Missouri Consensus

DIABETES MANAGEMENT

Guideline for Adults

Missouri Department of
Health and Senior Services

Introduction

The *Missouri Consensus Diabetes Management Guideline for Adults* was developed to provide diabetes treatment guidance to health care providers across the state. It is not intended to replace or preclude clinical judgment. The guideline is a supplement to the standard general medical care provided to all adults with or without diabetes.

Guideline recommendations are summarized in a two-page chart that can be printed separately and used as a reference tool. Supplemental information to support the recommendations is provided in Appendix A. Guideline references are provided in Appendix B.

The guideline, along with the *State of Missouri Consensus Screening Guidelines for Pre-diabetes and Diabetes in the Medical Setting*, are available electronically on the Missouri Department of Health and Senior Services website at: http://www.dhss.mo.gov/diabetes/Guidelines.html. Guideline implementation tools will be made available on the website as they are developed.

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Missouri Consensus Diabetes Management Guideline for Adults*

Diabetes care is a partnership between the person with diabetes, family members, and the diabetes team. This team may include, but is not limited to, the person with diabetes and/or caregiver/significant other, endocrinologist, primary care provider, diabetes educator, nurse, dietitian, pharmacist, and other specialists. Abnormal physical or lab findings should result in appropriate interventions. The *Missouri Consensus Diabetes Management Guideline for Adults* was developed to provide treatment guidance to primary care providers across the state and is not intended to replace or preclude clinical judgment. This guideline is a supplement to the standard general medical care provided to all adults with or without diabetes. Appendix A and B and implementation tools can be accessed via the Internet at http://www.dhss.mo.gov/diabetes/Guidelines.html or by calling 573-522-2861. REVISED: 4-1-2008

COMPONENT OF CARE	CARE/TEST	FREQUENCY
General Recommendations	✦ Perform diabetes focused visit[1] (see Appendix A).....	✦ Every 3-6 months or more often based on control and complications[1]
Cardiovascular	✦ Manage cardiovascular risk factors.[2].....	✦ At each visit until therapeutic goals are achieved[2]
	✦ Advise blood pressure <130/80 mmHg..... To achieve blood pressure targets, angiotensin converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARBs) should be used; a thiazide diuretic should be added to those with an eGFR ≥50 ml/min per 1.73 m^2 and a loop diuretic for those with an eGFR < 50 ml/min per 1.73 m^2.[2,3] Consider teratogencity potential in all women of childbearing age.[2,4] (see Appendix A)	✦ Follow-up and medication adjustment at monthly intervals until blood pressure goal is reached. Multiple drug therapy is generally required to reach blood pressure targets. Closely monitor kidney function and serum potassium with the use of ACE inhibitors, ARBs, and diuretics. After goal is reached and stable, follow-up at 3-6 month intervals.[3]
