

**The American Association of Clinical Endocrinologists
Medical Guidelines for the Management of Diabetes Mellitus:
The AACE System of
Intensive Diabetes Self-Management—2002 Update**

*Developed by the
American Association of Clinical Endocrinologists
and the American College of Endocrinology—2002*



INTRODUCTION

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In 1994, the American Association of Clinical Endocrinologists (AACE) developed a System of Intensive Diabetes Self-Management. This system remains the centerpiece of the AACE Medical Guidelines for the Management of Diabetes Mellitus. A key component of the AACE system of care is a patient-physician contract, which maintains the preeminence of the patient-physician relationship and the importance of the patient's participation in personal care. As stated therein, the duties of the physician and the diabetes management team are to teach and to help direct the patient's own self-management.

The System of Intensive Diabetes Self-Management includes the concepts of care, the responsibilities of the patient and the physician, and the appropriate intervals of follow-up assessment. Also included are the timing of required laboratory testing, determined by evidence-based and consensus clinical experience. As indicated in the original publication of the guidelines, the intensive self-management system applies to patients with type 1 and type 2 diabetes.

AACE brought these concepts directly to the public with two highly successful patient initiatives. These diabetes initiatives were called "Patients First" and "Patients First 1998." The names of these initiatives emphasize that the treatment of the patient should be the first priority for the patient, the physician, and all those providing health-care coverage. Access to appropriate care and durable medical equipment should not be restricted. AACE emphasizes that the patient should demand access to appropriate care.

In addition, the patient, with a focus on self-management, must become a "Professor of Diabetes." The physician and the diabetes management team are responsible for helping the patient achieve this expertise, and the clinical endocrinologist is the physician best trained to make the

initial diagnosis and to recommend optimal treatment of diabetes.

During the past 5 years, many published studies have confirmed the importance of intensive diabetes self-management, not only for type 1 but also for type 2 diabetes. There is now no doubt that control of diabetes is of utmost importance. Furthermore, many new pharmacologic agents have been developed, some with unique mechanisms of action. The use of combinations of older and new pharmacologic agents enables the patient to achieve near-normalization of blood glucose levels.

Evidence continues to accumulate in support of the importance of intensive diabetes self-management early during the course of the disease as well as intensive control of comorbid states, such as hypertension, dyslipidemia, and obesity. The early control of comorbid states decreases the occurrence of complications of diabetes. Moreover, comorbid states can be precipitated or worsened by the occurrence of diabetes.

The 2000 revision of the AACE medical practice guidelines focuses on the system of care provided in the original guidelines but adds new evidence for management and treatment of type 1 and type 2 diabetes mellitus. The AACE System of Intensive Diabetes Self-Management remains intact. In this revision, we have emphasized type 2 diabetes because it is our conviction that type 2 diabetes is an underrecognized but very serious disease that must be treated as aggressively as type 1 diabetes mellitus.

As chairman, I wish to thank the Diabetes Medical Guidelines Task Force, Drs. Richard Hellman, Richard Dickey, Paul Jellinger, John Janick, Helena Rodbard, Rhoda Cobin, David Bell, Om Ganda, Eugene Davidson, and John Seibel, for their valuable contributions to these revised, expanded guidelines.

2002 UPDATE

The American College of Endocrinology (ACE) held a Diabetes Mellitus Consensus Conference, August 20-21, 2001. The outcome of this ground breaking conference included new guidelines for HbA1c levels. Pre and postprandial targets, and a universal term for hemoglobin A1c. These guidelines have been revised to reflect these outcomes. Also included in the 2002 version are changes in treatment that have occurred since the publication of the 2000 version.

MISSION STATEMENT

The results of the Diabetes Control and Complications Trial (DCCT), announced in June 1993, confirmed that the near-normalization of blood glucose levels in patients with type 1 diabetes can significantly delay the onset and slow the progression of complications associated with this disease (1). Near-normalization of blood glucose can be achieved by intensive control of diabetes (1). It has been established that the complications of diabetes are related to abnormalities in blood glucose (1). Many endocrinologists contended that intensive control could also reduce the complications associated with type 2 diabetes (2). At that time, AACE agreed that a system of intensive control of diabetes mellitus would likely decrease the rate of complications, improve the patient's quality of life, and decrease the total cost of care associated with both type 1 and type 2 diabetes. Studies since that time, including the United Kingdom Prospective Diabetes Study (UKPDS) of 1998, have confirmed AACE's notion that the goal in type 2 diabetes must also be normalization or near-normalization of the blood glucose level in order to decrease associated complications (3-5).

A systematic multidisciplinary approach has been developed to help clinical endocrinologists and other physicians provide intensive therapy for patients with diabetes mellitus in an effort to achieve normal or near-normal blood glucose levels. The primary requirements for the successful implementation of this system of care are active patient participation, a committed health-care team, and adherence to the schedule of recommended interactions between the patient and the health-care team.

The health-care team should be managed by a clinical endocrinologist; ideally, the team should include a diabetes-trained nurse, a dietitian skilled in diabetes education, and, as needed, a pharmacist, psychologist, and exercise physiologist. The team should be led by a clinical endocrinologist or other physician who has expertise and experience in overseeing and directing this integrated system of care. Of course, notable improvement in patient care will be achieved when physicians of all specialties are more aware of the relationship between blood glucose control and diabetes-associated complications and are familiar with the steps for implementing a program of intensive diabetes treatment. These guidelines, which are intended to assist in those efforts, now include the scientific evidence of recent years to support the AACE System of Intensive Diabetes Self-Management.

SECTION 1: INTENSIVE THERAPY IN TYPE 1 AND TYPE 2 DIABETES

Mechanisms and Goals

Current strategies for optimal care of patients with diabetes mellitus include vigorous and persistent efforts to achieve physiologic control of blood glucose and other often associated conditions including hypertension, dyslipidemia, and excess weight. Abundant evidence is now

available that long-term maintenance of near-normal blood glucose levels is protective of patients with diabetes and substantially reduces complications and mortality in both type 1 and type 2 diabetes (1,3-6). The term "intensive therapy" denotes a comprehensive program of diabetes care that includes, as two of its components, frequent self-monitoring of blood glucose levels and more complex and sophisticated regimens for maintaining near-normoglycemia—which, in the case of insulin treatment, often involves multiple insulin injections daily or subcutaneous insulin infusion therapy (insulin pump therapy).

The DCCT (1) showed that, for patients with type 1 diabetes, intensive insulin therapy including three or more insulin injections daily or use of an insulin pump was optimal management. This therapy also can be optimal for many patients with type 2 diabetes who may have insulin deficiency and therefore require insulin supplementation. Often included in this group are older patients, nonobese patients, and patients with diabetes of long duration.

With the recent development of five major classes of orally administered antidiabetic agents, modern patterns of intensive therapy in type 2 diabetes are now widely diverse. In addition to medical nutrition therapy, the clinician often uses a wide variety of therapeutic regimens at different times in the care of the patient with type 2 diabetes. The decision for use of a specific treatment option should be in the hands of the leader of the diabetes care team, the clinical endocrinologist, who should establish the targets and choose the therapeutic agents for control of blood glucose.

