

Quick References

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2012 Wisconsin Diabetes Guidelines at a Glance

For details and references for each specific area, as well as the disclaimer, please refer to the supporting documents and implementation tools in the full-text Guidelines available via the Internet at <http://www.dhs.wisconsin.gov/diabetes/> or telephone: (608) 261-6855.

Concern	Care/Test	Frequency
General Recommendations for Care	<ul style="list-style-type: none"> Perform diabetes-focused visit Review management plan; assess barriers and goals Assess physical activity level Assess nutrition/weight/growth 	<p><i>Type 1:</i> Every 3 months ❖ <i>Type 2:</i> Every 3 – 6 months ❖</p> <p>Each focused visit; revise as needed</p> <p>Each focused visit</p> <p>Each focused visit</p>
Self-Management Education	<ul style="list-style-type: none"> Refer to diabetes educator, preferably a CDE in an ADA Recognized or AADE Accredited Program 	At diagnosis, then every 6 – 12 months, or more as needed
Medical Nutrition Therapy	<ul style="list-style-type: none"> Refer for medical nutrition therapy (MNT) provided by a registered dietitian (RD), preferably a CDE 	At diagnosis or first referral to RD: 3 to 4 visits, completed in 3 to 6 months; then, 1-2 hours of routine RD visits annually. RD determines additional visits per needs/goals.
Glycemic Control	<ul style="list-style-type: none"> Check A1C, general goal: < 7.0% (individualize; see Table 4 - 2) Review goals, change in lifestyle/meals pattern, medications, side effects, and frequency of hypoglycemia Assess self-blood glucose monitoring schedule 	<p>Every 3 months if not at goal; every 6 months if at goal</p> <p>Each focused visit</p> <p>Each focused visit, 2 – 4 times/day, or as recommended</p>
Cardiovascular Care	<ul style="list-style-type: none"> Check fasting lipid profile Adult goals: Total Cholesterol < 200 mg/dL Triglycerides < 150 mg/dL HDL ≥ 40 mg/dL (men) HDL ≥ 50 mg/dL (women) Non-HDL (Cholesterol) < 130 mg/dL Non-HDL (Cholesterol) < 100 mg/dL (for very high risk) LDL < 100 mg/dL (optimal goal without overt CVD) LDL < 70 mg/dL (optimal goal with overt CVD) Start statin with ongoing lifestyle changes Check blood pressure, Adult goal: < 130/80 mmHg † (limit total sodium to < 1500 mg/day) Assess smoking/tobacco use status Start aspirin therapy (unless contraindicated) 	<p><i>Children:</i> After age 2 then follow AAP and or NHLBI Guidelines <i>Adults:</i> Annually, except for those with low risk repeat every 2 years. If abnormal, follow NCEP III guidelines.</p> <p>Adults with overt CVD; Age > 40 yrs without CVD and one or more risk factors for CVD; < age 40 individualize</p> <p><i>Children:</i> Each focused visit; follow National High Blood Pressure Education Program recommendations for Children and Adolescents <i>Adults:</i> Each office visit</p> <p>Each office visit; (5As: Ask, Advise, Assess, Assist, Arrange)</p> <p>Age > 50 yrs for most men and > 60 yrs for most women with diabetes and at least one other major risk factor; Men ≤ 50 yrs, and women ≤ 60 yrs, individualized based on risk</p>
Kidney Care	<ul style="list-style-type: none"> Check albumin/ creatinine ratio for microalbuminuria using a random urine sample; Goal < 30 mg/g Check serum creatinine to estimate GFR and stage CKD Perform routine urinalysis 	<p><i>Type 1:</i> 5 years after diagnosis, then annually <i>Type 2:</i> At diagnosis, then annually</p> <p>At diagnosis, then annually</p> <p>At diagnosis, then as indicated</p>
Eye Care	<ul style="list-style-type: none"> Dilated and comprehensive eye exam by an ophthalmologist or optometrist 	<p><i>Type 1:</i> If age ≥ 10 yrs within 5 years after diagnosis, then annually <i>Type 2:</i> At diagnosis, then annually; every 2-3 years with one or more normal exams Two exceptions exist</p>
Neuropathies and Foot Care	<ul style="list-style-type: none"> Assess/screen for neuropathy (autonomic and DPN) Visual inspection of feet with shoes and socks off Perform comprehensive lower extremity/foot exam Screen for PAD (consider ABI) 	<p><i>Type 1:</i> Five years after diagnosis, then annually <i>Type 2:</i> At diagnosis, then annually</p> <p>Each focused visit; stress daily self-exam</p> <p>At diagnosis, then annually</p> <p>At diagnosis, then annually</p>
Oral Care	<ul style="list-style-type: none"> Simple inspections of gums and teeth for signs of periodontal disease Dental exam by general dentist or periodontal specialist 	<p>At diagnosis, then each focused visit</p> <p>At diagnosis, then individualize based on an oral assessment and risk as more often may be needed</p>
Emotional and Sexual Health Care	<ul style="list-style-type: none"> Assess emotional health; screen for depression Assess sexual health concerns 	<p>Each focused visit</p> <p>Each focused visit</p>
Communicable Diseases Prevention	<ul style="list-style-type: none"> Provide influenza vaccine Provide pneumococcal vaccine Provide Hepatitis B series Screen for Tuberculosis infection or disease 	<p>Annually, if age ≥ 6 months</p> <p>Once; then per Advisory Committee on Immunization Practices</p> <p>Once at diagnosis for age 19 - 59 years of age; individualize for ≥ 60 years of age</p> <p>As needed</p>
Preconception, Pregnancy, and Postpartum Care	<ul style="list-style-type: none"> Ask about reproductive intentions/assess contraception Provide preconception counseling/assessment Screen for undiagnosed type 2 diabetes in women with known risk Screen for GDM in all women not known to have diabetes Screen for type 2 diabetes in women who had GDM 	<p>At diagnosis and then every visit ❖</p> <p>3 – 4 months prior to conception ❖</p> <p>At first prenatal visit ❖</p> <p>At 24 – 28 weeks gestation ❖</p> <p>At 6 – 12 weeks postpartum then at least every 3 years lifelong</p>
Assessing Risk and Prevention of Type 2 Diabetes	<ul style="list-style-type: none"> Check A1C test, fasting plasma glucose test, or oral glucose tolerance test Assess lifestyle management and diabetes risk status 	<p>Test all adults ≥ age 45 yrs or with BMI ≥ 25 kg/m² and one other risk factor. If normal, retest in 3 years or less. (see Quick Reference: Test Criteria: Type 2 diabetes in children and adolescents)</p> <p>At each visit; refer to evidenced-based prevention resources as indicated</p>

