This program was partially funded by a cooperative agreement between the Centers for Disease Control and Prevention, Division of Diabetes Translation, and the Massachusetts Department of Public Health, Diabetes Prevention and Control Program.

Diabetes Prevention and Control Program
Bureau of Family and Community Health
Massachusetts Department of Public Health
250 Washington Street, 4th Floor
Boston, MA 02108-4619
June 2007

Dear Colleague:

The Diabetes Prevention and Control Program of the Massachusetts Department of Public Health and members of the Diabetes Guidelines Work Group are pleased to provide you with the latest update to the Massachusetts Guidelines for Adult Diabetes Care, based on the American Diabetes Association’s 2007 Clinical Practice Recommendations. First created in 1999, the Guidelines are revised every two years. Our initial goals were to: 1) develop uniform guidelines that apply to adults with diabetes regardless of insurer, 2) help eliminate any confusion brought about by differences in guidelines disseminated by individual third party payers, and 3) assist health care professionals in systematizing the care provided to people with diabetes. Many organizations working together created and updated this document that we hope is user-friendly and will serve as a valuable tool to improve diabetes care in the Commonwealth.

Revisions

The 2007 revisions to the Guidelines include:

- Updated Prevention or Delay of Type 2 Diabetes section with recommendations for treatment of individuals with IFG, IGT, or both
- Updated all medication tables
- Addition of two new algorithms: Metabolic Management of Type 2 Diabetes and Insulin Initiation Considerations
- Addition of the Cockcroft-Gault Equation for calculation of GFR
- Addition of a new Neuropathy section
- Updated Medical Nutrition Therapy and Diabetes Self-Management Education sections
- Updated and renamed Tobacco Use and Diabetes section
- Addition of a new Physical Activity section
- Addition of a new Inpatient Glucose Control section
- Addition of two new Appendices: Components of the Comprehensive Diabetes Evaluation and Disaster Preparations for People with Diabetes.

Partners

The Guidelines are a collaborative effort among many partners:

Baystate Health System
Blue Cross Blue Shield of Massachusetts
Boston Medical Center HealthNet Plan
Fallon Community Health Plan
Harvard Pilgrim Health Plan
Joslin Diabetes Center
Massachusetts College of Pharmacy and Health Sciences
Massachusetts Department of Public Health (MDPH)
Massachusetts League of Community Health Centers
Massachusetts Medical Society
MassPRO
Neighborhood Health Plan
Network Health
Partners/MPGH
Primary Care Clinician (PCC) Plan
Tufts Health Plan
University of Massachusetts, Amherst

Additional Information

- The Guidelines are available online at www.mass.gov. Search for “Department of Public Health” and then search for “Diabetes Guidelines”.
- You may also order additional copies of the Guidelines, patient care cards, and the laminated Guidelines summary free of charge from the Massachusetts Health Promotion Clearinghouse at www.maclearinghouse.com or via the enclosed order form.
- If you have questions about the Guidelines, please call the Massachusetts Diabetes Prevention and Control Program at (617) 624-5070.

Massachusetts Department of Public Health • 4th Floor • 250 Washington Street • Boston, MA 02108-4619
(continued on reverse)
Please join us in our efforts to reduce the burden of diabetes in Massachusetts by reviewing the enclosed Guidelines, and applying these key recommendations to your practice.

Sincerely,

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Massachusetts Department of Public Health

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INTRODUCTION

Both national studies and state data indicate that people with diabetes do not receive recommended levels of preventive care, leaving wide gaps between current recommendations and actual practice. *The Massachusetts Guidelines for Adult Diabetes Care* were developed as a way to improve diabetes care in the Commonwealth. The guidelines highlight and summarize essential components of quality diabetes management, and offer accompanying tools for use in the primary care setting. These guidelines are not intended to replace the clinical judgment of primary care providers, nor are they intended to preclude more extensive evaluation and management of the patient by other specialists as needed.

The guidelines were developed by a Work Group convened by the Massachusetts Department of Public Health Diabetes Prevention and Control Program and its Advisory Board. The Work Group was comprised of clinicians, representatives from managed care organizations, the Primary Care Clinician Plan, Joslin Diabetes Center, the Massachusetts College of Pharmacy and Health Sciences, the Massachusetts League of Community Health Centers, the Massachusetts Medical Society, MassPRO, and University of Massachusetts Amherst. Their recommendations were incorporated into the final version. First developed in 1999, the guidelines are reviewed and revised by the Work Group every two years.

The guidelines are a cooperative effort among many partners. This unique collaboration eliminates the confusion brought about by slight differences in guidelines developed by each managed care organization. Although based on the American Diabetes Association’s (ADA) Clinical Practice Recommendations, the guidelines are not intended to serve as a description of benefits or coverage; coverage may vary by insurer.

The following topics are covered in the 2007 guidelines.

**Diagnosis and Classification of Diabetes Mellitus**

This section provides recommendations for screening, diagnosis, and classification of diabetes and pre-diabetes.

**Prevention or Delay of Type 2 Diabetes**

Both Impaired Glucose Tolerance (IGT) and Impaired Fasting Glucose (IFG) have been categorized as pre-diabetes and are risk factors for future diabetes and cardiovascular disease. There is now substantial evidence that type 2 diabetes can be prevented or delayed. This section includes information on the benefits of weight loss and physical activity for overweight or sedentary patients.

**Diabetes Medications**

This section provides an overview of oral diabetes medications, insulin, and other medications including information on dosage, onset, duration, drug interactions, and contraindications. Two new algorithms, *Metabolic Management of Type 2 Diabetes* and *Insulin Initiation Considerations*, have been included to assist with treatment decision making in type 2 diabetes.

**Cardiovascular Risk-Reduction Guidelines**

Adults with diabetes are two to four times more likely to have coronary heart disease than those without diabetes. Treatment of diabetic dyslipidemia is critical, as is the prevention and treatment of other cardiovascular risk factors such as high blood pressure, excess weight, smoking, and lack of physical activity. These guidelines include the addition of a new table: *Pharmacological Therapy for Lipid Disorders.*

**Hypertension**

Hypertension contributes to the development and progression of chronic complications of diabetes. Aggressive treatment of even mild-to-moderate hypertension is beneficial. This guideline includes information on progressive goals for hypertension management.

**Diabetic Nephropathy Guidelines**

Diabetes is the leading cause of end-stage renal disease, accounting for about 40% of new cases. Annual screening for microalbuminuria will allow early identification of patients with nephropathy. Improving glycemic control, aggressive antihypertensive treatment, and the use of ACE inhibitors and/or ARBs may slow the progression of nephropathy. A new section on *Medical Nutrition Therapy and Kidney Disease* has been added.

**Retinopathy**

Diabetic retinopathy is estimated to be the most frequent cause of new blindness among adults aged 20-74 years. Early diagnosis and treatment is beneficial in preventing vision loss for people with diabetes. This section outlines current screening recommendations.

**Neuropathy**

A new section on *Neuropathy* has been added to the guidelines. Diabetic neuropathies may result in loss of nerve fibers affecting many bodily functions. This section highlights the importance of early recognition and appropriate management of neuropathy in patients with diabetes.

(continued on reverse)
Foot Inspection and Monofilament Use Guide

Foot ulcers and amputations are a major cause of morbidity and disability for people with diabetes. Early recognition and management of risk factors for ulcers and amputations can delay the onset of these adverse outcomes. This guide highlights key points of the foot exam, monofilament test, and use of a tuning fork.

Periodontal Disease

Almost one-third of people with diabetes has severe periodontal disease, which progresses more rapidly and is more difficult to treat in people with diabetes. Recent research suggests the presence of periodontal disease can negatively impact glycemic control. Including a routine oral exam as part of the yearly comprehensive visit and encouraging patients to receive follow-up dental care at least twice a year are among the recommendations.

Diabetes Self-Management Education and Medical Nutrition Therapy

Diabetes self-management education and medical nutrition therapy are integral to successful diabetes care and management. These provide the person with diabetes with the knowledge and skills to perform self-care on a day to day basis to achieve and maintain optimal glucose control. Numerous studies have demonstrated that self-management education leads to reductions in costs associated with diabetes and its complications. This section lists topics to include in both basic and continuing education for medical nutrition therapy and diabetes self-management education.

Physical Activity

An important component of a healthy lifestyle, physical activity can positively impact the prevention of diabetes and its complications. This new section highlights the goals of physical activity and basic patient education.

Tobacco Use and Diabetes

Only about half the smokers with diabetes have been advised to quit smoking by their health care providers. This section has been updated and includes screening and treatment recommendations, as well as resources for smoking cessation counseling.

Psychosocial Issues

Psychosocial issues may prevent patients with diabetes from adhering to the recommended medical regime. This guideline discusses incorporating psychosocial screening and treatment into routine care for people with diabetes.

Inpatient Glucose Control

Until recently, glycemic control in hospitalized patients has not been a major therapeutic focus. This new section includes broad guidelines and recommendations to overcome barriers and facilitate improvements in inpatient diabetes care.

Tools:

Guidelines for Adult Diabetes Care (laminated summary)

This summary of the Guidelines highlights basic medical care for people with diabetes. We suggest you post them in each exam room as a reminder of recommendations for care.

Determining Body Mass Index (BMI)

Obesity substantially raises the risk of morbidity from type 2 diabetes and other diseases. The BMI describes relative weight for height and is significantly correlated with total body fat content. The BMI may be used to assess overweight and obesity and to monitor changes in body weight.

Flow Sheet for Diabetes Care

The flow sheet reflects the recommendations found on the Guidelines for Adult Diabetes Care laminated summary. It can be copied or modified for use in your practice and included in patients’ charts. Diabetes medications, exams, and test results can be documented over time to track diabetes management.

Diabetes Care Card (patient wallet card)

The Diabetes Care Card allows people with diabetes to track their diabetes care and personal goals. The wallet card has space to record test results and services received over four visits. Encourage your patients to bring this card to each office visit.

References

References for the Guidelines and supporting materials are provided at the end of this document.
**Criteria for Testing for Diabetes and Pre-diabetes in Asymptomatic Adults**

Testing for diabetes should be considered for all individuals aged 45 and older, particularly in those with a BMI \( \geq 25 \text{kg/m}^2 \) (or BMI \( \geq 23 \text{kg/m}^2 \) for Asian individuals). If normal, testing should be repeated at three-year intervals.

Testing should be considered at a younger age, or be carried out more frequently, in individuals who are overweight (BMI \( \geq 25 \text{kg/m}^2 \)) and have any of the following additional risk factors:

- Habitually physically inactive
- First-degree relative with diabetes
- Members of a high-risk ethnic population (African American, Latino, Native American, Asian American, Pacific Islander)
- Delivered a baby weighing > 9 lbs. or have been diagnosed with Gestational Diabetes Mellitus (GDM)
- Hypertensive ( \( \geq 140/90 \text{mmHg} \))
- High-density lipoprotein (HDL) cholesterol level \( \leq 35 \text{mg/dl} \) and/or a triglyceride level \( \geq 250 \text{mg/dl} \)
- Polycystic ovary syndrome (PCOS)
- Impaired Glucose Tolerance (IGT) or Impaired Fasting Glucose (IFG) on previous testing
- Other conditions associated with insulin resistance (acanthosis nigricans)
- History of vascular disease
- A waist circumference > 94 (37") for men and > 80 cm (32") for women represents increased risk; > 102 cm (40") for men and > 88cm (35") for women represent substantially increased risk.
- Medication use which may predispose to diabetes (e.g., steroids, atypical antipsychotics, protease inhibitors)

**Diagnostic Criteria for Diabetes and Pre-diabetes**

A Fasting Plasma Glucose (FPG) value \( \geq 126 \text{mg/dl} \) (confirmed by testing on two different occasions) is diagnostic for diabetes. If the FPG is < 126 mg/dl and there is a high suspicion of diabetes, an Oral Glucose Tolerance Test (OGTT) may be performed. These criteria are for diagnosis and are not treatment criteria or goals.

A FPG via venipuncture is the preferred diagnostic test due to its ease of administration, convenience, acceptability to patients, and lower cost.

The hemoglobin A1c (A1C)\(^2\) is not recommended for diagnosis at this time.

### Criteria for the Diagnosis of Diabetes in Non-pregnant Adults

<table>
<thead>
<tr>
<th></th>
<th>Fasting Plasma Glucose (FPG) (^3) (preferred)</th>
<th>Casual Plasma Glucose (CPG) (^4)</th>
<th>Oral Glucose Tolerance Test (OGTT) (^5)</th>
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</thead>
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<tr>
<td><strong>Diabetes Mellitus</strong></td>
<td>FPG ( \geq 126 \text{mg/dl} ) ( (7.0 \text{mmol/l}) )</td>
<td>Casual Plasma Glucose ( \geq 200 \text{mg/dl} ) ( (11.1 \text{mmol/l}) ) plus symptoms of diabetes</td>
<td>Two-hour plasma glucose ( (2 \text{hPG}) \geq 200 \text{mg/dl} )</td>
</tr>
<tr>
<td><strong>Pre-diabetes</strong></td>
<td>Impaired Fasting Glucose (IFG) FPG ( \geq 100 \text{and} &lt; 126 \text{mg/dl} )</td>
<td></td>
<td>Impaired Glucose Tolerance (IGT) ( 2\text{-hPG} \geq 140 \text{and} &lt; 200 \text{mg/dl} )</td>
</tr>
<tr>
<td><strong>Normal</strong></td>
<td>FPG (&lt; 100\text{mg/dl} )</td>
<td></td>
<td>2-hPG (&lt; 140\text{mg/dl} )</td>
</tr>
</tbody>
</table>

\(^1\) National Obesity Forum, http://nationalobesityforum.org.uk/content/view/171/168/.

\(^2\) The term A1c (A1C) is used to represent tests of average glycemic control such as glycosolated or glycated hemoglobin (HbA1c).

\(^3\) The FPG is the preferred test for diagnosis, but any one of the three listed is acceptable. Fasting is defined as no caloric intake for at least 8 hours.

\(^4\) Casual is defined as any time of day without regard to time since last meal. Symptoms are the classic ones of polyuria, polydipsia, and unexplained weight loss. There are currently no guidelines for interpreting CPG values that fall between 140-199 mg/dl. For values in this range, a follow-up FPG to rule out diabetes can be considered.

