

Chapter

7

FOLLOW-UP VISITS

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Once the diagnosis of diabetes has been made and therapy has begun, patients should be evaluated periodically to assess glycemic control, risk factor management, and progression of complications.

- ▶ Follow-up visits with A1C and self-monitored blood glucose (SMBG) evaluation are recommended 4 times per year.^{1,2}
- ▶ More frequent evaluations are necessary for newly diagnosed patients and for those not achieving therapeutic goals.

It is now possible to maintain contact with patients between visits through electronic mail and faxing. Clinicians may also keep a computerized database and an electronic tracking system to pinpoint patients who are not meeting treatment goals.

INTERIM PATIENT HISTORY AND PHYSICAL EXAMINATION

At follow-up visits, data should be collected on any new medical history since the last visit. The following information should be gathered²:

1. New health problems
2. Changes in chronic health problems
3. Possible symptoms or signs suggestive of hypoglycemia
4. Change in risk factors
5. Review of self-monitoring diaries

Table 7-1 Follow-up Physical Examination*

Evaluation	Rationale
Height, weight, waist circumference, and body mass index (BMI)	<ul style="list-style-type: none"> ▲ To evaluate success or failure of weight loss program ▲ Barometer of general health
Blood pressure evaluation—supine and upright	To assess for the presence of hypertension
Eye examination	To assess for the development of diabetic retinopathy
Thyroid palpation	To assess for the presence of thyroid dysfunction (enlargement, nodules)
Cardiac examination	To assess for development of cardiovascular disease (eg, cardiac enlargement, murmurs, pulmonary edema)
Evaluation of pulses (vascular)	To assess for development of peripheral vascular disease
Foot examination	To assess for presence of peripheral neuropathy and infection
Skin examination	To assess for presence of peripheral neuropathy
Neurologic examination	To assess for autonomic and peripheral neuropathy

Source: AACE Guidelines. 2002.²

*Measurement of blood pressure, weight, BMI, and a foot examination should be conducted at every patient visit.

At least once annually, patients with diabetes should undergo a physical examination, including the evaluations listed in Table 7-1.²

LABORATORY EXAMINATION

Laboratory testing is necessary during periodic visits to:

- ▲ Assess glycemic control
- ▲ Determine the presence or progression of complications, such as cardiovascular disease and nephropathy, and assess risk factors

Tests that should be conducted routinely are found in Table 7-2.

ASSESSMENT OF TREATMENT EFFECTIVENESS

- ▲ The A1C measures how well blood glucose has been controlled over a period of 2 to 3 months. Compliance should be evaluated and lifestyle modifications reinforced at every patient visit.
- ▲ Referral to a registered dietitian or diabetes educator for reinforcement of dietary principles is recommended, if necessary.
- ▲ Patients attempting to control diabetes with diet and exercise may eventually require an oral medication.
- ▲ Patients on single oral medications may need a dose adjustment or the addition of another medication. Initiation of insulin therapy may be needed in those failing two oral agents.
- ▲ Patients taking insulin should be evaluated for compliance and hypoglycemia and referred to an endocrinologist, if necessary. More frequent insulin injections may be required.

ASSESSMENT OF COMPLICATIONS AND REFERRALS

Patients with diabetes require continual evaluation for complications. Left untreated, complications can lead to serious health challenges, including cardiovascular disease, blindness, amputation, and end-stage renal disease. At follow-up examinations, the clinician should assess the development of complications and

Table 7-2
Laboratory Tests to Evaluate Glycemic Control and Complications

Test	Frequency	Goal	Action		Rationale
			Recommended		
A1C	Quarterly	Lowest possible without unacceptable hypoglycemia (CADRE) <7% (ADA ¹) ≤6.5% (AAACE ²)	>7% (CADRE) >6.5% (AAACE ²)		Quarterly testing of A1C will provide a relatively complete picture of how well glycemia has been managed over the course of a year. In studies, patients who were able to achieve A1C levels of ~7% significantly reduced their risk of complications
Fasting and/or postprandial glucose (to corroborate self-glucose testing)		<110 mg/dL <140 mg/dL	>110 mg/dL >140 mg/dL		

Lipids	Yearly, or more often as necessary ^d	Patients with diabetes are at twice the risk of coronary events as those without and have the same risk as patients without diabetes with a previous MI
HDL cholesterol	>40 mg/dL (males); >50 mg/dL (females)	Controlling dyslipidemia has been shown to reduce risk of diabetes-related cardiovascular complications
LDL cholesterol	<100 mg/dL	<40 mg/dL (males); <50 mg/dL (females)
Triglycerides	<150 mg/dL	>100 mg/dL >150 mg/dL