For each patient, therapy should be individualized to maximize the likelihood of attaining and maintaining the appropriate goal and reducing the frequency of side effects or adverse reactions. To date, several studies have found a significant advantage associated with a decrease in glycosylated hemoglobin levels to 7.0% (normal, 3.8 to 6%), or lower if possible (1,3-6). Both preprandial and postprandial blood glucose targets are useful. The ACE Diabetes Mellitus Consensus Conference in August 2001 established the following goals: HbA1c level of 6.5% or less; preprandial glucose of 110 mg/dL or less; and the postprandial glucose of 140 mg/dL or less.(6a)

Clearly, the method used to attain normoglycemia is less important than the fact that the goal is achieved. The threat of hypoglycemia seems to be much less serious in type 2 than in type 1 diabetes (3,4) and can often be minimized with more frequent blood glucose monitoring (6), more comprehensive educational intervention, and careful adjustment of medication.

Emerging evidence indicates that intensive therapy and careful control of blood glucose levels are particularly important in achieving better diabetes-related outcomes in the setting of acute conditions (7,8). Data from the DIGAMI (Diabetes Mellitus and Insulin-Glucose Infusion in Acute Myocardial Infarction) Study (7) indicate the value of intensive insulin therapy during and after acute myocardial infarction in patients with diabetes. Other studies have also shown the importance of maintaining

Treatment

The key to nonpharmacologic therapy to reduce insulin resistance is increased physical activity and decreased caloric intake. Both the increase in physical activity and the decrease in caloric intake will increase insulin sensitivity, with or without weight loss (91).

As little activity as walking for 40 minutes four times per week is enough to lower insulin resistance. Likewise, as little physical activity as walking 5 miles per week can reduce the risk of developing diabetes by 6% (the reduction is even more in obese persons and those persons with a family history of diabetes) (36,92). Exercise increases the affinity of the insulin receptor for insulin, increases the mobilization of glucose transporters, and increases the activity of tyrosine kinase, each of which will lead to a decrease in insulin resistance in skeletal muscle. By preferentially decreasing intraperitoneal adiposity, increased activity also results in a decrease in free fatty acids and a further decrease in insulin resistance. Similarly, even as little as a 5% decrease in body weight will result in a substantial reduction in insulin resistance.

When the plasma glucose is high in the patient with diabetes, insulin resistance is increased. Irrespective of the method used to lower blood glucose levels, reversal of "glucotoxicity" will result in a decrease in insulin resistance as well as an increase in endogenous production of insulin.

SECTION 9: AACE SYSTEM OF INTENSIVE DIABETES SELF-MANAGEMENT

The AACE System of Intensive Diabetes Self-Management is divided into three phases. Phase I provides the opportunity for the initial patient assessment. Initial patient education and formulation of a customized therapeutic approach may require several outpatient visits during a period of a few weeks. Phase II, the follow-up phase, provides for interim assessments of the patient's physical condition, reaction to intensive therapy, and understanding of the tools for diabetes self-management. Phase III consists of the ongoing assessment of the complications of diabetes mellitus as well as reeducation of the patient and encouragement to maintain enthusiasm for the difficult task of intensively managing blood glucose levels.

In this ongoing system, the patient-intensive participation is the key to effective control of the diabetes. The clinical endocrinologist or other physician and all members of the health-care team must facilitate this participation by the patient.

Phase I: Initial Assessment

The primary goal of Phase I is the assessment of the patient's disease status and risk factors for complications of diabetes. This goal may be accomplished by a thorough elicitation of the patient history, performance of a complete physical examination by the physician, and appropriate laboratory evaluation. During Phase I, which may require multiple patient visits during an interval of 3 to 4

weeks, the physician will gather information, develop initial recommendations for the patient, and begin a diabetes self-management program with the help of the diabetes health-care team. The educational program should address appropriate nutrition, exercise, medication, record-keeping systems, and self-monitoring of blood glucose. As the patient begins to understand the rationale for intensive control of blood glucose, the regimen can be modified and the patient can be taught the reasons for modification. At this time, the clinical endocrinologist can schedule the appropriate evaluations or referrals for assessment of complications and specific risk factors.

Other goals during Phase I are to assess the patient's knowledge base about diabetes mellitus and to evaluate the ability of the patient to learn new skills and techniques. These assessments can be done by using a combination of objective knowledge tests, psychologic adjustment tests, and interview questions. After these assessments have been completed, the physician and other team members should be able to initiate the appropriate level of education regarding diabetes self-management skills.

During Phase I, the physician should evaluate the patient's commitment to a program of intensive treatment of diabetes and elicit the patient's written agreement to participate in the diabetes self-management system. The physician, patient, and health-care team should develop a set of individualized instructions for the patient's care.

Patient History

The patient's responses to the following areas of questioning should help the physician confirm the diagnosis and duration of diabetes mellitus, establish the success or failure of previous treatment regimens, evaluate the presence of existing complications of diabetes, and determine the patient's risk for the future development of complications (93).

1. What is the patient's chief complaint?
How long has the patient had diabetes?
2. Did onset of diabetes include the following:
 - a. Polydipsia?
 - b. Polyuria?
 - c. Polyphagia?
 - d. Unexplained weight loss or gain?
3. Is there a family history of diabetes or other endocrine disorders?
4. Does the patient have a history of gestational diabetes?
 - a. Hyperglycemia?
 - b. Delivery of an infant weighing >9 lb (4.1 kg)?
 - c. Toxemia?
 - d. Stillbirth?
 - e. Other complications of pregnancy?
5. Has the patient lost or gained weight? What is the patient's current nutritional regimen?
6. What are the patient's exercise history and ability to exercise?
7. What are the patient's current non-diabetes-related medications?

8. What is the patient's alcohol intake?
9. Is there a history of recreational drug use?
10. Has the patient ever been hospitalized or undergone a surgical procedure?
11. If the patient has already been diagnosed as having diabetes mellitus:
 - a. When and how was the diabetes diagnosed?
 - b. Which medications have been used to treat the diabetes, and in which order? Establish the current treatment regimen, including nutrition and exercise programs.
 - c. How have the patient's blood glucose levels been monitored in the past? Has the patient monitored blood glucose at home? How frequently was the patient's glycosylated hemoglobin monitored? Were the results of these tests used to maximize the degree of control of diabetes?
12. Does the patient have symptoms of any of the following types of complications of diabetes?
 - a. Ophthalmologic (including retinopathy)?
 - b. Neuropathy?
 - c. Renal?
 - d. Vascular (cardiovascular, cerebrovascular, peripheral vascular system)?
 - e. Sexual dysfunction (men and women)?
 - f. Ketoacidosis?
 - g. Hypoglycemia?
 - h. Infections (for example, cutaneous, foot, gynecologic)?
13. Does the patient have any identifiable risk factors for complications of diabetes?
 - a. Family history of diabetes or coronary artery disease?
 - b. Hypertension (systolic, diastolic)?
 - c. Smoking history?
 - d. Lipid abnormalities?
 - e. Central obesity?