\(^5\) OGTT should be performed using a glucose load containing the equivalent of 75g anhydrous glucose dissolved in water. The OGTT is not recommended for routine clinical use, but may be necessary when evaluating patients with IFG or when diabetes is still suspected despite an FPG \(< 126 \text{mg/dl} \).

(continued on reverse)
Not all classifications of diabetes are discussed here. For further information on other types, see the American Diabetes Association reference below.

**Type 1**
Type 1 diabetes most often results from a cellular mediated autoimmune destruction of the beta cells of the pancreas. Patients with this form of diabetes are dependent upon insulin for survival and are at risk for ketoacidosis. Type 1 commonly occurs in childhood and adolescence but may occur at any age.

**Type 2**
Individuals with type 2 diabetes have insulin resistance and relative insulin deficiency. Over time the potential for absolute deficiency exists. Primary treatment centers on beta cell preservation and improving insulin resistance via weight loss, improved nutrition, and increased age-appropriate physical activity. Type 2 diabetes commonly goes undiagnosed for years because it is often asymptomatic in its early stages. Individuals with undiagnosed type 2 diabetes are at increased risk for developing macro- and microvascular complications.

**GDM**
Gestational Diabetes Mellitus (GDM), which typically occurs following the 24th week, is defined as any degree of glucose intolerance with onset or first recognition during pregnancy.* The definition applies regardless of whether insulin or only dietary modification is used for treatment. GDM complicates approximately 4% of all pregnancies in the U.S.; however, the prevalence is higher among some minority groups. Six weeks or more after the pregnancy ends, a woman with GDM should be tested to rule out type 1 or 2 diabetes or IFG/IGT. Women with GDM have a higher risk for type 2 diabetes later in life.

* Hyperglycemia occurring during the early part of pregnancy is generally indicative of type 1 diabetes or undiagnosed type 2 diabetes.

**Pre-diabetes**
Both Impaired Glucose Tolerance (IGT) and Impaired Fasting Glucose (IFG) have been categorized as pre-diabetes and are risk factors for future diabetes and cardiovascular disease. IFG has been defined as a fasting plasma glucose of $\geq 100$ mg/dl but < $126$ mg/dl. IGT is defined as a 2-hour oral glucose tolerance test value (OGTT) of $\geq 140$ mg/dl, but < $200$ mg/dl.

Summary

Hyperglycemia that does not meet the diagnostic criteria for diabetes is referred to as Impaired Fasting Glucose (IFG) or Impaired Glucose Tolerance (IGT).

Several well-designed studies have shown that lifestyle modification is nearly twice as effective as a glucose-lowering medication (metformin) in delaying or preventing the onset of diabetes in individuals at risk.\textsuperscript{7,8,9,10,11} Study populations often had other recognized risk factors for diabetes including obesity, a prior history of gestational diabetes, or a positive family history of diabetes.\textsuperscript{12} These studies have shown that modest weight loss (5-10%) and regular physical activity can reduce the rate of progression of IGT to type 2 diabetes. Lifestyle modification using the following should be the first treatment modality to employ in persons at high risk:

- Low-calorie, low-fat diets
- Increased physical activity (generally 150 minutes per week)

Such interventions also provide a variety of other health benefits in addition to delaying diabetes. At every opportunity, health care providers are encouraged to stress the benefits of weight loss and physical activity for overweight or sedentary patients.

Recent trials have evaluated the use of medications to address insulin resistance in delaying or preventing the development of type 2 diabetes. Given current cost estimates, use of insulin sensitizer medications such as metformin as a first line of defense should be given consideration, contraindications not withstanding. Some of the manufacturers of thiazolidinediones have reported observational data of an increased risk of fractures (arm, hand, ankle and foot of 9.3%, 5.09%, and 3.47 % respectively) as compared to metformin and glyburide in women taking these agents for three or more years.\textsuperscript{13,14}

Trials continue to evaluate the cost-effectiveness of different types of interventions. At this time, however, the known financial burden resulting from diabetic complications suggests that any attempt to prevent diabetes is worthwhile.

---

\textsuperscript{14} The U.S. Food and Drug Administration, http://www.fda.gov/medwatch/safety/2007/safety07.htm#Actos.

(continued on reverse)
Lifestyle Modification

Individuals who are at high risk for developing diabetes need to become aware of the benefits of weight loss, if indicated, and participating in regular physical activity.

- Refer patients with IFG or IGT for medical nutrition therapy for counseling on weight loss, as well as instruction for increasing physical activity.
- Provide for follow-up weight management, diet, and physical activity counseling.
- Monitor for the development of diabetes every 1-2 years.

### Treatment Recommendations for Individuals with IFG, IGT, or Both

<table>
<thead>
<tr>
<th>Population</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>IFG or IGT</td>
<td>Lifestyle modification (i.e., 5-10% weight loss and moderate intensity physical activity ~ 30 min/day)</td>
</tr>
</tbody>
</table>
| Individuals with IFG and IGT and any of the following:  
  - < 60 years of age  
  - BMI ≥ 35 kg/m²  
  - Family history of diabetes in first-degree relatives  
  - Elevated triglycerides  
  - Reduced HDL cholesterol  
  - Hypertension  
  - A1C > 6.0%* | Lifestyle modification (as above) and/or metformin** |

* While A1C values are not recommended for diagnosis, they may be used to monitor people with pre-diabetes.
** Metformin 500-850 mg twice per day, based on gastrointestinal tolerance.


Sources:
Treatment Goals

Optimal treatment for type 2 diabetes incorporates a multiple risk factor approach, including self-management counseling, medical nutrition therapy, physical activity, weight reduction if appropriate, and the use of glucose-lowering agents or insulin. Careful consideration needs to be given to ameliorating associated risk factors such as hypertension, smoking, and dyslipidemia.

When setting treatment goals for individuals with type 2 diabetes, it is important to assess the risk for severe hypoglycemia and consider the person’s ability to comprehend the regimen. Consider as well other factors that may influence the treatment’s benefit, including advanced age, end-stage renal disease (ESRD), advanced cardiovascular or cerebrovascular disease, or other comorbidities that may lead to reduced life span.

Achievement of normal or near normal blood glucose levels requires education in self-management techniques including:

- Self-monitoring of blood glucose (SMBG)
- Recognition, treatment, and prevention of hypoglycemia
- Prevention, early detection, and treatment of chronic complications
- Medical nutrition therapy
- Regular physical activity
- Reinforcement and continuing education
- Patients with frequent or severe hypoglycemia may require less intensive glycemic goals
- Children, pregnant women, and elderly individuals require special consideration when setting glycemic goals

Goals for Glycemic Control in Non-Pregnant Adults*

<table>
<thead>
<tr>
<th></th>
<th>Normal</th>
<th>Goal</th>
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</thead>
<tbody>
<tr>
<td>Preprandial Plasma Glucose</td>
<td>&lt; 100 mg/dl</td>
<td>90-130 mg/dl</td>
</tr>
<tr>
<td>Peak Postprandial (2-hour) Plasma Glucose</td>
<td>&lt; 120 mg/dl</td>
<td>&lt; 180 mg/dl</td>
</tr>
<tr>
<td>A1C</td>
<td>&lt; 6%</td>
<td>&lt; 7%</td>
</tr>
</tbody>
</table>

*More stringent goals, including a normal A1C of < 6%, can be considered in individual patients and during pregnancy.

Points to remember when setting glycemic goals:

- Individualize goals.
- Target postprandial glucose if A1C values are not optimal and preprandial glucose goals are met.
- A lower A1C is associated with lower rates of microvascular complications; however, there is a greater risk of hypoglycemia.6
- Patients with frequent or severe hypoglycemia may require less intensive glycemic goals.
- Children, pregnant women, and elderly individuals require special consideration when setting glycemic goals.

Recommendations:

• Perform the A1C test at least two times a year in patients who are meeting treatment goals and who have stable glycemic control.
• Perform the A1C test quarterly in patients whose therapy has changed or who are not meeting glycemic goals.

Pharmacological Therapy

According to the American Diabetes Association's Consensus Statement, pharmacological therapy is recommended for individuals who:

• Have been unable to achieve optimal blood glucose control after 3 months of medical nutrition therapy and exercise
• Have symptomatic hyperglycemia
• Are ketotic (insulin only)
• Have a concurrent illness or surgery resulting in worsening of glycemic control

The U.S. Food and Drug Administration has approved many classes of oral agents for monotherapy (see Medical Management of Type 2 Diabetes Algorithm). The choice of a particular agent must depend, however, on the individual’s characteristics, self-monitoring of blood glucose (SMBG) profiles, clinical scenario, cost-effectiveness, and physician preferences. Before initiating therapy, renal status and hepatic function should be evaluated. Appropriate diet and exercise should be maintained even if the diabetes is being managed pharmacologically. This suggested treatment approach reflects current thinking; however, changes will continue to be made in this recommended algorithm.

In the case of monotherapy not achieving target glycemic goals, combinations of oral agents or injectable therapies should be attempted. The adverse effect profile of a particular course of therapy may determine which combination regimen is chosen for a specific patient. Individual concerns over hypoglycemia, gastrointestinal (GI) side effects, or edema may "tip the scale" away from one permutation towards another. Cardiac, renal, and hepatic function should be evaluated as appropriate for each oral agent. The tables on the following pages compare the oral antidiabetic agents. Insulin can be used either alone or in combination with an indicated oral/injectable drug regimen.
**Medications: Oral Antidiabetic**

<table>
<thead>
<tr>
<th>CLASS</th>
<th>GENERIC NAME STRENGTH</th>
<th>TRADE NAME®</th>
<th>USUAL DOSAGE</th>
<th>COMMENTS</th>
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</thead>
<tbody>
<tr>
<td>Biguanides</td>
<td>metformin 500, 850, 1000 mg 500 mg/5 ml</td>
<td>Glucophage Riomet</td>
<td>500-1000 mg</td>
<td>Decreases hepatic glucose production and increases insulin sensitivity. When used as monotherapy, does not cause hypoglycemia. Take with food to lessen gastrointestinal (GI) side effects. Do not use with impaired renal or hepatic function. Hold for iodinated contrast study. Start at 500 mg bid or 850 mg qd, increase 500 mg weekly or 850 mg every 2 weeks. Max 2550 mg/day; however, most studies show little benefit over 2000 mg/day. Start dose low and titrate slowly to minimize GI effects. Extended release formulation may be given once daily. Do not crush. Monitor Serum Creatinine (SCr) at baseline and at least yearly, more often if indicated. Discontinue if age greater than 80 or SCr is &gt; 1.5 in males and 1.4 in females. Hold if dehydrated or septic; increases risk of lactic acidosis. Potential for vitamin B-12 deficiency.</td>
</tr>
<tr>
<td></td>
<td>metformin extended release (ER) 500, 750, 1000 mg</td>
<td>Glucophage XR Glumetza Fortamet</td>
<td>1000-2000 mg q pm 1000-2500 mg q pm</td>
<td></td>
</tr>
<tr>
<td>Second-generation Sulfonylureas</td>
<td>glipizide 5, 10 mg</td>
<td>Glucotrol Glucotrol XL</td>
<td>5-20 mg qd to bid 2.5-20 mg qd</td>
<td>Stimulates pancreatic islet beta cell insulin release. Start at 5 mg qd or 2.5 mg qd if elderly. The extended release (ER) formulation may allow for once daily dosing. For non-ER form, divide doses &gt; 15mg/day. Max 40 mg qd. Do not cut or crush the ER form.</td>
</tr>
<tr>
<td></td>
<td>glipizide extended release (ER) 2.5, 5, 10 mg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First-generation Sulfonylureas are no longer used due to their adverse effect profiles. Caution in elderly patients</td>
<td>glyburide 1.25, 2.5, 5 mg</td>
<td>Micronase Diabeta</td>
<td>1.25-20 mg qd</td>
<td>Start at 2.5 to 5 mg qd or 1.25 mg qd if at risk for hypoglycemia. Max 20 mg qd. Take with breakfast or first meal.</td>
</tr>
<tr>
<td></td>
<td>glyburide (micronized) 1.5, 3, 6 mg</td>
<td>Glynase PresTab</td>
<td>0.75-12 mg qd</td>
<td>No advantage over the nonmicronized products. Start at 1.5-3 mg qd or 0.75 mg qd if at risk for hypoglycemia. Take with breakfast or first meal.</td>
</tr>
<tr>
<td></td>
<td>glimepiride 1, 2, 3, 4, 6, 8 mg</td>
<td>Amaryl</td>
<td>1-4 mg qd</td>
<td>Dosage once daily with first main meal. Start at 1-2 mg po qd. Titrate by 1-2 mg every 1-2 weeks. Max 8 mg qd. Take with first main meal.</td>
</tr>
</tbody>
</table>

(continued on reverse)
### Medcations: Oral Antidiabetic

<table>
<thead>
<tr>
<th>CLASS</th>
<th>GENERIC NAME STRENGTH</th>
<th>TRADE NAME®</th>
<th>USUAL DOSAGE</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulin Secretagogues</td>
<td>repaglinide 0.5, 1, 2 mg</td>
<td>Prandin</td>
<td>0.5-4 mg before meals</td>
<td>Similar mechanism of action as the sulfonylureas (insulinotropic). Unlikely to cause hypoglycemia if given with meals. Start at 0.5 mg before each meal, double preprandial dose weekly. Max 4 mg/dose; 16 mg/day. Take 15-30 minutes before a meal. Skip dose if meal is skipped. Do not use in combination with sulfonylureas or other secretagogues.</td>
</tr>
<tr>
<td>Insulin Secretagogues</td>
<td>nateglinide 60, 120 mg</td>
<td>Starlix</td>
<td>60-120 mg tid 1-30 minutes before meals</td>
<td>Similar mechanism of action as the sulfonylureas (insulinotropic). Use with caution in chronic liver disease. Unlikely to cause hypoglycemia if given with meals. Should not be added to regimens of patients who have not been adequately controlled by glyburide or other insulin secretagogues. Start 60-120 mg po tid. Skip dose if meal is skipped. Do not use in combination with sulfonylureas or other secretagogues.</td>
</tr>
<tr>
<td>Thiazolidinediones (TZD)</td>
<td>rosiglitazone 2, 4, 8 mg</td>
<td>Avandia</td>
<td>Start 4 mg</td>
<td>Increases peripheral and hepatic sensitivity to insulin. Approved for use as monotherapy or in combination with insulin, metformin, or sulfonylureas. Neither causes hypoglycemia when used as monotherapy. Start Actos at 15 mg qd. Start Avandia at 4 mg qd or 2 mg bid. May increase dose after 12 weeks. Maximum dose of Actos is 45 mg qd and Avandia is 8 mg qd. Use with caution in the presence of hepatic disease. Monitor baseline transaminase when initiating therapy, then periodically as clinically indicated. May cause anovulatory premenopausal women to resume ovulation. Monitor for symptoms and signs of congestive heart failure at 6 weeks and 3 months. Caution: Congestive heart failure (CHF) class I, II New York Heart Association (NYHA) or CHF risk factors. Monitor for fluid retention. Contraindicated in CHF class III, IV NYHA, baseline alanine transaminase (ALT) &gt; 2.5 x ULN.</td>
</tr>
<tr>
<td>Thiazolidinediones (TZD)</td>
<td>pioglitazone 15, 30, 45 mg</td>
<td>Actos</td>
<td>15-45 mg</td>
<td></td>
</tr>
</tbody>
</table>

