I. PRESENCE OF DIABETES COMPLICATIONS

1. *Check all that apply*

❒ Peripheral neuropathy
❒ Nephropathy
❒ Retinopathy
❒ Peripheral vascular disease
❒ Cardiovascular disease
❒ Amputation *(specify date, side, and level)*

Current ulcer or history of a foot ulcer?
Y_____ N _____

For Sections II & III, fill in the blanks with "Y" or "N" or with an "R," "L," or "B" for positive findings on the right, left, or both feet.

II. CURRENT HISTORY

1. Is there pain in the calf muscles when walking that is relieved by rest?
   Y_____ N _____
2. Any change in the foot since the last evaluation? Y_____ N_____
3. Any shoe problems? Y_____ N_____
4. Any blood or discharge on socks or hose? Y_____ N_____
5. Smoking history? Y_____ N_____
6. Most recent HbA1C result
   _____ %_______ date

III. FOOT EXAM

1. Skin, Hair, and Nail Condition
   Is the skin thin, fragile, shiny and hairless? Y_____ N _____

   Are the nails thick, too long, ingrown, or infected with fungal disease?
   Y_____ N _____

Measure, draw in, and label the patient's skin condition, using the key and the foot diagram below.
C=Callus U=Ulcer PU=Pre-Ulcer
F=Fissure M=Maceration R=Redness
S=Swelling W=Warmth D=Dryness

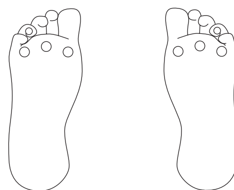
2. Note Musculoskeletal Deformities
   ❒ Toe deformities
   ❒ Bunions (hallus valgus)
   ❒ Charcot foot
   ❒ Foot drop
   ❒ Toe deformities
   ❒ Prominent metatarsal heads

3. Pedal Pulses *Fill in with a "P" or an "A" to indicate present or absent.*
   Posterior tibial Left____Right____
   Dorsalis pedis Left____Right____

4. Sensory Foot Exam *Label sensory level with a "+" in the five circled areas of the foot if the patient can feel the 10-gram monofilament and "-" if the patient cannot feel the filament*

Notes

Right Foot



Notes

Left Foot

IV. RISK CATEGORIZATION *CHECK APPROPRIATE BOX.*

❒ **Low-risk patient**	❒ **High-risk patient**
ALL of the following:	One or more of the following:
❒ Intact protective sensation	❒ Loss of protective sensation
❒ Pedal pulses present	❒ Absent pedal pulses
❒ No deformity	❒ Foot deformity
❒ No prior foot ulcer	❒ History of foot ulcer
❒ No amputation	❒ Prior amputation

V. FOOTWEAR ASSESSMENT *INDICATE YES OR NO.*

1. Does the patient wear appropriate shoes? Y_____ N _____
2. Does the patient need inserts? Y _____ N _____
3. Should corrective footwear be prescribed? Y _____ N _____

VI. EDUCATION *INDICATE YES OR NO.*

1. Has the patient had prior foot care education? Y_____ N _____
2. Can the patient demonstrate appropriate foot care?
   Y_____ N_____
3. Does the patient need smoking cessation counseling?
   Y_____ N_____
4. Does the patient need education about HbA1C or other diabetes self-care? Y _____ N _____

Physician Signature____

VII. MANAGEMENT PLAN *CHECK ALL THAT APPLY.*

1. Self-mangement education:
   Provide patient education for preventative foot care. Date: _____
   Provide or refer for smoking cessation counseling. Date: ______
   Provide patient education about HbA1C or other aspect of self-care. Date: ______
2. Diagnostic studies:
   ❒ Vascular laboratory
   ❒ HbA1C (at least twice per year)
   ❒ Other: ____
3. Footwear recommendations:
   ❒ None ❒ Custom shoes
   ❒ Athletic shoes ❒ Depth shoes
   ❒ Accommodative inserts
4. Refer to:
   ❒ Primary care physician ❒ Endocrinologist
   ❒ Diabetes educator ❒ Vascular surgeon
   ❒ Podiatrist ❒ Foot surgeon
   ❒ RN foot specialist ❒ Rehab. specialist
   ❒ Pedorthist ❒ Other:
   ❒ Orthotist
5. Follow-up care:
   Schedule follow-up visit. Date: _________________________