❖ Consider more often and/or if A1C is ≥ 7.0% and/or individual risk and/or complications exist or less often if at goal and individual risk and or complication do not exist

❖ Consider referring to provider experienced in care of women with diabetes during pregnancy

† More or less stringent Blood Pressure goals must be individualized if < 130/80 is not reasonable to achieve

Diabetes Types/Classifications

Type/Classification	Definition
Type 1 Diabetes	Type 1 diabetes was formerly known as insulin-dependent diabetes mellitus (IDDM), juvenile/childhood-onset diabetes, adult-onset type 1 diabetes, and ketosis-prone diabetes (beta-cell destruction commonly leading to absolute insulin deficiency). Approximately 5-10% of people with diabetes have type 1 diabetes. Type 1 diabetes is usually diagnosed before the age of 30.
Type 2 Diabetes	Type 2 diabetes (formerly known as non-insulin-dependent or adult-onset diabetes) is usually diagnosed after the age of 40. Type 2 diabetes is increasingly being diagnosed in young adults and children. Type 2 diabetes is the most common type of diabetes. Insulin resistance is a distinguishing feature of type 2 diabetes.
Monogenic Diabetes	Monogenic diabetes is a rare form of diabetes resulting from an inherited gene mutation change. There are two main forms: Maturity-onset of the Young (MODY) and Neonatal Diabetes. MODY is the most common form occurring in children and adolescents. Neonatal diabetes is rare and usually occurs in the first six months of life. These forms of diabetes can be mistakenly diagnosed as type 1 or type 2 diabetes. A combination of genetic testing and an assessment of clinical factors can assist with proper diagnosis and guide appropriate treatment as some of these people can be successfully treated with sulfonylureas instead of insulin. Additional information can be found at: www.ispad.org .
Gestational Diabetes (GDM)	Gestational diabetes is a condition unique to pregnancy. Blood glucose levels are elevated because of insufficient insulin production and or insulin resistance in the mother. Women who have had gestational diabetes are at greater risk of developing type 2 diabetes.
Pre-Diabetes	Pre-diabetes is a condition in which blood glucose levels are higher than normal but not high enough for a diagnosis of type 2 diabetes. People with pre-diabetes have increased risk for developing type 2 diabetes in the future. Categories of increased risk are: 1) fasting plasma glucose (FPG) of 100-125 mg/dL, referred to as impaired fasting glucose (IFG), 2) oral glucose tolerance (OGTT) 2-hour result of 140-199 mg/dL, referred to as impaired glucose tolerance (IGT), and 3) A1C of 5.7-6.4%.
Other Types of Diabetes	Other specific types of diabetes exist due to various causes (e.g., genetic abnormality in beta-cell function and insulin action, other diseases of the exocrine pancreas such as cystic fibrosis and drug or chemical induced). For a detailed list of etiological classifications of diabetes mellitus, see page 65 of the 2012 <i>ADA Clinical Practice Recommendations</i> .

