

# Indian Health Service

## Standards of Care for Adults With Type 2 Diabetes

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Division of Diabetes Treatment and Prevention  
5300 Homestead Road, NE  
Albuquerque, New Mexico 87110

<http://www.ihs.gov/medicalprograms/diabetes>



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## Introduction

In 1986, the Indian Health Service (IHS) Division of Diabetes developed its first *IHS Standards of Care for Diabetes*. For over 20 years, these guidelines have helped health care professionals provide excellence in diabetes care to American Indians and Alaska Natives.

To keep guidelines current with the ever-changing field of diabetes care, the IHS Division of Diabetes and the Area Diabetes Consultants have updated the *2006 IHS Standards of Care for Patients with Type 2 Diabetes*.

These guidelines:

- Address the **unique aspects of care for American Indian and Alaska Native people**.
- Enable health care professionals and other members of a diabetes care team to offer **consistent quality diabetes care to American Indian and Alaska Native adults** with type 2 diabetes.
- Have been **developed using a consensus process** backed by literature review, consultation with scientific experts, and input from health professionals from many disciplines.
- Reflect and support the **concept of a team approach to diabetes care** in our facilities and the communities that surround them.
- Should be **used in the context of the whole patient**, not just a single disease entity.
- Should be **used in the context of a model of care** (such as the Chronic Care Model) that foster productive interactions between informed patients—who play an active role in their care—and providers with resources and expertise.

The IHS Division of Diabetes endorses and supports the current *American Diabetes Association (ADA) Clinical Practice Recommendations* as the foundation of excellence in diabetes. The *2008 IHS Standards of Care for Patients With Type 2 Diabetes* differ from the ADA clinical practice recommendations by bringing focus to the specific care issues of American Indian and Alaska Native adults with diabetes, placing greater emphasis on the prevention of complications that are most notable in the this population.

As such, these guidelines do not include clinical guidelines on the care of people with type 1 diabetes. The *ADA Standards of Medical Care in Diabetes—2008* thoroughly address the issues of the diagnosis and treatment of type 1 diabetes, and providers are encouraged to refer to these for guidance. The *ADA Standards of Medical Care in Diabetes—2008* are available online ([http://care.diabetesjournals.org/content/vol31/Supplement\\_1](http://care.diabetesjournals.org/content/vol31/Supplement_1)).

# Summary of 2009 Revisions

## Part 1. Clinic Visit Checklists

### Immunization status review

[http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5753a6.htm?s\\_cid=mm5753a6\\_e](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5753a6.htm?s_cid=mm5753a6_e)

- a. Tdap should replace a single dose of Td for persons aged <65 years who have not previously received a dose of Tdap.
- b. Zoster vaccine is recommended in people  $\geq 60$  years, regardless of reported history of prior herpes zoster episode.
- c. Human papillomavirus (HPV) is recommended for all females  $\leq 26$  years who have not completed the vaccine series.

## Part 2. Supporting Statements

### Section 2. Glycemic control and microvascular risk reduction

- a. Aggressive glycemic control (A1C <6.5%) has not been shown to decrease macrovascular events.
- b. The current A1C target remains <7% in nonpregnant adults. More or less stringent glycemic control should take into account patient characteristics such as duration of diabetes, presence of complications and life expectancy.
- c. Early intensive diabetes treatment as compared to standard treatment, regardless of early glycemic differences, conferred risk reduction for microvascular disease, myocardial infarction and death from any cause. This legacy effect has implications for aggressive and early treatment of diabetes.

### Section 3. Cardiovascular disease risk reduction

- a. Information regarding The Strong Heart Study and the 10-year risk calculator developed from American Indian observational data is provided.

### Section 5. Other topics for consideration

- a. Information on bariatric surgery has been added.
- b. Information on the estimated average glucose (eAG) as been added.

## Part 1: Clinic Visit Checklists

### 1. Components of the initial comprehensive evaluation

The following is an initial clinic visit checklist for a newly diagnosed patient or a patient with pre-existing diabetes but not previously followed in your clinic.

The initial evaluation should also include *Ongoing Management Recommendations* (see pages 6-8) as part of a comprehensive evaluation.

**Table 1. Initial Comprehensive Evaluation of Adults with Type 2 Diabetes**

Component	Visit Checklist
Diagnosis	<input type="checkbox"/> Review laboratory test and date of diagnosis of type 2 diabetes
History	<input type="checkbox"/> Medical and family history <input type="checkbox"/> Assessment of lifestyle habits and activity level <input type="checkbox"/> Determine CVD co-morbidities: HTN, dyslipidemia, other CVD risk factors <input type="checkbox"/> Assess cultural and psychosocial issues <input type="checkbox"/> Assess social and economic resources
Screening and assessments	<input type="checkbox"/> Depression screening <input type="checkbox"/> Tobacco use assessment <input type="checkbox"/> Evaluate TB status and place PPD if needed
Measurements	<input type="checkbox"/> Blood pressure and pulse <input type="checkbox"/> Height, weight, and waist <input type="checkbox"/> Calculated BMI
Comprehensive physical exam	<input type="checkbox"/> Oral, thyroid palpation, cardiac, pulmonary, abdominal, pulses, extremities to include neurological foot check of sensation with 10-gm monofilament
Labs and tests	<input type="checkbox"/> A1C <input type="checkbox"/> Fasting lipid profile <input type="checkbox"/> ALT, AST, electrolytes, BUN, creatinine, calculated eGFR <input type="checkbox"/> TSH once metabolic control established <input type="checkbox"/> Urinary albumin, microalbumin/creatinine ratio (UACR) <input type="checkbox"/> 12-lead electrocardiogram
Medications	<input type="checkbox"/> Review previous treatments <input type="checkbox"/> Review current medications
Referrals	<input type="checkbox"/> Optometrist or ophthalmologist/retinal photo for eye exam <input type="checkbox"/> Registered dietitian or nutritionist <input type="checkbox"/> Diabetes educator <input type="checkbox"/> Foot specialist if indicated

## 2. Ongoing management recommendations

**Table 2. Components of Care Visits for Adults with Type 2 Diabetes**

Component	Checklist
Blood pressure	<input type="checkbox"/> Assess at every visit <input type="checkbox"/> Monitor and adjust therapy to keep <b>BP &lt;130/80 mmHg</b>
Measurements	<input type="checkbox"/> Weight, recalculate BMI, and monitor trends
Glycemic control	<input type="checkbox"/> A1C if indicated. <b>Goal: &lt;7%</b> for nonpregnant adults <input type="checkbox"/> A1C lower than 6% may benefit select individuals and less stringent goals may be appropriate for others. <input type="checkbox"/> Review log of patient's SBGM results <input type="checkbox"/> Point-of-care capillary blood glucose check if indicated <input type="checkbox"/> Monitor and adjust therapy to attain glycemic goals
Kidney function  <ul style="list-style-type: none"> <li>• Annual for screening</li> <li>• More frequently for monitoring of chronic kidney disease</li> </ul>	<input type="checkbox"/> Estimated eGFR (serum creatinine needed for calculation) <input type="checkbox"/> Urine albumin to creatinine ratio (UACR) <input type="checkbox"/> Preserve kidney function: <input type="checkbox"/> Consider ACE inhibitor or ARB <input type="checkbox"/> Lower targets for BP control: <120/70 mmHg <input type="checkbox"/> If eGFR <60: <input type="checkbox"/> Hemoglobin/hematocrit for presence of anemia <input type="checkbox"/> Ca, PO <sub>4</sub> , and PTH to assess metabolic bone disease
Lipids assessment  <ul style="list-style-type: none"> <li>• Annual for screening</li> <li>• More frequently to monitor treatment</li> </ul>	<input type="checkbox"/> Fasting lipoprotein panel (total cholesterol, LDL, HDL, and triglyceride) <input type="checkbox"/> LDL target <100 mg/dl <input type="checkbox"/> If CVD present, lower LDL <70 mg/dl <input type="checkbox"/> HDL target >40 mg/dl in men and >50 mg/dl in women <input type="checkbox"/> Triglyceride target <150 mg/dl <input type="checkbox"/> If fasting lipids not possible, obtain direct LDL, total cholesterol, and HDL
Antiplatelet therapy	<input type="checkbox"/> Aspirin therapy (75-162 mg/day) for primary prevention in >40 year old people <u>or</u> younger with other risk factors
Visit exams	<input type="checkbox"/> Directed exam, including routine foot check, according to review of systems <input type="checkbox"/> Routine foot check <input type="checkbox"/> Annual neurovascular foot exam to include 10-gm monofilament
Immunization status review	<input type="checkbox"/> Annual Influenza immunization <input type="checkbox"/> PneumoVax at diagnosis. Re-immunization if ≥65 years, and first dose given before age 65 and if vaccine was administered > 5 years prior. <input type="checkbox"/> Tetanus and diphtheria every 10 years, Tdap should replace a single dose of Td for persons <65 years who have not previously received a dose of Tdap <input type="checkbox"/> HBV immunization if eGFR <60 or at high risk for HBV <input type="checkbox"/> Zoster vaccine for persons ≥60 years as a single dose, regardless of reported history of prior herpes zoster episode <input type="checkbox"/> Human papillomavirus (HPV) vaccine in all females ≤26 years of age

**Table 3. Lifestyle Practice Recommendations**

Component	Checklist
Mental and emotional health	<input type="checkbox"/> Assess depression annually or as clinically indicated using the PHQ-2 or PHQ-9. <input type="checkbox"/> Provide timely diagnostic and therapeutic services for anyone with positive screen.
Diabetes self-management education (DSME)	<input type="checkbox"/> Refer patients and their families for DSME at diagnosis and as needed thereafter. <input type="checkbox"/> Refer to diabetes educator to complete an education needs assessment and establish self-management education and care plan.
Medical nutrition therapy (MNT)	<input type="checkbox"/> Refer patient to a registered dietitian for individualized MNT at diagnosis and as needed thereafter to achieve treatment goals.
Physical activity	<input type="checkbox"/> Screen and re-assess macrovascular and microvascular complications that may be worsened with physical activity. <input type="checkbox"/> Provide and modify exercise prescription based on the medical evaluation. <input type="checkbox"/> Provide education on proper footwear. <input type="checkbox"/> Evaluate for risk of hypoglycemia, and make appropriate adjustments in pharmaceutical and non-pharmaceutical therapies as needed.
Tobacco	<input type="checkbox"/> Screen for tobacco use at diagnosis and periodically thereafter. <input type="checkbox"/> Advise all patients not to smoke or use tobacco products. <input type="checkbox"/> Refer to tobacco cessation program as indicated. Nicotine replacement therapy recommended.
Alcohol and other substance use	<input type="checkbox"/> Screen for alcohol and substance use at diagnosis and periodically thereafter. <input type="checkbox"/> Counsel on appropriate use of alcohol. Moderation is considered one daily drink for adult women and two drinks for adult men. <input type="checkbox"/> Refer patients with alcohol or substance abuse to appropriate behavioral health staff or treatment program. <input type="checkbox"/> Advise abstinence from alcohol for women during pregnancy and for people with medical problems such as pancreatitis, advanced neuropathy, severe hypertriglyceridemia, or alcohol abuse.