There has been a recent meta-analysis bringing into question the effects of rosiglitazone (Avandia) on the risk of myocardial infarction and death from cardiovascular disease. At the time of this writing, the American College of Cardiology, American Diabetes Association, and American Heart Association have issued a joint statement recognizing that while the overall level of risk associated with rosiglitazone appears to be small, it is one that must be considered carefully.\(^\text{17,18}\)


Diabetes Medications

**Medications: Oral Antidiabetic**

<table>
<thead>
<tr>
<th>CLASS</th>
<th>GENERIC NAME STRENGTH</th>
<th>TRADE NAME®</th>
<th>USUAL DOSAGE</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha-glucosidase Inhibitors</td>
<td>acarbose 25, 50, 100 mg</td>
<td>Precose</td>
<td>50-100 mg tid</td>
<td>Delays and decreases absorption of starch after a meal. Take with first bite of food. When used as a monotherapy, does not cause hypoglycemia. Most common side effects are excessive flatulence, diarrhea, and abdominal pain. Start 25 mg tid. Max 100 mg tid. Start dose low and titrate slowly to minimize GI effects. Contraindicated in diabetic ketoacidosis (DKA), inflammatory bowel disease, colonic ulceration, or partial intestinal obstruction. If hypoglycemia occurs in patients who are being treated with Precose or Glyset, it MUST be treated with glucose, not sucrose or complex carbohydrates.</td>
</tr>
<tr>
<td>Miglitol Inhibitors</td>
<td>miglitol 25, 50, 100 mg</td>
<td>Glyset</td>
<td>50-100 mg tid</td>
<td>Inhibits dipeptidyl peptidase-4, slowing incretin metabolism, increasing insulin synthesis and release, and decreasing glucagon levels. Regulates glucose by affecting the beta cells and alpha cells in the pancreas. Approved as monotherapy and as add-on therapy to metformin or TZDs.</td>
</tr>
</tbody>
</table>

**Medications: Oral Combination**

| Glyburide/Metformin         | 1.25/250, 2.5/500, 5/500 mg | Glucovance  | 1-2 tabs bid | Refer to comments on individual drugs.                                                                                                                                                                  |
| Glipizide/Metformin         | 2.5/250, 2.5/500, 5/500 mg  | Metaglip    | 1-2 tabs qd-bid |                                                                                                                                                                                                     |
| Metformin/Rosiglitazone     | 500/1, 500/2, 500/4, 1000/2, 1000/4 mg | Avandamet  | 1-2 tabs bid |                                                                                                                                                                                                     |
| Metformin/Pioglitazone      | 500/15, 850/15 mg           | ACTOplusmet | 1 tab qd-bid |                                                                                                                                                                                                     |
| Rosiglitazone/Glimepiride   | 4/1, 4/2, 4/4 mg            | Avandaryl   | 1 tab q am   |                                                                                                                                                                                                     |
| Sitagliptin/Metformin       | 50/500, 50/1000 mg          | Janumet     | 1 tab bid    |                                                                                                                                                                                                     |
### Medications: Injectables

<table>
<thead>
<tr>
<th>CLASS</th>
<th>GENERIC NAME STRENGTH</th>
<th>TRADE NAME®</th>
<th>USUAL DOSAGE</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incretin Mimetic</td>
<td>exenatide injection</td>
<td>Byetta</td>
<td>5 mcg-10 mcg</td>
<td>Incretin mimetics stimulate insulin production in response to elevated blood glucose levels, inhibit post-meal glucagon release, and slow nutrient absorption. Adjunct therapy for type 2 patients who have not achieved adequate glycemic control. When added to sulfonylurea therapy, a reduction in the dose of sulfonylurea may be considered to reduce the risk of hypoglycemia. Starting dose is 5 mcg bid. Increase to 10 mcg bid in one month if tolerated. Injected within 60 minutes before the morning and evening meals. Precautions: Byetta is not a substitute for insulin in insulin-requiring patients. Byetta should not be used in patients with type 1 diabetes for the treatment of DKA. The concurrent use of Byetta with insulin, TZDs, D-phenylalanine derivatives, meglitinides, or alpha-glucosidase inhibitors has not been studied. Not recommended for use in patients with end-stage renal disease or severe renal impairment or in patients with severe gastrointestinal disease. Byetta slows gastric emptying and may reduce the absorption of orally administered drugs. Drugs requiring food at the time of administration should be taken with a meal or snack when Byetta is not administered. Medications dependent on threshold concentrations for efficacy, such as contraceptives and antibiotics, should be taken at least 1 hour before Byetta injection. Side Effects: Observe for hypoglycemia if prescribed with a sulfonylurea. Other adverse events associated with Byetta (vs. placebo) include nausea (44% vs. 18%), vomiting (13% vs. 4%), and diarrhea (13% vs. 6%).</td>
</tr>
<tr>
<td>Amylin Analogue</td>
<td>pramlintide injection</td>
<td>Symlin</td>
<td>Type 1 30-60 mcg before meals Type 2 60-120 mcg before meals</td>
<td>Used in both type 1 and type 2 patients on insulin. Decreases postprandial plasma glucose rise, suppresses glucagon secretion, delays gastric emptying, and promotes satiety. Used with meals. Start patients with type 1 diabetes at 15 mcg sc tid and titrate to 45 mcg tid as needed. Start type 2 patients at 30 mcg sc tid and titrate to 120 mcg tid as needed.</td>
</tr>
</tbody>
</table>
Insulin Considerations

The use of insulin requires the following considerations:

• The onset, peak, and duration of any insulin preparation may vary depending on injection site, exercise, depth of injection, and other variables. Hypoglycemia is a side effect of insulin. Patients must be instructed on the risks as well as appropriate treatments.
• Reduced hyperglycemia and an improvement in glucose toxicity will occur in type 2 diabetes given sufficient doses of insulin. Individuals with moderately severe type 2 diabetes, defined as a fasting plasma glucose of 140-200 mg/dl, will often show sufficient response to a single or twice-daily dose of insulin.
• Insulin therapy often results in weight gain as a result of improved blood glucose utilization and potential for increased hypoglycemia. Attention should be given to lifestyle modification and medication options in order to minimize effect.19
• Individuals with severe type 2 diabetes, defined as a fasting plasma glucose of > 200 mg/dl, or those who have proved not responsive to the above-mentioned regimens, may require frequent insulin dosing. This usually requires the addition of short-acting insulin before meals.
• The total daily insulin doses for type 2 diabetes may range from 0.4-1.2 U/kg/day. Be aware that in insulin-resistant patients, doses of > 1.5 U/kg/day may be required.
• Total daily dosage for people with type 1 diabetes may range from 0.3-0.5 U/kg/day.
• The degree of glucose-lowering effect is dose-related. Studies have demonstrated a lowering of fasting glucose of up to 190 mg/dl from baseline in patients with type 2 diabetes treated with insulin.
• Insulin can be delivered via syringe, pen, pump, or inhaler.20

Insulin regimens should be designed taking lifestyle and meal schedule into account. The algorithm can only provide basic guidelines for initiation and adjustment of insulin. Premixed insulins are not recommended during adjustment of doses; however, they can be used conveniently, usually before breakfast and/or dinner, if proportion of rapid- and intermediate-acting insulins is similar to the fixed proportions available. (bg = blood glucose).

---

Regular testing of blood glucose and A1C is recommended to assess medication effect.

<table>
<thead>
<tr>
<th>INSULIN TYPE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very short-acting insulin lispro Humalog&lt;sup&gt;®&lt;/sup&gt; (Lilly)</td>
<td>0-15 minutes</td>
<td>30-90 minutes</td>
<td>2-4 hours</td>
<td>Insulins lispro, aspart, and glulisine are very short-acting products. Both lispro and aspart are available mixed with intermediate-acting preparations as fixed-ratio combinations which provide the benefit of rapid and intermediate action. Humalog mix 75/25 is a mixture of 75% insulin lispro protamine suspension and 25% insulin lispro. NovoLog 70/30 is a mixture of 70% insulin aspart protamine and 30% insulin aspart.</td>
</tr>
<tr>
<td>Very short-acting insulin aspart NovoLog&lt;sup&gt;®&lt;/sup&gt; (NovoNordisk)</td>
<td>10-20 minutes</td>
<td>60-180 minutes</td>
<td>3-5 hours</td>
<td>NPH and regular insulins are also available as fixed-ratio combinations of 50/50 and 70/30.</td>
</tr>
<tr>
<td>Very short-acting insulin glulisine Apidra&lt;sup&gt;®&lt;/sup&gt; (Sanofi-Aventis)</td>
<td>10-20 minutes</td>
<td>60-120 minutes</td>
<td>3-4 hours</td>
<td>NPH and regular insulins are also available as fixed-ratio combinations of 50/50 and 70/30.</td>
</tr>
<tr>
<td>Short-acting regular insulin</td>
<td>30 minutes-1 hour</td>
<td>2-4 hours</td>
<td>4-8 hours</td>
<td>NPH and regular insulins are also available as fixed-ratio combinations of 50/50 and 70/30.</td>
</tr>
<tr>
<td>Intermediate-acting NPH insulin</td>
<td>2-4 hours</td>
<td>4-10 hours</td>
<td>10-16 hours</td>
<td>NPH and regular insulins are also available as fixed-ratio combinations of 50/50 and 70/30.</td>
</tr>
<tr>
<td>Long-acting insulin glargine Lantus&lt;sup&gt;®&lt;/sup&gt; (Aventis) approved in pediatric population ≥ 6 years Insulin detemir Levemir&lt;sup&gt;®&lt;/sup&gt; (Novo Nordisk) approved in pediatric population ≥ 6 years</td>
<td>4-6 hours</td>
<td>No pronounced peak</td>
<td>18-24 hours</td>
<td>Once daily subcutaneous administration at a consistent time in patients who require basal (long-acting) insulin for the control of hyperglycemia. Neither should be diluted nor mixed with any other insulin or solution, and is not intended for intravenous administration.</td>
</tr>
</tbody>
</table>
COMMENTS
Regular testing of blood glucose and A1C is recommended to assess medication effect.

INSULIN TYPE | ONSET | PEAK | DURATION | COMMENTS
---|---|---|---|---
Inhaled insulin short-acting Exubera® | 10-20 minutes | 30-90 minutes | 6 hours | The 1 mg blister is approximately equal to 3 units of regular insulin and the 3 mg blister is approximately equal to 8 units of regular insulin. Three 1 mg blisters do not equal one 3 mg blister; it is not a one-for-one conversion to insulin.

Guidelines for Initial, Pre-Meal Exubera Dose
Exubera is approved for type 1 and type 2 diabetes for prandial administration. Patients with type 1 diabetes will require basal insulin. Forced Expiratory Volume over 1 second (FEV₁) testing at baseline, 6 months, and yearly is recommended with inhaled insulin. It is contraindicated in current smokers or those who have smoked in the last six months. It is not approved for the pediatric population. Dosing is weight-based and should be calculated as part of an overall implementation plan. Delivery given in 1 and 3 mg blister packs. 1 mg of Exubera is approximately equivalent to 3 units of insulin, and 3 mg of Exubera is approximately equivalent to 8 units of insulin. Training on the use of the inhaler by a diabetes educator is recommended.

<table>
<thead>
<tr>
<th>Patient Weight (in kg)</th>
<th>Patient Weight (in lb)</th>
<th>Initial Dose per Meal</th>
<th>Number of 1 mg blisters per dose</th>
<th>Number of 3 mg blisters per dose</th>
<th>Total Daily Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-59.9 kg</td>
<td>66-132 lb</td>
<td>1 mg per meal</td>
<td>1</td>
<td></td>
<td>3 mg</td>
</tr>
<tr>
<td>60-79.9 kg</td>
<td>133-176 lb</td>
<td>3 mg per meal</td>
<td>1</td>
<td></td>
<td>9 mg</td>
</tr>
<tr>
<td>80-119.9 kg</td>
<td>177-264 lb</td>
<td>4 mg per meal</td>
<td>1</td>
<td>1</td>
<td>12 mg</td>
</tr>
<tr>
<td>≥ 120 kg</td>
<td>≥ 265 lb</td>
<td>Determine pre-meal dose based on body weight (kg) x 0.05 mg/kg, rounded down to the nearest whole mg.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Summary of Antidiabetic Interventions

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Expected decrease in A1C (%)</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1: Initial</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lifestyle modification to decrease weight and increase activity</td>
<td>1-2</td>
<td>Low cost, many benefits</td>
<td>Fails for most in first year</td>
</tr>
<tr>
<td>Metformin</td>
<td>1.5</td>
<td>Mild weight loss, inexpensive</td>
<td>GI side effects, rare lactic acidosis</td>
</tr>
<tr>
<td><strong>Step 2: Additional therapy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulin</td>
<td>1.5-2.5</td>
<td>No dose limit, some types moderately priced, improved lipid profile</td>
<td>Injections, monitoring, hypoglycemia, weight gain</td>
</tr>
<tr>
<td>Sulfonylureas</td>
<td>1.5</td>
<td>Inexpensive</td>
<td>Weight gain, hypoglycemia*</td>
</tr>
<tr>
<td>Thiazolidinediones</td>
<td>0.5-1.4</td>
<td>Suggested improved lipid profile</td>
<td>Fluid retention, weight gain, expensive</td>
</tr>
<tr>
<td><strong>Other Drugs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alpha-glucosidase inhibitors</td>
<td>0.5-0.8</td>
<td>Weight neutral</td>
<td>GI side effects, mealtime dosing, expensive</td>
</tr>
<tr>
<td>Exenatide</td>
<td>0.5-1.0</td>
<td>Weight loss</td>
<td>Twice daily injections, GI side effects, expensive</td>
</tr>
<tr>
<td>Glinides</td>
<td>1-1.5**</td>
<td>Short duration</td>
<td>Three times/day dosing, expensive</td>
</tr>
<tr>
<td>Pramlintide</td>
<td>0.5-1.0</td>
<td>Weight loss</td>
<td>Injections, three times/day dosing, frequent GI side effects, expensive</td>
</tr>
<tr>
<td>Sitagliptin</td>
<td>0.4-0.9</td>
<td>Weight neutral</td>
<td>No serious reactions reported to date; dose must be reduced in renal dysfunction</td>
</tr>
</tbody>
</table>

*Severe hypoglycemia is relatively infrequent with second-generation sulfonylurea therapy.

