dialogues IN CLINICAL PRACTICE℠

GENERAL DIABETES CARE

A Practical Guide for Performance Improvement

NEWSLETTER FACULTY

Faculty Adviser
Howard Baum, MD
Clinical Professor of Medicine
UT Southwestern
Dallas Diabetes and
Endocrine Center, PA
Dallas, TX

Authors
Sylvia Hanna, MD
Piscataway, NJ

Katherine Kahn
Southampton, MA

Activity Planners
Rachel A. Karcher, PharmD
Director, Clinical Content
Med-IQ
Baltimore, MD

Lisa R. Rinehart, MS, ELS
Senior Managing Editor
Med-IQ
Baltimore, MD

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5523 Research Park Drive
Suite 210
Baltimore, MD 21228

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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 program offers a comprehensive series 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 type 2 diabetes care.

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% to 95% 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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Howard Baum, MD
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LEARNING OBJECTIVES

Upon completion, participants should be able to:

1. Discuss guideline recommendations, practical strategies, and risks in implementing the key lifestyle interventions of nutrition and physical activity in patients with type 2 diabetes
2. Develop individualized strategies for providing patient education on various aspects of general diabetes care, such as lifestyle interventions, medication adherence, and sick day management
3. Identify situations in general diabetes care that warrant referral to a certified diabetes educator or a registered dietitian

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PROGRAM 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 program 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 general diabetes care 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: physical activity, nutrition, medication adherence, sick day management, and referral to certified diabetes educators and nutritionists.

This guide is not meant to be a comprehensive review of all aspects of diabetes care, 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 focuses solely on the aspects of care 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.

General Diabetes Care:

A Practical Guide for Performance Improvement

INTRODUCTION

Diabetes mellitus is a chronic, progressive disease that has reached epidemic proportions in the United States (US). The disease affects 23.6 million people, or 8% of the US population.[1] From 2005 to 2007, the total prevalence of diabetes increased by 13.5%, and 29 million Americans are expected to be diagnosed with diabetes by 2050.[1,2]

Diabetes is a complex disease that requires continual therapeutic intervention to prevent and delay the onset of diabetes-related complications.[3] Lifestyle modifications such as physical activity and nutritional counseling should be aggressively implemented at the time of initial diagnosis. These interventions have been shown to be effective in controlling glycemia, weight gain, hypertension, and hyperlipidemia, but many patients have difficulties adhering to them over time.[3] In addition, the complexity of medication regimens is often overwhelming for patients and can contribute to suboptimal medication use and poor glycemic control.[4]

WHAT'S INSIDE

This newsletter is designed to help primary care healthcare professionals navigate select areas of general diabetes care. We will discuss the American Diabetes Association's (ADA's) recommendations for physical activity and nutrition, offering practical management approaches to maximize your patients' abilities to meet diabetes-related goals. We will also review the challenges of medication adherence, sick day management, and appropriate referral. To supplement the guidelines-based information we have provided, we are including practical tools and suggestions you can use in your practice every day.

PHYSICAL ACTIVITY

ADA Goals:

- Patients should engage in at least 150 minutes per week of moderate intensity aerobic physical activity (50% to 70% of maximum heart rate)
- Patients should engage in resistance training 3 times per week if there are no contraindications to this type of exercise

Physical activity confers multiple health benefits in type 2 diabetes. These include reducing cardiovascular disease (CVD) risk by lowering blood pressure, improving lipid profiles, reducing body weight, and increasing an overall sense of well-being.[3] In addition, the metabolic adaptations that occur in response to physical activity can improve glycemic control.[5] Physical activity, however, is often one of the most difficult lifestyle changes to make. A recent nationally representative survey found that only 39% of adult patients with diabetes were physically active, compared with 58% of adults without diabetes.[6]

KEY FACTS

- The Diabetes Prevention Program demonstrated that 150 minutes of physical activity per week, coupled with a 7% reduction in initial weight, reduced the risk of progression from impaired glucose tolerance to type 2 diabetes by 58% ($P < 0.001$)[7]
- A meta-analysis by Boule et al found that structured aerobic exercise for 8 weeks or more could result in HbA1C reductions from 8.3% to 7.7% ($P < 0.001$)[8]
- Patients who are able to undertake more vigorous exercise may experience greater improvements in HbA1C and cardiovascular fitness[9]
- Resistance training can lower HbA1C levels by up to 1.2% in patients with type 2 diabetes ($P < 0.05$)[10]
- Combined aerobic and resistance training results in the greatest improvements in glycemic control[11]

MANAGEMENT APPROACHES

When working with patients to create a physical activity program, the amount and intensity of activity should vary based on an individual patient's goals. In general:

- Physical activity sessions should be spread over 3 or more days per week[5]
- There should be no more than 2 consecutive days without physical activity[5]
- Resistance training should involve all major muscle groups and should progress over time to the goal of 3 sets of 8 to 10 repetitions at a weight that cannot be lifted more than 10 times[5]
- A qualified exercise specialist should provide initial instruction and occasional follow-up assessment to ensure that resistance exercises are performed accurately[5]
- Performing larger volumes of moderate to vigorous exercise may offer additional benefits—4 or more hours per week of moderate to vigorous aerobic and/or resistance training can result in greater reductions of CVD risk[12]
- Long-term maintenance of major weight loss generally requires larger volumes of exercise—7 hours per week of exercise has been shown to result in sustained weight loss[5,13]