	✦ Check lipid profile..... Adult goals: • Triglycerides <150 mg/dL • High density lipoproteins (HDL) >40 mg/dL in men and >50 mg/dL in women should be considered • Low density lipoproteins (LDL) <100 mg/dL[5] (see Appendix A)	✦ At least annually and more often if needed to achieve goals[6]
	✦ Prescribe statins in persons who have one or more cardiovascular risk factors (both type 1 and type 2 diabetes). Consider teratogencity potential in all women of childbearing age[6] (see Appendix A).	
	✦ Prescribe low dose aspirin therapy (75-325 mg/day) in all adults ≥30 years of age with diabetes and one or more other cardiovascular risk factors, if not contraindicated. Persons with diabetes <21 years of age should not receive aspirin due to increased risk of Reye's syndrome.[6]	
Diabetes Self-Management Training (DSMT)	✦ Provide or refer for guided self-management/education services by a diabetes educator, preferably a certified diabetes educator (CDE), or someone board certified in advanced diabetes management (BCADM).[7] This should include but is not limited to cardiovascular risk reduction, tobacco use cessation, nutrition and lifestyle counseling, regular physical activity, foot care, glycemic control, medication, and preconception counseling.[8] (see Appendix A)	✦ At diagnosis; annually thereafter or at follow-up visits if appropriate[9]
Disability	✦ Refer to appropriate specialist, agency, or organization as needed.[10] (Disability is defined as an impairment that substantially limits one or more major life activities.) (see Appendix A)	✦ At each diabetes focused visit, assess for functional and activity limitations.
Eye Care	✦ Refer for a dilated retinal exam by an ophthalmologist or optometrist knowledgeable and experienced in diagnosing diabetic retinopathy.[11]	✦ Type 1: Annually beginning 3-5 years after onset Type 2: Annually beginning at diagnosis[11] (see Appendix A)
Family Planning	✦ Assess contraception/discuss family planning.[1,12].....	✦ At diagnosis and at each diabetes focused visit[1,12]
	✦ Provide preconception counseling[13] (see Appendix A).....	✦ At time of initial visit in all women of childbearing age[13]
Foot Care	✦ Inspect feet with shoes and socks off. Stress the need for daily self-exam and appropriate foot care.[14].....	✦ At each diabetes focused visit
	✦ Perform or refer for a comprehensive foot exam[14] (see Appendix A)...	✦ Annually
Glycemic Control	✦ Review self-monitoring blood glucose logs. Individualize management plan to encourage persons with diabetes to reach and maintain treatment goals.[15].....	✦ At each diabetes focused visit
	✦ Achieve glycated hemoglobin (A1C) goal for persons with diabetes… as close to normal (<6%) as possible without significant hypoglycemia. • American Diabetes Association <7%[15] • American Association of Clinical Endocrinologists ≤6.5%[16]	✦ 2-4 times annually based on individual's therapeutic goal. Develop or adjust the management plan to achieve normal or near-normal glycemia. Less stringent treatment goals may be appropriate for persons with diabetes and a history of severe hypoglycemia; persons with diabetes and limited life expectancies; and older adults with co-morbid conditions.[15]