Tests to Diagnose Diabetes

Four tests are available to diagnose diabetes. The chart below indicates how each test is performed, normal test results, and abnormal results indicating a diagnosis. For more on who to test and how often, see *Section 13: Assessing Risk and Prevention of Type 2 Diabetes*.

Test	Hemoglobin (A1C)⊙	Fasting Plasma Glucose (FPG)	Oral Glucose Tolerance Test (OGTT)	Random/Casual Plasma Glucose (with symptoms)
How Performed	Measured at anytime regardless of eating.⊙	Must be measured after at least an 8 hour fast	75-gram glucose load (drink) is ingested after at least an 8 hour fast; blood glucose is measured at 2 hours	Can be measured at any time regardless of eating
Normal	≤5.6 %	< 100 mg/dL (< 5.6 mmol/L)	< 140 mg/dL (< 7.8 mmol/L)	
Diabetes Mellitus	≥ 6.5%❖	≥ 126 mg/dL❖ (7.0 mmol/L)	≥ 200 mg/dL❖ (≥ 11.1 mmol/L)	≥ 200 mg/dL ⌘ (≥ 11.1 mmol/L) (with symptoms)

Adapted from: *American Diabetes Association Clinical Practice Recommendations, 2012*

⊙A1C levels when performed using the National Glycohemoglobin Standardization Program (NGSP) method and standardized to the Diabetes Control and Complications Trial (DCCT) reference assay, *not* point-of-care testing

❖In the absence of high blood glucose signs and symptoms test should be repeated to confirm diagnosis, preferable using same test

⌘ It is not appropriate to have a person eat a meal and then draw a random glucose two hours after

Test Criteria: Type 2 Diabetes in Children and Adolescents

The chart below provides information on testing for type 2 diabetes in asymptomatic children and adolescents.

Criteria for Testing	
<ul style="list-style-type: none"> Overweight (BMI > 85th percentile for age and sex, weight for height > 85th percentile, or weight > 120% of ideal for height) 	
Plus any two of the following risk factors:	
<ul style="list-style-type: none"> Family history of type 2 diabetes in first- or second-degree relative Race/ethnicity (e.g., Native American, African American, Hispanic/Latino, Asian American, and Pacific Islander) Signs of insulin resistance or conditions associated with insulin resistance (e.g., acanthosis nigricans, hypertension, dyslipidemia, PCOS, or small for gestational-age birth weight) Maternal history of diabetes or GDM during the child's gestation 	
Age of initiation:	age 10 years or at onset of puberty if puberty occurs at a younger age
Frequency:	every 3 years
Test:	FPG, OGTT, A1C

Adapted from: *American Diabetes Association Clinical Practice Recommendations, 2012*

Other Tests: Points to Consider

C-peptide Test

- C-peptide is an assessment of endogenous insulin secreted in the absence of very high glucose levels.
- When glucose toxicity is present, the C-peptide level may be low when in fact there is still adequate beta-cell reserve.
- A C-peptide level does not help determine if a person has type 1 or type 2 diabetes.
- The C-peptide test should not be used to decide when to start insulin therapy.
- The lab report should include the specific reference range for the test result.
- C-peptide can accumulate in the setting of renal disease; therefore, the test can be inaccurate.
- The Centers for Medicare and Medicaid Services (CMS) may require a fasting glucose test and C-peptide test for insulin pump approval.

Glutamic Acid Decarboxylase Antibodies (GAD) Test

- GAD antibodies have been found to be more specific than C-peptide or islet cell antibodies in assessing relative or absolute insulin deficiency.
- A GAD test may assist with determining type of diabetes and early appropriate therapy.
- The GAD65 and GADA tests are more specific and sensitive, especially in non-obese adults.
- The Centers for Medicare and Medicaid Services (CMS) may require a GAD test for insulin pump approval.

Insulin Level Test

- An insulin level is not a valuable test for diagnosis of diabetes.
- May be used in some specific cases such as polycystic ovary syndrome (PCOS).