PRACTICAL CONSIDERATIONS

There are several considerations that are particularly important and specific for the individual with diabetes[14]:

- Proper footwear (eg, polyester or blend socks, silica gel, air midsoles, etc.) to prevent blisters and keep feet dry is important for minimizing trauma, particularly for those with peripheral neuropathy
- In case of emergency, patients should wear a diabetes identification tag
- Because dehydration can adversely affect blood glucose levels and heart function, adequate hydration (ie, 17 ounces of fluid consumed 2 hours before exercise) is critical

Adhering to exercise programs is often one of the greatest challenges that patients with diabetes face. In fact, adherence to an exercise program beyond 3 months is poor.[15] One way to identify barriers to adherence is to have a nurse or other staff member periodically conduct a written lifestyle adherence interview.[16] Tailored interventions can be based on the patient's response. Tool 1 is an example of a written adherence interview. Some additional practical steps to help patients achieve physical activity goals include:

- Setting realistic goals and expectations by suggesting a staged approach to incorporating physical activity. For example, in a sedentary patient, advise setting a short-term goal of walking or using a beginner's exercise video for 15 minutes, 3 times a week. When the patient has achieved and maintained this goal for a few weeks, increase the frequency to 4 days per week. As a next step, the time may be increased to 20 minutes and so on, until the patient reaches the goal of 150 minutes per week.
- Having patients create a written exercise plan. Ask them to write down the type of exercise, the date and time they are planning to exercise, and how many minutes they intend to exercise. They can then use the simple tool included with this guide to document their adherence and chart their progress (Tool 2).
- Encouraging patients to celebrate the achievement of short-term exercise goals with a meaningful, non-food reward.
- Providing short, simple educational messages to patients about the benefits of exercise. For example, tell them that even a modest weight loss of just 10 to 15 pounds can improve glycemic control and that physical activity can improve glycemic control independent of weight loss.
- Asking patients to write down obstacles to exercising and solutions for overcoming them. For example, if the patient walks outside and the weather is inclement, possible solutions might be to walk at a nearby mall or use an exercise video or DVD at home.
- Having nurses, diabetes educators, or other healthcare professionals in the office provide patients with brief telephone "coaching" sessions and follow-up. A recent study found that such an approach can increase the frequency of exercise and other diabetes-related self-care behaviors.[17] If these resources are not available in your office, consider referring patients to a certified diabetes educator (CDE) for this education.

Exercise-Induced Hypoglycemia. Although the ADA advises against exercise in patients with type 1 diabetes who have a plasma glucose higher than 300 mg/dL because exercise can worsen hypoglycemia and ketosis, exercise avoidance at this glucose level is probably unnecessary in patients with type 2 diabetes unless the patient is severely insulin-deficient or ketotic.[3,5] If the patient feels well otherwise, exercise may be safely undertaken.[3,5]

Patients who are taking insulin or an insulin secretagogue (eg, a sulfonylurea) have a risk of experiencing exercise-induced hypoglycemia.[3] Patients who take these medications should check their blood glucose before, after, and several hours after exercising to determine the typical decrease in blood glucose that occurs during exercise.[5] Once patients determine their blood glucose patterns associated with physical activity, they may not need to check their levels as frequently. A general recommendation is that patients should consume additional carbohydrate if pre-exercise blood glucose levels are under 100 mg/dL.[5] If patients appear prone to exercise-induced hypoglycemia, the dose of insulin or secretagogues may be reduced before physical activity or a carbohydrate snack may be consumed to raise blood glucose levels to allow for an adequate margin of safety.[5]

Assessing Patients for Contraindications. Before recommending a program for physical activity, patients with type 2 diabetes should be assessed for any conditions that might contraindicate certain types of exercise.[3] In addition, the patient's age and previous physical activity should be taken into consideration.[3]

Although previous ADA guidelines recommended screening patients with multiple CVD risk factors for coronary artery disease, recent ADA statements advise against this screening for asymptomatic patients.[3] Using clinical judgment in this area, however, is the best approach.[3] A stress test may be useful in predicting coronary ischemia if the patient's estimated risk of a coronary event over a 10-year period is at least 10%.[5] A useful tool for estimating this risk is the UKPDS Risk Engine available at http://www.dtu.ox.ac.uk/index.php?maindoc=/riskengine/index.php. Stress testing can help determine maximum heart rate, set exercise intensity targets, and assess functional capacity.[5] In previously sedentary patients who have a moderate risk of coronary artery disease, a graded exercise test with

ECG monitoring should be performed before a patient engages in aerobic activity that exceeds the intensity of normal everyday demands.[5]

Other diabetes-related conditions that may influence the choice of physical activity include advanced retinopathy, peripheral neuropathy or a history of foot ulcers, and autonomic neuropathy.[3] Table 1 presents diabetes-related complications, increased exercise-related risks associated with these conditions, and specific recommendations for exercise.