**Repaglinide is more effective at lowering A1C than nateglinide.
Metabolic Management of Type 2 Diabetes

Alternatives to insulin, sulfonylurea, or glitazone are not included in this algorithm because of limited clinical data and/or relative expense. However, they may be appropriate in selected patients. See table above.

Summary of Lipid-Lowering Therapy

Patients with diabetes have been classified as a coronary equivalent and should be treated as if they have underlying cardiovascular disease (CVD). They are likely to benefit from early intervention with lifestyle modification and cardio-protective drugs if necessary.

Evidence from clinical trials published over the past decade suggests that broad-based treatment of dyslipidemia, hypertension, and hypercoagulability (as well as interventional cardiology and cardiovascular surgery during acute coronary syndrome) can improve the event-free survival rate in people with diabetes who already have clinical CVD.

Screening Recommendations

• Annual testing for lipid disorders. More often if necessary to reach goal levels.
• Testing every two years is adequate for those with low-density lipoprotein (LDL), high-density lipoprotein (HDL), and triglycerides (TG) within the target levels listed below.

Lifestyle Modifications

Specific lifestyle changes aimed at lowering lipid profiles are recommended for all patients with diabetes. Lifestyle intervention should include medical nutrition therapy (MNT), increased physical activity, smoking cessation, and weight loss if indicated. Nutrition therapy should be tailored to the individual patient and focus on the reduction of saturated fat, cholesterol, and trans fat intake. Recommendations for an LDL goal of less than 70 should be considered for the patient at very high risk.

According to the American Dietetic Association's Evidence Analysis Library, there is fair evidence to support the use of omega-3 fatty acids in decreasing the risk of death from cardiac events and non-fatal myocardial infarctions (MI). If not contraindicated, omega-3 fatty acids can be added to the diet. They can be from both marine and plant sources: two 4-oz servings of fish per week (preferably fatty fish such as mackerel, salmon, herring, trout, sardines, or tuna) and plant-based foods of 1.5 g alpha-linolenic acids (1 Tbsp canola or walnut oil, 0.5 Tbsp ground flax seed, < 1 tsp flax seed oil). The FDA does warn that fatty fish can be high in methylmercury and should be limited accordingly in women who are or may become pregnant, nursing mothers, and young children.

Target Levels of Risk Factors in Patients with Diabetes

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Target Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1C</td>
<td>&lt; 7%</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>&lt; 130/80 mmHg</td>
</tr>
<tr>
<td>LDL cholesterol</td>
<td>&lt; 100 mg/dl</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>&lt; 150 mg/dl</td>
</tr>
<tr>
<td>HDL cholesterol</td>
<td>&gt; 40 mg/dl (male); &gt; 50 mg/dl (female)</td>
</tr>
</tbody>
</table>


Pharmacological Therapy

The first priority of pharmacological therapy is to lower LDL cholesterol to a target goal of < 100 mg/dl or to achieve a reduction in LDL of 30-40%. Statins are the drugs of choice for LDL reduction. Other drugs that lower LDL include nicotinic acid, ezetimibe (18%), bile acid sequestrants (15-30%), and fibric acid derivatives (fenofibrate and gemfibrozil 5-20%). Niacin and fibric acid derivatives are used primarily for TG lowering. According to Franco, et al., treating those at high levels of risk is cost effective, but inconsistencies exist at lower levels.²⁵

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Trade Name®</th>
<th>Dose (mg)*</th>
<th>LDL % Reduction**</th>
</tr>
</thead>
<tbody>
<tr>
<td>atorvastatin</td>
<td>Lipitor</td>
<td>10-80</td>
<td>29-45%</td>
</tr>
<tr>
<td>fluvastatin</td>
<td>Lescol</td>
<td>20-80</td>
<td>17-25%</td>
</tr>
<tr>
<td>lovastatin</td>
<td>Mevacor</td>
<td>10-80</td>
<td>16-29%</td>
</tr>
<tr>
<td>pravastatin</td>
<td>Pravachol</td>
<td>10-80</td>
<td>16-27%</td>
</tr>
<tr>
<td>rosuvastatin ***</td>
<td>Crestor</td>
<td>5-40</td>
<td>33-46%</td>
</tr>
<tr>
<td>simvastatin</td>
<td>Zocor</td>
<td>5-80</td>
<td>19-36%</td>
</tr>
<tr>
<td>ezetimibe/simvastatin</td>
<td>Vytorin</td>
<td>10/10-10/80</td>
<td>45-60%</td>
</tr>
</tbody>
</table>

*All of these statins are available at doses up to 80 mg except for rosuvastatin. For every doubling of the dose above starting dose, an approximate 6% decrease in LDL cholesterol level can be obtained.²⁶

**Estimated LDL reductions were obtained from U.S. Food and Drug Administration package inserts for each drug.

***For rosuvastatin, start with 5 mg in those who need less aggressive LDL-lowering or in Asian patients.

Liver function should be evaluated before the start of pharmacotherapy and post initiation, as directed by insert.


Sources:


Lipid-Lowering Decision Tree in Type 2 Diabetes

*TC = total cholesterol

(continued on reverse)
Coronary Heart Disease

Cardiovascular risk factors should be assessed at least annually in people with diabetes. For patients without clear or suggestive symptoms of coronary artery disease, a risk factor-based approach is recommended, evaluating for dyslipidemia, hypertension, smoking, a positive family history of premature coronary disease, or the presence of micro- or macroalbuminuria. A recent study, however, concluded that the presence of traditional and emerging cardiac risk factors failed to identify a significant percentage of patients with silent ischemia.\(^2\)

**Recommendations**

- An angiotensin converting enzyme (ACE) inhibitor is recommended for patients > 55 years of age with one cardiovascular risk factor (independent of hypertensive status), unless contraindicated. For additional information on the use of ACE inhibitors, see section on Nephropathy.
- A beta-blocker should be added for patients with a prior myocardial infarction or for those undergoing major surgery. Caution should be used in those with hypoglycemia unawareness.
- Screening tests such as a stress electrocardiogram (ECG), and/or stress echocardiography, and/or perfusion imaging may be beneficial for asymptomatic patients.
- A risk factor evaluation aimed at stratifying patients by 10-year risk should be considered.
- Metformin is contraindicated in patients with acute or unstable heart failure.
- Thiazolidinediones are contraindicated in congestive heart failure (CHF) class III, IV New York Heart Association (NYHA), and if baseline alanine transaminase (ALT) > 2.5 x upper limit of normal.
- Use caution in prescribing thiazolidinediones for patients with preexisting edema, CHF class I, II NYHA, or other heart diseases.

**Aspirin Therapy in Diabetes**

Both men and women with diabetes have a two- to four-fold increased risk of dying from the complications of cardiovascular disease. Evidence suggests that aspirin therapy should be prescribed as a secondary prevention strategy and, if no contraindications exist, should also be used as a primary prevention strategy in men and women with diabetes who are at high risk (over 40 or with other CVD risk factors). Use of aspirin has not been studied in individuals under the age of 30.

**Aspirin Therapy Recommendations**

- Use aspirin therapy (75-162 mg/day) as a secondary prevention strategy in men and women with diabetes and with a history of myocardial infarction, vascular bypass procedure, stroke or transient ischemic attack, peripheral vascular disease, claudication, and/or angina.
- Use aspirin therapy (75-162 mg/day) as a primary prevention strategy in men and women with type 2 diabetes at increased cardiovascular risk, including those over 40 years of age or who have additional risk factors (family history of CVD, hypertension, smoking, dyslipidemia, albuminuria).
- Use aspirin therapy as a primary prevention strategy in men and women with type 1 diabetes at increased cardiovascular risk, including those over 40 years of age or who have additional risk factors (family history of CVD, hypertension, smoking, dyslipidemia, albuminuria).
- People with aspirin allergy, bleeding tendency, recent gastrointestinal bleeding, and clinically active hepatic disease are not candidates for aspirin therapy. Other antiplatelet agents, such as clopidogrel, may be a reasonable alternative for high-risk patients with contraindications to aspirin therapy.


**Sources:**


Summary
Hypertension contributes to the development and progression of chronic complications of diabetes. The primary goal of therapy for adults should be to decrease blood pressure to < 130/80 mmHg. Epidemiological analysis of the United Kingdom Prospective Diabetes Study (UKPDS) showed a continuous relationship between the level of systolic blood pressure and the risk of stroke, diabetes-related deaths, heart failure, microvascular complications, and vision loss.

Screening Recommendations
• Measure blood pressure at every routine visit. Patients with systolic blood pressure (SBP) ≥ 130 mmHg or diastolic blood pressure (DBP) ≥ 80 mmHg require confirmation on a separate day.
• Orthostatic readings should be performed when clinically indicated.

Cardiovascular autonomic neuropathy is common in patients with diabetes and can cause falsely low or high readings depending on the position of the patient when the blood pressure is taken. Blood pressure and pulse should ideally be measured both in the supine and standing position leaving two minutes in between readings. Two or more determinations in each position should be obtained using an appropriately sized cuff. If the first two readings differ by more than 5 mmHg, additional readings should be obtained and averaged.

Lifestyle Modifications
The Dietary Approaches to Stop Hypertension (DASH) diet, which encourages the intake of fruits, vegetables, whole grains, poultry, fish, and low-fat dairy products, particularly when those foods are combined with sodium restriction, has been associated with substantial improvements in blood pressure.

Changes such as weight loss, increased physical activity, smoking cessation, and prudent reduction of sodium and alcohol should be a major aspect of treatment of hypertension. A maximum three-month trial of lifestyle/behavioral modification is recommended for those with a SBP of 130-139 mmHg or a DBP of 80-89 mmHg.

Treatment
If target levels are not reached by the end of three months, pharmacological therapy should be instituted. Patients with SBPs ≥ 140 mmHg or DBPs ≥ 90 mmHg should receive prescriptions for both antihypertensive medication as well as lifestyle changes.

28Orthostatic measurement is recommended to identify autonomic neuropathy. Orthostatic hypotension is defined as a fall in the systolic blood pressure of 20-30 mmHg or diastolic blood pressure of 10-15 mmHg after two to three minutes of standing. Arauz-Pacheco C, et al. The treatment of hypertension in adult patients with diabetes. Diabetes Care 25:134-147, 2002.


(continued on reverse)
**Benefit of Aggressive Treatment**

Control of hypertension has been demonstrated conclusively to reduce the rate and progression of nephropathy and retinopathy, and to reduce the complications of cerebrovascular disease and cardiovascular disease (CVD).

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**Treatment Categories**

<table>
<thead>
<tr>
<th>Systolic</th>
<th>Diastolic</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 130 mmHg</td>
<td>&lt; 80 mmHg</td>
<td>Target blood pressure</td>
</tr>
<tr>
<td>130-139 mmHg</td>
<td>80-89 mmHg</td>
<td>Lifestyle changes alone (maximum 3 months), then add drug therapy</td>
</tr>
<tr>
<td>≥ 140 mmHg</td>
<td>≥ 90 mmHg</td>
<td>Lifestyle changes plus drug therapy</td>
</tr>
</tbody>
</table>

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**Pharmacological Therapy**

Patients with SBPs ≥ 140 mmHg or DBPs ≥ 90 mmHg should receive prescriptions for both antihypertensive medication as well as lifestyle/behavioral changes.

- All patients with diabetes and hypertension should be treated with ACE inhibitors, or angiotensin II receptor blockers (ARBs), if ACE inhibitors are not tolerated. Add a thiazide diuretic if needed to reach target blood pressure.
- Monitor renal function and serum potassium levels when using ACE inhibitors, ARBs, or diuretics.
- Multiple drug therapy utilizing two or more agents at proper doses is often necessary to reach target levels.
- Clinical trials provide evidence that ACE inhibitors and ARBs have additional impacts on nephropathy and CVD. Refer to the sections on Nephropathy and CVD Risk-Reduction.
- Beta-blockers should be added for those who have had a recent myocardial infarction (MI) if not contraindicated; caution should be used in those with hypoglycemia unawareness.
- In pregnant patients with diabetes and chronic hypertension, target BP goals of 110-129/65-79 mmHg are suggested. ACE inhibitors and ARBs are contraindicated during pregnancy and should be discontinued in women planning pregnancy due to their teratogenic effect.
- In elderly patients, blood pressure should be lowered gradually.

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*Sources:*


Summary
The earliest clinical evidence of nephropathy is microalbuminuria, the appearance of low but abnormal levels of albumin in the urine. A harbinger of renal failure and cardiovascular complications in diabetes, microalbuminuria is an albumin concentration in the urine that is greater than normal but is not detectable with common urine dipstick assays for protein.

Screening
When to Screen
• Type 2 diabetes: at diagnosis and yearly thereafter.
• Type 1 diabetes: after five years of disease duration and yearly thereafter.
• Yearly testing is recommended even if the patient has previously screened positive for microalbuminuria and/or is currently taking an ACE inhibitor or ARBs in order to provide monitoring and to ensure adequate control of microalbuminuria.

Screening Tests
Most authorities recommend the analysis of a spot sample for the albumin-to-creatinine ratio. Additional options, including a 24-hour urine collection or a timed collection, are rarely necessary for screening, but do provide a more complete evaluation. Due to the variability in albumin excretion, 2 of 3 samples done in a 3 to 6 month period should show elevated levels before diagnosing microalbuminuria. If normal, repeat yearly.