Physical Examination

Phase I should include a complete physical examination of each patient. Special attention should be directed to those aspects of the examination that focus on specific areas of risk for the patient with diabetes (93), including the following factors:

1. Height and weight measurements
2. Blood pressure determination, including orthostatic evaluation
3. Ophthalmoscopic examination
4. Thyroid palpation
5. Cardiac examination
6. Evaluation of pulses, including carotid pulses or bruit and respiratory variation
7. Foot examination
8. Skin examination
9. Neurologic examination, with particular attention to reflexes, vibratory sensation, touch, and proprioception

Laboratory Evaluation

Laboratory tests should be ordered to establish the diagnosis of diabetes and to determine the current level of glycemic control (93). In addition, Phase I laboratory testing should provide an evaluation of the patient's general medical condition and should identify associated risk factors. The following laboratory tests should be included in the Phase I assessment:

1. Fasting or random plasma glucose*
2. Glycosylated hemoglobin or fructosamine
3. Fasting lipid profile (cholesterol, triglycerides, HDL/LDL calculation)
4. Serum electrolytes*
5. Serum creatinine*
6. Urinalysis
7. Sensitive or ultrasensitive thyroid-stimulating hormone
8. Microalbuminuria and creatinine clearance
9. Electrocardiography, stress test, or both

*Commonly available as part of a serum chemistry profile.

Patient Knowledge Base and Motivation

The results of objective testing regarding the physiologic aspects and treatment of diabetes mellitus will help the clinical endocrinologist or other physician assess the level of diabetes education to be initiated (94). Psychologic tests and a subjective evaluation of the patient's psychologic support systems will help predict patient adherence to a system of intensive therapy. These evaluations will help determine which referrals are most necessary and will help establish priorities for educating the patient about diabetes self-management.

1. The following evaluation forms may be used to assess the patient's understanding of the physiologic aspects of diabetes mellitus:
 - a. Diabetes Assessment and Teaching Record (see Appendix)
 - b. AACE Knowledge Evaluation Forms (see Appendix)
2. The following psychologic tests may be used to evaluate the patient's motivation for participating in a diabetes self-management system:
 - a. Michigan Diabetes Research and Training Center Diabetes Care Profile (Available from MDRTC, University of Michigan Medical Center, G1111 Towsley Center, Ann Arbor, MI 48109-0201)
 - b. Millon Behavioral Health Inventory (Available to licensed professionals from National Computer Systems, PO Box 1294, Minneapolis, MN 55440)
3. The patient's resources and support systems should be evaluated in the following areas, to help assess the patient's motivation for adherence to intensive diabetes treatment:
 - a. Family
 - b. Financial (including medical insurance status)
 - c. Employment

4. The patient may be reassessed and reevaluated at 6 months to determine the level of knowledge retained after training and education

Diabetes Self-Management System

Patient empowerment is vital to a system of intensive diabetes therapy. For a successful system, the patient must understand and learn to manage the diabetes and its treatment (95). Traditional patient education is just one aspect of diabetes intensive self-management. In addition, the patient with diabetes must be taught to assume responsibility for the self-monitoring and problem solving that are critical to the successful implementation of a system of intensive diabetes therapy.

Although this educational process is initiated during Phase I, the information is so vital and the material is so extensive that the educational process should be continued during all phases of treatment.

Because each participating patient will have different educational needs, the members of the health-care team must individualize the program. The results of the initial patient assessment will help health-care team members establish a system of priorities for scheduling each topic to be covered. A series of ongoing patient assessments, undertaken during all subsequent phases of treatment, will help health-care team members revise these priorities as needed to ensure that the individual needs of each patient are being met and to facilitate patient adherence.

Topics to be addressed during the overall course of treatment of the patient with diabetes may be divided into the following categories (93):

1. Pathophysiologic features of diabetes
2. Rationale for the intensive treatment of diabetes mellitus
 - a. Potential complications associated with diabetes
 - b. Relationship between control and complications
3. Self-monitoring of blood glucose
 - a. Use of a blood glucose self-monitor
 - b. Schedule for use (minimum of twice daily)
 - c. Instructions for record keeping
4. Medication
 - a. Description
 - b. Dosing instructions
 - c. Dosage adjustment algorithms
 - d. Suggestions for record keeping
5. Nutrition
 - a. Importance
 - b. Prescribed meal plan
 - c. Dealing with nutrition-related fluctuations in blood glucose levels
 - d. Suggestions for record keeping
6. Exercise
 - a. Importance
 - b. Prescribed exercise plan
 - c. Dealing with activity-related fluctuations in blood glucose levels
 - d. Suggestions for record keeping

7. Recognizing and managing potentially dangerous complications
 - a. Hypoglycemia
 - b. Diabetic ketoacidosis
 - c. Hypoglycemia unawareness
 - d. Infection
 - e. Vascular disease
8. Instructions for special situations
 - a. Sick day rules
 - b. Travel instructions
 - c. Use of glucagon
9. Preventive care
 - a. Foot care
 - b. Skin care
10. Psychologic aspects
 - a. Effect on relationships and family dynamics
 - b. Effect on self-image
 - c. Importance of support
 - d. Denial
11. Instructions for family members

Patient-Physician Contract

For successful implementation of intensive diabetes management, the patient and the clinical endocrinologist or other physician must have mutual, frequently communicated treatment goals. This relationship necessitates regularly scheduled communication and frequent visits between the patient and members of the health-care team. The frequency of these interactions should be based on individual patient needs. Patients must be encouraged to adhere to the specified schedule. To achieve this goal, the physician may need to establish a follow-up system or, in some cases, the intervention of a third-party payer.

For optimal patient adherence to the System of Intensive Diabetes Self-Management, it may be helpful to elicit the patient's written commitment to participate. The document, which should be signed by both the patient and the physician, should specify the responsibilities of both parties and contain the prescribed schedule of follow-up visits and communications (see Appendix). The risks of assuming or declining the responsibility of intensive therapy need to be defined in the contract.

Phase II: Follow-Up Assessments

A goal of each follow-up assessment is to evaluate the patient's physical condition, level of blood glucose control, and degree of adherence to guidelines. Such an assessment should include an interim history, physical examination, laboratory evaluation, and review of the patient's results of self-monitoring of blood glucose. On the basis of the results of this evaluation, the physician and the patient may elect to revise any or all aspects of the patient's treatment plan or the schedule for the assessment of complications (see Phase III).

Because the patient with diabetes has a considerably increased risk of coronary artery and peripheral arterial disease, dyslipidemia, and hypertension, lipid levels and

blood pressure must be rigidly monitored and controlled. The patient with diabetes should be viewed comparably to a nondiabetic patient who has had a coronary event. As has been substantiated, the reduction of high blood pressure in patients with diabetes significantly decreases the risk of nephropathy and retinopathy (55).

Other goals during Phase II are to assess the patient's understanding of diabetes mellitus and the rationale for intensive self-management and to determine the patient's self-management skills. This evaluation necessitates periodic administration of follow-up objective and psychological tests and inquiry about the patient's support systems. Depending on the results of this interim assessment, the physician may reinstitute intensive diabetes education in any deficient areas.

Follow-up assessments should be scheduled at intervals of no longer than 3 months and may be combined with the modules for assessment of complications (see Phase III).

Interim Patient History

The patient's responses to the following areas of questioning should help in the development of a revised treatment plan, assessment of existing diabetes-associated complications, and reevaluation of the patient's risk for future complications.

1. Has the patient experienced any acute health problems?
2. Have any changes occurred in any chronic health problems?
3. Has the patient experienced any symptoms or signs suggestive of hypoglycemia?
4. Does the patient have any new symptoms or signs suggestive of diabetes-related complications?
5. Have any risk factors changed?