(table continues)

Table 7-2
(continued)

Test	Frequency	Goal	Action Recommended	Rationale
Microalbumin	Yearly unless: <ul style="list-style-type: none"> ▶ Type 1 patient within 5 years of diagnosis ▶ Age <10 years ▶ Overt proteinuria 	<30 mg/g creatinine per 24 h		The presence of low but abnormal levels of albumin in the urine indicate early signs of diabetic nephropathy. Microalbuminuria rarely occurs with short duration of type 1 diabetes; however, as the onset of type 2 diabetes is usually unknown, screening should be performed at diagnosis, with yearly follow-up testing.
Creatinine	Yearly or more frequently if necessary ^b	<1.3 mg/dL		

HDL, high-density lipoprotein; LDL, low-density lipoprotein; MI, myocardial infarction.

Sources: Clark, 2000⁵; NCEP⁶; DCCT⁷; UKPDS⁸; ADA⁹.

^a Newly diagnosed patients should have a fasting lipid profile performed at least twice a year. Many patients with diabetes are on lipid regulating medications and will therefore require more frequent lipid status evaluation based on drug recommendations, dosage changes, and treatment response. Changes in glucose control, use of other medications affecting lipid status, or changes in risk factor status may require more frequent lipid assessment.

^b Patients on metformin may require more frequent assessment, particularly if dehydration or intervening illness occurs or following radiographic dye studies.

make referrals if necessary. The frequency of these assessments is based on individual clinical circumstances but should be performed at least annually. A foot examination should be performed at each visit. Table 7-3 presents information on assessing for diabetes complications. (See Chapter 11 for more information on complications associated with diabetes.)

Depression and Anxiety

In addition to the complications listed in Table 7-3, health care professionals treating patients with diabetes should be alert for symptoms of depression and anxiety disorders:

- ▲ Major depression is more common among those with both type 1 and type 2 diabetes—approximately 15% to 20% prevalence—than in the general population.
- ▲ Depression in patients with diabetes is associated with decreased compliance and glycemic control and an increased risk of complications.^{3,4}
- ▲ Patients may also develop chronic anxiety in relation to injections and blood testing, hypoglycemia, and/or the long-term implications of their disease.
- ▲ When making referrals to mental health professionals, it is important to choose those with experience in treating these disorders within the context of diabetes.³

Sexual Health

During follow-up visits, patients with diabetes should be questioned in regard to sexual health. Erectile dysfunction in male patients is a non-life-threatening but challenging complication of diabetes. Factors that affect sexual function in male patients with diabetes include:

- ▲ Patient age—risk increases with increasing age
- ▲ Poorly controlled glycemic levels

Table 7-3 Assessing Diabetes Complications

Complications	Indicated by
Cardiovascular	ECG and stress test (based on patient's age and symptoms), lipid profile, blood pressure measurement, clinical vascular assessment
Renal	24-h urine for microalbuminuria, creatinine clearance; random microalbumin
Retinal	Tests of visual acuity (Snellen chart), fundus-copic examination, intraocular pressure test
Neuropathy	Review of symptoms related to peripheral nerve and autonomic dysfunction; vibratory sensation, soft-touch, and pinprick testing; assessment of autonomic function, including orthostatic hypotension
Foot	Physical examination for lesions, skin integrity, discoloration, and peripheral pulses

Source: AACE Guidelines, 2002.²
ECG, electrocardiogram.

- ▲ Presence of diabetes complications
- ▲ Presence of macrovascular risk factors, such as dyslipidemia, hypertension, and smoking
- ▲ Use of medications that affect erectile function, including cardiovascular medications such as β -blockers, thiazide diuretics, and older antihypertensive agents, as well as drugs that affect the central nervous system, such as antidepressants and antipsychotics
- ▲ Psychological considerations, including relationship issues and performance anxiety

For patients complaining of erectile dysfunction, a history should be taken, including a complete description of the problem, all medications used, and relationship issues. A physical examination, including genital evaluation, should be performed, and blood glucose and free testosterone levels should be tested. Also, measuring nocturnal penile activity may prove helpful in determining the causes of the problem.

When treating erectile dysfunction, referrals to a sexual therapist, discontinuation of causative medications, or treatment with hormone replacement or PDE5 inhibitors may be considered. It is important to note that PDE5 inhibitors should be used with caution in patients with cardiovascular complications. (See Chapter 11 for more information on sexual dysfunction.)