**Table 4. Lab Testing for Adults with Type 2 Diabetes**

Laboratory Test	Checklist
A1C	<input type="checkbox"/> Twice yearly in patients who are meeting treatment goals <input type="checkbox"/> Quarterly in patients whose therapy has changed or who are not meeting treatment goals <input type="checkbox"/> Point-of-care testing for A1C allows for timely decisions on therapy changes
Fasting lipid panel	<input type="checkbox"/> Fasting lipoprotein panel (total cholesterol, LDL, HDL, and triglyceride) obtained after a 9–12-hour fast <input type="checkbox"/> If fasting lipids not possible or reasonable, consider direct LDL, total cholesterol, and HDL <input type="checkbox"/> Re-evaluate lipid profiles 6–12 weeks after new therapies are initiated
Serum creatinine with calculated EGFR	<input type="checkbox"/> Measure to estimate EGFR regardless of the degree of urine albumin excretion <input type="checkbox"/> Screen annually. If used for monitoring treatment, more frequent screening is recommended
Albumin to creatinine ratio	<input type="checkbox"/> Test for protein in urine with albumin to creatinine ratio <input type="checkbox"/> Screen annually. If used for monitoring treatment, more frequent screening is recommended
Liver enzymes	<input type="checkbox"/> ALT and AST to monitor medication therapy or assess fatty liver
Hemoglobin and hematocrit	<input type="checkbox"/> Assess for presence of anemia

**Table 5. Annual Specialty Referral**

Component	Checklist
Dilated eye exam	<input type="checkbox"/> Retinal exam either through dilated pupils or stereofundus photos
Dental exam	<input type="checkbox"/> Screen for periodontal disease and examine gums and oral cavity for lesions <input type="checkbox"/> Bi-annual dental cleaning

## Part 2: Supporting Statements

### 1. *Criteria for the diagnosis of type 2 diabetes in adults*

Type 2 diabetes can be diagnosed in one of three ways, a casual plasma glucose or a fasting plasma glucose or a two-hour plasma glucose. The criteria for diagnosis of type 2 diabetes in adults using three plasma blood tests and the corresponding diagnostic values are presented below. For casual plasma glucose, casual is defined as any time of day without regard to time of last meal. Fasting plasma glucose is defined as no caloric intake for at least 8 hours.

**In the absence of unequivocal hyperglycemia, confirm these criteria by repeat testing on a different day.**

**Table 6. Criteria for diagnosis of type 2 diabetes in adults.**

Plasma blood tests	Diagnostic values
Casual plasma glucose	$\geq 200$ mg/dl <u>plus</u> symptoms of diabetes: <ul style="list-style-type: none"><li>• Polyuria</li><li>• Polydypsia</li><li>• Unexplained weight loss</li></ul>
Fasting plasma glucose	$\geq 126$ mg/dl
Two-hour plasma glucose	$\geq 200$ mg/dl during a 75 g oral glucose tolerance test (OGTT)

There has been interest in the use of A1C values for screening and identification of pre-diabetes and diabetes. However, no clear cut off for diagnosis has been established. The IHS Division of Diabetes and the ADA currently do not recommend its use for screening or diagnostic purposes.

## **2. Glycemic control and microvascular risk reduction**

### **Assessment of glycemic control**

We recommend that self-monitoring blood glucose (SMBG) data and A1C be available during the clinic visit for therapeutic management decisions. Routine office measurement of casual glucose, either capillary or venous, has limited clinical utility. Ongoing therapeutic decisions cannot be made based on single office testing. Point-of-care A1C testing allows providers to make timely decisions on therapy changes.

In a 10-year follow-up of more than 5,000 newly diagnosed people with diabetes enrolled in the United Kingdom Prospective Diabetes Study (UKPDS), significant risk reductions in microvascular disease, myocardial disease and mortality were noted in the intensive therapy group (either sulfonylurea or insulin or, in overweight persons, metformin) over the conventional therapy (dietary restriction) group. This was noted despite an early loss in glycemic differences. This has been referred to as a “legacy effect” and is credible evidence for the importance of intensive therapy at the time of diagnosis.

### **A1C**

A1C is a “weighted” measure of glycemic control over the preceding 120 days. The more recent days contribute more to the measure than the distant days. The mean level of blood glucose in the 30 days immediately preceding the test contributes approximately 50% of the final result.

In the UKPDS, each 1% reduction in mean A1C was associated with reductions in risk of 21% for any end point related to diabetes, 21% for deaths related to diabetes, 14% for myocardial infarction, and 37% for microvascular complications. We recommend A1C testing in all adults with diabetes to monitor progress toward clinical targets and facilitate therapeutic decision-making.

The A1C goal is <7%. However, the provider can consider more stringent goals (e.g., <6.0%) for some patients as well as less stringent for others. ADA 2008 clinical practice recommendations state: “Older adults who are functional, cognitively intact, and have significant life expectancy should receive diabetes treatment using goals developed for younger adults.” A1C testing may be repeated as soon as one month later to assess response to therapy or every 3–6 months in “stable” patients.

Two large randomized, double-blind trials in patients with diabetes, ACCORD and ADVANCE, have not found a decrease in macrovascular events with intensive glycemic control, A1C <6.5%.

## **Self-monitoring blood glucose**

Patients can use SMBG to achieve and maintain specific glycemic goals. The patient should set reasonable goals on the frequency of testing with the provider. The provider should review these results with the patient during each visit. SMBG values can be used for clinical decisions in the timing, dose, and type of therapy, especially for patients on insulin.

## **Assessment of chronic kidney disease**

The IHS Division of Diabetes supports the National Kidney Foundation's standard definition for chronic kidney disease (CKD).

### Terminology

- Use the term "kidney" instead of "renal."
- The term "chronic kidney disease (CKD)" replaces "end stage renal disease," "pre-dialysis" or "chronic renal failure."

### Tests used to assess kidney disease

Screening includes an assessment of estimated glomerular filtration rate (eGFR) and measurement of urinary protein excretion. These tests should be done at diagnosis, and repeated at least annually. Providers can use these tests to monitor the progression of kidney disease and the effects of therapy. As such, these tests are continued for the life of the patient regardless of the stage of kidney disease or types of treatments provided. However, once a patient is on dialysis, these tests are no longer indicated.

### Assessment of Estimated Glomerular Filtration Rate (eGFR)

The kidney is usually described as "a filter," and eGFR is a measure of the kidneys' ability to filter blood, which can be expressed on a continuous scale. Serum creatinine alone does not provide enough information for diagnosis and classification. eGFR can be estimated by using the serum creatinine, body weight, and age. Formulas to calculate eGFR include the MDRD (Modification of Diet in Renal Disease Study Group) and Cockcroft-Gault equations. The Resource and Patient Management System (RPMS) can calculate the eGFR automatically when you order a serum creatinine test.

Online calculators, such as the National Kidney Foundation's MDRD eGFR calculator, are available.

[http://www.kidney.org/professionals/kdoqi/eGFR\\_calculator.cfm](http://www.kidney.org/professionals/kdoqi/eGFR_calculator.cfm)

Because the estimated equation does not produce reliable results above 60 mL/1.73m<sup>2</sup>, results above 60 are reported simply as "above 60". Thus, it is not possible to distinguish between stages 1 and 2 without actually measuring GFR.

### Measurement of urinary protein excretion

Urinary protein excretion is a continuous variable; therefore, it is better to use a quantitative measurement and to describe the rate of excretion of urinary protein. We recommend use of the urinary albumin to creatinine ratio (UACR), which can be estimated from a simple spot urine specimen. The UACR is roughly equivalent to the 24-hour protein excretion in grams. 24-hour urine collection and testing is not recommended for routine diabetes nephropathy screening. We recommend reporting the actual UACR in terms of mg of albumin per gm of creatinine. Although UACR is considered the gold standard for the measurement of urinary protein excretion, there are programs that continue to use semi-quantitative tests.

### Definitions of abnormalities in albumin excretion

The definition of normal and abnormal albumin excretion in the urine, using a spot collection is:

- Normoalbuminuria < 30 mg/gm creatinine
- Albuminuria > 30 mg/gm creatinine

Because of variability in urinary albumin excretion, at least two specimens, preferably first morning void, collected within a 3- to 6-month period should be abnormal before considering a patient to have crossed one of these diagnostic thresholds. Exercise within 24 hours, infection, fever, congestive heart failure, marked hyperglycemia, pregnancy, marked hypertension, urinary tract infection, and hematuria may elevate urinary albumin over baseline values.

### Diagnosis of CKD

CKD is kidney damage for three months as defined by structural or functional abnormalities with or without decreased eGFR, or an eGFR of 60 ml/min/1.73 m<sup>2</sup> or less with or without kidney damage. So, if there is a UACR of 30 mg/gm or greater, or if the eGFR is less than 60 for more than three months, then CKD is present.

### **Stages of Chronic Kidney Disease (CKD)**

<b>Stages</b>	<b>1*</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>eGFR, mL/min</b>	>60	>60	30 – 59	15 – 29	<15

\*Distinguishing Stage 1 from Stage 2 CKD has limited clinical implications

### Further evaluation of CKD

In adults with diabetes, the most likely cause of CKD is the diabetes itself. However, there are other treatable causes of CKD or there is doubt as to the cause of the CKD – e.g. if there is significant albuminuria early in the course of diabetes or a rapid increase in albumin excretion, evaluation and consultation is appropriate.

### Monitoring and treatment of CKD

Once CKD and its cause are established, there are important treatments that can delay progression and improve quality of life. CKD further increases CVD risk in patients with diabetes. Therefore modification of CVD risk factors, such as tobacco cessation, lipid and blood pressure control is essential.

Aggressive treatment of blood pressure requires lower targets for systolic and diastolic blood pressure. Certain blood pressure medication, such as ACE inhibitors or ARBs, may play an important role. These medications, as well as lowering blood pressure, may decrease the rate of urinary protein excretion. Following serial UACRs levels will help assess effectiveness of the intervention.

Treatment of anemia and metabolic bone disease becomes important in people with eGFR <60.

### **Diabetes eye examination**

Complications of diabetes include several visual disorders, such as retinopathy, cataracts, and glaucoma, which may lead to blindness. Approximately 15–28% of people with type 2 diabetes have retinopathy at the time diabetes is diagnosed. This may be due to the extended period of time these individuals have diabetes, but remained undiagnosed and uncontrolled. The risk factors associated with the severity of retinopathy include high mean fasting blood glucose, high A1C level, elevated systolic blood pressure, high UACR, as well as whether the patient is on kidney dialysis or has had a long duration of diabetes.

Adults with diabetes should have a comprehensive dilated examination by an ophthalmologist or optometrist shortly after the diagnosis of diabetes. Re-examinations should be repeated annually. Examinations will be required more frequently if retinopathy is progressive.

Examinations can also be done by taking retinal photographs and having these read by experienced experts in this field. In-person exams are still necessary when the photos are unacceptable and for follow-up of detected abnormalities. This technology has its greatest potential in areas where qualified eye care professionals are not available. Results of eye examinations should be documented and transmitted to the referring health care professional.

Women with gestational diabetes (GDM) are at very low risk for the development of diabetic retinopathy during pregnancy due to the limited exposure to increased blood glucose. Retinopathy screening is therefore not indicated. However, women with pregestational diabetes (PGDM) who are planning pregnancy or who have become pregnant should have a comprehensive eye examination screening for retinopathy and should be counseled on the risk of development and/or progression of diabetic retinopathy. This eye examination should occur in the first trimester with close follow-up throughout pregnancy and for one year postpartum.

### **Diabetes foot care**

Foot ulcers and amputations are a major cause of complications and disability for adults with diabetes. However, they are among the most common *preventable* complications from diabetes. Early recognition and management of independent risk factors for ulcers and amputations can prevent or delay the onset of adverse outcomes.

#### Foot inspection at each visit

Approximately one in five adults with diabetes who present for routine care will have a condition that requires prompt attention, including large calluses, bacterial or fungal infections, bulky or ingrown nails, or frank ulceration. Accordingly, shoes should be removed and feet inspected for acute problems at each visit.