Physical Examination

Phase II includes an interim physical examination for each patient. The following elements may be included, depending on patient symptoms and signs and the results of the initial physical examination:

1. Height and weight measurements*
2. Blood pressure determination, including orthostatic evaluation*
3. Ophthalmoscopic examination
4. Thyroid palpation
5. Cardiac examination
6. Evaluation of pulses, including carotid pulses or bruit and respiratory variation
7. Foot examination*
8. Skin examination
9. Neurologic examination

**Should be included with every interim physical examination.*

Every patient should undergo a complete physical examination at least once annually.

Laboratory Evaluation

During each follow-up assessment, the results of the patient's self-monitoring of blood glucose should be reviewed. In addition, laboratory tests should be ordered to confirm the patient's current level of glycemic control. These analyses should include the following:

1. Random plasma glucose
2. Glycosylated hemoglobin or fructosamine
3. Fasting lipid profile

On the basis of the results of the patient's self-monitoring of blood glucose and the laboratory testing, the physician may elect to revise the recommendations regarding nutrition, exercise, medication, self-monitoring, and follow-up communication. In addition, the physician may elect to revise the schedule for implementing any or all of the Phase III modules for assessment of complications.

Patient Knowledge Base and Self-Management Skills

To assess the patient's current level of understanding of the pathophysiologic features of diabetes mellitus and the rationale for self-management and to determine the current level of self-management skills, follow-up objective and psychological tests should be administered. In addition, the patient's support systems should be reevaluated.

1. The following evaluation forms may be used to assess the patient's current understanding of the physiologic aspects of diabetes mellitus:
 - a. Diabetes Assessment and Teaching Record (see Appendix)
 - b. AACE Knowledge Evaluation Forms (see Appendix)
2. The following psychological test may be used to evaluate the patient's motivation for participating in a diabetes self-management system:
 - a. Michigan Diabetes Research and Training Center Diabetes Care Profile (Available from MDRTC, University of Michigan Medical Center, G1111 Towsley Center, Ann Arbor, MI 48109-0201)
 - b. Millon Behavioral Health Inventory (Available to licensed professionals from National Computer Systems, PO Box 1294, Minneapolis, MN 55440)
3. The patient's resources and support systems should be reevaluated in the following areas:
 - a. Family
 - b. Financial (including medical insurance status)
 - c. Employment

Depending on the results of the interim assessment, the physician may reinstitute intensive education in the deficient areas or refer the patient to one or more members of the health-care team.

Phase III: Assessment of Complications

The goal of Phase III is to assess the presence and severity of the complications associated with diabetes mellitus. Each of the following four complications modules (93,96) should be performed in conjunction with a quarterly Phase II follow-up assessment:

1. Retinal
2. Cardiac-cerebrovascular-peripheral vascular
3. Renal
4. Neuropathy

Retinal Module

When performed in conjunction with the retinal module (96), the Phase II interim history and physical examination should include any questions relevant to the assessment of retinal complications. Additional diagnostic evaluations should include the following:

1. Test of visual acuity (Snellen chart)
2. Funduscopy examination
3. Intraocular pressure test

In addition to educating the patient about the retinal complications that may be associated with diabetes, the physician should determine—on the basis of the patient's history and findings on the current examination—the frequency of follow-up and the need for referral to an ophthalmologist or retinal specialist.

Cardiac-Cerebrovascular-Peripheral Vascular Module

Vascular risk factors should be assessed annually in adult patients with diabetes. When performed in conjunction with the cardiac-cerebrovascular-peripheral vascular module (93), the Phase II interim history and physical examination should include any questions relevant to the assessment of cardiac-cerebrovascular-peripheral vascular complications. Additional diagnostic evaluations should include the following:

1. Electrocardiography and rhythm strip, stress test, or both (based on the patient's age and symptoms)
2. Lipid profile (cholesterol, triglycerides, HDL/LDL calculation)
3. Evaluation of peripheral pulses by physical or objective testing (or both)

In addition to educating the patient about the vascular complications that may be associated with diabetes, the physician should determine—on the basis of the patient's history and findings on the current examination—the frequency of follow-up, the need for more intensive cardiac testing, and the need for referral to a cardiologist, neurologist, interventional radiologist, or vascular surgeon.

Renal Module

When performed in conjunction with the renal module (93), the Phase II interim history and physical exami-

nation should include any questions relevant to the assessment of renal complications. Additional diagnostic evaluations should include the following:

1. Test for microalbuminuria
2. Creatinine clearance
3. Automated serum chemistry analysis

In addition to educating the patient about the renal complications that may be associated with diabetes, the physician should determine—on the basis of the patient's history and findings on the current examination—the frequency of follow-up and the need for referral to a nephrologist.

Neuropathy Module

When performed in conjunction with the neuropathy module (93), the Phase II interim history and physical examination should include any questions relevant to the assessment of neuropathy. Additional diagnostic evaluations should include the following:

1. A review of symptoms relevant to peripheral nerve and autonomic dysfunction
2. Module-specific testing (vibratory sensation, soft-touch, pinprick, evaluation of autonomic dysfunction—for example, R-R interval variation with paced breathing)

In addition to educating the patient about neuropathy, the physician should determine—on the basis of the patient's history and findings on the current examination—the frequency of follow-up and the need for referral to a neurologist.

CONCLUSION

AACE has provided the recent scientific evidence that continues to support its Medical Guidelines for the Management of Diabetes Mellitus: A System of Intensive Diabetes Self-Management. A thriving patient-physician relationship and a partnership effort among the patient, the physician, and the diabetes management team remain critical to the success of intensive diabetes self-management. These coordinated efforts should result in normalization or near-normalization of the patient's glycosylated hemoglobin value and blood glucose level. The outcome will be an enhancement in the patient's quality of life, a decrease in morbidity, and a reduction in mortality.

The patient must be committed to learning diabetes self-management, and the physician and the diabetes self-management team must be dedicated to teaching the patient the appropriate techniques and the rationale for them. AACE hopes that the use of these guidelines by physicians and patients will lead to improved care for patients with diabetes, an augmented quality of life for such patients, and decreased overall costs of diabetes care for the individual patients and society.

Appendix

Diabetes Assessment and Teaching Record

I. Name _____ Initial Visit Date _____

Date Dx Diabetes _____ Occupation _____

Support System _____ Physician _____

Outside Referral _____ Letter Sent _____

Age _____ Ht _____ Wt _____ IBW _____ Sex _____ Race _____

Type 1 _____ Type 2 _____ Gestational _____ AIM _____ Update _____

II. Current Medications

Oral Agent Therapy: _____

<i>Drug</i>	<i>Dose</i>	<i>Time(s)</i>
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Insulin Therapy: _____ Diet Therapy Only _____

A.M. *P.M.* *Supper* *HS*

Allergies _____ Health Status _____

Date	BP	Wt	HbA _{1c}	Chol	HDL	Trig
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Current Problems: _____

III. Educational Objectives/Plan

Date	Objectives Met
1.	
2.	
3.	