NUTRITION

ADA Goals:

- In patients at risk of diabetes, promote healthy food choices to encourage moderate weight loss[8]
- In patients with diabetes[8]:
  - –Achieve and maintain blood glucose and blood pressure levels as close to normal as is safely possible
  - –Optimize lipid values to reduce the risk of CVD diabetes-related complications
  - –Address individual nutritional needs and maintain pleasure of eating
  - –Prevent hypoglycemia during exercise and illness for patients taking insulin or insulin secretagogues

Medical nutrition therapy (MNT) is important in preventing diabetes, managing diabetes, and preventing the development of diabetes-related complications. A nationwide survey found that patients are often insufficiently counseled and educated about the need for lifestyle changes that can affect their risks of common chronic diseases.[19] In more than 50% of all office visits, patients with type 2 diabetes did not receive any diet or exercise counseling.[19]

KEY FACTS

- Several randomized controlled trials have shown that, in addition to controlling weight gain, MNT can result in an HbA1C decrease of 1% to 2%[20]
- In patients with type 2 diabetes, a weight loss of 5% of body weight is associated with improvements in blood pressure, hyperlipidemia, and glycemic values[21]

MANAGEMENT APPROACHES

Key components of MNT for individuals with type 2 diabetes include reducing caloric intake, managing carbohydrate intake, limiting dietary fat, and increasing fiber intake.[18] Patients with microalbuminuria or nephropathy may benefit from protein restriction.[18]

Carbohydrate Consumption. The ADA offers the following recommendations specific to carbohydrate[18]:

- Monitoring carbohydrate, whether by carbohydrate counting, exchanges, or experienced-based

TABLE 1. Diabetes-Related Conditions, Contraindications, and Recommendations for Exercise

CONDITION	EXERCISE MAY INCREASE THE RISK OF	RECOMMENDATIONS
Proliferative or severe, nonproliferative diabetic retinopathy	• Retinal detachment • Vitreous hemorrhage	• Avoid vigorous aerobic or resistance training • If patient undergoes laser coagulation therapy, wait 3 to 6 months before initiating or resuming vigorous exercise
Peripheral neuropathy	• Exercise-induced injury • Skin infection or ulceration • Charcot joint destruction	• If severe, encourage non-weight-bearing activities such as swimming, bicycling, or arm exercises
Autonomic neuropathy	Exercise-induced injury due to: • Decreased cardiac responsiveness • Postural hypotension • Impaired autonomic regulation of skin blood flow, sweating, and thirst	• Patients with autonomic neuropathy should undergo cardiac testing (eg, thallium scintigraphy) before beginning a physical activity program
Microalbuminuria/nephropathy	• Increased urinary protein excretion	• Can possibly consider performing an exercise ECG stress test if beginning an exercise regimen that is more intense than everyday activities • There is no evidence at this time to suggest that patients with microalbuminuria or nephropathy should avoid specific exercise regimens

Data from American Diabetes Association. Standards of medical care in diabetes—2009. *Diabetes Care*. 2009;32(suppl 1):S13-S60; and Sigal RJ, Kenny GP, Wasserman DH, et al. Physical activity/exercise and type 2 diabetes. *Diabetes Care*. 2004;27(10):2518-2539.

estimation, remains a key strategy in achieving glycemic control
- The use of glycemic index and load may provide a modest additional benefit over that observed when total carbohydrate is considered alone
- Sucrose-containing foods can be substituted for other carbohydrates in the meal plan or, if added to the meal plan, covered with insulin or other glucose-lowering medications
- Care should be taken to avoid excess energy intake
- Sugar alcohols and nonnutritive sweeteners are safe when consumed within the daily intake levels established by the FDA; patients may subtract half of the carbohydrate grams in sugar alcohols from the total carbohydrate grams

The ADA recommends that diets include an average minimum requirement of 130 g/day of carbohydrate.[18] MNT should include carbohydrate from fruits, vegetables, whole grains, legumes, and low-fat milk. A meta-analysis has demonstrated that low-glycemic index diets decrease HbA1C by 0.4% compared with high-glycemic index diets.[22]

Teaching patients with diabetes about reading food labels is essential to their care. Pointing out serving size, servings per container, and total carbohydrate are good first steps to helping patients understand their food choices. Dietary counseling can also help patients make better decisions.

Fiber. The ADA suggests that[18]:
- As an initial strategy, patients with diabetes should be encouraged to consume 14 grams of fiber per 1,000 kilocalories
- This may be achieved through the consumption of a variety of fiber-containing foods

Data suggest that consuming a high-fiber diet (ie, ~50 g/day) reduces glycemia, hyperinsulinemia, and hyperlipidemia in individuals with type 2 diabetes.[18,23] In addition, randomized controlled trials have demonstrated that high fiber consumption is associated with a reduced risk of type 2 diabetes.[24,25] Foods rich in fiber include oats, barley, fruits, vegetables, brown rice, dry beans, peas, lentils, nuts, and whole-grain breads, cereals, and pastas.[18]

Fats. The ADA recommends that patients with type 2 diabetes[18]:
- Limit saturated fat to less than 7% of total calories
- Minimize intake of trans fat
- Limit dietary cholesterol to less than 200 mg/day
- Consume at least 2 servings of fish per week (with the exception of commercially fried fish filets) for n-3 polyunsaturated fats