Diabetes-Related International Classification of Diseases-9 (ICD-9) Codes

This table lists several diabetes-related International Classification of Diseases-9 (ICD-9) codes including: impaired fasting glucose, metabolic syndrome, and pre-diabetes.

Condition	ICD-9 Code
Abnormal glucose <i>Excludes:</i> <i>diabetes mellitus (250.00-250.93)</i> <i>dysmetabolic syndrome X (277.7)</i> <i>gestational diabetes (648.8)</i> <i>glycosuria (791.5)</i> <i>hypoglycemia (251.2)</i> <i>that complicating pregnancy, childbirth, or the puerperium (648.8)</i> (There are codes below this one [790.21, 790.22, 790.29] that define this diagnosis in greater detail; do not use 790.2 on a reimbursement claim.)	790.2
Impaired fasting glucose <i>Elevated fasting glucose</i>	790.21
Impaired glucose tolerance test (oral) <i>Elevated glucose tolerance test</i>	790.22
Other abnormal glucose <i>Abnormal glucose NOS</i> <i>Abnormal non-fasting glucose</i> <i>Hyperglycemia NOS</i> <i>Pre-diabetes NOS</i>	790.29
Metabolic Syndrome (dysmetabolic syndrome X) <i>Use additional code for associated manifestation, such as:</i> <i>cardiovascular disease (414.00-414.07)</i> <i>obesity (278.00-278.01)</i>	277.70
Polycystic Ovaries <i>Isosexual virilization Stein-Leventhal syndrome</i>	256.4

NOS = Not otherwise specified

Summary of Research: Landmark National and International Research Studies Impacting Diabetes Care

<p>Diabetes Control and Complications Trial (DCCT)</p>	<p>The DCCT was a 10-year clinical study funded by the National Institute of Diabetes, Digestive, and Kidney Diseases and included 1,441 volunteers with type 1 diabetes. This study conclusively demonstrated that tight glycemic control (in the intensively-treated group) delayed the onset of microvascular complications and slowed progression of complications already present. Results included a 76% reduced risk of diabetic retinopathy, a 50% reduced risk of nephropathy, and a 60% reduced risk of neuropathy. Benefits of tight glycemic control were seen for all participants regardless of age, sex, duration of diabetes, and history of poor or good control. Factors that enhanced care included: a physician-coordinated team approach to a complex, chronic disease; an emphasis on preventive care, education, intensive monitoring, increased intervention, and frequent follow-up; and access to consultation with specialists, such as endocrinologists, ophthalmologists, podiatrists, and dentists. For more information, go to the following links: http://diabetes.niddk.nih.gov/dm/pubs/control/ http://content.nejm.org/cgi/content/short/353/25/2643</p>
<p>United Kingdom Prospective Diabetes Study (UKPDS)</p>	<p>This prospective, multicenter, randomized controlled study of 5,102 newly diagnosed people with type 2 diabetes showed significant reduction in microvascular, but NOT macrovascular disease, with intensive control of blood glucose. In addition, this study evaluated tight blood pressure control and documented reduced microvascular complications and improved morbidity with a decrease seen in the incidence of congestive heart failure (CHF) and cardiovascular accident (CVA). Of further importance, nearly 50% of participants had one or more complications of diabetes at diagnosis, emphasizing the need for early diagnosis and treatment of diabetes. For more information, go to the following link: http://www.ncbi.nlm.nih.gov/pubmed/9742976</p>
<p>Diabetes Prevention Program (DPP)</p>	<p>This large clinical trial demonstrated that modest weight loss (5-7% of initial body weight) and regular physical activity resulted in a 58% reduction in the development of type 2 diabetes in persons at risk for the disease. These impressive results were obtained in all ethnic groups and especially for people over age 60 years. For more information, go to the following link: http://diabetes.niddk.nih.gov/dm/pubs/preventionprogram/</p>
<p>Action to Control Cardiovascular Risk in Diabetes (ACCORD)</p>	<p>This multicenter clinical trial sponsored by the National Heart, Lung and Blood Institute (NHLBI) with over 10,000 participants was the first trial to create controversy in the medical community regarding achievement of intensive glucose control. Results were released in 2008 when the glucose arm of this study was stopped based on increased all-cause mortality in adults with type 2 diabetes at high risk for heart attack and stroke. Intensive glucose control in these subjects did not reduce risk of major cardiovascular events. Data from the blood pressure and lipid control arms of this study were released in 2010. Intensive blood pressure control (to lower-than-standard guidelines) reduced risk of stroke, but was not shown to reduce risk of cardiovascular (CV) events or CV death. Lipid control was also evaluated with attention to comparison of use of statins alone, placebo, and statins plus fibrates. For more information, go to the following links: https://www.accordtrial.org/public/index.cfm?CFID=603757&CFTOKEN=9ecbc983c467fed3-34526245-03F4-68EC-BC0649BB33701EB7 http://content.nejm.org/cgi/content/full/NEJMoa0802743?query=TOC</p>
<p>Epidemiology of Diabetes Interventions and Complications (EDIC)</p>	<p>The EDIC study is a follow-up study of more than 90% of the DCCT participants. Experts will use this information to evaluate the incidence and predictors of diabetes and cardiovascular complications (eye, kidney, and nerve complications, as well as heart attack, cardiovascular accident, and heart surgery). The EDIC study also will study intensive control in evaluating cost effectiveness and impact on quality of life. For more information, go to the following link: http://diabetes.niddk.nih.gov/dm/pubs/control/</p>