From National Institutes of Health and Centers for Disease Control and Prevention. Feet Can Last a Lifetime. A Health Care Provider's Guide to Preventing Diabetes Foot Problems. November 2000, NDEP-2. Available at http://www.ndep.nih.gov/diabetes/pubs/feet_HCGuide.pdf. Last accessed May 5, 2009.

TOOL 4. Combined Referral/Results Form for Dilated Retinal Examination

Date: ____________ Patient Name: ________________ ID #: ______________________

DOB: ____________ Phone number: ______________________

Primary Healthcare Professional:

Name: ________________________________ Office: ______________________

Address: ____

Phone: ________________________________ Fax: ______________________

Patient Lab Values/Comorbidities

___HbA1C _____%

___Hypertension: BP _____/_____

___Microalbuminuria/nephropathy__________ μg/mg

___Dyslipidemia: LDL-C _____mg/dL
HDL_____ mg/dL
Triglycerides _____ mg/dL

___A history of smoking
___Former (pack years) _____
___Current (packs/day) _____

___Other: ______________________

Referral to Eye Care Specialist:

Name: ________________________________ Office: ______________________

Address: ________________________________ Phone: ______________________

Fax: ________________________________

EYE CARE SPECIALIST: Please complete the form below and fax or mail this form to the primary healthcare professional listed above

Eye examination date: ____________________

I have performed a dilated eye examination on this patient and have found the following:

Intraocular pressure: R eye _______ L eye _______

Visual acuity: R eye _______ L eye _______

Retinal Examination Results

___No diabetic retinopathy

___Diabetic retinopathy: no treatment required at this time. Follow up: ______________________

___Diabetic retinopathy: treatment required

Glaucoma

___Not present ___Controlled ___Not controlled

Recommended treatment: ____

Cataracts

___Interfere with daily activities ___Do not interfere with daily activities

Recommended treatment: ____

Other Ocular Conditions/Treatment: ____

____

Follow-Up Recommendations

___3 months ___6 months ___1 year ___Other

Eye Care Specialist Name: ______________________ **Signature:** ______________________

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TOOL 5. Diabetes Flow Sheet

When it comes to the screening and management of type 2 diabetes, diabetes flow sheets can improve patient care and adherence to published guidelines.[a] They are forms placed in patient records that gather a patient's information about a specific disease, usually on 1or 2 pages. A diabetes flow sheet can not only serve as a reminder to perform screening exams or initiate treatments, but can also document that patients are receiving guideline-driven care.

Adult Type 2 Diabetes Patient Flow Sheet
For period beginning: __________ (month/day/year), ending: __________ (month/day/year)
Name: ______________________ DOB: ______________ Patient ID#: ______________
Results: N = Normal, A = Abnormal, T = Treated, C = Counseled, R = Referred