Gastrointestinal Disorders

Gastrointestinal difficulties resulting from autonomic dysfunction may occur in patients with diabetes. Gastroparesis, or decreased gastric motility, causes symptoms such as nausea, postprandial vomiting, bloating, pain, belching, and loss of appetite. Patients should be advised to eat small, frequent meals. Medication therapy is also available (eg, metoclopramide, erythromycin, and bethanechol).³ (See Chapter 11 for more information on gastroparesis.)

EVALUATION OF PATIENT EDUCATION AND SELF-MANAGEMENT SKILLS

More than in any other disease, the patient's active role in diabetes management is critical to long-term success. Therefore, during follow-up visits, it is important to evaluate a patient's understanding of the disease and his or her ability to self-manage. Poorly controlled patients who display an inability or unwillingness to comply with treatment regimens may benefit from a referral to a diabetes educator. Recent guidelines on the management of diabetes mellitus from the American Association of Clinical Endocrinologists (AACE)² contain several useful forms and tests for the evaluation of patient knowledge and self-management skills.

COUNSELING ON SMOKING CESSATION AND ALCOHOL USE

Smoking is a major risk factor for macrovascular and retinal complications associated with diabetes. Therefore, patients who smoke should be counseled to quit during follow-up visits:

- ▲ Reinforce dangers of smoking to overall health and to diabetes complications.
- ▲ Recommend smoking cessation medications, gums, lozenges, or patches.

Table

7-4

Summary Follow-up Schedule

Quarterly and biannual visits (or more frequently if indicated)

- ▲ Weight and BMI
- ▲ Blood pressure measurement—supine and upright
- ▲ Foot examination
- ▲ A1C
- ▲ Review SMBG, self-management skills, and current therapies, including diet and exercise goals
- ▲ Counsel on smoking cessation and alcohol use
- ▲ Lipid profile, under certain circumstances

Annual visits

- ▲ Physical examination, including vascular and neurologic (peripheral, autonomic) components
- ▲ Fasting lipid profile
- ▲ Serum creatinine and 24-h urine for creatinine clearance and microalbuminuria
- ▲ Eye (fundoscopic) examination

BMI, body mass index; SMBG, self-monitored blood glucose.

- ▲ Make referrals to local smoking cessation programs and support groups.

Patients' use of alcohol should also be discussed:

- ▲ Advise patients of how alcohol affects the management of their disease and cardiovascular risk.
- ▲ Make referrals to alcohol abuse programs and support groups, if necessary.

FOLLOW-UP SCHEDULE

A guideline for scheduling follow-up care is found in Table 7-4, organized according to quarterly, biannual, and annual visits.

REFERENCES

1. American Diabetes Association (ADA). Clinical Practice Recommendations. Standards of medical care in diabetes. *Diabetes Care*. 2004;27:S15-S35.
2. American Association of Clinical Endocrinologists (AACE). Medical guidelines for the management of diabetes mellitus: the AACE system of intensive diabetes self-management—2002 update. *Endocr Pract*. 2002;8(suppl 1):40-82.
3. Beaser RS. *Joslin's Diabetes Deskbook*. Boston, Mass: Joslin Diabetes Center; 2001.
4. Lustman PJ, Griffith LS, Freedland KE, Clouse RE. Fluoxetine for depression in diabetes: a randomized double-blind placebo-controlled trial. *Diabetes Care*. 2000;23:618-623.
5. Clark NG. Standards of care in diabetes. In: Leahy JL, Clark NG, Cefalu WT, eds. *Medical Management of Diabetes Mellitus*. New York: Marcel Dekker; 2000.
6. National Cholesterol Education Program (NCEP). Detection, evaluation, and treatment of high blood cholesterol in adults. Adult Treatment Panel III. Executive summary. NIH publication no. 01-3670. Bethesda, Md: National Institutes of Health; 2001.
7. Diabetes Control and Complications Trial Research Group (DCCT). The effect of intensive treatment of diabetes on the devel-

- opment and progression of long-term complications in insulin-dependent diabetes mellitus. *N Engl J Med.* 1993;329:977-986.
8. UK Prospective Diabetes Study (UKPDS) Group. Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). *Lancet.* 1998;352:837-853.
 9. American Diabetes Association (ADA). Clinical Practice Recommendations 2004. Hypertension management in adults with diabetes. *Diabetes Care.* 2004;27:S65-S67.