IVa. Nutrition History

Time:

Breakfast:

Snack:

Lunch:

Snack:

Dinner:

Snack:

Food preferences/intolerances:

IVb. Meal Plan

Prescribed Total Daily Caloric Intake: _____

	Milk	Veg	Fruit	Starch	Lean Meat	Fat
Breakfast:						
Midmorning Snack:						
Lunch:						
Afternoon Snack:						
Dinner:						
Bedtime Snack:						

V. Previous Diabetes Education

	<i>Date</i>		<i>Place</i>	
Will anyone else attend the education sessions?	Yes	No	Name	
Frequency of:				
DKA	Low BS	High BS	Diabetic	Hospitalizations
Complications:				
Retinopathy	I BP	Nephropathy	Neuropathy	PVD Other
Smoke	Amount		Drink Alcohol	Amount Type
Exercise:				
Type	Times/Week	How Long		

VI. Teaching Record	Written Instr	Verbal Instr	Vrb/iz Undist	Demos Acort Tchng	Follow-up	Comments	Print Materials
<p>A. Basic Pathophysiology Understands the basic pathophysiology of diabetes</p>							
<p>B. Psychologic Adjustment Has psychologically adjusted to diabetes and lifestyle modifications and understands effects of stress on management</p>							
<p>C. Family Involvement Family and/or significant other(s) are sufficiently involved in diabetes management S M W D</p>							
<p>D. Exercise Describes, understands, and incorporates effective exercise habits into diabetes management</p>							
<p>E. Medications Demonstrates and/or verbalizes correct use of 1. P.O. Type Dosage Frequency Action 2. Insulin Type/Dose Action Injection Techniques Mixing Storage Site Selection</p>							
<p>F. Relationship Among Nutrition/Exercise/Medication Understands interrelation of nutrition, exercise, medication, and lab values and incorporates this into diabetes management</p>							
<p>G. Monitoring 1. Demonstrates accurate blood or urine glucose monitoring 2. Frequency 3. Type 4. Urine ketone testing</p>							
<p>H. Hypoglycemia Understands, describes, and appropriately reacts to and treats the signs and symptoms of hypoglycemia</p>							
<p>I. Illness/Hyperglycemia Understands, describes, and appropriately responds to the signs and symptoms of illness and/or hyperglycemia; ketone</p>							

VI. Teaching Record (continued)	Written Instr	Verbal Instr	Vrbiz Undst	Demos Acct Tchng	Follow-up	Comments	Print Materials
<p>J. Complications (Prevent, Treat, Rehabilitate) Understands the complications of diabetes and practices health-care measures to manage and assist in rehabilitation of those complications:</p> <ul style="list-style-type: none"> Neuropathy Nephropathy Retinopathy Impotence BP Control 							
<p>K. Care Benefits/Responsibilities Understands the benefits and responsibilities of appropriate diabetes management</p>							
<p>L. Hygiene Understands the importance of and practices routine hygiene to prevent possible diabetes complications</p> <ul style="list-style-type: none"> Foot care Eye care Dental Care General 							
<p>M. Use of Health-Care Systems Is aware of and appropriately uses health-care systems (financial resources, health insurance) and knows how to reach health-care team and emergency care</p>							
<p>N. Community Resources Is aware of and appropriately uses available community resources (ADA, MedicAlert®, support groups)</p>							
VIIa. Dietary Education							
<p>A. States that food is important for good nutrition and the control of glucose and lipid levels</p>							
<p>B. States the necessity of eating meals and snacks at consistent times and in appropriate amounts</p>							
<p>C. Lists the types and amounts of food to be included in meals and snacks as indicated on the meal plan</p>							
<p>D. States that meal planning is a critical component in diabetes management</p>							
<p>E. States the importance of maintaining normal body weight</p>							

VIIb. Follow-up/Continuing Education	Written Instr	Verbal Instr	Vrbiz Undst	Demos Acct Tchng	Follow-up	Comments	Print Materials
A. Demonstrates how to plan appropriate meals from the meal plan							
B. States the caloric level of the meal plan and the percentages of carbohydrate, protein, and fat							
C. Lists food sources of dietary fiber and describes how to incorporate foods with fiber into the meal plan							
D. Demonstrates how to select foods in appropriate portion sizes							
E. Demonstrates how to select appropriate foods when dining out							
F. States the need to be consistent in daily caloric intake							
G. States the benefits of making permanent lifestyle changes in nutrition and activity levels							
Other:							

VIII. Evaluation Summary/Follow-up

Pretest Score: _____ Date: _____

Posttest Score: _____ Date: _____

Signatures

_____ RN, CDE

_____ RD/LD

AACE Knowledge Evaluation Forms

The AACE Knowledge Evaluation Forms are to be used to assess the patient's knowledge of diabetes before and after exposure to the system of intensive diabetes management in order to detect weaknesses in the patient's understanding and provide appropriate useful information. The educational process need not begin with basic elements in an already knowledgeable patient. The goals are to provide the information needed for self-management of diabetes and to encourage adherence.

Sample forms without the answers starred are available from the AACE office on request and may be photocopied.

Type 2 Diabetes: Patient Evaluation

What Is Diabetes?

1. In type 2 diabetes, the body
 - a. cannot use insulin well*
 - b. makes no insulin at all
 - c. rejects insulin
 - d. destroys insulin
2. Patients with type 2 diabetes
 - a. never need insulin injections
 - b. need insulin injections daily
 - c. may need insulin injections*
3. Insulin is made in the
 - a. liver
 - b. stomach
 - c. kidneys
 - d. pancreas*
4. Insulin helps the body
 - a. turn sugar into energy*
 - b. get rid of sugar
 - c. store sugar in the blood
 - d. make red blood cells
5. "Blood glucose" refers to the level of sugar (glucose) in the blood.
 - a. true*
 - b. false
6. The target range for blood glucose before meals is
 - a. 50 to 70 mg/dL
 - b. 70 to 120 mg/dL*
 - c. 125 to 160 mg/dL
 - d. 160 to 200 mg/dL
7. "Hyperglycemia" means
 - a. high blood glucose*
 - b. low blood glucose
 - c. high blood pressure
 - d. low blood pressure
8. "Hypoglycemia" means
 - a. high blood pressure
 - b. low blood pressure
 - c. high blood glucose
 - d. low blood glucose*
9. Which of the following is a symptom of hypoglycemia?
 - a. weakness
 - b. sweating
 - c. shakiness
 - d. all of the above*
10. The aim of intensive diabetes treatment is
 - a. to keep blood glucose as close to normal as possible
 - b. to avoid long-term complications
 - c. both of the above*
11. Complications of diabetes include
 - a. kidney disease
 - b. eye problems
 - c. foot problems
 - d. all of the above*
12. Which of the following can affect blood glucose control?
 - a. stress
 - b. eating habits
 - c. exercise
 - d. all of the above*
13. Patients with diabetes have no control over the development of complications.
 - a. true
 - b. false*
14. "Tight" control of diabetes means
 - a. keeping blood glucose as close to normal as possible
 - b. frequent self-monitoring
 - c. reduced complications
 - d. all of the above*
15. Treatment of type 2 diabetes is usually initiated with
 - a. insulin
 - b. diet and exercise programs*
 - c. diabetes pills
16. The most important person on your health-care team is
 - a. you*
 - b. the doctor
 - c. the diabetes educator
 - d. the dietitian