Summary of Research: Landmark National and International Research Studies Impacting Diabetes Care (continued)

<p>Rosiglitazone Evaluated for Cardiovascular Outcomes in Oral Agent Combination Therapy for Type 2 Diabetes (RECORD)</p>	<p>The RECORD study is a randomized clinical trial sponsored by GlaxoSmithKline of 4,447 people with type 2 diabetes on metformin or a sulfonylurea. Participants were randomized to one of five multi-drug therapy protocols. Researchers found that rosiglitazone did not increase the overall risk of cardiovascular morbidity or mortality. Increased risk of heart failure and some fractures (mainly in women) were seen in participants randomized to rosiglitazone. For more information, go to the following links: http://clinicaltrials.gov/ct2/show/NCT00379769 http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(09)60953-3/abstract</p>
<p>Action in Diabetes and Vascular Disease: Preterax and Diamicron Modified Release Controlled Evaluation (ADVANCE)</p>	<p>The ADVANCE Clinical Trial included over 11,000 high-risk people with type 2 diabetes from 215 clinical centers in 20 countries. In addition to evaluating tight control of blood glucose and blood pressure, ADVANCE also included sub-studies to evaluate heart and eye function after intervention, cost-effectiveness and quality of life, and genetic factors. Data from this trial contrasts with ACCORD data, in that it provides no evidence of increased risk of death with intensive diabetes control (goal A1C \leq 6.5%). Results demonstrated that aggressive blood pressure control (with Perindopril and Indapamide) – even in normotensive patients – led to improved survival and reduced renal and coronary events. For more information, go to the following links: http://www.advance-trial.com/static/html/prehome/prehome.asp http://content.nejm.org/cgi/reprint/358/24/2560.pdf</p>
<p>Prospective Pioglitazone Clinical Trial in Macrovascular Events (PROactive)</p>	<p>This cardiovascular outcomes study of 5,238 persons with type 2 diabetes compared the addition of pioglitazone or placebo in patients already being treated for type 2 diabetes. The cardiovascular end point was major adverse cardiovascular events (MACEs). In persons with advanced type 2 diabetes at high risk for cardiovascular events, pioglitazone-treated patients had significant risk reductions in MACE end points to three years. For more information, go to the following link: http://www.ncbi.nlm.nih.gov/pubmed/18371481</p>
<p>A Diabetes Outcome Progression Trial (ADOPT)</p>	<p>The ADOPT study is a randomized, double-blind which investigated the effectiveness of three oral antidiabetic agents in treating type 2 diabetes and their influence for preventing progression of the risk factors related to long-term complications. Monotherapy with Rosiglitazone maintained glycemic control and progression of pathophysiological abnormalities compared to metformin or glyburide. For more information, go to the following link: http://care.diabetesjournals.org/content/25/10/1737.fullpdf+html</p>
<p>Diabetes Reduction Assessment with Ramipril and Rosiglitazone Medication (DREAM)</p>	<p>This clinical trial evaluated the likelihood of progression of type 2 diabetes over a three-year period among 5,269 people with pre-diabetes. The trial reduced the risk of developing type 2 diabetes by 62 percent relative to placebo among people at high risk of developing type 2 diabetes. The DREAM did not show that Ramipril prevents type 2 diabetes in population tested; however, it did demonstrate an effect on regression to normal glucose levels. Results suggest that Ramipril may have favorable effects on glucose metabolism, a finding that is constant with other reports on studies of ACE inhibitors (when used for established indicators). For more information, go to the following link: http://www.ameinfo.com/99017.html</p>