Exam/Lab/Counseling/Referral	Schedule	Date/ Result					
BMI Overweight: BMI 25-29.9 kg/m^2 Obese: BMI ≥ 30 kg/m^2	Every visit						
Blood pressure Target: systolic < 130 mm Hg diastolic < 80 mm Hg	Every visit						
Complete physical/history	Initial visit/as needed						
Tobacco use Provide counseling or referral as needed	Every visit						
Foot examination/neurologic assessment for DPN	Annual comprehensive exam/ examine feet at every visit						
Screen for autonomic neuropathy (including cardiovascular autonomic neuropathy)	Initial visit/annually						
HbA1C Target: < 7.0% (AACE goal < 6.5%)	Every 3-6 months						
Lipid profile Targets: LDL-C < 100 mg/dL (< 70 mg/dL in high-risk patients or those with CAD) HDL-C > 50 mg/dL (> 40 mg/dL in men) Triglycerides < 150 mg/dL	Annually if at target/ Otherwise every 3-6 months						
Albumin status Spot collection (mg/mg creatinine): Normal albumin, < 30 µg/mg Microalbuminuria, 30-299 µg/mg Macroalbuminuria, ≥ 300 µg/mg	Initial visit, then annually						
Kidney function/Measure serum creatinine, estimate GFR GFR(ml/min/1.73m2 body surface area): Mildly decreased, 60-89 mL/min Moderately decreased, 30-59 mL/min Severely decreased, 15-29 mL/min Kidney failure, < 15 mL/min	Initial visit, then annually Consider referral for renal disease if GFR < 80 mL/min, serum creatinine > 2 mg/dL						
Dilated retinal examination Refer to ophthalmologist	Initial visit/then annually						
Dental examination Refer to dentist	As needed						
Vaccinations (influenza and pneumococcus) (for elderly or high-risk groups)	Annually						
Diabetes education Refer to a CDE counselor	Initial visit/as needed						
Medical nutrition therapy Refer to registered dietitian	Initial visit/as needed						
Psychosocial counseling If indicated, refer to mental health provider	Initial visit/as needed						
Exercise counseling If necessary, refer for DSME	Initial visit/as needed						

Adapted from American Diabetes Association. Standards of medical care in diabetes—2009. *Diabetes Care*. 2009;32(suppl 1):S13-S60; and Texas Department of State Health Services. Diabetes minimum practice recommendations, 2006. Last updated July 27, 2006. Available at http://www.dshs.state.tx.us/diabetes/PDF/algorithms/minpflow.pdf. Last accessed April 15, 2009; Hahn KA, Ferrante JM, Crosson JC, et al. Diabetes flow sheet use associated with guideline adherence. *Ann Fam Med*. 2008;6(3):235-238.

PREVENTION, DETECTION, AND MANAGEMENT OF DIABETES-RELATED COMPLICATIONS: A PRACTICAL GUIDE FOR PERFORMANCE IMPROVEMENT

CME/CE EVALUATION AND POST-TEST

Release Date: June 30, 2009 Expiration Date: May 31, 2011

SA080DIA09 IG2 6-30-09 1/3

To earn CME/CE credit, complete the following evaluation and post-test, answering 70% of the post-test questions correctly. If completing the evaluation in print form, please use all capital letters and print your name, address, and other information requested below. Keep a copy of the completed evaluation for your files.

Send originals to:
Med-IQ, 5523 Research Park Drive, Suite 210, Baltimore, Maryland, 21228, or fax to 443 543 5210 by May 31, 2011. For mailed or faxed evaluations, allow 4 to 6 weeks from receipt of evaluation form for delivery of statement of credit.

The purpose of this evaluation is to receive your feedback so we may improve future educational activities. All responses are confidential but may be evaluated in aggregate. Thank you.

PARTICIPANT INFORMATION

Date of Participation in Activity: ____________________

First Name: ____________________ Last Name: ____________________

Degree/Profession: ❒ MD ❒ DO ❒ PharmD ❒ RPh ❒ PhD ❒ PA ❒ MBA
❒ RN ❒ NP ❒ LPN ❒ Other: ____________________

Specialty: ____________________

Address 1: ____________________

Address 2: ____________________

City/State/Zip: ____________________

Phone: ____________ Fax: ____________ E-mail: ____________

Type of practice: ❒ Community/Private ❒ Academic ❒ Hospital ❒ HMO ❒ Other ____________

Approximately how many patients do you see each week? ____________

Of these patients, how many do you feel are at risk of diabetes-related complications? ______%