#### Annual complete foot examination

Examination should include assessment of protective sensation, foot structure and biomechanics, vascular status, and skin integrity. Test sensation with the 10-gm monofilament on the plantar aspect of the first, third, and fifth digits and metatarsal heads of each foot. If the patient has no sensation on one or more of the tested sites, he or she is at high risk of developing an ulcer. Inspect the foot for deformities and altered biomechanics including hammer or claw toe deformities, bunions, Charcot foot, any bony prominence, and excessive pronation. Additionally, patients with a history of prior non-traumatic ulceration or amputation are at high risk.

Conduct a vascular assessment by feeling for dorsalis pedis and posterior tibial pulses on each foot. Alternatively, assess vascular status with an ankle brachial index (ABI). An absent pulse or ABI ratio of <0.9 on either foot confers high risk. Keep in mind these results may be falsely elevated in diabetics due to calcification of the arteries.

Patients with low-risk feet should be re-examined annually with interventions aimed at controlling blood glucose, blood pressure, and lipids, and to encourage patients who use tobacco to quit.

People with high-risk foot conditions should have their feet re-examined every one to three months with the goal of protecting the foot from injury through patient education, podiatry care, and protective footwear. Patient education should stress:

- Wash and inspect feet on a daily basis.
- Clear walk areas of dangerous objects.
- Select and use appropriate and properly fitted footwear.
- Use slippers indoors (i.e., no bare feet).
- Provide proper nail and callus care (e.g., no bathroom surgery).
- Avoid extreme temperatures.
- Avoid soaking feet.
- Promptly report problems, such as infections, ulcers, and cuts that do not heal. Advise the patient who and when to call.

### **Diabetes dental care**

Periodontal (gum) disease, an infection of the supporting tissues of the teeth caused by specific bacteria, is a common complication of diabetes. Therefore, adults with diabetes are at increased risk of periodontal disease. Among AI/AN adults with diabetes, advanced periodontal disease occurs at rates two to three times higher than for individuals who do not have diabetes. Infections associated with advanced periodontal disease can interfere with an individual's glycemic control and can actually cause blood glucose levels to rise.

Periodontal disease can result in the loss of all teeth in approximately one third of AI/AN adults with diabetes. People with no teeth can suffer not only emotionally, but also nutritionally because they may not have the ability to eat many types of important foods.

All adults with diabetes should have an annual screen for periodontal disease and other oral pathology. Regular dental examinations provide opportunities for prevention, early detection, and treatment of periodontal disease. Regular dental cleaning has been shown to improve glycemic control in patients with poorly controlled diabetes.

### **3. Cardiovascular disease risk reduction**

Cardiovascular disease (CVD) is *the* major cause of mortality and a significant cause of morbidity for individuals with diabetes. It is the leading cause of death in AI/AN. Addressing dyslipidemia and hypertension is critical given that lowering blood glucose alone is not adequate to address the CVD risk in diabetes. Patients with type 2 diabetes have an increased prevalence of hypertension and lipid abnormalities, including high triglyceride and low HDL levels, which contribute to the

higher rates of CVD. Management of hypertension and lipids results in significant CVD risk reduction for adults with diabetes.

The Strong Heart Study, a study of cardiovascular disease and its risk factors among American Indians, is the largest epidemiologic study of American Indians to date. Supported by National Heart, Lung, and Blood Institute (NHLBI), the Strong Heart Study began in 1998 and has included longitudinal analysis on 13 American Indian tribes in Arizona, North and South Dakota and Oklahoma.  
(<http://strongheart.ouhsc.edu/CHDcalculator/calculator.html>)

Based on information collected over 10-year period in American Indians over the age of 30, a “risk calculator” to predict the risk of coronary heart disease has been developed for this diverse AI population with high rates of diabetes and albuminuria (defined as the ratio of urinary albumin and creatinine  $\geq 30$ ).

A major new finding was that albuminuria is an independent risk factor for development of heart disease. In addition, the effects of diabetes may be stronger in the American Indian population than in the general population.

### **Assessment and management of blood pressure**

Blood pressure (BP) control reduces the risk for diabetic microvascular and macrovascular complications and is a priority for American Indians and Alaska Natives with diabetes.

Accurate BP measurement in the office is essential for the diagnosis and treatment of elevated BP. Ambulatory and home monitoring should be considered if office readings question the diagnosis or control of hypertension.

**Note:** The BP target for adults with diabetes is <130/80 mmHg. Lowering BP to <120/70 mmHg can offer additional protection against kidney disease.

Major lifestyle modifications have been shown to lower BP. These include weight reduction in overweight or obese individuals and adoption of the Dietary Approaches to Stop Hypertension (DASH) eating plan. The DASH eating plan emphasizes consuming foods rich in potassium and calcium, reducing dietary sodium, increasing physical activity, and cutting down on alcohol consumption.

Treatment with two or more anti-hypertensive agents is frequently required to achieve BP targets. Antihypertensive agents are initiated in a step progression and selected based on the patient’s coexistent conditions and desired secondary benefits as outlined in JNC VII. ACE inhibitors or ARBs offer kidney protection and improve insulin sensitivity.

Unlike the benefits seen in the UKPDS 10-year follow-up study for intensive glucose control regardless of early loss of glycemic differences (within 2 years of termination of the trial), no benefit was appreciated for early blood pressure control when not

sustained. It appears that in order for there to be benefit, as measured by any diabetes-related end point, diabetes related death, microvascular disease and stroke; good blood pressure control must be maintained.

### Assessment and management of dyslipidemia

At a minimum, perform a complete lipid profile annually. This includes total cholesterol, low-density lipoprotein cholesterol (LDL), high-density lipoprotein cholesterol (HDL), and triglycerides. *More frequent testing may be required* to assess therapeutic measures from therapies such as Medical Nutrition Therapy (MNT) and pharmacotherapy.

While a 9–12 hour fasting lipid profile is preferable, it is possible to make reasonable assessments of the lipid status on a non-fasting profile. If the triglycerides are too high to calculate a reliable LDL, a direct LDL may be ordered; non-fasting status does not affect the *direct* LDL measurement. The calculation of the non-HDL may also be of benefit in therapeutic decision-making (see below). It is sometimes difficult for patients traveling significant distances to come in fasting. We recommend point-of-care testing, if possible, so that timely decisions can be made in regards to therapy.

Lifestyle intervention, including MNT addressing fat and cholesterol intake, increased physical activity, weight loss, and smoking cessation, is indicated for any patient with type 2 diabetes because of the increased risk of CVD, even with “normal” lipid levels. Glycemic control is also important for modifying plasma lipid levels and should be addressed to help reduce hypertriglyceridemia.

The goals for lipid control in patients with type 2 diabetes are shown below.

#### Goals for lipid control in patients with type 2 diabetes.

Target	Lipid	Goal
Primary target	LDL	<100 mg/dL, if <u>no</u> CVD
Primary target	LDL	<70 mg/dL, if CVD
Secondary target	Triglycerides	<150 mg/dL
Secondary target	Non-HDL*	<130 mg/dL, if <u>no</u> CVD; <100 mg/dL, if CVD

\* Non-HDL = total cholesterol – HDL

### Primary target

Although lifestyle modification including MNT is always the foundation of therapy, we recommend pharmacotherapy for patients without known CVD who have not attained the LDL target of 100 mg/dL through lifestyle interventions within three months. HMG–CoA reductase inhibitors (statins) are considered first-line therapy for the primary LDL target, but providers may consider other agents depending on the triglyceride and HDL levels. Consider initiating statin therapy in conjunction *with* lifestyle modification for those with LDL levels >130 mg/dL.

Providers should consider all individuals with diabetes and known CVD for statin therapy regardless of initial LDL levels to achieve a reduction of 30–40%; a goal LDL of 70 mg/dL is an option.

### Secondary targets

The **triglyceride** target outlined above is a secondary goal of therapy for dyslipidemia. Optimal use of lifestyle modifications and glycemic control should help reach this goal. In selected patients and especially those at higher risk, combining a fibrate or niacin with a statin may be warranted, although no large-scale clinical outcome trials have evaluated these combinations. For those with near normal LDL levels and known clinical CVD, fibrates are associated with a reduction in CVD events. Therefore, some patients may be appropriate candidates for fibrate or niacin alone, depending on their initial triglycerides, reaction to medications, or other clinical considerations.

Setting goals for **HDL** presents a special challenge. A low HDL should be defined as a level of < 40 mg/dl in both men and women. Although clinical trials suggest that raising HDL will reduce the risk for CVD, effective pharmacologic therapies are limited. Therefore, a specific goal for HDL is not identified by the National Cholesterol Education Program ATP-III guidelines. We support the recommendation that non-drug and drug therapies that raise HDL and are part of management of other lipid and non-lipid risk factors should be part of a lipid management strategy for adults with diabetes.

**Non-HDL** is an important secondary goal for lipid therapy following successful interventions for LDL level. The non-HDL is a simple calculation of subtracting the HDL from the total cholesterol and represents the total “atherogenic load”. This has been validated as a useful tool in identifying CVD risk and can be performed in the non-fasting state. The target, as identified above, is 30 mg/dl higher than the LDL target. Statin therapy to improve CVD risk would be considered first line when addressing the non-HDL.

### Monitoring for HMG–CoA reductase inhibitors (statins) therapy

Before initiating statin therapy, you should document baseline measurements, including a liver and lipoprotein profile, which will be used to follow the drug’s efficacy and safety. We also recommend a baseline thyroid-stimulating hormone (TSH) measurement since hypothyroidism is a secondary cause of high cholesterol.

## **Antiplatelet therapy**

Aspirin is used as a primary and secondary prevention strategy to prevent cardiovascular events.

### Primary prevention

Aspirin therapy is strongly recommended as a primary prevention strategy for men and women aged 40 and above with diabetes. It is also recommended for younger individuals with increased risk for CVD: family history of CVD, smoking, hypertension, albuminuria, or dyslipidemia. Aspirin therapy is not recommended for patients under the age of 21 due to the increased risk of Reye's syndrome.

### Secondary prevention

Aspirin therapy at 75–325 mg/day is recommended for adults with diabetes and evidence of large vessel disease, such as a history of myocardial infarction (MI), stroke, peripheral vascular disease, claudication, or angina.

No specific data support an exact dose of aspirin; however, using lower doses decreases the risk of side effects. Combination therapy with medication such as clopidogrel (Plavix) may be considered in patients with severe and progressive CVD.

### Other considerations

Consider using clopidogrel (Plavix) as an alternative to aspirin therapy if the patient has significant gastrointestinal intolerance or a true aspirin allergy. Studies show similar efficacy with clopidogrel when compared to aspirin.

## **4. Lifestyle practices**

### **Anthropometric measurements**

Obesity is common and increasingly prevalent among Native Americans with diabetes. In people who have diabetes, overweight and obesity can worsen complications and complicate diabetes management by increasing insulin resistance and raising blood glucose levels. Lifestyle changes are the core components of weight management and are essential for the management of diabetes and its co-morbidities hypertension, dyslipidemia, and CVD.

We highly recommend that weight management counseling be a multidisciplinary team approach and include a registered dietitian or a public health nutritionist. Patients who are overweight (BMI 25.0–29.9 kg/m<sup>2</sup>) or obese (BMI ≥30 kg/m<sup>2</sup>) should be referred to community or clinic based structured programs where weight loss is addressed. Such programs should emphasize goal setting, coaching and motivational interviewing, education and skills development, physical activity, self-monitoring, problem solving, behavioral change, stress and stimulus control, the importance of social support, and the use of community resources. The role of the clinician is to educate, monitor, and support the patient during these processes. All

clinical providers should encourage their adults with diabetes to make healthier diet choices.

Regular documentation of weight and height for Body Mass Index (BMI) computation is necessary for meaningful monitoring, support, and encouragement. Following BMI trends over time may identify weight gain issues early. The degree of insulin resistance, the incidence of type 2 diabetes, and the increased risk for CVD are highest in individuals with upper body or abdominal obesity, as manifested by a waist-to-hip circumference ratio that is >0.95 in men and >0.85 in women. Measurement of waist circumference and/or waist-to-hip ratio should be considered as these have also been correlated with increased risk for CVD.