CVD and stroke affect people with diabetes more than twice as often as others and are the most life-threatening consequences of diabetes.[26] Diabetes itself is a strong independent risk factor for CVD.[27] Thus, steps that help reduce this risk are important. In individuals with diabetes, there are two primary goals for fat consumption: limit saturated fat and limit dietary cholesterol.[18] Saturated fat is linked to low density lipoprotein (LDL) cholesterol levels. In addition, trans fatty acids raise LDL and lower HDL cholesterol.[18]

Plant sterols or stanol esters block the intestinal absorption of cholesterol from both dietary and biliary sources and have been shown to lower plasma total and LDL cholesterol.[18] These substances have now been added to many foods and beverages, such as low-fat milk, margarines, some brands of orange juice, and yogurt. The ADA advises that patients with type 2 diabetes consume approximately 2 grams per day; however, to avoid excess weight gain, these foods should be factored into total caloric intake.[18]

Protein. The ADA offers the following recommendations[18]:
- Protein intake generally averages 15% to 20% of energy intake in most patients; there is no conclusive evidence that this intake should be modified in patients with normal renal function
- Currently, high-protein diets (> 20% of daily calories) are not recommended for weight loss because the long-term effects in patients with diabetes are unknown
- Good-quality protein sources are meat, fish, poultry, cheese, milk, eggs, and soy
- Because protein causes an increase in insulin response without an increase in plasma glucose levels, it should not be used to treat acute or prevent nighttime hypoglycemia
- In earlier stages of chronic kidney disease (CKD), reduction of protein to 0.8 to 1.0 g/kg of body weight per day may improve urine albumin excretion rates and glomerular filtration rates (GFR)
- Reduction of protein intake to 0.8 g/kg of body weight per day may improve renal function measures in later stages of CKD

Findings from short-term studies suggest that high protein diets (> 20% of total daily energy intake) may increase satiety and reduce glucose and insulin concentrations.[18] Long-term follow-up is lacking, however, and it is not known how these diets might affect kidney function in patients with diabetes.[18]

Alcohol Consumption. The ADA recommends that patients with type 2 diabetes[18]:
- Limit daily intake to 1 drink or less for women and 2 drinks or less for men

Alcohol should be consumed with food to reduce the risk of nocturnal hypoglycemia in individuals using insulin or insulin secretagogues.[18] In addition, the ADA

cautions that carbohydrate coingestion with alcohol (eg, mixed drinks) may raise blood glucose.[18]

Women should refrain from drinking if they are pregnant or trying to become pregnant, as should individuals with a history of alcohol dependence or abuse or with certain medical conditions (eg, liver disease, pancreatitis, advanced neuropathy, severe hypertriglyceridemia).[18] Excessive alcohol consumption, defined as 3 or more drinks per day on a consistent basis, contributes to hyperglycemia.[18] Moderate alcohol consumption, however, is associated with a decreased incidence of heart disease in persons with diabetes.[18,28]

PRACTICAL CONSIDERATIONS

As with physical activity, nutrition counseling should be tailored to the personal needs of the patient.[18] Simply presenting a written diet to patients and telling them to follow it is rarely effective, and MNT is time-intensive to deliver and requires specialized knowledge. Referral to a CDE or a registered dietitian (RD) knowledgeable in MNT is often the most effective educational strategy.[29] Still, even if referred for education, primary healthcare professionals play a key role in educating patients, keeping them motivated, and helping them attain goals. The following suggestions can help patients with type 2 diabetes adopt and adhere to healthy eating plans[30]:

- To avoid overwhelming patients, suggest small, incremental changes in diet rather than dramatic dietary overhauls. For example, if patients use large quantities of butter in cooking, suggest substituting smaller quantities of olive oil or a vegetable oil spray. Encourage patients to aim for 1 or 2 changes every week. Patients can develop these goals themselves, write them down, and monitor their own achievements. These goals can then be discussed at office visits.
- Convey to patients that MNT is not a temporary diet, but a way of eating that should be followed for a lifetime. Point out that diabetes meal plans are a healthy way of eating for the entire family and may help prevent chronic disease in family members.
- Reiterate that a modest amount of weight loss can offer significant improvements in glycemic control.
- Consider a patient's cultural background when advising changes in diet. Suggest simple alterations or substitutions to traditional menus, rather than insisting that patients give up cherished foods. For example, suggest using reduced-fat dairy products or removing skin and fat from poultry and meats.
- The "plate method" is one of the easiest ways to educate patients about healthy eating habits. Tell patients to divide a 9-inch plate into 2 halves. One-half of the plate should be filled with green, nonstarchy vegetables. The other half should be divided into 2 smaller sections. Of these sections, one can be filled with a starchy vegetable, pasta, or rice and the other section can be filled with meat or a meat substitute. An 8-ounce glass of milk, a small roll, or another small carbohydrate serving may be added on the side. A piece of fruit or one-half of a cup of fruit juice or fruit salad may also be added.