ACTIVITY EVALUATION

Rate the extent to which this CME activity met the following learning objectives:	Minimally 1	2	3	4	5	Completely 6	7	N/A
1. Identify goals and screening recommendations for blood pressure, lipid values, and microalbuminuria	❒	❒	❒	❒	❒	❒	❒	❒
2. Discuss clinical guideline recommendations for the management of hypertension, hyperlipidemia, and microalbuminuria in type 2 diabetes and implement these recommendations into practice	❒	❒	❒	❒	❒	❒	❒	❒
3. Implement strategies outlined in clinical guidelines for smoking cessation, comprehensive foot exams, and retinal exams in patients with type 2 diabetes	❒	❒	❒	❒	❒	❒	❒	❒

Rate the extent to which this CME activity:	Minimally 1	2	3	4	5	Completely 6	7	N/A
Met your expectations	❒	❒	❒	❒	❒	❒	❒	❒
Is applicable to your practice	❒	❒	❒	❒	❒	❒	❒	❒
Used appropriate teaching methods	❒	❒	❒	❒	❒	❒	❒	❒
Provided current scientific evidence to support content	❒	❒	❒	❒	❒	❒	❒	❒
Addressed barriers to optimal patient management	❒	❒	❒	❒	❒	❒	❒	❒
Provided useful non-educational resources *(eg, patient handouts, tools to assess practice, resources)*	❒	❒	❒	❒	❒	❒	❒	❒
Addressed the following 6 core competencies:								
Patient care	❒	❒	❒	❒	❒	❒	❒	❒
Medical knowledge	❒	❒	❒	❒	❒	❒	❒	❒
Interpersonal and communication skills	❒	❒	❒	❒	❒	❒	❒	❒
Professionalism	❒	❒	❒	❒	❒	❒	❒	❒
Systems-based practice	❒	❒	❒	❒	❒	❒	❒	❒
Practice-based learning and improvement	❒	❒	❒	❒	❒	❒	❒	❒

Compared with all other CME activities I have participated in over the past year, I would rate this program as:	Needs Improvement 1	2	3	Average 4	5	Outstanding 6	7
	❒	❒	❒	❒	❒	❒	❒

Did this activity provide fair and balanced content free from comercial bias? ❒ Yes ❒ No
(Commercial bias is defined as information presented that advocates a specific proprietary business product or service of a commercial interest.)

As a result of this learning experience, what will you do differently in the care of your patients?

____

Which of the following practice changes do you intend to implement as a result of participating in this learning experience?
A. I will measure blood pressure at every visit and record this number in the patient chart
B. I will measure lipid levels at least annually in my patients with diabetes
C. I will perform foot exams according to guideline recommendations and will note the results in the patient chart
D. I will discuss and chart smoking cessation strategies and progress at every patient visit with current smokers who have type 2 diabetes
E. I will use a new tool (eg, pocket card, foot exam form, diabetes care flow sheet, etc.) in my practice (please specify): ____________
F. Other (please specify): ____
G. None

How confident are you in your ability to SCREEN your pateints with type 2 diabetes for diabetes-related complications?
A. Extremely confident
B. Moderately confident
C. Somewhat confident
D. Not confident at all

How confident are you in your ability to MANAGE diabetes-related complications according to guideline recommendations?
A. Extremely confident
B. Moderately confident
C. Somewhat confident
D. Not confident at all

Are there specific barriers to patient management that you feel better equipped to address as a result of this activity?
If so, please list them: ____

Are there specific barriers to patient management that this activity did not address? If so, please list them.