### **Classification of weight and body mass index (BMI).**

<b>Classification</b>	<b>BMI</b>
Underweight	< 18.4 kg/m <sup>2</sup>
Normal	18.5 - 24.9 kg/m <sup>2</sup>
Overweight	25 - 29.9 kg/m <sup>2</sup>
Obesity (Class 1)	30 - 34.9 kg/m <sup>2</sup>
Obesity (Class 2)	35 - 39.9 kg/m <sup>2</sup>
Extreme Obesity (Class 3)	> 40 kg/m <sup>2</sup>

### **Medical Nutrition Therapy and nutrition education**

Every person with diabetes should receive individualized MNT at diagnosis and as needed thereafter to achieve treatment goals. MNT for diabetes is delivered by a registered dietitian following nationally-recognized American Dietetic Association protocols. MNT includes individualized assessment, intervention, monitoring, and follow-up of nutrition interventions specific to the management and treatment of diabetes or kidney disease. MNT is intensive nutrition counseling and therapy that relies heavily on follow-up and feedback to change behavior over a period of time. MNT is cost-effective and is a Medicare reimbursable service when provided by a registered dietitian. (The *ADA [American Diabetes Association] Standards of Medical Care in Diabetes—2006* provide specific recommendations for MNT.)

Given the established benefits of MNT, every attempt should be made to provide MNT to all individuals with diabetes. However, the IHS recognizes that certain communities have limited access to a registered dietitian. When providing other nutrition counseling and education in the absence of a registered dietitian, health care professionals within IHS, tribal, and urban (ITU) programs should convey consistent, culturally relevant messages. This includes the use of traditional foods, social and religious traditions, and family and community customs and beliefs.

## Diabetes self-management education

Diabetes self-management education (DSME) is an integral part of diabetes care for all individuals with diabetes who want to achieve successful health-related outcomes. Comprehensive diabetes education helps adults with diabetes initiate effective self-care when they are first diagnosed; on-going DSME helps people maintain effective self-management for the long term.

Health care providers with specialized diabetes training, including registered dietitians, registered nurses, or pharmacists who are certified diabetes educators (CDE), should provide DSME to individuals when their diabetes is first diagnosed and as needed thereafter. In addition, community health workers who have completed specialized training in diabetes are uniquely positioned to collaborate with diabetes educators and other health care providers to improve the quality of diabetes education in their communities.

Providing DSME through programs that meet national standards helps ensure high-quality diabetes care and education. The IHS, through its Integrated Diabetes Education Recognition Program (IDERP), is one of only two organizations that have been approved by the Centers for Medicare and Medicaid Services (CMS) as a national accrediting organization for outpatient DSME services. Accreditation by the IHS IDERP not only acknowledges a program for the quality of its diabetes services, but also allows a program to seek reimbursement of DSME services for eligible Medicare beneficiaries. In addition, accreditation can enhance the marketing of diabetes services to the community and providers, and improve clinical and behavioral outcomes for participating clients.

The *IHS IDERP Standards, Review Criteria, and Application Manual* provides guidelines for education program development with criteria specific for AI/AN health care facilities. The guidelines have been used by ITU health care facilities to guide and improve diabetes education and care.

## Physical activity and exercise

The IHS recommendations for physical activity and exercise in this document do not diverge from those of the ADA. People with diabetes should be advised to perform at least 150 min/week of moderate-intensity aerobic physical activity (50-70% of maximum heart rate). In the absence of contraindications, people with type 2 diabetes should be encouraged to perform resistance training three times per week.

Given the often-earlier onset of diabetes and the increased rate of complications in AI/AN populations, the initial medical examination should carefully screen for the presence of macrovascular and microvascular disorders that may worsen as a result of an exercise program. The provider is responsible for:

- Giving medical clearance.
- Providing an exercise prescription based on the medical evaluation.
- Ensuring the patient has the resources and ability to evaluate his or her glycemic response to an exercise session (i.e., SMBG). This may require a referral to a diabetes educator.

- Ensuring the patient can identify and treat hypoglycemic episodes. This may require a referral to DSME or other resource.
- Educating the patient about proper footwear and care, especially when prescribing weight-bearing activities. This responsibility may be referred to another member of the diabetes team.

Referral to resources for supervision by a fitness specialist and for coaching is highly recommended. Many ITU programs have invested in physical activity services, professionals, and equipment. This has increased patients' access to knowledgeable exercise specialists who can assist in problem solving and provide ongoing support. An individualized exercise program minimizes the risk and maximizes the benefits of exercise by:

- Considering the appropriate type of activity based on interest and indications and contraindications due to the complications of diabetes.
- Prescribing specific guidelines for intensity, duration, and frequency of exercise.
- Teaching proper methods and techniques for performing resistance exercise, a new recommendation by the ADA.

Any increase in physical activity—from daily living, occupational pursuits, structured aerobic exercise or resistance exercise—will add to the overall caloric expenditure that could contribute to weight loss and may have other beneficial effects. The American Heart Association has identified physical inactivity as a major modifiable risk for chronic heart disease. Therefore, providers should encourage any increase in physical activity.

### **Mental and emotional health: Screening for depression in patients with diabetes**

Depression in adults with diabetes has a significant impact on the individual, as well as the health care system. A previous diagnosis of depression doubles the risk for developing diabetes. Adults with diabetes are more likely to experience depression than those without diabetes. Approximately 15–20% of adults with diabetes suffer from depression, as compared with 2–9% of the general population. Specific information on depression in AI/AN with diabetes is limited; however in the Pima Indian population, the prevalence was documented at 16.3%. Individuals with other chronic diseases in addition to diabetes have greater levels of depression.

In addition, depression is linked to poor glycemic control, poor diabetes self-care, diabetes complications, and higher health care costs. Research shows adults with diabetes who struggle with depression have a significant overall greater risk of mortality than those without depression.

For the person with diabetes and depression, a multidisciplinary approach to care, which may include a behavioral health professional, is beneficial. Timely diagnosis of depression with the initiation of a treatment plan and adequate follow-up in those diagnosed or with a positive *screen* for depression is necessary.

### Depression screening recommendations

Use a screening tool that is simple to administer and assess, such as the Patient Health Questionnaire (PHQ) screening tool. This assesses DSM-IV criteria and is designed for use in the primary care setting. The PHQ-2 is a basic screening tool that asks the following two questions:

“Over the last two weeks, have you been bothered by any of the following problems:

1. Little interest or pleasure in doing things?
2. Feeling down, depressed, or hopeless?”

If the patient responds “yes” to either question, administer the PHQ-9, which asks seven additional questions. Patients who screen positive should receive timely evaluation by a medical provider or behavioral health provider to determine whether the patient meets diagnostic criteria for depression and, if so, to initiate a treatment plan. (See [references](#) for further information and a website where you can download the PHQ-9.)

## **Tobacco**

### Assessment

Every visit should include an assessment of tobacco use and willingness to quit. Providers should systematically document the history of tobacco use for all adolescent and adult individuals with diabetes.

### Counseling

All health care providers should advise individuals with diabetes not to initiate tobacco use (e.g., smoking or chew tobacco). This advice should be consistently repeated to prevent smoking and other tobacco use, particularly among children and adolescents with diabetes.

Tobacco users should complete cessation counseling as a routine component of diabetes care. Providers should:

- Use a clear, strong, and personalized manner to urge every tobacco user to quit
- Describe the added risks of tobacco use and diabetes

- Ask every tobacco user with diabetes if he or she is willing to quit at the present time. If the patient answers “no”, he or she should receive a brief and motivational discussion regarding the need to stop using tobacco and the risks of continued use, as well as encouragement to quit and support when ready. If the patient answers “yes”, providers should assess the patient’s treatment preference and initiate either minimal, brief, or intensive cessation counseling and offer pharmacological supplements as appropriate.

#### Systems for delivery of tobacco cessation resources

Diabetes health care providers should consider training in the Public Health Service guidelines regarding tobacco cessation. Providers should also use follow-up procedures designed to assess and promote quitting status for all tobacco users with diabetes.

### **Alcohol and other substance use**

Providers should assess all adults with diabetes for alcohol and other substance use. Providers should also counsel all patients on the appropriate use of alcohol:

- Recommend limiting alcoholic beverage to one serving per day for adult women and two servings per day for adult men. (One serving = a 12 oz beer, 5 oz glass of wine, or 1½ oz distilled spirits [e.g., vodka, whiskey, gin, etc.] )
- Advise abstention from alcohol for women during pregnancy and for people with medical problems such as liver disease, pancreatitis, advanced neuropathy, severe hypertriglyceridemia, or alcohol abuse.
- Refer patients with alcohol or substance abuse to the appropriate behavioral health staff or treatment program.

## **5. Other topics for consideration**

### **Distinguishing type 1 and type 2 diabetes**

Distinguishing type 1 diabetes and type 2 diabetes is not always straightforward, yet the distinction can be critical. Type 1 diabetes exists in AI/AN patients and must be considered in patients of any age or weight who present with a new diagnosis of diabetes and an unclear clinical picture. This is especially true in children, even if they are overweight. Some type 1 diabetes variants, such as Latent Autoimmune Diabetes of Adults (LADA), may not require insulin to avoid ketosis in the early stages.

Although no test can definitively distinguish type 1 from type 2 diabetes, several laboratory studies may be helpful when the diagnosis is not clear clinically. Providers should consider obtaining consultation if they are unfamiliar with the use of these tests or how to make a diagnosis in a complex patient. Incorrectly diagnosing type 2 diabetes in a patient who truly has type 1 diabetes can cause considerable problems.

### Measurement of endogenous insulin secretion

The results for these tests may be low in type 2 diabetes patients with glucose toxicity. If in doubt, measure after glycemic control has been restored for several weeks:

- Fasting insulin level—if the patient is not on exogenous insulin
- C-peptide, the other half of pro-insulin. This test is useful even if the patient is taking insulin injections.

### Autoantibodies

Positive antibody tests denote an autoimmune process, but negative tests do not rule it out:

- Islet cell antibodies (ICA)
- Glutamic acid decarboxylate antibodies (GADA)
- Other antibody tests have been used in research and some clinical settings (e.g., thyroid peroxidase antibodies, insulin autoantibodies, etc.).

### Other lab tests and exams

Gauging the degree of insulin deficiency versus insulin resistance with the following tests can be helpful. Although some overweight type 1 diabetes patients may have some signs of insulin resistance, in general, they will not have the usual type 2 diabetes measurements at diagnosis:

- Lipids: Type 2 diabetes patients have the typical low HDL/high triglyceride pattern.
- Blood pressure: Type 2 diabetes patients often have some degree of hypertension at time of diabetes diagnosis.
- Ketones: Although patients with type 2 diabetes can have ketonuria and even diabetic ketoacidosis (DKA), generally these only occur at very high glucose levels or with a serious concurrent illness or infection. More often, it is patients with type 1 diabetes who have significant ketonuria and who are more profoundly acidotic with DKA.
- Microvascular complications: Many type 2 diabetes patients already have retinopathy, microproteinuria, or neuropathy at the time of diagnosis, whereas this is almost never true of patients with type 1 diabetes.
- Weight loss: The degree and speed of weight loss before diagnosis is usually more rapid in patients with type 1 than type 2 diabetes.

## **Pregnancy and diabetes**

During the last two generations, diabetes during pregnancy has increased significantly in AI/AN women. Hyperglycemia during pregnancy can be associated with morbidity and mortality for both the mother and her infant. Therefore, management of diabetes in pregnancy offers a unique opportunity to affect both patients' health positively. Currently, women with diabetes and good glycemic control can look forward to pregnancy outcomes that are comparable to that of the general population.