Nutrition

1. In overweight patients with diabetes, losing weight may
 - a. help the body use insulin better
 - b. lower blood glucose
 - c. decrease the risk of heart disease
 - d. do all of the above*
2. Meals should generally be eaten
 - a. 1 to 2 hours apart
 - b. 4 to 5 hours apart*
 - c. every 6 hours
 - d. whenever you want
3. Carbohydrates should make up what percent of your daily calories?
 - a. 5 to 10%
 - b. 15%
 - c. 25%
 - d. 55 to 60%*
4. A good source of complex carbohydrates is
 - a. eggs
 - b. mayonnaise
 - c. whole-grain bread*
 - d. roast beef
5. Fat should constitute what percent of your daily calories?
 - a. less than 30%*
 - b. 45%
 - c. 55 to 60%
 - d. 75%
6. Which of the following foods is high in fat?
 - a. apples
 - b. lettuce
 - c. cheddar cheese*
 - d. oatmeal
7. The fatty substance in food linked to heart disease is
 - a. carbohydrates
 - b. protein
 - c. cholesterol*
 - d. fiber
8. To decrease dietary fat and cholesterol, which food is the best choice?
 - a. steak
 - b. fried eggs
 - c. broiled chicken without skin*
 - d. ham and cheese sandwich
9. How much cholesterol should you have a day?
 - a. 1,200 mg
 - b. 750 mg
 - c. 500 mg
 - d. no more than 300 mg*
10. Which of the following foods contain cholesterol?
 - a. eggs
 - b. Swiss cheese
 - c. red meat
 - d. all of the above*
11. How much of your diet should be protein?
 - a. less than 10%
 - b. 15 to 20%*
 - c. 50%
 - d. 75%
12. Which of the following foods provides low-fat protein?
 - a. broiled flounder*
 - b. Swiss cheese
 - c. carrots
 - d. saltines
13. The maximum daily amount of salt (sodium) in your diet should be
 - a. less than 3 g*
 - b. 5 g
 - c. 10 g
 - d. 12 g
14. One serving of alcohol equals
 - a. 12 ounces of beer
 - b. 2 ounces of wine
 - c. 1.5 ounces of scotch
 - d. all of the above*
15. If alcohol is allowed, you should drink it
 - a. on an empty stomach
 - b. along with food*
16. If alcohol is allowed, which is *not* a good choice?
 - a. dry white wine
 - b. sweet liqueur*
 - c. scotch and water
 - d. beer
17. A "free food"
 - a. has no sugar
 - b. has fewer than 20 calories*
 - c. has no salt
 - d. can be eaten in unlimited quantities
18. Patients with diabetes should never eat in restaurants.
 - a. true
 - b. false*
19. Which of the following may help lower blood glucose?
 - a. fat
 - b. protein
 - c. soluble fiber*
 - d. all of the above

20. Which food provides soluble fiber?
 - a. lentils
 - b. oats
 - c. fruits
 - d. all of the above*
21. Which of the following should *not* be used by patients with diabetes?
 - a. aspartame
 - b. honey*
 - c. saccharin
 - d. fructose
22. People with diabetes need more vitamins and minerals than do people without diabetes.
 - a. true
 - b. false*
23. The number of calories eaten should be
 - a. greatest at breakfast
 - b. greatest at lunch
 - c. greatest at dinner
 - d. evenly distributed among meals*
24. All patients with diabetes follow the same meal plan.
 - a. true
 - b. false*
25. "Exchange" refers to foods that
 - a. can be substituted for each other*
 - b. must be returned because they contain sugar
 - c. can be shared with friends
 - d. must be avoided
4. In general, fit patients with diabetes should exercise for
 - a. 15 minutes once a week
 - b. 1 hour once a week
 - c. 20 to 30 minutes 3 times a week*
 - d. 1 hour every day
5. Patients who need insulin should inject it into the thigh muscle before running.
 - a. true
 - b. false*
6. If blood glucose is less than 80 mg/dL during exercise, you should
 - a. lie down
 - b. eat a snack*
 - c. call your doctor immediately
 - d. ignore it and keep exercising
7. If blood glucose is more than 300 mg/dL, insulin should be adjusted or exercise should be delayed.
 - a. true*
 - b. false
8. For avoidance of hypoglycemia, the best time to exercise is
 - a. any time you are hungry
 - b. just before dinner
 - c. after meals*
 - d. just before breakfast

Exercise

1. Regular exercise
 - a. improves lipid levels
 - b. strengthens the heart
 - c. gives a sense of well-being
 - d. does all of the above*
2. Regular exercise may
 - a. lower blood glucose
 - b. reduce the amount of insulin needed
 - c. reduce the amount of diabetes pills needed
 - d. do all of the above*
3. Which exercise is best for patients with "insensitive" feet?
 - a. swimming*
 - b. jogging
 - c. running
 - d. tap dancing

Monitoring

1. Low blood glucose can be detected accurately by testing
 - a. urine
 - b. blood*
 - c. saliva
 - d. all of the above
2. Self-monitoring of blood glucose is
 - a. essential for intensive therapy
 - b. the key to determining the right amount of medication
 - c. useful even if diabetes is controlled with diet and exercise
 - d. all of the above*
3. With intensive therapy, self-monitoring of blood glucose should be done
 - a. only before breakfast
 - b. only before lunch
 - c. only before dinner
 - d. several times a day*

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4. Monitoring should be done more often
 - a. on sick days
 - b. when traveling
 - c. when meal or exercise plans change
 - d. at all of the above times*
5. Patients with diabetes should undergo assessment by their clinical endocrinologist or another physician
 - a. every 3 months*
 - b. every year
 - c. every 2 years
 - d. only after complications develop
6. A glycosylated hemoglobin test measures blood glucose over the past
 - a. hour
 - b. day
 - c. week
 - d. 8 to 12 weeks*
7. In people without diabetes, the normal glycosylated hemoglobin value is about
 - a. 8 to 10%
 - b. 3.8 to 6.0%*
 - c. 2.5 to 3.5%
 - d. 10.1 to 11.8%
8. During illness, blood glucose should be monitored every
 - a. 1/2 hour
 - b. 3 to 4 hours*
 - c. 6 hours
 - d. 12 hours
9. To treat mild hypoglycemia, you could
 - a. take 3 glucose tablets
 - b. eat a few pieces of candy (*not* sugar-free)
 - c. eat 2 tablespoons of raisins
 - d. do any of the above*
10. Nighttime hypoglycemia should be treated with
 - a. carbohydrate
 - b. protein
 - c. fat
 - d. first carbohydrate, then carbohydrate plus protein*
3. Sources of insulin used for injections are
 - a. pigs
 - b. cows
 - c. synthesis by recombinant DNA
 - d. all of the above*
4. The insulin you are using should be stored in
 - a. the refrigerator
 - b. the freezer
 - c. the medicine cabinet
 - d. a cool, dry place*
5. The preferred site for an insulin injection is
 - a. the abdomen*
 - b. the hips
 - c. the buttocks
 - d. all of the above
6. Insulin should always be injected in the same site.
 - a. true
 - b. false*
7. When you travel, your medications and supplies should be
 - a. checked in your luggage
 - b. carried with you*
 - c. left at home
8. During illness, you should stop taking your medications.
 - a. true
 - b. false*

Type 1 Diabetes: Patient Evaluation

What Is Diabetes?