Random spot collection (preferred):
• Normal: < 30 µg/mg creatinine
• Microalbuminuria: 30-299 µg/mg creatinine
• Clinical albuminuria ≥ 300 µ/mg creatinine

Several factors may elevate the albumin excretion rate. Screening should be postponed in the following situations: exercise within 24 hours, marked hypertension or hyperglycemia, infection, hematuria, fever, or heart failure.

Hypertension and Nephropathy
To reduce the risk or slow the progression of nephropathy, optimal glucose and blood pressure control are recommended. Both systolic and diastolic hypertension markedly accelerate the progression of diabetic nephropathy. Control of hypertension has been demonstrated to reduce the rate and progression of nephropathy and to reduce the complications of cerebrovascular disease and cardiovascular disease. Refer also to the Cardiovascular and Hypertension sections.

(continued on reverse)
Calculation of Glomerular Filtration Rate

Serum creatinine should be measured annually for the estimation of glomerular filtration rate (GFR) in all adults with diabetes regardless of the degree of urinary albumin excretion. The serum creatinine alone should not be used as a measure of kidney function but instead used to estimate GFR and estimate the level of chronic kidney disease. The use of prediction equations to estimate GFR from serum creatinine and other variables (age, sex, race, and body size) is recommended by the National Kidney Foundation as a cost effective method of diagnosis and stratification of chronic kidney disease. If the GFR is low, check the Parathyroid Hormone (PTH) and vitamin D levels to rule out hyperparathyroidism. Consider referral to a physician experienced in the care of diabetic renal disease when the estimated GFR has fallen to < 60 ml/min per 1.73 m², or if difficulties occur in the management of hypertension or hyperkalemia.

Cockcroft-Gault Equation

\[
\frac{(140-\text{Age [years]}) \times \text{Body Weight (kg)} \times K}{\text{Serum Creatinine (\(\mu\)mol/L)}},
\]

K is a constant: 1.23 (males) 1.04 (females)

Normal range is > 90 mL/minute or > 1.5 mL/second.

Those wishing to estimate GFR may access the following resources:


Source:
Pharmacological Therapy

For patients with both micro- and macroalbuminuria, either ACE inhibitors or ARBs should be used except during pregnancy. To assess hyperkalemia, serum potassium levels should be monitored in patients treated with either class of medication.

Clinical trials reveal the following observations:

- In patients with type 1 diabetes with microalbuminuria and hypertension, ACE inhibitors delay the progression of nephropathy.
- For patients with type 2 diabetes with both hypertension and microalbuminuria, both ACE inhibitors and ARBs delay the progression to macroalbuminuria.
- In patients with type 2 diabetes who have hypertension, macroalbuminuria, and renal insufficiency, ARBs delay the progression of nephropathy.
- Dihydropyridine calcium channel blockers (DCCBs) are less likely to slow the progression of nephropathy compared with ACE inhibitors or ARBs. DCCBs should be used only as an additional therapy in patients already treated with ACE inhibitors or ARBs.
- For patients with albuminuria or nephropathy who cannot tolerate ACE inhibitors and/or ARBs, consider using beta-blockers, diuretics, or non-DCCBs. Non-DCCBs may reduce albuminuria in patients with diabetes including during pregnancy.
- Due to their teratogenic potential, caution is advised when using either ACE inhibitors or ARBs in women of childbearing age.

Sources:

Diabetic retinopathy is estimated to be the most frequent cause of new cases of blindness among adults aged 20-74 years. The prevalence of retinopathy is strongly related to the duration of diabetes. Intensive diabetes management with the goal of achieving near normoglycemia has been shown to prevent and/or delay the onset of diabetic retinopathy. High blood pressure is an established risk factor for the development of macular edema and is linked to the presence of proliferative diabetic retinopathy. The presence of nephropathy is also associated with retinopathy. Patients with diabetic retinopathy or macular edema are often asymptomatic. Early diagnosis and prompt application of laser photocoagulation surgery is useful in preventing vision loss, but generally not beneficial in reversing already diminished acuity.

**Screening Recommendations**

- An ophthalmologist or optometrist who is knowledgeable and experienced in diagnosing the presence of diabetic retinopathy, and is aware of its management, should perform comprehensive eye exams.
- Adults with type 1 diabetes should have an initial dilated and comprehensive eye examination within 5 years of the diagnosis of diabetes.
- Adults with type 2 diabetes should have an initial dilated and comprehensive eye examination shortly following the diagnosis of diabetes.
- Subsequent examinations for patients with type 1 and type 2 diabetes should be repeated annually.
- A qualified eye care professional may recommend less frequent exams.
- Examinations will be required more frequently if retinopathy is progressing.
- Women with preexisting diabetes should have a comprehensive eye examination when planning pregnancy and should be counseled on the risk of development and/or progression of diabetic retinopathy.
- Women with diabetes who become pregnant should have a comprehensive eye examination in the first trimester and close follow-up throughout pregnancy and for 1 year postpartum.
- Retinal screening is not necessary for women who develop gestational diabetes because these women are not at increased risk for diabetic retinopathy.
- In general, small doses of aspirin are safe for preventive therapy in patients with retinopathy; when in doubt, consult a diabetic eye disease specialist.
- Anyone with a change or loss of vision requires prompt referral.

*Source:*  
Summary

Neuropathy is a disorder of the peripheral nervous system resulting in loss of nerve fibers affecting many bodily functions. There are several syndromes of diabetic neuropathy, the most common being distal symmetric polyneuropathy (DPN) and autonomic neuropathy. The diabetic neuropathies are heterogeneous with diverse clinical manifestations. Specific treatment for the underlying nerve damage is currently not available. Improved glycemic control may slow progression but rarely reverses neuronal loss. Effective symptomatic treatments are available for the manifestations of DPN and autonomic neuropathy. Early recognition and appropriate management of neuropathy in the patient with diabetes is important for a number of reasons:

• Non-diabetic neuropathies may be present in patients with diabetes and may be treatable.
• A number of treatment options exists for symptomatic diabetic neuropathy.
• Up to 50% of DPN may be asymptomatic and patients are at risk of insensate injury to their feet.
• Autonomic neuropathy may involve every system in the body.
• Cardiovascular autonomic neuropathy causes substantial morbidity and mortality.
• Sexual dysfunction in both men and women can be a symptom of neuropathy.

Please refer to Foot Inspection and Monofilament Use Guide for additional information about DPN.

Diabetic Autonomic Neuropathy

Patients with diabetes should be screened for presenting signs and symptoms of diabetic autonomic neuropathy as part of the initial history and review of systems.

Cardiac
• Resting tachycardia (> 100 bpm)
• Exercise intolerance
• Orthostatic hypotension (a fall in systolic blood pressure > 20 mmHg upon standing)

Gastrointestinal
• Esophageal enteropathy
• Gastroparesis
• Constipation
• Diarrhea
• Fecal incontinence

Genitourinary Tract
• Recurrent urinary tract infections
• Pyelonephritis
• Incontinence
• Palpable bladder
• Loss of penile erection
• Retrograde ejaculation
• Sexual dysfunction in female

Additional Concerns
• Hyper- or hypohidrosis (inability to sweat or excessive sweating)
• Impaired neurovascular function
• Hypoglycemia unawareness

Treatment for Autonomic Neuropathy

The first step towards the goal of slowing the progress of diabetic neuropathies is to achieve and maintain optimal glycemic control. Improving labile blood glucose values may have an impact on symptoms as well. A number of pharmacological agents are used to treat the symptoms of autonomic neuropathies such as gastroparesis, bladder dysfunction, and sexual dysfunction. Although they do not change the underlying pathology of the disease, they may have an impact on the patient’s quality of life.

Sources:

(continued on reverse)
Disorders of the Feet

Summary

Foot ulcers and amputations resulting from neuropathy and/or peripheral vascular disease are major causes of disability and morbidity among people with diabetes. The risk of ulcers or amputations is increased in people who have had diabetes for 10 or more years, are male, have poor glucose control, smoke, or have cardiovascular, retinal, or renal complications. Early recognition of problems and risk factor management can delay or prevent unfavorable outcomes.

Screening

Risk Identification

The following conditions are associated with an increased risk for amputation:

- Smoking
- Peripheral neuropathy with loss of protective sensation
- Altered biomechanics
- Evidence of increased pressure (hemorrhage under a callus, erythema)
- Bony deformity
- Peripheral vascular disease (PVD)
- History of ulcers or amputation of the other limb
- Severe nail pathology

Risk Category

Low Risk

High Risk

All of the following:

• Intact protective sensation
• Pedal pulses present
• No severe deformity
• No prior foot ulcer
• No amputation

One or more of the following:

• Loss of protective sensation
• Absent pedal pulses
• Severe foot deformity
• History of foot ulcer
• Prior amputation

Recommendations

• Perform a visual foot inspection at each primary care visit.
• Conduct an annual comprehensive foot exam. The exam may take place in the primary care setting and should include a visual inspection and palpation for pulses as well as a sensory evaluation using a tuning fork or a Semmes-Weinstein monofilament. See monofilament and tuning fork instructions.
• Provide self-care education to all patients, especially those with risk factors such as smoking or prior lower extremity complications.
• Refer high-risk patients to a foot care specialist for ongoing preventive care.
• Screen for peripheral artery disease (PAD) by assessing the pedal pulses and evaluating for a history of claudication. Consider obtaining an ankle-brachial index (ABI) as many patients with PAD are asymptomatic.
• Refer patients with significant claudication or a positive ABI for further vascular assessment.
• Offer a multidisciplinary approach for patients with foot ulcers and high-risk feet.
Disorders of the Feet
Symptomatic Treatments

- Aim for stable and optimal glycemic control.
- Avoid extreme blood glucose fluctuations.
- Some patients may need pharmacological treatment for pain associated with distal symmetric polyneuropathy (DNP).\textsuperscript{15}

Medications for consideration to treat neuropathy pain are of the following:

- Tricyclics: amitriptyline, nortriptyline, imipramine; selective serotonin reuptake inhibitors (SSRIs); 5-hydroxytryptamine and norepinephrine uptake inhibitor (SNRIs) ( duloxetine)
- Anticonvulsants (gabapentin, pregabalin)
- Substance P inhibitors (capsaicin cream)

Many agents have efficacy confirmed in published randomized controlled trials. The choices of treatment will depend on contraindications as well as reimbursement.

Compared with other anticonvulsants, pregabalin has a rapid onset of action, 1 to 2 days. It also has predictable pharmacokinetics, so that the dosing is much more predictable than with gabapentin. When insurance issues prevent the use of pregabalin, use gabapentin or a tricyclic if not contraindicated. Tricyclics should be used with caution in the elderly. Capsaicin is effective but requires up to 4 weeks to show a maximal effect.

Assessing Protective Sensation

Use of the Semmes-Weinstein monofilament
• Have the patient look away or close his or her eyes.
• Hold the filament perpendicular to the skin.
• Avoiding any ulcers, calluses, or sores, touch the monofilament to the skin until it bends. Hold in place for approximately 1.5 seconds, then gently remove it.
• Randomly test the sites shown on the diagram to the right.
• Elicit a response from the patient at each site. Lack of sensation at any site may indicate diabetic neuropathy.
• The monofilament may be cleaned with 1:10 sodium hypochlorite solution if contaminated with blood or body fluids.

Tuning fork instructions
• Strike a 128 Hz tuning fork (hard enough to make a noise).
• Place the vibrating tuning fork on the dorsum of the great toe, just proximal to the nail bed.
• With the hand that is not holding the tuning fork, place a finger on the plantar surface of the same toe.
• Have the patient close his or her eyes and inform you when vibration is no longer perceived.
• Gauge the difference between when the patient stops feeling the vibrating tuning fork and when you stop sensing vibration. The patient who stops feeling the vibration almost immediately is indicative of severe loss.
• If the patient and examiner stop feeling the vibration at nearly the same moment, vibratory perception is considered normal.
• Intermediate losses can be judged as mild or moderate loss of perception.
• Some clinicians recommend counting how long the patient perceives the vibration and use 10 seconds as a cut-off for normal perception.

Monofilament Resources

All monofilaments are 5.07 (10 gm)

Lower Extremity Amputation (LEAP) Program
Bureau of Primary Health Care (BPHC)
1-888-ASK-HRSA
www.bphc.hrsa.gov/leap
Disposable

Medical Monofilament Manufacturing, LLC
1-508-746-7877
www.medicalmonofilament.com
Disposable
$0.19-$0.23

Mid-Delta Home Health and Hospice
1-800-543-9055
www.middelta.com
Durable
$10.00 each

North Coast Medical, Inc.
1-800-821-9319
www.ncmedical.com
Durable
$25.95 each
Set of six, assorted sizes: $124.95

Sammons, Pruss, Rolyan
Durable
1-800-558-8633
$19.99 each
Set of five, assorted sizes: $99.99

Sources:
Periodontal disease is more common among people with diabetes. Young adults with diabetes have about twice the risk for periodontal disease than those without. Almost one-third of people with diabetes has severe periodontal disease with loss of attachment of the gums to the teeth measuring 5 millimeters or more. Periodontal disease progresses more rapidly, is often more aggressive, and difficult to treat in people with diabetes than in people without diabetes.

Defined as a bacterially-induced chronic inflammatory process, periodontal disease destroys connective tissue and bone supporting the teeth, leading to tooth loss. Recent research suggests a bidirectional relationship between diabetes and periodontal disease in that people with diabetes are more susceptible, and the presence of periodontal disease can negatively impact glycemic control.

Symptoms of periodontal disease include red, swollen, tender, and bleeding gums, receding gums, evidence of pus upon gum compression, persistent bad breath, loose permanent teeth, change in bite, or change in the fit of dentures. Most individuals with diabetes do not have pain with periodontal disease and some may be asymptomatic.

Concurrent risk factors that increase the chances of developing periodontal disease include: disease duration, poor metabolic control, presence of other long-term complications, smoking, plaque, and hormonal variations as in adolescence, pregnancy, and menopause. Mouth care is often overlooked when managing the other issues associated with diabetes.

**Recommendations**

- Conduct an oral exam as part of the yearly comprehensive visit.
- Advise patients of the importance of oral hygiene.
- Promptly refer patients with symptoms of periodontal disease for dental evaluation.
- Encourage patients to receive dental follow-up twice a year, and more often if necessary.