### Pregnancy and type 2 diabetes

Pregnancy in women with pregestational diabetes (PGDM) is associated with an increase in risk to both the fetus and the mother. The incidence of congenital anomalies and spontaneous abortions increases during the period of fetal organogenesis in women with poor glycemic control. A woman may not know she is pregnant during fetal organogenesis, which is not complete until eight weeks post-conception. Therefore, preconception counseling and planning are essential in women of childbearing age who have type 2 diabetes to optimize their diabetes control before becoming pregnant.

### Gestational diabetes

American Indian and Alaska Native women are at increased risk for developing gestational diabetes (GDM), as are women with certain other risk factors, including but not limited to the following:

- Previous GDM
- Obesity
- Previous fetal macrosomia
- Insulin resistance syndrome
- Unexplained stillbirth
- Polycystic ovarian syndrome
- Congenital anomaly
- Family history of diabetes.

American Indian and Alaska Native women should be screened for pre-existing diabetes early in pregnancy with a 50 gram one-hour OGTT. If early screening is negative, repeat the screen for GDM at 24–28 weeks gestation. The screening can be repeated at 32 weeks in selected cases. A positive screening test should be followed by a 100 gram three-hour OGTT. The IHS *Diabetes in Pregnancy Screening and Management Guidelines* gives a comprehensive outline on the screening, testing, and management of patients with GDM and PGDM that is beyond the scope of this document.

### Management of glycemic levels during pregnancy

The treatment of diabetes in pregnant women involves several components, including careful and frequent monitoring of blood glucose, the administration of insulin if indicated, and dietary interventions.

Hypoglycemia, a major risk of insulin therapy, can usually be prevented with careful SBGM and education of the mother. Exercise therapy has been shown to be effective in some randomized controlled data in this field.

Women with diabetes who are planning pregnancy or who have become pregnant (PGDM) should have a comprehensive eye examination and should be counseled on the risk of development and/or progression of diabetic retinopathy. Eye examination should occur in the first trimester with close follow-up throughout pregnancy and for one year postpartum. Women who develop diabetes (GDM) during pregnancy do not require a comprehensive eye examination during pregnancy due to the short period of exposure to elevated glucose and the low risk of developing diabetic retinopathy.

### Postpartum gestational diabetes screening for type 2 diabetes

Women with GDM are at increased risk of developing type 2 diabetes after delivery. About one third of all AI/AN women with GDM will develop diabetes within five years of delivery. These women should be re-tested by a 75 gram two-hour OGTT at least 6–12 weeks post delivery to determine their glycemic status. Women with a normal postpartum OGTT should be re-tested every 1–3 years with a fasting blood glucose. Providers should monitor blood glucose in the postpartum and lactating period as clinically appropriate.

All women with a history of GDM should receive counseling and education regarding lifestyle modifications that will reduce or delay the development of type 2 diabetes. Moreover, the importance of maintaining optimal glucose control prior to and during any subsequent pregnancy should be stressed. Women with a history of diabetes in pregnancy can be offered all standard Food and Drug Administration-approved contraceptive agents.

Mothers should also be made aware that children of GDM pregnancies should be monitored for obesity and abnormalities of glucose utilization.

## **Cancer screening**

The American Cancer Society (ACS) recommends early detection of cancer in average-risk asymptomatic people. As part of comprehensive diabetes care, patients should be offered cancer screening based on national recommendations, family history, and increased risk. Further recommendations and guidelines for cancer screening may be found in the references section.

### Cervical cancer

- Pap smear and pelvic exam to begin within 3 years of onset of sexual activity or at age 21 with screening at least every 3 years or according to ACS guidelines.

### Breast cancer

- Clinical breast examination according to ACS guidelines.
- Counseling to raise awareness of breast cancer symptoms.
- Mammogram every one to two years in women aged 40–49, annually thereafter.

### Prostate cancer

- Digital rectal exam (DRE) and prostate-specific antigen test (PSA) should be offered annually, starting at the age of 50, for men who have a life expectancy of at least 10 more years. Screening should occur earlier in men with a family history of prostate cancer. The potential benefits, limitations, and harms associated with testing should be discussed.

### Colorectal cancer

Potential colorectal cancer (CRC) screening options are numerous. However, within the IHS setting, access to care and cost constraints may limit provider options. As a result, the IHS recommends the following:

- Renewed emphasis on CRC screening
- Improved patient education on CRC screening
- Fecal occult blood testing (FOBT) (three samples gathered at home) every year if possible; every two years at a minimum starting at the age of 50
- Appropriate follow-up for positive FOBT results.

Additional screening options if available:

- Flexible sigmoidoscopy every five years starting at the age of 50 or
- Double contrast enema every five years, starting at the age of 50 or
- Colonoscopy every 10 years, starting at the age of 50.

If the patient is at risk for earlier onset CRC (e.g., first degree relative with onset of CRC before the age of 50), screening should begin earlier and more frequently.

### **Tuberculosis screening and treatment**

Adults with diabetes and latent TB infection (LTBI) are at high risk of progressing to active TB disease if they are not treated for LTBI. Studies have shown that the risk is two to six times greater than in patients without diabetes. On average, an estimated 30% of individuals with diabetes will develop active TB disease over the course of their lifetime if they have TB infection and have not been treated. Other factors that further increase the risk of progression from latent TB infection to TB disease include: tuberculin skin test (TST), conversion within two years,

intravenous drug use, immuno-suppressive drugs (particularly TNF- $\alpha$  inhibitors) and chronic kidney disease. The TST was previously referred to as a purified protein derivative (PPD).

One of the strategies to prevent and control TB in the United States is targeted testing: to diagnose and treat LTBI in people who are at increased risk for the development of disease. This includes certain medical conditions, such as diabetes. It is also important to remember that a decision to tuberculin test is a decision to treat. The health facility that places TSTs, should assess how many are placed and read and how many individuals initiate and complete treatment.

The TST is most frequently used test to assess latent TB infection. In a person with diabetes, induration  $>10$  mm 48–72 hours after administration is considered a positive result. Newer FDA approved tests that are T-cell interferon- $\gamma$  release assays (IGRA), such as the QuantiFERON®-TB Gold In-Tube or T-Spot.TB, are becoming increasingly available. However, published data concerning the use of IGRAs in populations at increased risk for LTBI are limited.

Check the TST status of all adults with diabetes. If the TST status is negative ( $<10$  mm in the absence of other pertinent social or medical history) or unknown:

- TST testing should be done within one year of the initial work-up for the diabetes diagnosis; patients should be treated if they have LTBI.
- If no TST has been placed since the diagnosis of diabetes, TST status should be determined.

If the TST status is positive ( $\geq 10$  mm), a review of symptoms, targeted physical exam and chest radiograph should be done. In most cases, progression of LTBI to active TB can be prevented with treatment. At the present time, Isoniazid with Vitamin B6 for 9 months is the preferred regimen. Patients must be screened and routinely evaluated for hepatotoxicity.

### **Diabetes neuropathies**

Diabetes neuropathies are a heterogeneous group of disorders and present a wide range of abnormalities. They are among the most common long-term complications of diabetes and are a significant source of morbidity and mortality. Proximal and distal peripheral sensory and motor nerves can be affected, as well as the autonomic nervous system. The major morbidity of somatic neuropathy is foot ulceration. Neuropathy increases the risk of amputation 1.7 fold. An in-depth discussion of diabetic neuropathies is beyond the scope of this document.

### **Peripheral arterial disease in diabetes**

Peripheral arterial disease (PAD), or atherosclerosis affecting the limb, can lead to disabling symptoms of claudication or critical limb ischemia threatening limb viability. Moreover, PAD is a marker of systemic atherosclerosis; as a result, patients are at increased risk for MI, stroke, and death. Risk factors associated with

PAD include older age, cigarette smoking, diabetes, hypercholesterolemia, hypertension, and possibly genetic factors.

Initial screening for PAD should include a history for claudication and an assessment of pedal pulses. As many patients with PAD are asymptomatic, an ankle brachial index (ABI) may be considered in the evaluation of suspected PAD. The ABI, a ratio of Doppler-recorded systolic pressures in the lower and upper extremities, is a simple and accurate noninvasive test for the screening and diagnosis of PAD. Both the sensitivity and specificity of ABI less than 0.9 (the accepted cut-off for the presence of PAD) is about 95% for detecting angiographic arterial disease. Data from the Strong Heart Study suggest that the upper limit of normal ABI should not exceed 1.40. Patients with significant or positive ABI should be referred for further vascular assessment; exercise, medications, and surgical options should be considered. Smoking cessation and lipid-lowering agents improve claudication symptoms and lower extremity functioning among patients with symptomatic PAD.

## **Anemia**

Anemia is a common complication of diabetes. For many adults with diabetes, anemia could occur for several reasons. Anemia of chronic disease is associated with a number of disease states, especially if there is a significant inflammatory component (e.g., individuals with diabetes who also have metabolic syndrome). Anemia aggravates pre-existing CVD.

Anemia is commonly associated with CKD (as a result of erythropoietin deficiency) and nephropathy. Anemia can be expected in patients with stage 3 CKD. Recent reports suggest that anemia is common in patients with stage 2 CKD and normal serum creatinine. Providers should assess diabetes patients for anemia and, when identified, determine the cause. Appropriate and effective treatment of anemia will decrease morbidity, improve survival, and increase quality of life.

## **Nonalcoholic fatty liver disease and nonalcoholic steatohepatitis**

Nonalcoholic fatty liver disease (NAFLD) and nonalcoholic steatohepatitis (NASH) represent a spectrum of disease from simple fatty liver (steatosis) to steatosis with inflammation, necrosis, and cirrhosis. NAFLD occurs in people who drink little or no alcohol and affects all age groups. NASH represents the more severe end of this spectrum, and it is associated with liver disease that progresses to fibrosis and cirrhosis.

The etiology of NASH and the cellular basis for fat accumulation in the liver is unclear. Most patients with NASH are obese and have associated type 2 diabetes, hypertension, dyslipidemia, and insulin resistance.

The diagnosis is often made during a work-up of persistent AST/ALT elevation. Liver imaging studies with ultrasound or CT scan may show evidence of fat infiltration in the liver. Providers should eliminate other possible causes for chronic

liver disease through tests such as viral and autoimmune testing for liver disease. The gold standard diagnostic test is a liver biopsy.

Treatment for both NAFLD and NASH include weight loss, exercise, improved diabetes, and lipid control. Glycemic control medications that reduce insulin resistance, such as metformin and thiazolidinediones (TZD), have been shown to improve serum AST/ALT and liver pathology through increasing insulin sensitivity.

## **Bariatric Surgery**

Obesity surgery offers patients substantial and sustained weight loss. However, the procedures carry significant operative risk and long-term outcomes are not known. Weight loss surgery is an option for weight reduction in patients with clinically severe obesity, i.e., a BMI  $\geq 40$ , or a BMI  $\geq 35$  with comorbid conditions. Weight loss surgery should be reserved for patients in whom other methods of treatment have failed. Lifelong medical monitoring after surgery is necessary and monetary cost of the procedure may be prohibitive.

Two types of operations have proven to be effective: those that restrict gastric volume (banded gastroplasty) and those that, in addition to limiting food intake, also alter digestion (Roux-en-Y gastric bypass). For most patients, weight loss surgery provided medically significant sustained weight loss for more than 5 years. Perioperative complications vary with weight and the overall health of the individual. In the published literature, young patients without comorbidities with a BMI  $< 50$  kg/m<sup>2</sup> who have undergone surgery have mortality rates less than 1 percent, whereas massively obese patients with a BMI  $> 60$  kg/m<sup>2</sup> who are also diabetic, hypertensive, and in cardiopulmonary failure may have mortality rates that range from 2 to 4 percent. Operative complications, including anastomotic leak, subphrenic abscess, splenic injury, pulmonary embolism, wound infection, and stoma stenosis, occur in less than 10% of patients.