1. In type 1 diabetes mellitus, the body does not make enough
 - a. saliva
 - b. insulin*
 - c. glucose
 - d. cholesterol
2. Patients with type 1 diabetes
 - a. never need insulin injections
 - b. need insulin injections daily*
 - c. may occasionally need insulin injections
3. Insulin is made in the
 - a. liver
 - b. stomach
 - c. kidneys
 - d. pancreas*
4. Insulin helps the body
 - a. turn sugar into energy*
 - b. get rid of sugar
 - c. store sugar in the blood
 - d. make red blood cells

Medications

1. Diabetes pills
 - a. lower blood glucose
 - b. increase the release of insulin
 - c. fight insulin resistance
 - d. do all of the above*
2. For diabetes pills to work, the body must be able to make some insulin.
 - a. true*
 - b. false

5. "Blood glucose" refers to the level of sugar (glucose) in the blood.
 - a. true*
 - b. false
6. The target range for blood glucose before meals is
 - a. 50 to 70 mg/dL
 - b. 70 to 120 mg/dL*
 - c. 125 to 160 mg/dL
 - d. 160 to 200 mg/dL
7. "Hyperglycemia" means
 - a. high blood glucose*
 - b. low blood glucose
 - c. high blood pressure
 - d. low blood pressure
8. "Hypoglycemia" means
 - a. high blood pressure
 - b. low blood pressure
 - c. high blood glucose
 - d. low blood glucose*
9. Which of the following is a symptom of hypoglycemia?
 - a. weakness
 - b. sweating
 - c. shakiness
 - d. all of the above*
10. The aim of intensive diabetes treatment is
 - a. to keep blood glucose as close to normal as possible
 - b. to avoid long-term complications
 - c. both of the above*
11. Complications of diabetes include
 - a. kidney disease
 - b. eye problems
 - c. foot problems
 - d. all of the above*
12. Which of the following can affect blood glucose control?
 - a. stress
 - b. eating habits
 - c. exercise
 - d. all of the above*
13. Patients with diabetes have no control over the development of complications.
 - a. true
 - b. false*
14. "Tight" control of diabetes means
 - a. keeping blood glucose as close to normal as possible
 - b. frequent self-monitoring
 - c. reduced complications
 - d. all of the above*

15. The most important person on your health-care team is
 - a. you*
 - b. the doctor
 - c. the diabetes educator
 - d. the dietitian

Nutrition

1. Carbohydrates should make up what percent of your daily calories?
 - a. 5 to 10%
 - b. 15%
 - c. 25%
 - d. 55 to 60%*
2. A good source of complex carbohydrates is
 - a. eggs
 - b. mayonnaise
 - c. whole-grain bread*
 - d. roast beef
3. Fat should constitute what percent of your daily calories?
 - a. less than 30%*
 - b. 45%
 - c. 55 to 60%
 - d. 75%
4. Which of the following foods is high in fat?
 - a. apples
 - b. lettuce
 - c. cheddar cheese*
 - d. oatmeal
5. The fatty substance in food linked to heart disease is
 - a. carbohydrates
 - b. protein
 - c. cholesterol*
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6. Which of the following foods contain cholesterol?
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7. To decrease dietary fat and cholesterol, which food is the best choice?
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 - c. 10 g
 - d. 12 g
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 - c. 1.5 ounces of scotch
 - d. all of the above*
12. If alcohol is allowed, you should drink it
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 - b. along with food*
13. If alcohol is allowed, which is *not* a good choice?
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2. Which exercise is best for patients with “insensitive” feet?
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 - c. running
 - d. tap dancing
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 - a. 15 minutes once a week
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5. If blood glucose is less than 80 mg/dL during exercise, you should
 - a. lie down
 - b. eat a snack*
 - c. call your doctor immediately
 - d. ignore it and keep exercising
6. If blood glucose is more than 300 mg/dL, insulin should be adjusted or exercise should be delayed.
 - a. true*
 - b. false
7. For avoidance of hypoglycemia, the best time to exercise is
 - a. any time you are hungry
 - b. just before dinner
 - c. after meals*
 - d. just before breakfast

Monitoring

Exercise

1. Regular exercise
 - a. improves lipid levels
 - b. strengthens the heart
 - c. gives a sense of well-being
 - d. does all of the above*
1. Low blood glucose can be detected accurately by testing
 - a. urine
 - b. blood*
 - c. saliva
 - d. all of the above
2. Self-monitoring of blood glucose is
 - a. essential for intensive therapy
 - b. the key to determining the right amount of medication
 - c. important to see the effect of food intake
 - d. all of the above*
3. With intensive therapy, self-monitoring of blood glucose should be done
 - a. only before breakfast
 - b. only before lunch
 - c. only before dinner
 - d. several times a day*

4. Monitoring should be done more often
 - a. on sick days
 - b. when traveling
 - c. when meal or exercise plans change
 - d. at all of the above times*
 5. If your blood glucose is more than 240 mg/dL and your urine contains large ketones, you should
 - a. take a nap
 - b. take extra insulin, then call your doctor*
 - c. eat a large meal
 - d. exercise
 6. Ketoacidosis may be caused by
 - a. very high blood glucose
 - b. very little insulin*
 - c. too much insulin
 - d. too much food
 7. Patients with diabetes should undergo assessment by their clinical endocrinologist or another physician
 - a. every 2 years
 - b. every 5 years
 - c. every 3 months*
 - d. only after complications develop
 8. A glycosylated hemoglobin test measures blood glucose over the past
 - a. hour
 - b. day
 - c. week
 - d. 8 to 12 weeks*
 9. In people without diabetes, the normal glycosylated hemoglobin value is about
 - a. 8 to 10%
 - b. 3.8 to 6.0%*
 - c. 2.5 to 3.5%
 - d. 10.1 to 11.8%
 10. During illness, blood glucose should be monitored every
 - a. 1/2 hour
 - b. 3 to 4 hours*
 - c. 6 hours
 - d. 12 hours
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 - a. take 3 glucose tablets
 - b. eat a few pieces of candy (*not* sugar-free)
 - c. eat 2 tablespoons of raisins
 - d. do any of the above*
 12. Nighttime hypoglycemia should be treated with
 - a. carbohydrate
 - b. protein
 - c. fat
 - d. first carbohydrate, then carbohydrate plus protein*
- Medications**
1. Sources of insulin used for injections are
 - a. pigs
 - b. cows
 - c. synthesis by recombinant DNA
 - d. all of the above*
 2. The insulin you are using should be stored in
 - a. the refrigerator
 - b. the freezer
 - c. the medicine cabinet
 - d. a cool, dry place*
 3. The best site for an insulin injection is
 - a. the abdomen*
 - b. the hips
 - c. the buttocks
 - d. all of the above
 4. Insulin should always be injected in the same site.
 - a. true
 - b. false*
 5. When you travel, your medications and supplies should be
 - a. checked in your luggage
 - b. carried with you*
 - c. left at home
 6. During illness, you should stop taking your medications.
 - a. true
 - b. false*

Sample Patient-Physician Contract

I understand that if I agree to participate in the System of Intensive Diabetes Self-Management, I will be expected to do the following:

1. Dedicate myself to getting my blood glucose level as close to normal as possible by following the instructions of the diabetes self-management team
2. Regularly visit the clinic for a physical examination, laboratory tests, and nutrition counseling; follow-up visits will be scheduled every 3 months or more frequently if deemed necessary by my physician or other members of my health-care team
3. Bring a detailed 1-day food record to each follow-up visit, provide necessary nutrition information for me and my dietitian, and adjust my eating habits to meet the nutrition goals established by my dietitian
4. Use medications as prescribed by my health-care team
5. Monitor my blood glucose levels at home as instructed and bring the results to each follow-up visit
6. Follow my prescribed exercise plan
7. Obtain identification as a patient with diabetes, for prompt assistance in case of an emergency
8. Ask my physician and other members of my health-care team to explain any aspect of my care that I do not entirely understand

I understand that if I do not monitor myself carefully, there is a risk of hypoglycemia.