**Sources:**


Purpose

Diabetes self-management education (DSME) should be offered throughout the life cycle of those diagnosed with diabetes and prediabetes. Families and support systems are encouraged to participate. The main aims of DSME are to provide patients with the management skills necessary to achieve optimal control of their diabetes, and to assist them in becoming effective, self-directed decision makers for their own diabetes care, health, and well-being. Without comprehension of the relationship between blood glucose readings, meal planning, and physical activity, patients with diabetes will be hindered in their ability to achieve optimal blood glucose control, and are at higher risk for long-term complications. A referral to a Certified Diabetes Educator (CDE) or clinician who has expertise in culturally competent DSME is strongly recommended. A CDE may be a nurse, physician, dietitian, social worker, exercise physiologist, or pharmacist.

Goals

• Prevent the acute complications of diabetes, hyperglycemia, and hypoglycemia
• Prevent or delay the chronic complications of diabetes
• Promote healthy birth outcomes through preconception counseling, monitoring, and support during and after pregnancy
• Enhance patient participation in diabetes treatment
• Plan and improve patient confidence in self-management skills
• Enhance psychosocial adjustment to living with a chronic disease
• Decrease health care costs by reducing the need for expensive hospital stays and treatment of complications
• Maximize quality of life in a cost-effective manner

A referral for a face-to-face educational assessment is recommended. This allows for an appropriate educational treatment plan to be outlined. DSME is offered at both basic survival and advanced training levels. Consideration should be given to the patient for dealing with psychosocial aspects of the diagnosis. Literacy and cultural issues that may impact training should also be evaluated.

Standards established by the American Diabetes Association (ADA) require that the following areas be covered in DSME. Standards are reviewed and updated on a regular basis and the most current standards can be accessed on the ADA website.\(^34\)

Diabetes disease process

• Overview
• Benefits of optimal diabetes control and factors that influence it
• Effects of insulin resistance, deficiency, and excess
• Treatment of insulin resistance through weight loss, physical activity, and medication
• Nature of diabetes in terms of chronicity and metabolism
• Differences between type 1 and type 2 diabetes
• Balance of meals, physical activity, and medication, if prescribed

Nutrition

• Basic vs. advanced training (carbohydrate to insulin ratio)

Physical activity

• Impact of physical activity on blood glucose, lipid levels, hypertension, weight, and stress reduction
• Frequency, level, and benefits of physical activity
• Impact of physical activity on hyperglycemia, ketosis, and hypoglycemia
• Physical activity planning appropriate to age, ability, interest, and willingness
• Potential impact of physical activity on existing long-term diabetes complications and skills for avoiding injury

Medications

• Oral medication management
  • Action, side effects, timing of dose(s), interactions
• Insulin management
  • Action, dosage, onset/peak/duration, pre-filling, mixing, injecting, site selection, storage, syringe disposal, travel guidelines, adjustments (sick and well days)
  • Recommendations for syringe reuse: techniques, benefits, and risks
  • Pump or inhaled insulin use, if appropriate
  • Use of Glucagon, if appropriate
• Injectable medication if prescribed
• Influences of other medications on blood glucose and possible interactions with oral diabetes medications
• Possible drug interactions with other oral medications

Monitoring/using results

• Blood glucose meter selection and orientation
• Time(s) to check blood sugar/rationale
• Recording and interpreting of results, encouraging dialogue with clinician
• Establish A1C targets

\(^33\)National Certification Board for Diabetes Educators, http://www.ncbde.org/.

(continued on reverse)
• Use of self-monitoring of blood glucose to adjust the treatment plan based on approved guidelines
• Disposal of lancets, needles, and other contaminated materials
• Performance of urinary and blood ketone testing, if appropriate
• Use of advanced technology: Continuous Glucose Monitoring System (CGMS) if appropriate

**Acute complications**

• Hypoglycemia and hyperglycemia recognition, causes, treatment, and prevention
• Sick day management
• Trauma, surgery, and/or severe acute illness
• Planning skills for scheduled procedures and surgeries
• Potential changes in blood glucose monitoring
• Meal planning changes: short- and long-term where applicable (e.g., surgeries, illness > 1-2 days)
• Potential changes in medication (e.g., addition of insulin to oral medications or insulin initiation, times, and frequency of insulin doses)
• Signs and symptoms of acute changes in status of diabetes control (e.g., Diabetic Ketoacidosis (DKA), dehydration, Hyperosmolar Hyperglycemic State (HHS))
• Importance of strict glycemic control during:
  • Pre-surgical preparation
  • Treatment series
  • Recovery period

**Complications prevention and recognition**

• Self-foot care, early detection of problems, and importance of timely access to care
• Early recognition of eye disease and need for complete eye exam
• Impact of lipids; importance of monitoring annually or every two years if values fall within accepted risk levels
• Importance of blood pressure control; need for regular monitoring
• Identification of the symptoms, treatment, and major factors contributing to the development of complications
• Preventing kidney disease, peripheral vascular disease, cardiovascular disease, periodontal disease, and neuropathy
• Importance of pneumonia vaccine and yearly flu vaccine
• Smoking cessation
• Use of aspirin if not contraindicated

**Psychosocial adjustment**

• Assess adjustment to lifestyle change; screen for depression, eating disorders, and cognitive impairment; refer to counseling as needed
• Develop psychosocial skills and incorporate into routine care to support emotional well-being
• Ongoing support

**Preconception care, pregnancy, and GDM (if applicable)**

Advances in treatment options are continuing; DSME should be offered annually after initial diagnosis and training to ensure that patients are current in changing technology and self-management behavioral strategies.

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Source:
Purpose

Medical nutrition therapy (MNT) is an integral component of assisting patients in acquiring and maintaining the knowledge, skills, and behaviors to successfully meet the challenges of daily diabetes self-management. The 2006 Nutrition Recommendations and Interventions for Diabetes, published by the American Diabetes Association, identifies three categories of medical nutrition therapy: primary prevention to reduce the risk of or delay the onset of diabetes; nutrition management for blood glucose control; and management and prevention in the treatment of comorbidities. Adequate nutrition advice or an individualized meal plan will assist patients in achieving optimal blood glucose control. Meeting nutrition-related goals requires a coordinated team effort that includes the person with diabetes. A referral to a registered dietitian skilled in the complexities of diabetes management is strongly recommended.

Motivational interviewing, a counseling technique shown in studies to be beneficial in behavioral change, should be utilized in working with clients around modifying nutritional intake.

Goals

• Achieve and maintain near normal blood glucose levels as well as optimal lipid levels, blood pressure, and recommended body weight.
• Prevent and treat the acute and long-term complications of diabetes.
• Improve overall health through optimum nutrition and physical activity.
• Address individual needs, considering cultural preferences, lifestyle, and ability to change.
• Maintain the pleasure of eating by only limiting food choices when indicated by scientific evidence.
• Delay the onset of diabetes in patients with pre-diabetes.
• Provide for the needs of special populations:
  • Youth with type 1 or type 2 diabetes;
  • Pregnant and lactating women;
  • Older adults;
  • Active individuals treated with drugs that may potentially cause hypoglycemia (insulin and insulin secretagogues and meglitinides) to ensure safety during activity;
  • Individuals at risk for developing diabetes;
  • Individuals with deteriorating renal or cardiac function; and
  • Individuals with deteriorating visual acuity.

Basic Education

For patients newly diagnosed with diabetes or pre-diabetes, or patients not recently educated, basic survival skills should include:

• Relationship of food and meals to blood glucose levels, medication, and physical activity
• Monitoring of total grams of carbohydrate intake
• Basic food/meal plan guidelines, including portion control
• Consistent times each day for meals and snacks
• Recognition, prevention, and treatment of hypoglycemia
• Sick day management
• Self-monitoring of blood glucose

Ongoing Nutrition Self-Management

Ongoing nutrition education is recommended for patients recently diagnosed with diabetes or pre-diabetes who have been taught basic survival skills or those who have not received current nutrition education. Others who may benefit from nutrition self-management education include patients having difficulties with diabetes management or those experiencing changes in lifestyle, medication, weight, or childbearing status. Follow-up sessions should focus on increasing the patient’s knowledge, skills, and flexibility as he or she gains experience living with diabetes.


(continued on reverse)
MNT topics should include:

- Weight loss strategies, including reduction in energy intake and/or increase in physical activity, if indicated; consideration of medications and/or bariatric surgery for those with a BMI > 35
- Amount (grams) and type of carbohydrate in food and influence on blood glucose levels
- Use of meal replacements if desired
- Glycemic index
- Sources of nutrients and their effects on blood glucose and lipid levels
- Carbohydrate (CHO) counting
- Label reading and grocery shopping guidelines
- Dining out
- Reduced dietary energy from fat (~ 30% of total energy)
- Use of sugar-containing foods, dietetic foods, and sweeteners
  - Sugar alcohols and nonnutritive sweeteners are safe when consumed within the acceptable daily intake levels established by the Food and Drug Administration (FDA).
- Alcohol guidelines
  - If adults with diabetes choose to use alcohol, daily intake should be limited to a moderate amount (one drink per day or less for adult women and two drinks per day or less for adult men).
- Using blood glucose monitoring for glucose pattern control
- Adjusting meal times
- Adjusting food for physical activity
- Special occasions, holidays
- Travel, schedule changes
- Vitamin and mineral supplementation
  - Routine supplementation with antioxidants, such as vitamins E and C and carotene, is not advised because of lack of evidence of efficacy and concern related to long-term safety.
  - Benefit from chromium supplementation in people with diabetes or obesity has not been conclusively demonstrated, and therefore cannot be recommended.

Low carbohydrate (CHO) diets (restricting total CHO to < 130 g/day) are not recommended in the management of diabetes.

Program components should include:

- Individualized counseling
- Structured, intensive lifestyle education
- Promotion of healthy food choices and physical activity

Sources:


Purpose

Physical activity is an important component of a healthy lifestyle that can positively impact the prevention of diabetes and its complications. The use of the term “physical activity” is preferred to “exercise” because it includes the spectrum of options from mild (e.g., walking or light housekeeping) to moderate (e.g., brisk walking, dancing, swimming, bicycling) to vigorous (e.g., jogging, bicycling uphill, swimming multiple laps). The metabolic effects of physical activity are generally measurable up to 24-48 hours after a single bout. Therefore, repeated bouts of physical activity (generally 5-7 times per week) are recommended to achieve ongoing benefits.

Goals

The overall goals of physical activity are to improve glycemic control, maintain a healthy weight, and decrease cardiovascular risk. These goals should address the individual’s preferred method of becoming more physically active to help improve their sense of well-being and maintaining balance to prevent falls.

Basic Education

- Relationship of physical activity to change in blood glucose levels
- Impact of physical activity on risk for hypoglycemia (especially in patients taking sulfonylureas, meglitinides, or insulin preparations)
- Potential for impact of physical activity on blood glucose levels 12-24 hours after completion
- Types of physical activity
- Preventing injuries

Aerobic Activity

≥ 150 minutes per week of moderate intensity
or
≥ 90 minutes/week of vigorous intensity

Aerobic activity should be distributed over at least three days per week with no more than two days between activities. Prior to starting a physical activity program involving moderate or vigorous efforts, most people with type 2 diabetes should undergo a graded exercise tolerance test, particularly if they have been previously sedentary.

Conditions that may contraindicate moderate to vigorous activity include:

- Uncontrolled hypertension (risk for CVD)
- Peripheral neuropathy (risk for lower extremity injury)
- Severe autonomic neuropathy (risk for CVD) or hypoglycemia unawareness
- Pre-proliferative or proliferative retinopathy or macular edema (risk for retinal detachment or vitreous hemorrhage)
- Blood glucose concentration ≥ 250 mg/dl with ketones or ≥ 300 mg/dl without ketones

Resistance Training

- Three times per week targeting all major muscle groups. Start by identifying a weight that cannot be lifted more than 8-10 times. Use this weight and gradually increase to three sets of 8-10 repetitions.
- Not recommended for people with significant retinopathy due to risk of retinal detachment or vitreous hemorrhage.

In order to promote or sustain weight loss, increased physical activity beyond the above guidelines may be needed. Recommendations include 60 minutes/day of moderate intensity physical activity to prevent weight gain and 60-90 minutes/day to promote and sustain weight loss.*

Sources:


Patients with diabetes who smoke have a heightened risk of morbidity and premature death due to macrovascular complications. Smoking is also related to the premature development of microvascular disease and may have a role in the development of type 2 diabetes.

The cardiovascular burden of diabetes in combination with smoking is not being consistently presented to people with diabetes. Only about half of the smokers with diabetes have been advised to quit smoking by their health care providers. Screening for smoking status should be a part of routine care and should include conducting brief interventions with tobacco users at every visit, prescribing smoking cessation medications, and referring tobacco users for more intensive smoking cessation counseling.

**Remember the 5As: Ask, Assess, Advise, Assist, and Arrange follow-up.**

**Screen for Tobacco Use**

- **Ask** about smoking at every visit. Document smoking status in the medical record.
- For adults who have never smoked, flag the record to avoid repeat questions.
- For adults who have previously smoked, check for relapse.

**Conduct Brief Interventions with Tobacco Users**

- **Assess** readiness to quit among current tobacco users.
- **Advise** all smokers of the importance of quitting, describing the added risks of smoking and diabetes.
- **Assist** those ready to quit by establishing a quit date. Prescribe/offer pharmacological treatment, if appropriate.
- **Arrange** referral to a local smoking cessation program such as QuitWorks.

**Refer Patients for More Intensive Counseling and Support**

- QuitWorks is a free evidenced-based, fax-referral cessation counseling program available to all health care providers in Massachusetts and their patients who use tobacco. Enrollment forms can be downloaded from www.quitworks.org. See the following page for a description of the service and more information on how to enroll patients.
- Resources for patients are also available through the Try-To-STOP TOBACCO Resource Center, which operates a smokers’ helpline, a website, and QuitWorks.

1-800-TRYTOSTOP (800-879-8678) English; 1-800-8-DEJALO (800-833-5256) Spanish and Portuguese
TTY: 800-TDD-1477
www.trytostop.org

- Face-to-face counseling services are available at more than 30 health care sites in Massachusetts (community health centers, hospitals, and clinics). A list is available at www.trytostop.org.
- MassHealth (Medicaid) covers up to 16 cessation counseling sessions (30-45 min.) per member per year. See the next page for more information or go to www.quitworks.org for a list of provider FAQ, a consumer fact sheet, and other tools.