It is helpful to discuss nutrition at every diabetes-related office visit and address barriers to adherence to nutritional goals. One way to identify specific barriers is to conduct a nutrition adherence interview (Tool 1).[16] If time is short, consider delivering a "1-minute message" on nutrition, such as the following[31]:

- "The amount of carbohydrate you eat determines how much your blood sugar level rises. One to 2 hours after you begin to eat, your blood sugar peak should be less than 180 mg/dL."
- "You can lower your risk of heart disease by eating several servings per day of fresh or frozen fruits and vegetables. One serving is one-half of a cup."
- "If you currently drink two 12-ounce cans of non-diet soft drinks every day, by switching to water or diet soft drinks, you will cut out about 280 calories a day."

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 diabetes patients.

[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.

MEDICATION ADHERENCE

ADA Goal:
- Maximize adherence to medications to achieve and maintain HbA1C, blood pressure, and lipid targets

Difficulties with medication adherence are particularly common in patients with type 2 diabetes.[32,33] Many patients have personal barriers that need to be managed to optimize diabetes management.[32] Common barriers to successful medication management include[32]:

- Poor health literacy
- Financial difficulties
- Physical barriers (eg, poor eyesight, arthritis, tremors, peripheral neuropathy)
- Emotional barriers (eg, needle phobia, depression)
- Ethnic/cultural differences.

KEY FACTS

- The National Assessment of Adult Literacy reported that 36% of patients were unable to determine what time to take medication based on the drug label[34]
- More than 1 out of every 4 uninsured patients and 4 patients with Medicaid reported that cost was a barrier to obtaining prescription medications[35]
- Comorbid depression occurs in approximately 30% of adults with diabetes and is associated with poor metabolic control, higher complication rates, increased healthcare use and costs, poorer quality of life, and increased disability and mortality rates[36]
- Racial and ethnic disparities in medication adherence have been reported[37]

MANAGEMENT APPROACHES

Research has consistently demonstrated that patients' understanding of their conditions and treatment is positively related to adherence.[38] Several key interventions can help improve medication adherence[32,39]:

- Educating patients and their families about medications and the importance of adherence
- Supporting patients' autonomy and competence around medication use and diabetes self-management
- Taking a problem-solving approach for medication issues that arise
- Reviewing medication regimens often and simplifying them whenever possible

Medication side effects and risks also influence patients' treatment choices. In a recent survey of patients, achieving glycemic control was the most important reason for adhering to medication.[33] Medication-related weight gain and cardiovascular risk, however, had significant negative effects on medication adherence.[33] Educating patients about the safety profiles and adverse events associated with medications can help improve adherence.

PRACTICAL CONSIDERATIONS

To uncover patient barriers to medication adherence, have a nurse or office member periodically conduct a medication adherence interview that can be included in the patient's record. (Tool 3, which accompanies this guide, is an example of an adherence form that can be used for this type of interview.) The information can be used to tailor appropriate interventions. In addition, ask patients about medications at each visit to anticipate and address potential problems[40]:

- How well do you think your medications are working?
- What questions do you have about your medications?
- Can you describe any problems you might be having with taking your medications?
- How many days in the past week did you miss a dose of your medication?
- About how much are your medications costing you every month?

It can also be beneficial to help patients simplify oral medication management. Advise patients to[32,40]:

- Use a weekly pill container and dosing calendar to keep track of medications
- Consider using newer electronic medication reminder devices
- Take medications at the same time every day (eg, at meals, before bed)
- Keep extra doses at work or in a purse or briefcase

In addition, you might also consider:

- Asking the patient's pharmacy to provide

refill reminders
- Having office staff follow-up with patients via telephone or e-mail about medications

For patients who are having difficulty affording their medications, consider prescribing generic medications, if possible. Some patients may qualify to receive medications directly from the pharmaceutical company at little or no expense.

Physical barriers, such as poor eyesight, arthritis, and tremors, may make it difficult to test glucose, draw up insulin syringes, or administer medications. Glucose meters with large displays may help patients with poor eyesight, and insulin pens may help patients with other physical barriers improve adherence.

Although a complete discussion about barriers to insulin use is beyond the scope of this newsletter, adherence to insulin regimens may be improved by[30]:

- Providing patients with detailed, written instructions
- Keeping insulin regimens as simple as possible while still striving for glycemic control
- Having the patient use pen injectors whenever possible
- Reviewing SMBG logs with the patient at every visit
- Following up with patients who fail to make or keep scheduled appointments
- Referring the patient to a CDE to address personal barriers to insulin use

The time requirements for diabetes self-management are substantial for both patients and physicians; for patients with type 2 diabetes treated with oral medications, the time commitment can exceed 2 hours daily.[41] Newly diagnosed and elderly patients may require even more time.[41] Because the time committment to provide adequate education can be substantial for primary healthcare professionals, consider referring patients to a CDE or RD to better incorporate this important element of diabetes care.

SICK DAY MANAGEMENT

ADA Goal:
- Maintain blood glucose levels as close to normal as possible during periods of illness

Glycemic control may be more difficult to maintain during the stress of concomitant illness, surgery, or trauma. The goal of sick day management in type 2 diabetes is to prevent a nonketotic hyperosmolar state or diabetic ketoacidosis, both of which are severe complications with potentially fatal consequences.[42] These conditions are more likely to occur in patients with type 1 diabetes, but may occur in some higher-risk patients with type 2 diabetes.[3,43] Any condition that leads to difficulty in maintaining glycemic control requires more frequent SMBG and, possibly, the measurement of urine or blood ketones in at-risk patients.[3] Performing SMBG four times daily during periods of illness is probably adequate in patients with type 2 diabetes.[43] Patients who take insulin may need additional insulin to remain normoglycemic.[30]

It is useful for patients to have a sick day plan that includes details on medication management, dietary suggestions, and when to contact their physician.[30] A sample sick day plan (Tool 4) accompanies this guide.