## **Estimated Average Glucose (eAG)**

Hemoglobin A1C or percent glycated hemoglobin is the measurement used to assess long-term management of diabetes, and has been for many years. Because A1C is expressed as a percentage, it is hard to relate to other important diabetes measurements such as blood glucose expressed in mg/dl. Its significance can be difficult to explain to patients and hard for them to understand.

A study published in *Diabetes Care*, August 2008, found a linear relationship between A1C levels and a measure of average glucose. Data from capillary (finger stick) glucose monitoring and continuous glucose monitoring over 3 months in participants with and without diabetes were compared with A1C values. Investigators were able to develop a formula to calculate estimated average glucose (eAG) from the A1C value. The relationship between A1C and eAG is described by the formula  $28.7 \times A1C - 46.7 = eAG$ . The eAG is measured in mg/dl, the same unit that is seen in venous blood glucose results and blood glucoses monitored with

a home glucose monitor. As a result of this study, IHS is encouraging the use of eAG for diabetes management.

**A1C and estimated average glucose (eAG)**

<b>A1C %</b>	<b>eAG mg/dL</b>
<b>6</b>	<b>126</b>
<b>6.5</b>	<b>140</b>
<b>7</b>	<b>154</b>
<b>7.5</b>	<b>169</b>
<b>8</b>	<b>183</b>
<b>8.5</b>	<b>197</b>
<b>9</b>	<b>212</b>
<b>9.5</b>	<b>226</b>
<b>10</b>	<b>240</b>

A1C will still be reported for those who are familiar with this lab value and their goals. But eAG will make it easier for future diabetics and those having a hard time understanding the meaning of A1C in relation to their diabetes control. Health care professionals can set goals for patients based on eAG units so that it is easier to assess whether goals are being reached everyday when blood sugars are tested at home. This helps patients with diabetes make the connection between daily and long-term glucose control.

## **Part 3: References**

### ***Part 1. Clinic Visit checklists***

#### **Laboratory testing**

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<http://digestive.niddk.nih.gov/ddiseases/pubs/vaccinationshepab/#B>

### ***Part 2. Supporting Statements***

#### **1. Criteria for the diagnosis of type 2 diabetes in adults**

ADA. Diagnosis and classification of diabetes mellitus. Diabetes Care. 2008; 31:S55-S60.

#### **2. Glycemic control and microvascular risk reduction**

##### **Assessment of glycemic control**

UK Prospective Diabetes Study Group. Association of glycaemia with macrovascular and microvascular complications of type 2 diabetes (UKPDS 35): prospective

observational study. *Br Med J*. 2000 Aug 12;321(7258):405-12.

ACE/AACE Diabetes Road Maps, Road Maps to Achieve Glycemic Control in Type 2 Diabetes Mellitus. *Endocr Practice*. 2007;13(3):260-8.

The Action to Control Cardiovascular Risk in Diabetes (ACCORD) Study Group. Effects of intensive glucose lowering in type 2 diabetes. *N Engl J Med* 2008;358(24):2545-59.

The ADVANCE Collaborative Group. Intensive blood glucose control and vascular outcomes in patients with type 2 diabetes. *N Engl J Med* 2008(24);358:2560-272.

Duckworth W, Abraira C, Moritz T, Reda D, Emanuele N, Reaven PD, et al. Glucose control and vascular complications in veterans with type 2 diabetes. *N Engl J Med* 2009;360(2):129-139.

Holman RR, Paul SK, Bethel MA, Matthews DR, Neil AW. 10-year follow-up of intensive glucose control in type 2 diabetes. *N Eng J Med*. 2008;359(15):1577-89.

Goldstein DE, Little RR, Lorenz RA, Malone JI, Nathan D, Peterson CM, Sacks DB. Tests of glycemia in diabetes. *Diabetes Care*. 2004;27(7):1761-73.  
<http://care.diabetesjournals.org/cgi/content/full/27/7/1761>

### **Assessment of chronic kidney disease**

The *IHS Primary Care Provider* published a series of articles by Andrew Narva and Theresa Kuracina on a primary care approach to patients with chronic kidney disease. The following web links will direct you to the articles:

Chronic Kidney Disease is a Public Health Issue. September 2002.  
[http://www.ihs.gov/medicalprograms/kidney/pro\\_clinicaltools/CKDisaPublicHealthIssue.pdf](http://www.ihs.gov/medicalprograms/kidney/pro_clinicaltools/CKDisaPublicHealthIssue.pdf)

Chronic Kidney Disease: Definition and Classification. October 2002.  
[http://www.ihs.gov/medicalprograms/kidney/pro\\_clinicaltools/CKDDefinitionandClassification.pdf](http://www.ihs.gov/medicalprograms/kidney/pro_clinicaltools/CKDDefinitionandClassification.pdf)

Chronic Kidney Disease: Screening and Staging. November 2002.  
[http://www.ihs.gov/medicalprograms/kidney/pro\\_clinicaltools/CKDScreeningandStaging.pdf](http://www.ihs.gov/medicalprograms/kidney/pro_clinicaltools/CKDScreeningandStaging.pdf)

Chronic Kidney Disease: Association of EGFR level with complications. December 2002  
[http://www.ihs.gov/medicalprograms/kidney/pro\\_clinicaltools/GFRandCKDComplications.pdf](http://www.ihs.gov/medicalprograms/kidney/pro_clinicaltools/GFRandCKDComplications.pdf)

Hypertension and Chronic Kidney Disease. January 2003.  
[http://www.ihs.gov/medicalprograms/kidney/pro\\_clinicaltools/HypertensionandCKD.pdf](http://www.ihs.gov/medicalprograms/kidney/pro_clinicaltools/HypertensionandCKD.pdf)

Anemia and Chronic Kidney Disease. (February 2003).  
[http://www.ihs.gov/medicalprograms/kidney/pro\\_clinicaltools/Anemia%20and%20CKD.pdf](http://www.ihs.gov/medicalprograms/kidney/pro_clinicaltools/Anemia%20and%20CKD.pdf)

Nutrition and Chronic Kidney Disease. March 2003.  
[http://www.ihs.gov/medicalprograms/kidney/pro\\_clinicaltools/NutritionandCKD.pdf](http://www.ihs.gov/medicalprograms/kidney/pro_clinicaltools/NutritionandCKD.pdf)

Bone disease in Chronic Kidney Disease. April 2003.  
[http://www.ihs.gov/medicalprograms/kidney/pro\\_clinicaltools/BoneDiseaseandCKD.pdf](http://www.ihs.gov/medicalprograms/kidney/pro_clinicaltools/BoneDiseaseandCKD.pdf)

Managing dyslipidemias in Chronic Kidney Disease. May 2003.  
[http://www.ihs.gov/medicalprograms/kidney/pro\\_clinicaltools/DyslipidemiasinCKD.pdf](http://www.ihs.gov/medicalprograms/kidney/pro_clinicaltools/DyslipidemiasinCKD.pdf)

Functional status, well-being, and Chronic Kidney Disease. June 2003.  
[http://www.ihs.gov/medicalprograms/kidney/pro\\_clinicaltools/FunctionalStatusandCKD.pdf](http://www.ihs.gov/medicalprograms/kidney/pro_clinicaltools/FunctionalStatusandCKD.pdf)

Preparing “advanced Chronic Kidney Disease” patients for renal replacement therapy. (July 2003).  
[http://www.ihs.gov/medicalprograms/kidney/pro\\_clinicaltools/PreparingforDialysis.pdf](http://www.ihs.gov/medicalprograms/kidney/pro_clinicaltools/PreparingforDialysis.pdf)

FAQs about the Glomerular Filtration Rate. August 2003.  
[http://www.ihs.gov/medicalprograms/kidney/pro\\_clinicaltools/FAQsaboutGFR.pdf](http://www.ihs.gov/medicalprograms/kidney/pro_clinicaltools/FAQsaboutGFR.pdf)

Chronic Kidney Disease Series: References and Resources. September 2003.  
[http://www.ihs.gov/medicalprograms/kidney/pro\\_clinicaltools/ReferencesandResources.pdf](http://www.ihs.gov/medicalprograms/kidney/pro_clinicaltools/ReferencesandResources.pdf)

IHS Kidney Disease Program  
[http://www.ihs.gov/medicalprograms/kidney/providers\\_index.asp](http://www.ihs.gov/medicalprograms/kidney/providers_index.asp)

IHS Kidney Disease Program: Link to KDOQI Guidelines  
[http://www.ihs.gov/medicalprograms/kidney/pro\\_clinicaltools/kdoqi\\_guidelines.asp](http://www.ihs.gov/medicalprograms/kidney/pro_clinicaltools/kdoqi_guidelines.asp)

### **Nephropathy in diabetes**

ADA. Nephropathy in diabetes. Diabetes Care. 2004;27:S79-83.  
[http://care.diabetesjournals.org/cgi/content/full/27/suppl\\_1/s79](http://care.diabetesjournals.org/cgi/content/full/27/suppl_1/s79)

National Institute for Health and Clinical Excellence, Chronic Kidney disease, Clinical Guidelines (September 2008). <http://www.nice.org.uk/Guidance/CG73>

Hypertension, Dialysis, and Clinical Nephrology. <http://www.hdcn.com/>

NIH National Kidney Disease Education Program. <http://www.nkdep.nih.gov/>

National Kidney Foundation. <http://www.kidney.org/>

## **Diabetes eye examination**

Fong DS, Aiello LP, Ferris FL 3rd, Klein R. Diabetic retinopathy. *Diabetes Care*. 2004;27(10):2540–53.

<http://care.diabetesjournals.org/cgi/content/full/27/10/2540>

Gómez-Ulla F, Fernandez MI, Gonzalez F, Rey P, Rodriguez M, Rodriguez-Cid MJ, et al. Digital retinal images and teleophthalmology for detecting and grading diabetic retinopathy. *Diabetes Care*. 2002;25(8):1384-9.

<http://care.diabetesjournals.org/cgi/content/full/25/8/1384>

## **Diabetes foot care**

National Diabetes Education Program. *Feet Can Last a Lifetime: A Health Care Provider's Guide to Preventing Diabetes Foot Problems*. November 2000.

[http://www.ndep.nih.gov/diabetes/pubs/Feet\\_HCGuide.pdf](http://www.ndep.nih.gov/diabetes/pubs/Feet_HCGuide.pdf)

Lower Extremity Amputation Prevention (LEAP) Program.

<http://www.hrsa.gov/leap/default.htm>

Gohdes D, Rith-Najarian S. Foot disease in diabetes. *New Engl J Med*. 1995;332(4):269-70.

Mayfield JA, Sugarman JR. The use of the Semmes-Weinstein monofilament and other threshold tests for preventing foot ulceration and amputation in persons with diabetes. *J Fam Pract*. 2000;49(11 Suppl):S17-29.

Reiber GE, Raugi GJ. Preventing foot ulcers and amputations in people with diabetes: future promise based on lessons learned. *Lancet*. 2005;366(9498):1676-7.

## **Diabetes dental care**

American Dental Association FAQs on Diabetes and Oral Health.

<http://www.hrsa.gov/leap/default.htm>

CDC. *Working Together to Manage Diabetes: A Guide for Pharmacists, Podiatrists, Optometrists, and Dental Professionals*. 2007.

[http://www.ndep.nih.gov/diabetes/pubs/PPODprimer\\_color.pdf](http://www.ndep.nih.gov/diabetes/pubs/PPODprimer_color.pdf)

Saremi A, Nelson RG, Tulloch-Reid M, Hanson RL, Sievers ML, Taylor GW, et al. Periodontal disease and mortality in type 2 diabetes. *Diabetes Care*. 2005;28(1):27-32.