**Pharmacological Therapy**

- As with the general population, pharmacological agents increase smoking cessation rates among people with diabetes when used in conjunction with behavioral interventions.
- Nicotine replacement therapy (NRT) for 6-8 weeks is helpful for those with a moderate to severe nicotine dependence. Over-the-counter NRT therapies include the nicotine patch, nicotine gum, and the nicotine lozenge. The nicotine inhaler and nicotine nasal spray are available by prescription, but should be used with caution in patients receiving insulin.
- Non-nicotine prescription medications include bupropion (Wellbutrin, Zyban) and varenicline (Chantix). These medications can decrease the desire to smoke.
- MassHealth (Medicaid) now covers all FDA-approved smoking cessation medications. Go to www.quitworks.org for more information or call MassHealth customer service at 1-800-841-2900 or e-mail providersupport@mahealth.net.

Sources:

(continued on reverse)
Welcome to QuitWorks

In 2002, the Massachusetts Department of Public Health, in collaboration with all major health plans, launched QuitWorks, a first-of-its-kind tobacco cessation service for all Massachusetts residents. QuitWorks provides free, confidential information and tobacco treatment counseling by telephone for any Massachusetts resident, regardless of health insurance coverage. It is operated by the Try-To-STOP TOBACCO Resource Center in Boston. QuitWorks has been introduced to more than 4,000 physician practices, and as of spring 2007, 30 hospitals and 15 community health centers had become formal adopters of QuitWorks, integrating the program into their systems and routine patient care. QuitWorks has also been adapted for statewide and community-based public health programs. It can be customized for both office and home-based programs by contacting the University of Massachusetts Medical School (UMMS) Center for Tobacco Prevention and Control at 508-856-4099 or the Massachusetts Department of Public Health (MDPH) Tobacco Control Program at 617-624-5900.

How It Works

Using a simple enrollment form, any physician, nurse, or other clinician in a hospital, practice, or health center can easily and quickly enroll any patient who uses tobacco, regardless of health insurance status. The enrollment forms are faxed to the Try-To-STOP TOBACCO Resource Center.

When the form is received, the Resource Center calls the patient, completes a patient assessment, and offers the patient the state’s free, proven-effective stop-smoking services. Every referring provider will receive a fax-back report within a week to confirm contact with their patient and services accepted. About seven months later, QuitWorks calls the patient to assess their smoking status and faxes a report on patient outcomes to their health care provider.

MassHealth (Medicaid) Tobacco Cessation Program Benefit

Effective July 1, 2006, MassHealth (Medicaid) recipients in Massachusetts have access to smoking cessation medications and counseling support. Since tobacco use is an addiction and stopping may require multiple attempts, the new benefit has been designed by MassHealth to allow members and providers as much flexibility as possible in accessing evidenced-based counseling for smoking cessation and all FDA-approved medications.

Counseling and Medications Covered. The new benefit covers all FDA approved medications (over-the-counter and prescription) and members may access two 90-day treatment regimens per year with no prior authorization (except for nasal spray, inhaler, and brand name Zyban). The new benefit also covers up to 16 face-to-face counseling sessions per 12-month cycle with no authorization. These sessions may include any combination of individual or group counseling sessions and two intake/assessment sessions per year. More counseling and medications, beyond the two regimens per year, may be available with prior authorization from MassHealth.

Qualified Providers. Providers who may offer cessation counseling under the new benefit include physicians, nurse practitioners, nurse midwives, registered nurses, physicians’ assistants, and qualified Tobacco Cessation Counselors. A qualified Tobacco Cessation Counselor must have completed at least 8 hours of training from an accredited institution of higher learning, and all non-physician providers must be under the supervision of a physician, except for independent nurse practitioners and nurse midwives. A range of on-line and in-person cessation counselor training options are available through the University of Massachusetts Medical School. Go to www.quitworks.org for an intake/assessment protocol and access to University of Massachusetts Medical School CEU trainings for providers.

For more information, visit www.quitworks.org, call MassHealth customer service at 1-800-841-2900, or e-mail providersupport@mahealth.net.
Psychosocial issues may prevent people with diabetes from adhering to the recommended medical regimen. Stressors such as family issues, insufficient financial or social resources, eating disorders, and cognitive impairment may impact a patient's ability to carry out necessary diabetes care tasks. In addition to obtaining a history of previous psychiatric treatment, it is important to provide timely identification of issues that may impact or be symptomatic of depression.

In particular, depression in people with diabetes requires careful management due to its severe impact on comorbid conditions as well as on the individual's quality of life. Depression is known to affect glycemic control and micro/macrovascular complications. In addition, depressive symptoms play a more important role in mortality among people with diabetes than in those without. For adults with diabetes, the presence of two or more coexisting chronic conditions, particularly coronary artery disease, chronic arthritis, and stroke, increase the chances of developing major depression.

Compared to patients with diabetes who are without depression, those who are depressed require more costly care. These differences are partly related to non-adherence to medication regimens and worsened self-care skills. Depressive symptoms impact subsequent physical symptoms of poor glucose control by influencing patients' ability to adhere to their self-care regimen.

Primary care clinicians may choose to refer patients for management of psychological problems. However, utilizing the patient-provider relationship as a foundation for further treatment can increase the likelihood that the patient will accept referral for other services.

**Screening**

- It is important to include psychosocial evaluation as an integral component of the initial assessment for a patient with diabetes. Other opportunities for screening will occur during regularly scheduled management visits, as well as at times of medical status change such as the occurrence of a hospitalization, the development of a complication, or when problems with glucose control are identified.
- Screening should include but is not limited to: psychiatric history, affect/mood, quality of life attitudes, medical management expectations, and availability of and ability to access financial, social, and emotional resources.
- Screening for depression, eating disorders, and cognitive impairment is needed when adherence to the medical regimen is poor.

**Recommendations**

- Incorporate psychological screening and treatment into routine care rather than waiting for identification of a specific problem or deterioration in psychological status. The following two questions have shown high sensitivity and specificity:
  - “During the past month, have you often been bothered by feeling down, depressed, or hopeless?”
  - “During the past month, have you often been bothered by little interest or pleasure in doing things?”
- Treat depression or refer to a mental health specialist for depression treatment.
- Immediately refer to a mental health specialist familiar with diabetes management if self-harm or an eating disorder is suspected. A referral is also recommended if a problem is suspected to be organic in origin or when cognitive function is impaired.

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Source:


Summary

Several reports have documented increased morbidity and mortality with elevated glucose levels during inpatient hospitalization, predominantly in patients undergoing cardiac bypass graft surgery. Studies have also documented benefits to patients in intervention groups with lower blood glucose levels (mostly post-operatively) compared with control groups. In addition to benefiting people with diabetes, many of these studies have demonstrated benefit for people with elevated glucose levels as inpatients. The precise optimal level of control remains unclear and while several algorithms exist for reducing blood glucose concentrations, it is also unclear whether one regimen is clearly better than another. Other issues being debated include whether intensive control needs to occur in the operating room, whether intensive control targets change after transfer from an intensive care setting, and what is an optimal discharge therapeutic regimen for inpatients managed on insulin.

A more complete assessment of this topic is underway and a supplement to these guidelines is planned. Until then, broad guidelines and recommendations include:

• High-risk patients should be evaluated for undiagnosed type 2 diabetes.
• Sliding scale insulin does not adequately control inpatient glucose concentrations.
• Intravenous insulin effectively decreases blood glucose concentrations in intensive care settings and reduces morbidity and mortality in surgical intensive care unit patients, including rates of sepsis, wound healing, arrhythmia, ventilator duration, and Intensive Care Unit (ICU) length of stay.
• In ICU settings, hypoglycemia is generally infrequent and limited.
• Regimens for intensive insulin therapy should utilize general principles expressed throughout literature but should also be modified based on specifics of the individual institution.
• Regimens should be responsive to factors that may rapidly affect risk for hyper- or hypoglycemia such as:
  • changes in enteral/parenteral feeds (content, rate of delivery, temporary or permanent cessation);
  • order for NPO;
  • prolonged period outside of ICU;
  • changes in intravenous glucose solution content;
  • use of steroids or pressors (increasing or decreasing doses); and
  • sudden changes in clinical status (sepsis, acute renal failure).
• Institutions should prepare for transition from ICU to general areas of the hospital by:
  • arranging for follow-up glucose testing after intravenous insulin is stopped;
  • planning for follow-up insulin needs (short-acting during transfer and long-acting during subsequent days).
• Patients need to be educated that inpatient use of insulin does not commit them to permanent insulin therapy after discharge.
• Patients with hyperglycemia as inpatients, but without a previous diagnosis of diabetes, should have follow-up fasting glucose testing as outpatients.

Sources:
Components of the Comprehensive Diabetes Evaluation

Medical History
- Age and characteristics of onset of diabetes (e.g., DKA, routine laboratory evaluation)
- Prior A1C records
- Eating patterns, nutritional status, and weight history
- Diabetes education history
- Review of previous treatment programs
- Current treatment of diabetes, including medications, meal plan, and results of glucose monitoring and patient’s use of data
- Physical activity history
- DKA frequency, severity, and cause
- Hypoglycemic episodes
  - Any severe hypoglycemia: frequency, severity, and cause
- History of diabetes-related complications
  - Microvascular: eye, kidney, nerve
  - Macrovascular: cardiac, CVD, peripheral arterial disease (PAD)
  - Other: sexual dysfunction, gastroparesis
- Tobacco use
- Pneumococcal immunization
- Last influenza immunization

Physical Examination
- Blood pressure determination, including orthostatic measurements when indicated
- Fundoscopic examination
- Thyroid palpation
- Skin examination (for acanthosis nigricans and insulin injection sites)
- Neurological/foot examination
- Palpation of dorsalis pedis (DP) and posterior tibial (PT) pulses
- Presence/absence of patellar and Achilles reflexes
- Determination of proprioception, vibration, and monofilament sensation
- Cardiovascular exam (neck vein distention, peripheral pulses, irregular rhythm, S3 for heart failure)
- Pulmonary exam (check for heart failure)
- Abdominal exam (check for enlarged liver or tenderness due to gallbladder disease, etc.)

Depression Screening

Laboratory Evaluation
- A1C
- Fasting lipid profile, including total, LDL, and HDL cholesterol and triglycerides
- Liver function tests
- Test for microalbuminuria
- Serum creatinine and calculated GFR
- Thyroid-stimulating hormone
- Consider screening for celiac disease in type 1 diabetes and as indicated in type 2 diabetes

Referrals
- Eye exam, if indicated
- Family planning for women of reproductive age
- Medical nutrition therapy
- Diabetes self-management education upon diagnosis and update annually
Disaster Preparations for People with Diabetes

People with diabetes face particular challenges to their health care if there is a disaster. If told to evacuate, it is important for patients to let people know they have diabetes and any related conditions so they can obtain appropriate care. It is also important to prevent dehydration by drinking enough fluids, which can be difficult if drinking water is in short supply. In addition, it is helpful for people with diabetes to keep something containing sugar with them at all times, in case they develop hypoglycemia. To prevent infections, to which people with diabetes are more susceptible, careful attention should be paid to the health of their feet and getting medical treatment for any wounds. The following list can be used to pack a disaster kit.

1. Good diabetes education with a special focus on self-management skills and stress management.
2. Up-to-date with all immunizations, including tetanus.
3. Keep a waterproof and insulated disaster kit containing the following items:* 
   a. List of items to pack during an evacuation
      i. Glucose testing strips, lancets, and a glucose testing meter
      ii. Medications, including insulin
      iii. Syringes
      iv. Glucose tabs or gel
      v. Antibiotic ointments/creams for external use
      vi. Glucagon kit
   b. A list of contact information for national organizations, such as the American Diabetes Association, available from their help lines or the Internet
   c. Photocopies of relevant medical information, such as lab tests or procedures
   d. Up-to-date information on all oral medications and insulin, including formulation and dosing. If possible, have the prescription number available. Many chain pharmacies throughout the country may be able to refill based on the prescription number alone.
4. Evacuate early if possible, taking the above items with you.

* Check for expiration dates on supplies; disaster kits should be reviewed and replenished at least twice yearly.

Source:
<table>
<thead>
<tr>
<th>History &amp; Physical</th>
<th>Frequency</th>
<th>Description/Comments</th>
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<tbody>
<tr>
<td>Blood pressure, Height and Weight</td>
<td>Every 3-6 months</td>
<td>If BP &gt; 130/80 initiate measures to lower</td>
</tr>
<tr>
<td>Dilated Eye Exam</td>
<td>Annual</td>
<td>Refer to ophthalmologist or optometrist</td>
</tr>
<tr>
<td>Foot Exam</td>
<td>Every 3-6 months</td>
<td>Visual exam w/o shoes and socks every routine diabetes visit</td>
</tr>
<tr>
<td>Comprehensive Lower Extremity Sensory Exam</td>
<td>Initial/Annual</td>
<td>Teach protective foot behavior if sensation diminished. Refer to podiatrist if indicated. See Foot Inspection and Monofilament Use in packet</td>
</tr>
<tr>
<td>Dental Exam</td>
<td>Every 6 months</td>
<td>Refer to dentist</td>
</tr>
<tr>
<td>Smoking Status</td>
<td>Ongoing</td>
<td>Check every visit/Encourage smoking cessation See Tobacco Use and Diabetes in packet</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Labs</th>
<th>Frequency</th>
<th>Description/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1C</td>
<td>Every 3-6 months</td>
<td>Ideal goal &lt; 7.0% or &lt; 1% above lab norm Action required at &gt; 8%, make changes in regime</td>
</tr>
<tr>
<td>Fasting/Casual Blood Glucose</td>
<td>As Indicated</td>
<td>Compare lab results with glucose self-monitoring</td>
</tr>
<tr>
<td>Fasting Lipid Profile</td>
<td>Annual</td>
<td>See Cardiovascular Risk-Reduction Guidelines in packet</td>
</tr>
<tr>
<td>Urine Microalbumin/Creatinine</td>
<td>Initial/Annual</td>
<td>If abnormal, recheck x2 in a 3-month period, then treat if 2 out of 3 collections show elevated levels</td>
</tr>
<tr>
<td>Serum Creatinine</td>
<td>Annual</td>
<td>Measure annually for estimation of glomerular filtration (GFR)</td>
</tr>
<tr>
<td>EKG</td>
<td>Initial</td>
<td>If patient is &gt; 40 years old or DM ≥ 10 years</td>
</tr>
<tr>
<td>Thyroid Assessment</td>
<td>Initial/As Indicated</td>
<td>Thyroid palpation, thyroid function test(s) if indicated</td>
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<tr>
<th>Recommended Immunizations</th>
<th>Frequency</th>
<th>Description/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flu</td>
<td>Every Fall</td>
<td>Also revaccination x1 if ≥ 65 and 1st vaccine &gt; 5 years ago and patient &lt; 65 at the time of 1st vaccine</td>
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<tr>
<td>Pneumovax</td>
<td>Recommended</td>
<td>Once</td>
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<thead>
<tr>
<th>Self-Management</th>
<th>Frequency</th>
<th>Description/Comments</th>
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</thead>
<tbody>
<tr>
<td>Review Self-Management Skills</td>
<td>Initial/Ongoing</td>
<td>Check self-monitoring log book, diet, physical activity, and meds</td>
</tr>
<tr>
<td>Review Treatment Plan</td>
<td>Initial/Ongoing</td>
<td>Refer for Diabetes Self-Management Education if indicated</td>
</tr>
<tr>
<td>Review Education Plan</td>
<td>Initial/Ongoing</td>
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<tr>
<th>Counseling</th>
<th>Frequency</th>
<th>Description/Comments</th>
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<tbody>
<tr>
<td>Review Nutrition Plan</td>
<td>Initial/Ongoing</td>
<td>Refer for Medical Nutrition Therapy if indicated</td>
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<tr>
<td>Review Physical Activity Plan</td>
<td>Initial/Ongoing</td>
<td>Assess/Prescribe based on patient's health status</td>
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<tr>
<td>Tobacco Use</td>
<td>Annual/Ongoing</td>
<td>Assess readiness/Counsel cessation/Refer to QuitWorks or other smoking cessation program</td>
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<tr>
<td>Psychosocial Adjustment</td>
<td>Initial/Ongoing</td>
<td>Suggest diabetes support group/Counsel/Refer</td>
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<tr>
<td>Sexuality/Impotence/Erectile Dysfunction</td>
<td>Annual/Ongoing</td>
<td>Discuss diagnostic evaluation and therapeutic options</td>
</tr>
<tr>
<td>Preconception/Pregnancy</td>
<td>Initial/Ongoing</td>
<td>Need for tight glucose control 3-6 months preconception. Consider early referral to OB/GYN</td>
</tr>
</tbody>
</table>