THE ROLE OF CDEs AND RDs

The ADA recommends that people with diabetes receive medical care from a physician-coordinated team.[3] CDEs and RDs are key members of this team. Diabetes self-management education (DSME) delivered by a qualified educator can provide patients with the knowledge and skills required to make lifestyle changes, perform self-care, manage their medications, and address problems.[44] Nutritional issues in type 2 diabetes can be complex. Thus, referral to an RD with specific experience in implementing MNT in diabetes management is often warranted.[44]

When referring to a CDE or RD, it is important for primary healthcare professionals to state the goals of treatment and provide information about the patient's[45]:

- Diabetes treatment regimen, medical history, and current medications
- Current HbA1C, glucose, lipid, blood pressure, and microalbumin values/status

A sample referral form for DSME and MNT is presented in Tool 5. After patients receive education from a CDE or RD, the primary healthcare professional should reinforce the specific strategies discussed.[45]

The American Association of Diabetes Educators maintains a database of CDEs in each state. This resource can be accessed online at http://www.diabeteseducator.org/DiabetesEducation/Find.html.

CONCLUSION

The general care of patients with type 2 diabetes is complex and, to be effective, must evolve as the disease progresses. Primary healthcare professionals should work to ensure that patients with type 2 diabetes are actively and effectively participating in their own disease management. This can be accomplished by helping patients achieve and maintain guideline-driven goals for lifestyle interventions, such as physical activity, nutrition, and medication adherence. By doing so, patients can better control their glycemic levels and prevent the development of diabetes-related complications.

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TOOL 1. Type 2 Diabetes Physical Activity and Nutrition Adherence Interview

DIABETES PHYSICAL ACTIVITY AND NUTRITION PROBLEM-SOLVING CHECKLIST

Patient Name: _____ ❒ Male ❒ Female DOB: _____

Medical Record Number: _____

Physical Activity:

1. How many times per week do you exercise?
   ❒ Don't exercise ❒ 1-3 ❒ 4-5 ❒ 6-7

2. Approximately how long are your exercise sessions?
   ❒ 20 minutes or less ❒ 30 minutes ❒ 45 minutes ❒ One hour or longer

3. What kind of exercise do you do? _____

4. Do you lift weights? If so, how many days a week and for how long?
   _____ days/week _____ minutes

5. What are your biggest problems when it comes to exercising?
   ❒ Not enough time ❒ No safe place to exercise ❒ Can't afford gym/equipment ❒ Don't feel like it
   ❒ Other: _____

What are some things you could do that might help solve this problem?

_____

_____

Nutrition:

6. How many servings of fruits and vegetables do you eat on most days?
   ❒ None ❒ 1-2 ❒ 3-5 ❒ More than 5

7. Do you read nutrition labels on foods that you buy to help you decide whether they fit in with your eating plan?
   ❒ Yes ❒ No

8. What steps have you taken to reduce calories from fat in your diet?
   ❒ Use low-fat dairy products ❒ Trim fat off meat/remove skin from poultry
   ❒ Cut down on amount of fat used in cooking ❒ Other: _____

9. Do you feel confident in your ability to estimate the amount of carbohydrate in foods? ❒ Yes ❒ No

10. What are your biggest obstacles to eating healthfully?
    ❒ Not enough time to prepare nutritious meals
    ❒ Can't afford to buy good-quality food
    ❒ No good grocery stores in the neighborhood
    ❒ My family doesn't like the kind of food I am supposed to eat
    ❒ I crave fatty, sweet, or salty foods
    ❒ Other: _____

What are some things you could do that might help resolve these issues?

_____

_____

TOOL 2. Patient Exercise Tracker

Week of: _____

My exercise goals for the week are:

Aerobic exercise: _____

Resistance training: _____

This week's reward for achieving my goals is: _____

Day	Activity	Amount of Time	Exercise Goal Met? (Yes/No)	Blood Sugar Before Exercise*	Blood Sugar After Exercise*
Sun					
Mon					
Tue					
Wed					
Thu					
Fri					
Sat					

If I have trouble sticking to my goals, I will: _____

_____

_____

*These recordings are optional. It can be helpful to measure your blood sugar before and after exercise to better understand how different types and durations of exercise affect your blood sugar levels.