____

____

I would like to see CME/CE activities on these topics: ____

Other comments (eg, what can we do to improve future CME/CE activities?): ____

ATTESTATION AND SIGNATURE REQUIRED TO RECEIVE CREDIT:

Physicians: I claim ☐ ______ (maximum 1.0) *AMA PRA Category 1 Credit*™
Nurses: I claim ☐ ______ (maximum 1.0) contact hour for RNs, LPNs, LVNs, and NPs
Pharmacists: I claim ☐ ______ (maximum 1.0) contact hour/0.10 CEU

Signature: ______________________________ **Date:** ______________________

Nurses: license # ______________________________

Name

(Please Print)

1. A 54-year-old patient was recently diagnosed with hypertension and type 2 diabetes. The patient's most recent blood pressure was 142/88 mm Hg. What is the most appropriate initial antihypertensive therapy for this patient?
A. An ACE inhibitor or an ARB
B. Lifestyle modifications
C. Lifestyle modifications plus an ACE inhibitor or an ARB
D. A loop diuretic

2. You are initiating statin therapy in a 58-year-old female patient with type 2 diabetes who was diagnosed with dyslipidemia 3 months ago. Given that the patient does not have overt CVD, which of the following lipid goals is appropriate according to the ADA guidelines?
A. LDL-C < 120 mg/dL
B. LDL-C > 100 mg/dL
C. HDL-C > 40 mg/dL
D. HDL-C > 50 mg/dL

3. Lipid levels should be measured at least annually, but in patients who have low-risk profiles, tests may be repeated at 2-year intervals.
A. True
B. False

4. Which of the following patients with an LDL-C of 120 mg/dL should you refer to a specialist for the management of dyslipidemia?
A. A patient who has not implemented any dyslipidemia therapy yet
B. A patient who has been practicing lifestyle modification therapy alone for 3 months
C. A patient who has been on a regimen of lifestyle modification and statin therapy for 3 months
D. A patient who has been on a regimen of lifestyle modification, statin, and ezetimibe therapy for 3 months

5. You have recently diagnosed a 63-year-old male patient with type 2 diabetes and are screening him for microalbuminuria for the first time. Which of the following tests is the most appropriate to use for this patient?
A. Random spot test to determine albumin-to-creatinine ratio
B. Random spot test for albumin only by immunoassay
C. Timed urine collection
D. 24-hour urine collection

6. Which of the following is NOT an appropriate lifestyle change to recommend for a patient diagnosed with microalbuminuria?
A. Restrict sodium intake
B. Restrict alcohol intake
C. Increase protein intake
D. Increase physical activity

7. Which of the following statements about smoking cessation is TRUE?
A. Smoking cessation counseling has been shown to be a helpful tool, but it is not cost-effective
B. Weight gain may hinder cessation attempts and may require referral for further education
C. Nicotine gum and patches have not been shown to increase the odds of successfully quitting
D. The vast majority of smokers with diabetes are counseled to quit by healthcare professionals

8. You are performing an annual foot exam on a 68-year-old male patient with diabetes. Which of the following exam strategies most closely follows ADA guideline recommendations?
A. Visual inspection, 128-Hz tuning fork test, pin-prick sensation test, and ankle reflexes test
B. Visual inspection, assessment of foot pulses, vibration perception threshold test, and pin-prick sensation test
C. Visual inspection, 10-g monofilament test, pin-prick sensation test, and ankle reflexes test
D. Visual inspection, assessment of foot pulses, 10-g monofilament test, and 128-Hz tuning fork test

9. A patient who has a history of foot ulcers should have his or her feet examined by a specialist every 1 to 2 months.
A. True
B. False

10. A 67-year-old male patient was diagnosed with diabetes 6 months ago. At that time, he was referred to an ophthalmologist who performed a dilated eye exam. The patient's results were normal. According to ADA guidelines, when should you refer the patient for his next eye exam?
A. Now; patients with diabetes should receive an eye exam every 6 months
B. In 1.5 to 2.5 years; he had a normal eye exam, so evaluation every 2 to 3 years is acceptable
C. In 3.5 to 4.5 years; he had a normal eye exam, so evaluation every 4 to 5 years is acceptable
D. Never; he had a normal eye exam, so you no longer need to monitor for this complication

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