<http://care.diabetesjournals.org/cgi/content/full/28/1/27>

Vernillo AT. Dental considerations for the treatment of patients with diabetes mellitus. *J Am Dent Assoc*. 2003;134:24S-33S.

### 3. Cardiovascular disease risk reduction

Lee ET, Howard BV, Wang W, Welty TK, Galloway JM, Best LG, et al. Prediction of coronary heart disease in a population with high prevalence of diabetes and albuminuria: the Strong Heart Study. *Circulation*. 2006;113(25):2897-2905.  
<http://strongheart.ouhsc.edu/>

#### Assessment and management of blood pressure

UK Prospective Diabetes Study Group. Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes: UKPDS. *Br Med J*. 1998;317:703-13.

Holman RR, Paul SK, Bethel MA, Neil AW, Matthews DR. Long-term follow-up after tight control of blood pressure in type 2 diabetes. *N Eng J Med*. 2008;359(15):1565-1576.

Sacks FM, Svetkey LP, Vollmer WM, Appel LJ, Bray GA, Harsha D, et al. Effects on blood pressure of reduced dietary sodium and the Dietary Approaches to Stop Hypertension (DASH) diet. DASH-Sodium Collaborative Research Group. *N Engl J Med*. 2001;344(1):3-10.

*The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure*. NIH Publication No. 04-5230. August 2004.

<http://www.nhlbi.nih.gov/guidelines/hypertension/index.htm>

#### Assessment and management of dyslipidemia

National Cholesterol Education Program.

<http://www.nhlbi.nih.gov/about/ncep/index.htm>

Dyslipidemia Management in Adults with Diabetes.

[http://care.diabetesjournals.org/cgi/content/full/27/suppl\\_1/s68](http://care.diabetesjournals.org/cgi/content/full/27/suppl_1/s68)

NHLBI. Third Report of the Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). NIH Publication No. 02-5215. September 2002. <http://www.nhlbi.nih.gov/guidelines/cholesterol/index.htm>

ADA. Dyslipidemia management in adults with diabetes. *Diabetes Care*. 2004;27(Suppl 1):S68-71. [http://care.diabetesjournals.org/cgi/reprint/27/suppl\\_1/s68](http://care.diabetesjournals.org/cgi/reprint/27/suppl_1/s68)

Heart Protection Study Collaborative Group. MRC/BHF heart protection study of cholesterol lowering with simvastatin in 5963 people with diabetes: a randomized placebo-controlled trial. *Lancet*. 2003;361:2005-16.

Liu J, Sempos C, Donahue RP, Dorn J, Trevisan M, Grundy SM. Joint distribution of non-HDL and LDL cholesterol and coronary heart disease risk prediction among individuals with and without diabetes. *Diabetes Care*. 2005;28(8):1916-21.

<http://care.diabetesjournals.org/cgi/content/full/28/8/1916>

Lu W, Resnick HE, Jablonski KA, Jones KL, Jain AK, Howard WJ, et al. Non-HDL cholesterol as a predictor of cardiovascular disease in type 2 diabetes: the Strong Heart Study. *Diabetes Care*. 2003;26(1):16-23.

<http://care.diabetesjournals.org/cgi/content/full/26/1/16>

Snow V, Aronson MD, Hornbake ER, Mottur-Pilson C, Weiss KB; Clinical Efficacy Assessment Subcommittee of the American College of Physicians. Lipid control in the management of type 2 diabetes mellitus: a clinical practice guideline. *Ann Intern Med*. 2004;140(8):644-9.

<http://www.annals.org/cgi/content/full/140/8/644>

### **Anti-platelet therapy**

ADA. Aspirin therapy in diabetes. *Diabetes Care*. 2004;27(Suppl 1):S72-73.

[http://care.diabetesjournals.org/cgi/content/full/27/suppl\\_1/s72](http://care.diabetesjournals.org/cgi/content/full/27/suppl_1/s72)

## **4. Lifestyle practices**

### **Anthropometric**

Klein S, Sheard NF, Pi-Sunyer X, Daly A, Wylie-Rosett J, Kulkarni K, et al. Weight management through lifestyle modification for the prevention and management of type 2 diabetes: rationale and strategies: a statement of the American Diabetes Association, the North American Association for the Study of Obesity, and the American Society for Clinical Nutrition. *Diabetes Care*. 2004;27(8):2067-73.

<http://care.diabetesjournals.org/cgi/content/full/27/8/2067>.

Wilson C, Gilliland S, Moore K, Acton K. The epidemic of extreme obesity among American Indian and Alaska Native adults with diabetes. *Prev Chronic Dis*. 2007;4(1):A06.

[http://www.cdc.gov/pcd/issues/2007/jan/06\\_0025.htm](http://www.cdc.gov/pcd/issues/2007/jan/06_0025.htm)

Indian Health Service. Division of Diabetes Treatment and Prevention. Guidelines for Care of Adults with Prediabetes and/or the Metabolic Syndrome in the Clinical Setting. September 2008.

[http://www.ihs.gov/MedicalPrograms/Diabetes/HomeDocs/Tools/ClinicalGuidelines/PreDiabetes\\_Guidelines\\_0209.pdf](http://www.ihs.gov/MedicalPrograms/Diabetes/HomeDocs/Tools/ClinicalGuidelines/PreDiabetes_Guidelines_0209.pdf)

### **Medical Nutrition Therapy and nutrition education**

ADA. Nutrition Recommendations and Interventions for Diabetes. *Diabetes Care*. 2008;31:S61-78.

[http://care.diabetesjournals.org/cgi/content/full/31/Supplement\\_1/S61](http://care.diabetesjournals.org/cgi/content/full/31/Supplement_1/S61)

MNT Evidence-Based Guides for Practice. American Dietetic Association

[http://www.eatright.org/cps/rde/xchg/ada/hs.xsl/events\\_5468\\_ENU\\_HTML.htm](http://www.eatright.org/cps/rde/xchg/ada/hs.xsl/events_5468_ENU_HTML.htm)

Franz MJ, Bantle JP, Beebe CA, Brunzell JD, Chiasson JL, Garg

A, et al. Evidence-based nutrition principles and recommendations for the treatment and prevention of diabetes and related complications. *Diabetes Care*. 2002;25:148-98. <http://care.diabetesjournals.org/cgi/reprint/25/1/148>

Franz MJ, Monk A, Barry B, McClain K, Weaver T, Cooper N, et al. Effectiveness of medical nutrition therapy provided by dietitians in the management of non-insulin-dependent diabetes mellitus: a randomized, controlled clinical trial. *J Am Diet Assoc*. 1995;95(9):1009-17.

Kulkarni K, Boucher JL, Daly A, Shwide-Slavin C, Silvers BT, O'Sullivan Maillet J, Pritchett E; American Dietetic Association. American Dietetic Association: Standards of practice and standards of professional performance for registered dietitians (generalist, specialty, and advanced) in diabetes care. *J Am Diet Assoc*. 2005;105(5):819-24.

Pastors JG, Warshaw H, Daly A, Franz M, Kulkarni K. The evidence for the effectiveness of medical nutrition therapy in diabetes management. *Diabetes Care*. 2002;25(3):608-13. <http://care.diabetesjournals.org/cgi/reprint/25/3/608>

Wilson C, Brown T, Acton K, Gilliland S. Effects of clinical nutrition education and educator discipline on glycemic control and outcomes in the Indian Health Service. *Diabetes Care*. 2003;26(9):2500-4. <http://care.diabetesjournals.org/cgi/reprint/26/9/2500>

### **Diabetes self-management education**

Funnell MM, Brown TL, Childs BP, Haas LB, Hoseney GM, Jensen B, et al. National standards for diabetes self-management education. *Diabetes Care*. 2008;31(Suppl 1):S97-104. [http://care.diabetesjournals.org/cgi/content/full/31/Supplement\\_1/S97](http://care.diabetesjournals.org/cgi/content/full/31/Supplement_1/S97)

IHS. *Indian Health Service Integrated Diabetes Education Recognition Program: Standards, Review Criteria, and Application Manual*. Revised May 2004. <http://www.ihs.gov/MedicalPrograms/Diabetes/index.cfm?module=programsIDERP>

### **Physical activity and exercise**

American College of Sports Medicine. [http://www.acsm.org//AM/Template.cfm?Section=Home\\_Page](http://www.acsm.org//AM/Template.cfm?Section=Home_Page)

CDC The Community Guide. What works to promote health. <http://www.thecommunityguide.org/index.html>

CDC Division of Nutrition and Physical Activity. <http://www.cdc.gov/nccdphp/dnpao/index.html>

The Cooper Institute. <http://www.cooperinst.org/>

Albright A, Franz M, Hornsby G, Kriska A, Marrero D, Ullrich I, Verity LS. American College of Sports Medicine position stand: Exercise and type 2 diabetes. *Med Sci Sports Exerc.* 2000;32(7):1345–60.

<http://www.ms-se.com/pt/pt-core/template-journal/msse/media/0700.pdf>

ADA. Physical activity/exercise and diabetes. *Diabetes Care.* 2004;27(Suppl 1):S58-62.  
[http://care.diabetesjournals.org/cgi/content/full/diacare;27/suppl\\_1/s58](http://care.diabetesjournals.org/cgi/content/full/diacare;27/suppl_1/s58)

Women's Health Council: Women's Health, Diabetes, and Physical Activity

<http://www.chronicdisease.org/i4a/pages/Index.cfm?pageID=3405>

Galloway JM, Clark MA, Brody EA, Malasky B, Freund N, Holman R with the Native American Diabetes Program. Appropriate exercise prescription for patients with diabetes mellitus. *IHS Prim Care Provid.* 2002;27(11):221-25.

<http://www.ihs.gov/PublicInfo/Publications/HealthProvider/issues/PROV1102.pdf>

Sigal RJ, Kenny GP, Wasserman DH, Castaneda-Sceppa C, White RD. Physical activity/exercise and type 2 diabetes: a consensus statement from the American Diabetes Association. *Diabetes Care.* 2006;29(6):1433-8.

<http://care.diabetesjournals.org/cgi/content/full/29/6/1433?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&author1=sigal&searchid=1&FIRSTINDEX=0&sortspec=relevance&resourcetype=HWCIT>

## **Mental and emotional health: Screening for depression in adults with diabetes**

### **Patient Health Questionnaire (PHQ)**

The following websites provide sample PHQ forms. The PHQ-2 is the first two questions of the PHQ-9.

<http://www.depression-primarycare.org/clinicians/toolkits/materials/forms/phq9/>

[http://www.americangeriatrics.org/education/dep\\_tool\\_05.pdf](http://www.americangeriatrics.org/education/dep_tool_05.pdf)

Kroenke K, Spitzer RL, Williams JB. The Patient Health Questionnaire-2: validity of a two-item depression screener. *Med Care.* 2003;41(11):1284–92.

Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med.* 2001;16(9):606-13.

Behavioral Diabetes Institute: Addressing Real-Life Aspects of Diabetes.

<http://www.behavioraldiabetes.org/>

MacArthur Initiative on Depression Primary Care. <http://www.depression-primarycare.org/>

National Institute of Mental Health: Depression.