I also understand that if I do not strive to normalize my blood glucose, I am at increased risk of developing the complications of diabetes mellitus.

My signature indicates that I have read and understand the above agreement.

Patient

Date

I agree to provide the leadership for the diabetes self-management team. Team members will be available to answer your questions and help you self-manage your diabetes. I will continue to encourage you to maintain the best possible control of your diabetes.

Physician

Date

Phase I: Initial Assessment

Schedule:

Multiple visits over 3-4 weeks

Goals	Diagnostic tools	Action steps
Assess patient's disease status and risk factors	<p><i>Complex history</i></p> <ul style="list-style-type: none"> •Medical (including chief complaint, duration of known disease) •Family, personal •Gestational •Weight, nutrition •Exercise •Treatment •Symptoms of complications •Risk factors 	<p><i>Develop recommendations for</i></p> <ul style="list-style-type: none"> •Nutrition •Exercise •Medication •Blood glucose self-monitoring •Record keeping <p>Schedule appropriate modular evaluation and referrals for complications or risk factor modification</p>
	<p><i>Complex physical examination to be done by clinical endocrinologist or other physician</i></p> <ul style="list-style-type: none"> •Height, weight •Blood pressure (including orthostatic) •Ophthalmoscopy •Thyroid palpation •Cardiac assessment •Pulses •Feet •Skin •Neurologic system 	
	<p><i>Complex laboratory tests to be done and evaluated by clinical endocrinologist or other physician</i></p> <ul style="list-style-type: none"> •Fasting or random plasma glucose •Glycosylated hemoglobin •Fasting lipid profile •Serum electrolytes •Serum creatinine •Urinalysis •Thyrotropin •Microalbuminuria •Creatinine clearance •Electrocardiography, stress test 	

Phase I: Initial Assessment (continued)

Goals	Diagnostic tools	Action steps
Assess patient's knowledge base and motivation to learn Initiate appropriate level of diabetes education	<p><i>Objective tests</i></p> <ul style="list-style-type: none"> •Diabetes Assessment and Teaching Record •AACE Knowledge Evaluation Forms <p><i>Psychologic tests</i></p> <ul style="list-style-type: none"> •Michigan Diabetes Research and Training Center Diabetes Care Profile •Millon Behavioral Health Inventory <p><i>Support systems evaluation</i></p> <ul style="list-style-type: none"> •Family •Financial •Employment 	<p>Initiate discussion of diabetes self-management topics</p> <p><i>Refer to</i></p> <ul style="list-style-type: none"> •Diabetes educator (1-2 hours ASAP) •Dietitian (1-2 hours ASAP) •Exercise physiologist, if necessary •Psychologist, if necessary
Obtain patient agreement to intensive diabetes treatment and initiate diabetes self-management	Patient-physician contract	<p><i>Explain</i></p> <ul style="list-style-type: none"> •Pathophysiologic features of diabetes •Rationale for intensive treatment •Patient role in diabetes self-management <p><i>Provide instructions regarding</i></p> <ul style="list-style-type: none"> •Blood glucose self-monitoring •Medication (including dosage-adjustment algorithms) •Nutrition •Exercise •Complications •Special situations •Preventive care •Psychologic aspects <p>Review schedule of follow-up communications (telephone, office visits) among patient, clinical endocrinologist, and health-care team</p>

Schedule:

3-month intervals

(in combination with complications modules)

Phase II: Follow-Up Assessments

Goals	Diagnostic tools	Action steps
Evaluate blood glucose control and disease complications	<p><i>Interim history</i></p> <ul style="list-style-type: none"> •Acute problems •Chronic problems •Hypoglycemia •New symptoms suggestive of complications •Change in risk factors <p><i>Laboratory tests</i></p> <ul style="list-style-type: none"> •Random plasma glucose •Glycosylated hemoglobin •Lipids, if necessary <p>Results of blood glucose self-monitoring</p> <p><i>Physical examination</i></p> <ul style="list-style-type: none"> •Height, weight •Blood pressure (including orthostatic) •Ophthalmoscopy •Thyroid palpation •Cardiac assessment •Pulses •Feet •Skin •Neurologic system 	<p><i>Revise recommendations for</i></p> <ul style="list-style-type: none"> •Nutrition •Exercise •Medication (including dosage-adjustment algorithms) •Blood glucose self-monitoring •Follow-up communications between patient and health-care team <p>Make any necessary adjustments to scheduling of complications modules (see Phase III)</p>
6-month visit		
Evaluate patient's understanding of diabetes mellitus and rationale for self-management	<p>Objective tests</p> <p>Psychologic tests</p> <p>Support systems reevaluation</p>	<p>Initiate intensive education in areas of deficiency, if necessary</p> <p><i>Refer (as needed) to</i></p> <ul style="list-style-type: none"> •Diabetes educator •Dietitian •Exercise physiologist •Psychologist

Schedule:

Each module to be performed annually

Initiate at 9-month visit

Phase III: Assessment of Complications

Goals	Diagnostic tools	Action steps
Retinal module	<p>Module-specific follow-up assessment, including ophthalmoscopy</p> <p>Test of visual acuity (Snellen chart)</p> <p>Funduscopy examination and photographs (if indicated)</p> <p>Intraocular pressure test</p>	<p>Educate patient about retinal complications</p> <p>Determine frequency of follow-up—on the basis of presence or absence of complications</p> <p>Refer to ophthalmologist—on the basis of age, duration of disease, and findings on current examination</p>
Cardiac-cerebrovascular-peripheral vascular module	<p>Module-specific follow-up assessment, including pulses, orthostatic hypotension, and cardiac risk factors</p> <p>Electrocardiography and rhythm strip (R-R variation)—on the basis of age and symptoms</p> <p>Lipid profile (cholesterol, triglycerides, high-density and low-density lipoproteins)</p>	<p>Educate patient about vascular complications</p> <p>Determine frequency of follow-up—on the basis of presence or absence of complications and cardiac risk factors</p> <p>Consider more intensive cardiac testing (such as stress test) or referral to cardiologist—on the basis of findings on current examination</p>
Renal module	<p>Module-specific follow-up assessment</p> <p><i>Laboratory tests</i></p> <ul style="list-style-type: none"> •24-hour microalbuminuria •Creatinine clearance •Serum chemistry analysis 	<p>Educate patient about renal complications</p> <p>Determine frequency of follow-up—on the basis of presence or absence of complications</p> <p>Refer to dietitian for instructions on modifications of protein intake, if needed</p>
Neuropathy module	<p>Module-specific follow-up assessment, including thorough foot examination</p> <p>Review of symptoms relevant to peripheral nerve and autonomic dysfunction</p> <p><i>Module-specific testing</i></p> <ul style="list-style-type: none"> •Vibratory sensation •Soft-touch •Pinprick 	<p>Educate patient about neuropathologic complications</p> <p>Determine frequency of follow-up—on the basis of presence or absence of complications</p> <p>Refer to neurologist, if needed</p>