1 Type 1: Initial exam after 3-5 years disease duration. Type 2: Initial exam shortly after diagnosis. A qualified eye care professional may recommend less frequent exams; more frequent examinations will be required if retinopathy is progressing.
2 Every 3-6 months if patient has high-risk foot conditions.
3 2xyr for stable glycemic control. 4xyr if change in therapy or if not meeting glycemic goals.
4 More stringent goals, including a normal A1C of < 6%, can be considered in individual patients and during pregnancy.
5 If values fall in lower risk levels, assessment may be repeated every 2 years.
6 Initial urinalysis at diagnosis of type 2 diabetes. For patients with type 1 diabetes, screen for microalbumin after 5 years of disease duration. Annual microalbumin thereafter.
7 Type 1: Initial exam to begin with puberty and after 5 years disease duration.

These Guidelines are intended for community-dwelling adults. The Guidelines are not intended to replace the clinical judgement of health care providers.
Visit Frequency: 2x/yr if meeting treatment goals, 4x/yr if not meeting treatment goals

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<th>Date of Visit</th>
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<td>Diabetes Medications &amp; Doses</td>
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<td>ASA Therapy</td>
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<td>ACE inhibitor or ARB, if indicated</td>
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<td>BMI: Goal BMI &lt; 25 kg/m²</td>
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<td>BP: Goal &lt; 130/80</td>
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<td>A1C every 3-6 months: Target &lt; 7%</td>
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<td>Fasting/Casual Glucose: Goal 90-130 mg/dL, &lt; 180 1-2 hrs pc</td>
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<td>Review Blood Glucose Records ✔ when done</td>
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<td>Smoking Cessation Counseling ✔ when done</td>
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<td>Foot Exam ✔ when done</td>
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<td>Tobacco Cessation Counseling ✔ when done</td>
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<td>Psychosocial Assessment as needed ✔ when done</td>
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<td>Flu Vaccine Date</td>
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<td>Microalbumin² Date</td>
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<td>Dilated Eye Exam³ Date</td>
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<tr>
<td>Fasting Lipid Profile LDL (goal &lt; 100)⁴,⁵ Date/Values</td>
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<td>HDL (men, goal &gt; 40; women, goal &gt; 50)</td>
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<td>Triglycerides (goal &lt; 150)</td>
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<td>Total cholesterol (goal &lt; 200)</td>
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<td>Creatinine /GFR Date/Value</td>
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<td>Comprehensive Lower Extremity Exam⁴ Date</td>
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<td>Pneumonia vaccine Date</td>
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<td>EKG: if &gt; 40 years and/or DM ≥10 years Date</td>
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¹See discussion under CVD, HTN and Nephropathy in Massachusetts Guidelines for Adult Diabetes Care.

²Initial urinalysis at diagnosis; annual microalbumin thereafter. See discussion under Nephropathy.

³Type 1 DM: initial exam after 3-5 years disease duration. Type 2 DM: initial exam shortly after diagnosis. A qualified eye care professional may recommend less frequent exams; more frequent examinations will be required if retinopathy is progressing.

⁴Fasting Lipid Profile every 2 years if values fall in lower risk levels.

⁵Recommendations for an LDL goal < 70 should be considered for the patient at very high risk. See Cardiovascular Risk-Reduction Guidelines.

⁶Comprehensive lower extremity evaluation (LEE) every 3-6 months if patient has high-risk foot conditions.
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<th>Height (in.)</th>
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Classification of Overweight and Obesity by BMI, Waist Circumference, and Associated Disease Risk*

<table>
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<tr>
<th>BMI (kg/m²)</th>
<th>Obesity Class</th>
<th>Disease Risk* Relative to Normal Weight &amp; Waist Circumference</th>
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<tr>
<td>Underweight</td>
<td>&lt; 18.5</td>
<td>Men: ≤ 102 cm (≤ 40 in) Women: ≤ 88 cm (≤ 35 in)</td>
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<td>Normal</td>
<td>18.5-24.9</td>
<td>Increased</td>
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<td>Overweight</td>
<td>25.0-29.9</td>
<td>High</td>
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<tr>
<td>Obesity</td>
<td>30.0-34.9</td>
<td>High</td>
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<td>35.0-39.9</td>
<td>Very High</td>
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<tr>
<td>Extreme Obesity</td>
<td>≥ 40</td>
<td>Extremely High</td>
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</table>

REFERENCES

Refer also to specific Guideline pages for additional citations.

Diagnosis and Classification of Diabetes Mellitus


Prevention or Delay of Type 2 Diabetes


**Type 2 Diabetes Treatment Approach Principles**


**Medications**


Bristol-Myers Squibb Co. (March 2004). Prescribing information for metformin (Glucophage).

Bristol-Myers Squibb Co. (March 2004). Prescribing information for glyburide and metformin (Glucovance).

Bristol-Myers Squibb Co. (October 2002). Prescribing information for glipizide and metformin (Metaglip).


Novartis Pharmaceuticals Corporation. (January 2004). Prescribing information for nateglinide (Starlix).

(continued on next page)
REFERENCES

Novo Nordisk Pharmaceuticals, Inc. (December 2004). Prescribing information for repaglinide (Prandin).

Novo Nordisk Pharmaceuticals, Inc. (October 2004). Prescribing information for insulin aspart protamine/insulin aspart mix (NovoLog 70/30).

Pharmacia & Upjohn Co. (October 2004). Prescribing information for miglitol (Glyset).


**Cardiovascular Disease**


(continued on reverse)


**Hypertension**


**Nephropathy**


Centers for Medicare and Medicaid Services retrieved from http://www.cms.hhs.gov/MedicalNutritionTherapy/.


**Retinopathy**


**Neuropathy**


**Periodontal Disease**


**Retinopathy**


**Neuropathy**


**Diabetes Self-Management Education**


**Medical Nutrition Therapy**


**Physical Activity**


**Tobacco Use and Diabetes**


Psychosocial Issues


Inpatient Glucose Control


Components of the Comprehensive Diabetes Evaluation


Disaster Preparations for People with Diabetes


Data

diabetes

Massachusetts Guidelines for Adult Diabetes 2007 packet
For health care professionals only. Developed by the Diabetes Guidelines Work Group and the Massachusetts Diabetes Prevention and Control Program of the Massachusetts Department of Public Health. Includes Guidelines laminated summary. Guidelines are also available on CD.
Revised 2007 • 8-1/2”x11” • 57 pp • 3-hole punched • shrink-wrapped
English (#DB723) limit of 5

Massachusetts Guidelines for Adult Diabetes Care laminated summary
For health care professionals only. Laminated wall chart highlights essential components of quality diabetes management.
Revised 2007 • 8-1/2”x11” • English (#DB721)

Diabetes Care Card wallet card
For adults with diabetes. Wallet card helps people with diabetes to maintain records of medical tests and identify personal goals. Provides space to list medication and contact information for health care professionals.
2-3/4”x4-1/2” • 4-panel • English (#DB720)

Control Your Diabetes. For Life. fact sheet
For adults with diabetes. This fact sheet provides a three-part action plan. Encourages people with diabetes to know their A1c, blood pressure, and cholesterol numbers, and manage their diabetes to reach their target numbers.
8-1/2”x11” • double-sided • English (#DB742) • Portuguese (#DB743) • Spanish (#DB744)

If You Have Diabetes, You Are at High Risk for Heart Attack & Stroke brochure
For adults with diabetes. This brochure explains the link between diabetes and heart disease. Encourages people with diabetes to work with their health care team to set targets and manage the ABCs of diabetes: A1c, blood pressure, and cholesterol. Also includes a record form to track the ABCs.
3-1/2”x8” • 3-panel • English (#DB745)

Tips for Kids With Type 2 Diabetes tip sheets
For children with type 2 diabetes and their families. Set of 4 tip sheets, including: What is Diabetes?; Stay at a Healthy Weight; Be Active; and Eat Healthy Foods. Follows a simple Q & A format, defines basic medical terms associated with diabetes, and helps children understand how to manage the condition. Emphasizes the importance of maintaining a healthy diet, describes how food affects the body, and makes suggestions about how to choose appropriate foods in the school cafeteria. Emphasizes the importance of physical activity, and offers guidelines for getting regular exercise.
8-1/2”x11” • 4 sheets • reproducible • English (#DB781) • Spanish (#DB782)

Diabetes Fact Sheets
For adults with diabetes. This set of five bilingual fact sheets set shares information and resources on diabetes management (What Is Diabetes?; Do I Have Diabetes?; What Can I Do to Stay Healthy?; Low Blood Sugar, High Blood Sugar, and Sick Days; What is the Hemoglobin A1c Test?).
8-1/2”x11” • 5 sheets • reproducible • double-sided
English/Spanish (#DB729) limit of 1 set

New!

Diabetes and Your Feet brochure
For adults with diabetes. Brochure provides information about foot injuries that can be caused by diabetes. Describes symptoms and provides instructions for preventive foot care.
3-3/4”x8-1/2” • 3-panel
English (#DB707) • Haitian Creole (#DB708) • Portuguese (#DB756) • Spanish (#DB709)

Diabetes: Are You at Risk? brochure
For adults at risk for type 2 diabetes. Brochure presents risk factors for developing type 2 diabetes and emphasizes the importance of physical activity and nutrition to control, prevent, or delay diabetes. Includes descriptions of type 1 and type 2 diabetes, as well as prediabetes.
3-3/4”x8-1/2” • 3-panel
English (#DB701)

Diabetes Can Harm Your Vision brochure
For adults with diabetes. Brochure features two people with diabetes who encourage the reader to have an annual eye examination. Presents facts about diabetes and eye disease. Large type.
3-3/4”x8-1/2” • 4-panel
English (#DB704) • Haitian Creole (#DB702) • Portuguese (#DB759) • Spanish (#DB703) • Vietnamese (#DB761)

Diabetes: Are You at Risk? brochure
For adults at risk for type 2 diabetes. Brochure describes type 1 and type 2 diabetes, risks for diabetes, and symptoms. Includes space for health care professionals to record blood glucose screening results and recommendations for follow-up.
3-3/4”x8-1/2” • 3-panel • reproducible
Chinese (#DB758) • Haitian Creole (#DB702) • Khmer (#DB759) • Portuguese (#DB760) • Spanish (#DB703) • Vietnamese (#DB761)

Know Your Blood Sugar Numbers… brochure
For adults with diabetes. Easy-to-read brochure emphasizes the importance of blood sugar control and describes two important tests (HbA1c and finger stick blood glucose) that tell if blood sugar is at a healthy level. A checklist helps remind people of important tests and services they need.
3-3/4”x8-1/2” • 3-panel
English (#DB726) • Chinese (#DB734) • Khmer (#DB735) • Portuguese (#DB754) • Spanish (#DB727) • Vietnamese (#DB736)

Easy Eating for Busy People brochure
For adults with diabetes. Easy-to-read brochure emphasizes the importance of a balanced diet in diabetes management. Describes food groups using examples and demonstrates how to balance a meal. Includes sample daily menu and additional tips for diabetes control. Spanish version includes culturally appropriate photos and foods.
3-3/4”x8-1/2” • 4-panel • English (#DB752) • Spanish (#DB753)

Diabetes Help-Finder Resource Guide
For people with diabetes. This two-in-one directory offers basic information on all aspects of diabetes as well as resources to help manage living with this chronic disease. The first part of this directory contains educational information. The second half is set up like the yellow pages of a telephone book to provide easy access to information on services and supplies for people with diabetes.
8-1/2”x11” • 122 pp • 3-hole punched • shrink wrapped
English (#DB714) limit of 1
**ship to: (please print)**

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Please note: deliveries cannot be made to a PO box

**If you are ordering for an upcoming event or other deadline, please indicate date:________________________**

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Photocopy additional blank order forms if more than one page is needed.

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1. I am ordering these materials for
   - Regional Center for Healthy Communities
   - local, state, or federal agency
   - hospital (dept: ________________)
   - private practice
   - health center
   - police/fire department
   - HMO/MCO
   - VNA
   - nursing home
   - elder agency
   - multi-service agency
   - day care/preschool
   - school (K-12)
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   - religious organization
   - pharmacy
   - fitness organization
   - other: _______________________

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