TOOL 3. Type 2 Diabetes Medication Adherence Interview

TYPE 2 DIABETES MEDICATION ADHERENCE PROBLEM-SOLVING CHECKLIST

Patient Name: _____ ❒ Male ❒ Female DOB: _____

Date: ____/____/_____ Medical Record Number: _____

Medications:
❒ Metformin _____
❒ Sulfonylurea _____
❒ TZD _____
❒ Insulin Type: _____ Dose: _____ Time of Day: _____
❒ Other: _____

1. Over the past week, how many days did you take your diabetes medications as prescribed?
_____ out of 7 days

2. What strategies do you use to remember how to take your medications?
❒ No specific action
❒ Use a calendar or log book
❒ Use an electronic reminder device
❒ Written instructions from physician
❒ Take medications at same time every day
❒ Use a weekly pill box
❒ Family/friends remind me
❒ Other: _____

3. What are you main problems with taking medications?
❒ No problems ❒ Forgot to take them ❒ Inconvenient
❒ Too many pills to take
❒ Can't always afford medications
❒ Side effects, please specify: _____
❒ Disruption to regular routine, such as vacation, activities, life events
❒ Family/friends are not supportive
❒ Misplaced medication
❒ New illness/other medical reasons
❒ Lack of motivation
❒ Hard to administer injections or swallow pills
❒ Other: _____

4. What strategies would you be willing to try to overcome the problem(s) noted above?
❒ N/A
❒ Try a new device: (eg, pill box, log book) _____
❒ New strategy: (eg, take medication at more convenient time) _____
❒ Schedule education session to address barriers
❒ Receive medication tip sheet from healthcare provider
❒ Talk to family/friends about problems and ask for support
❒ Have healthcare provider address side effects
❒ Have more communication with healthcare staff about medications
❒ Find ways to make medications more affordable
❒ Other: _____

5. Please mention any other difficulties you are having with taking your medications:

_____

_____

TOOL 4. Sick Day Management

These are important tips for people with type 2 diabetes to help avoid hospitalization:

- **Never skip medications**. ALWAYS take your diabetes medication!
- **Test blood glucose frequently** (every 2 to 4 hours) when you are sick, especially if you are vomiting.
- **Check your blood or urine for ketones** whenever you are sick or if your blood sugar is higher than 240 mg/dL.
- **Drink extra fluids** to replace those your body loses due to high blood sugars, fever, vomiting and/or diarrhea.
- **Take your temperature**. Fever may be a sign of infection.
- **Try to eat your usual amount of carbohydrate**. Semi-solid foods or liquids may be easier to keep down if you are vomiting.

Foods for Sick Day Management

½ cup of juice	1 cup of soup
1 cup of Gatorade®	1 cup of milk
1 frozen pop stick	1 cup of yogurt
½ cup of sweetened gelatin	½ cup of ice cream or frozen yogurt
½ cup of sugar-free pudding	¼ cup of sherbet
½ cup of unsweetened applesauce	1/3 cup of rice
1 slice of toast	½ cup of mashed potatoes
6 saltine crackers	½ cup of unsweetened hot cereal
3 squares of graham crackers	½ - 1 cup of unsweetened cold cereal

Call your physician if you …

- Have a fever higher than 101 degrees
- Have persistent blood sugar higher than 240 mg/dL or lower than 60 mg/dL
- Experience persistent diarrhea (for more than 6 hours)
- Are vomiting and unable to keep food down
- Lose 5 pounds or more
- Have ketones in your blood or urine
- Have a "fruity" odor to your breath
- Have trouble breathing

TOOL 5. Sample Referral Form for Diabetes Education

PATIENT REFERRAL FORM FOR DIABETES EDUCATION/MNT

Referral To: _____

Patient Name: _____ DOB: _____

Date: _____

Address: _____

Home Phone: _____

City: _____ State: _____ Zip: _____

SS#: _____ Work Phone: _____

Interpreter needed? ❒ Yes ❒ No Language: _____

Referral Billing Information

Primary Diagnosis:

❒ Diabetes type 2; new onset
❒ Diabetes type 2; uncontrolled
❒ Diabetes type 2; pregnancy
❒ Other: _____

Secondary Diagnosis:

❒ Hypertension
❒ Obesity
❒ Neuropathy
❒ Microalbuminuria
❒ Hyperlipidemia
❒ Retinopathy
❒ Foot problems
❒ Nephropathy
❒ Other: _____

Diabetes Medications

❒ Oral: _____
❒ Insulin: _____
❒ Non-insulin injectable: _____
❒ Other: _____
Comments: _____

Referral for Diabetes Education

❒ Diabetes self-management education
❒ Medical nutrition therapy
❒ Insulin therapy education Type: _____ Dose: _____ Time of Day: _____
❒ Insulin pump training
❒ Continuous glucose monitoring
❒ Pre-diabetes management
❒ Other: _____
Patient requires individual education? ❒ Yes ❒ No If YES, reason: _____
Special instructions: _____

Lab Values

HbA1C: Date: _____ Result: _____ %
OGTT: Date: _____ Result: 1 hour: _____ 2 hour: _____ 3 hour: _____

Physician Signature: _____ Physician Name (print): _____
Office/Clinic Name: _____
Address: _____
Phone Number: _____ Fax Number: _____

GENERAL DIABETES CARE:
A PRACTICAL GUIDE FOR PERFORMANCE IMPROVEMENT

CME/CE EVALUATION AND POST-TEST

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

SA080DIA09 IG1 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? _____ %

ACTIVITY EVALUATION

Rate the extent to which this CME activity met the following learning objectives:	Minimally 1	2	3	4	5	6	Completely 7	N/A
1. Discuss guideline recommendations, practical strategies, and risks in implementing the key lifestyle interventions of nutrition and physical activity in patients with type 2 diabetes	❒	❒	❒	❒	❒	❒	❒	❒
2. Develop individualized strategies for providing patient education on various aspects of general diabetes care, such as lifestyle interventions, medication adherence, and sick day management	❒	❒	❒	❒	❒	❒	❒	❒
3. Identify situations in general diabetes care that warrant referral to a certified diabetes educator or a registered dietitian	❒	❒	❒	❒	❒	❒	❒	❒