<http://www.nimh.nih.gov/health/publications/depression/complete-index.shtml>

Screening for Mental Health, Inc. <http://www.mentalhealthscreening.org/>

Anderson RJ, Freedland KE, Clouse RE, Lustman PJ. The prevalence of comorbid depression in adults with diabetes: a meta-analysis. *Diabetes Care* 2001;24(6):1069-78. <http://care.diabetesjournals.org/content/vol24/issu,e6/>

Brown LC, Majumdar SR, Newman SC, Johnson JA. History of depression increases risk of type 2 diabetes in younger adults. *Diabetes Care*. 2005;28(5):1063-7. <http://care.diabetesjournals.org/cgi/reprint/28/5/1063>

Engum A, Mykletun A, Midthjell K, Holen A, Dahl AA. Depression and diabetes: a large population-based study of socioedemographic, lifestyle, and clinical factors associated with depression in type 1 and type 2 diabetes. *Diabetes Care*. 2005;28(8):1904-9. <http://care.diabetesjournals.org/cgi/reprint/28/8/1904>

Katon WJ, Von Korff M, Ciechanowski P, Russo J, Lin E, Simon G, et al. Behavioral and clinical factors associated with depression among individuals with diabetes. *Diabetes Care*. 2004;27(4):914-20. <http://care.diabetesjournals.org/cgi/reprint/27/914>

Katon WJ, Rutter C, Simon G, Lin EH, Ludman E, Ciechanowski P, et al. The association of comorbid depression with mortality in patients with type 2 diabetes. *Diabetes Care*. 2005;28(11):2668-72. <http://care.diabetesjournals.org/cgi/reprint/28/11/2668>

Lin EHB, Katon W, Von Korff M, Rutter C, Simon GE, Oliver M, et al. Relationship of depression and diabetes self-care, medication adherence, and preventive care. *Diabetes Care*. 2004;27:2154-60. <http://care.diabetesjournals.org/cgi/reprint/27/9/2154>

Singh PK, Looker HC, Hanson RL, Krakoff J, Bennett PH, Knowler WC. Depression, diabetes, and glycemic control in Pima Indians. *Diabetes Care*. 2004;27:618-9. <http://care.diabetesjournals.org/cgi/reprint/27/2/618>

## **Tobacco**

ADA. Smoking and diabetes. *Diabetes Care*. 2004;27:S74-75. [http://care.diabetesjournals.org/cgi/content/full/27/suppl\\_1/s74](http://care.diabetesjournals.org/cgi/content/full/27/suppl_1/s74)

HHS. Treating Tobacco Use and Dependence: 2008 Update <http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=hstat2.chapter.28163>

## **Alcohol and other substance use**

Alcohol and diabetes. In American Diabetes Association Medical Nutrition Therapy for Diabetes. Evidence-based nutrition principles and recommendations for the treatment and prevention of diabetes and related complications. *Diabetes Care*. 2002;25:164-165. <http://care.diabetesjournals.org/cgi/reprint/25/1/148>

## 5. Other topics for consideration

### Distinguishing Type 1 and Type 2 diabetes

Pinhas-Hamiel O, Zeitler P. The importance of a name. *N Engl J Med*. 1999;340(18):1419–21.

### Pregnancy and Diabetes

American College of Obstetricians and Gynecologists. *Clinical Updates in Women's Health Care*. Diabetes Mellitus: Early Detection, Prevention, and Management. 2007.

American College of Obstetricians and Gynecologists. Clinical management guidelines for obstetrician-gynecologists. Number 60, March 2005. Pregestational diabetes. *Obstet Gynecol*. 2005;105(3):675-85.

Correa A, Gilboa SM, Besser LM, Botto LD, Moore CA, Hobbs CA, et al. Diabetes mellitus and birth defects. *Am J Obstet Gynecol* 2008;199(3)237.e1-9.

ADA. Gestational diabetes mellitus. *Diabetes Care*. 2004;27(Suppl 1):S88-90.  
[http://care.diabetesjournals.org/cgi/content/full/26/suppl\\_1/s103](http://care.diabetesjournals.org/cgi/content/full/26/suppl_1/s103)

IHS Maternal and Child Health Program: Women's Health and Diabetes.  
<http://www.ihs.gov/MedicalPrograms/MCH/W/WHdm.cfm>

ADA. Preconception care of women with diabetes. *Diabetes Care*. 2004 Jan;27(Suppl 1):S76-78. [http://care.diabetesjournals.org/cgi/content/full/27/suppl\\_1/s76](http://care.diabetesjournals.org/cgi/content/full/27/suppl_1/s76)

ANMC Women's Health Service Diabetes Mellitus in Pregnancy Screening and Management Guidelines (2004).  
[http://www.ihs.gov/MedicalPrograms/MCH/w/Documents/DMPreg102504\\_000.doc](http://www.ihs.gov/MedicalPrograms/MCH/w/Documents/DMPreg102504_000.doc)

Kitzmiller JL, Block JM, Brown FM, Catalano PM, Conway DL, Coustan DR, et al. Managing preexisting diabetes for pregnancy: summary of evidence and consensus recommendations for care. *Diabetes Care* 31:1060-1079, 2008.  
<http://care.diabetesjournals.org/cgi/content/extract/31/5/1060>

### Cancer screening

National Cancer Institute Screening and Testing to Detect Cancer.  
<http://www.cancer.gov/cancertopics/screening>

Smith RA, Cokkinides V, Brawley OW. [Cancer](#) screening in the United States, 2008: a review of current American Cancer Society guidelines and cancer screening issues. *CA Cancer J Clin*. 2008;58(3):161-79.

## **Tuberculosis Treatment**

CDC's Division of TB Elimination established four Regional Training and Medical Consultation Centers (RTMCC) to provide medical consultation and training.

<http://www.cdc.gov/tb/rmcc.htm>

[Charles P. Felton National Tuberculosis Center at Harlem Hospital pocket reference and training materials](#)

CDC. *Interactive Curriculum on Tuberculosis: What the Clinician Should Know*, 2004. This resource provides detailed information on diagnosis and treatment for latent and active tuberculosis. <http://www.cdc.gov/tb/webcourses/corecurr/index.htm>

## **Diabetes neuropathies**

Mayo Clinic Proceedings. Consensus guidelines: assessment, diagnosis, and treatment of diabetic peripheral neuropathic pain. 2006 Supplement;81(4):S2-32.

Vinik AI, Mehrabian A. Diabetic neuropathies. *Med Clin North Am*. 2004;88:947-99.

## **Peripheral arterial disease in diabetes**

ACC/AHA Guidelines for the management of patients with peripheral arterial disease (Lower Extremity, Renal, Mesenteric, and Abdominal Aortic). American College of Cardiology. 2005.

<http://www.americanheart.org/downloadable/heart/1133899967030PADEExecSumm.pdf>

Lamar Welch VL, Casper M, Greenlund K, Zheng ZJ, Giles W, Rith-Najarian S. Prevalence of lower extremity arterial disease defined by the ankle-brachial index among American Indians: the Inter-Tribal Heart Project. *Ethn Dis*. 2002;12(1):S1-63-7.

Mehler PS, Coll JR, Estacio R, Esler A, Schrier RW, Hiatt WR.. Intensive blood pressure control reduces the risk of cardiovascular events in patients with peripheral arterial disease and type 2 diabetes. *Circulation*. 2003;107(5):753-56.

Resnick HE, Lindsay RS, McDermott MM, Devereux RB, Jones KL, Fabsitz RR, Howard BV. Relationship of high and low brachial index to all-cause and cardiovascular disease mortality: the Strong Heart Study. *Circulation*. 2004;109(6):733-9.

## **Anemia**

National Kidney Foundation, Kidney Disease Outcomes Initiative (KDOQI) Clinical Practice Guidelines and Clinical Practice Recommendations for Anemia in Chronic Kidney Disease (2006)

[http://www.kidney.org/professionals/KDOQI/guidelines\\_anemia/index.htm](http://www.kidney.org/professionals/KDOQI/guidelines_anemia/index.htm)

[McFarlane SI, Chen S, Whaley-Connell AT, Sowers JR, Vassalotti JA, Salifu MO, et al. Prevalence and associations of anemia of CKD: Kidney Early Evaluation Program \(KEEP\) and National Health and Nutrition Examination Survey \(NHANES\) 1999-2004. \*Am J Kidney Dis\*. 2008;51\(4 Suppl 2\):S46-55.](#)

## **Nonalcoholic fatty liver disease and nonalcoholic steatohepatitis**

Medina J, Fernández-Salazar LI, García-Buey L, Moreno-Otero R. Approach to the pathogenesis and treatment of nonalcoholic steatohepatitis. *Diabetes Care*. 2004;27(8):2057-66. <http://care.diabetesjournals.org/cgi/reprint/27/8/2057>

Erbey JR, Silberman C, Lydick E. Prevalence of abnormal serum alanine aminotransferase levels in obese patients and patients with type 2 diabetes. *Am J Med*. 2000;109(7):588-90.

Salmela PI, Sotaniemi EA, Niemi M, Mäentausta O. Liver function tests in diabetic patients. *Diabetes Care*. 1984;7(3):248-54.

## **Bariatric surgery**

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## **Estimated average glucose (eAG)**

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## Abbreviations

Alanine transferase .....	ALT
American Cancer Society .....	ACS
American Diabetes Association .....	ADA
American Indian and Alaska Native .....	AI/AN
Angiotensin converting enzyme .....	ACE
Angiotensin receptor blocker .....	ARB
Ankle brachial index .....	ABI
Aspartate transferase.....	AST
Blood pressure .....	BP
Blood urea nitrogen.....	BUN
Body Mass Index .....	BMI
Cardiovascular disease.....	CVD
Casual plasma glucose.....	CPG
Centers for Disease Control and Prevention .....	CDC
Centers for Medicare and Medicaid Services .....	CMS
Certified diabetes educators .....	CDE
Chronic kidney disease.....	CKD
Colorectal cancer .....	CRC
Creatinine kinase .....	CK
Department of Health and Human Services .....	DHHS
Diabetes self-management education .....	DSME
Diabetic ketoacidosis .....	DKA
<i>Diagnostic and Statistical Manual of Mental Disorders</i> , fourth edition .....	DSM-IV
Dietary Approaches to Stop Hypertension.....	DASH
Digital rectal exam .....	DRE
Division of Diabetes Treatment and Prevention.....	DDTP
Estimated average glucose.....	eAG
Fecal occult blood testing .....	FOBT
Gestational diabetes .....	GDM
Glomerular filtration rate .....	EGFR
Glutamic acid decarboxylate antibodies .....	GADA
Hepatitis B vaccine .....	HBV
High-density lipoprotein cholesterol .....	HDL
IHS Standards of Care for Adults With Type 2 Diabetes	

Hypertension.....	HPN
Indian Health Service.....	IHS
Integrated Diabetes Education Recognition Program.....	IHS IDERP
Islet cell antibodies.....	ICA
Indian Health Service, tribal, and urban.....	ITU
Latent autoimmune diabetes of adults.....	LADA
Latent tuberculosis infection.....	LTBI
Low-density lipoprotein cholesterol.....	LDL
Magnetic resonance angiography.....	MRA
Medical Nutrition Therapy.....	MNT
Modification of Diet in Renal Disease Study Group.....	MDRD
Myocardial infarction.....	MI
National Heart, Lung, and Blood Institute.....	NHLBI
National Kidney Foundation.....	NKF
Nonalcoholic fatty liver disease.....	NAFLD
Nonalcoholic steatohepatitis.....	NASH
Oral glucose tolerance test.....	OGTT
Parathyroid hormone.....	PTH
Patient health questionnaire.....	PHQ
Peripheral arterial disease.....	PAD
Prostate-specific antigen test.....	PSA
Purified protein derivative.....	PPD
Resource and Patient Management System.....	RPMS
Self-monitoring blood glucose.....	SMBG
Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure	JNC VII
Special Diabetes Program for Indians.....	SDPI
Thiazolidinediones.....	TZD
Thyroid-stimulating hormone.....	TSH
Tuberculosis.....	TB
Tuberuculin Skin Test.....	TST
Urinary albumin to creatinine ratio.....	UACR