Rate the extent to which this CME activity:	Minimally 1	2	3	4	5	6	Completely 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	6	Outstanding 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 recommend that patients without contraindications work up to at least 150 minutes of moderate intensity aerobic activity per week and will note this recommendation in the patient chart
B. I will more frequently refer patients to CDEs and RDs for education related to self-care and nutrition
C. I will provide sick day instructions to patients and will note that I have provided these instructions in the patient chart
D. I will use a new tool (eg, pocket card, referral form, adherence form, etc.) in my practice (please specify): _____
E. Other (please specify): _____
F. None

How confident are you in your ability to manage lifestyle recommendations (eg, nutrition, physical activity) in your type 2 diabetes patients?

A. Extremely confident
B. Moderately confident
C. Somewhat confident
D. Not confident at all

How confident are you in your ability to provide individualized patient education on topics related to general diabetes care (eg, lifestyle interventions, medication adherence, and sick day management)?

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. **You would like to recommend a physical activity program for a 55-year-old male patient newly diagnosed with type 2 diabetes who does not have any contraindications to exercise. According to the ADA guidelines, which of the following is the OPTIMAL goal for this patient?**
   A. Brisk walking for 40 minutes, 3 days weekly, and lifting light weights 2 times weekly
   B Brisk walking for 30 minutes, 4 days weekly, and lifting light weights 3 times weekly
   C. Brisk walking for 25 minutes, 6 days weekly, and lifting light weights 3 times weekly
   D. Brisk walking for 15 minutes, every day of the week, and lifting weights 4 times weekly

2. **Which of the following type 2 diabetes patients has the greatest risk of experiencing exercise-induced hypoglycemia?**
   A. A patient on insulin therapy only
   B. A patient on metformin therapy only
   C. A patient on combination therapy of metformin and a TZD
   D. A patient on combination therapy of metformin, a TZD, and exenatide

3. **MNT has been shown to reduce HbA1C levels by:**
   A. < 1%
   B. 1% to 2%
   C. 2.1% to 3%
   D. > 3%

4. **Which of the following MNT recommendations is appropriate for a patient with type 2 diabetes?**
   A. Avoid the use of sugar alcohols and nonnutritive sweeteners
   B. Reduce carbohydrate intake to 50 grams per day
   C. Limit fiber intake to 5 grams per day
   D. Aim for a protein intake that comprises approximately 15% to 20% of total daily calories

5. **Patients with type 2 diabetes should not consume any alcohol.**
   A. True
   B. False

6. **You are counseling a 57-year-old obese female patient with type 2 diabetes who is resistant to making any changes to her diet. Which of the following recommendations would be most appropriate for this patient?**
   A. Explain to the patient that she should aim to incorporate strategies that will allow her to lose 60 lbs and reach her goal weight of 150 lbs
   B. Offer that the patient incorporate the plate method to improve her eating habits by filling one-half of the plate with carbohydrate, one-quarter with green, nonstarchy vegetables, and one-quarter with meat
   C. Ask the patient to choose a single change to focus on in the next week, like substituting regular soft drinks with diet soft drinks or water
   D. Provide the patient with a specific meal plan that offers her two different options for every meal of the week

7. **You have just told a 65-year-old patient that he has type 2 diabetes. The patient is surprised to learn of this diagnosis and has a number of questions and concerns. Which of the following strategies is likely to benefit both you and the patient the most at this stage?**
   A. You answer the questions you can in the remaining 5 minutes of the scheduled office visit, provide a handout on exercise and MNT, and schedule the patient for a follow-up visit in 3 months
   B. You take 30 additional minutes to address all of the patient's questions and go through a detailed review of initial exercise and nutrition strategies, even though it means falling behind on your patient schedule
   C. You answer the questions you can in the remaining 5 minutes of the scheduled office visit, refer the patient to a CDE for education on initial lifestyle changes, and then follow up with the CDE's recommendations
   D. You tell the patient you understand that a diagnosis of diabetes is a lot to take in, and ask him to make a list of questions, find a CDE, and ask those questions to the CDE

8. **The primary goal of sick day management is to prevent hyperglycemia.**
   A. True
   B. False

9. **Which of the following patients with type 2 diabetes would you expect to be LEAST likely to experience difficulty in adhering to a medication regimen?**
   A. A patient whose daughter brings her to her diabetes visits
   B. A patient with depression
   C. A patient who recently lost her job and who no longer has health insurance
   D. A patient who only visits the doctor once every 1 to 2 years for a sick visit

10. **You have a 68-year-old patient who is having trouble adhering to his medication regimen of twice-daily metformin and multiple daily insulin injections. Which of the following recommendations would you consider to be appropriate for this patient?**
    A. Take your metformin at the same every day
    B. Use a weekly pill container to try to remember your metformin
    C. Visit a CDE for additional education on medication adherence
    D. All of the above

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