*Adult is defined as a non-pregnant, individual 18 years of age or older.

Pre-diabetes and diabetes screening guidelines for adults and children can be found at: http://www.dhss.mo.gov/diabetes/Guidelines.html.

COMPONENT OF CARE	CARE/TEST	FREQUENCY
Immunizations	✦ Provide flu vaccine.[2, 17] ✦ Provide pneumococcal vaccine.[2, 18]	✦ Annually; administer in the fall (October is optimal).[2, 17] ✦ Provide at least one lifetime pneumococcal vaccine for adults with diabetes. A one-time revaccination is recommended for individuals >65 previously immunized when they were <65 if the vaccine was administered more than 5 years ago.[2, 18]
Kidney Function	✦ Measure albumin/creatinine ratio using a random urine sample.[19] ✦ Check serum creatinine for the estimation of glomerular filtration rate (GFR) in all adults regardless of degree of urine albumin excretion.[20] Test as recommended above. (see Appendix A) ✦ If microalbuminuria or gross proteinuria is confirmed, treat type 1 diabetes with ACE inhibitor, treat type 2 diabetes with ACE inhibitor or ARB.[20] Consider teratogencity potential in all women of childbearing age.[2,4]	✦ Type 1: Annually beginning 5 years after onset; and earlier if gross proteinuria is present Type 2: Annually beginning at diagnosis[20] ✦ As above for diagnosis. Annually after diagnosis[20] ✦ Closely monitor kidney function and serum potassium with the use of ACE inhibitors, ARBs, and diuretics.
Medical Nutrition Therapy (MNT)	✦ Provide and/or refer for individual MNT to achieve treatment goals, preferably provided by a registered dietitian/CDE familiar with the components of diabetes MNT[15] (see Appendix A).	✦ At diagnosis, with follow-up as needed until initial goals are met, then at 6-month to 1-year intervals as needed
Medication Adherence	✦ Review purpose of medication (including complementary and alternative therapies); assess for accurate timing, dose frequency; and evaluate side effects.	✦ At each diabetes focused visit
Neuropathy	✦ Screen for distal symmetric polyneuropathy (DPN) using tests such as pinprick sensation, temperature, vibration perception (using 128-HZ tuning fork), 10-g monofilament pressure sensation at the dorsal surface of both great toes, just proximal to the nail bed, and ankle reflexes.[21] ✦ Assess cardiac autonomic neuropathy signs: resting tachycardia (>100 bpm), orthostasis (a fall in systolic blood pressure >20 mmHg upon standing), or other disturbances in autonomic nervous system function involving the skin, pupils, or gastrointestinal and genitourinary systems.[21]	✦ Annually[21] ✦ During history and review of systems[21]
Oral Health	✦ Evaluate dental symptoms/complaints and conduct visual examination of the mouth. Refer to dentist for treatment as appropriate.[1] (see Appendix A) ✦ Refer for dental exam by a general dentist or periodontal specialist to examine for periodontal disease (see Appendix A)	✦ At each diabetes focused visit ✦ Twice each year (every 6 months)[22]
Physical Activity	✦ Advise persons with diabetes regarding the benefits from an exercise program and assess for risks and benefits prior to engaging in moderate to strenuous exercise[23] (see Appendix A).	✦ At each diabetes focused visit
Pre-diabetes	✦ Counsel persons with pre-diabetes regarding measures to prevent diabetes (especially diet and exercise) and cardiovascular risk factors. These risk factors should be addressed and managed appropriately. Pre-diabetes is defined as: • Impaired glucose tolerance (IGT): Oral Glucose Tolerance Test (OGTT) 2 hours postload glucose 140-199 mg/dL • Impaired fasting glucose (IFG): Fasting Blood Glucose 100-125 mg/dL[24]	✦ See "State of Missouri Consensus Screening Guidelines for Pre-diabetes and Diabetes in a Medical Setting"[25] at http://www.dhss.mo.gov/diabetes/Guidelines.html.
Psychosocial Health	✦ Assess psychosocial health; screen for depression[26] and sexual health concerns ✦ Inquire about alcohol/recreational drugs	✦ At diagnosis, each diabetes focused visit, during hospitalizations, at discovery of complications, or at the discretion of the clinician[26] ✦ At diagnosis; annually thereafter
Social Support System	✦ Assess social barrier adherence in areas such as, but not limited to: literacy; family and community support; transportation problems; cultural competency; need for an interpreter; foreign language educational materials; insurance; and availability of food (see Appendix A).	✦ At diagnosis and as indicated
Tobacco Cessation	✦ Assess tobacco use in persons with diabetes. Ask and identify tobacco use. Advise of importance of quitting. Assess interest in quitting. Assist in quitting (e.g. pharmacologic therapy, referral, etc). Arrange for follow-up contact soon after quit date.[27]	✦ Tobacco user: Ask and advise at every visit. Non-tobacco user: Ask and advise at diagnosis and annually thereafter.[27]

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Pre-diabetes and diabetes screening guidelines for adults and children can be found at http://www.dhss.mo.gov/diabetes/Guidelines.html.

DISCLAIMER

Initial Evaluation
A complete medical evaluation should be performed to classify persons with diabetes, detect the presence or absence of diabetes complications, assist in formulating a management plan, and provide the basis for continuing care. If the diagnosis of diabetes has already been made, the evaluation should review the previous treatment and the past and present degrees of glycemic control. Laboratory tests appropriate to the evaluation of the general medical condition of persons with diabetes should be performed. A focus on the components of comprehensive care will assist the health care team to ensure optimal management of persons with diabetes.[28]

Management
Persons with diabetes should receive medical care from a physician-coordinated team. Such teams may include, but are not limited to, physicians, nurse practitioners, physician assistants, nurses, dietitians, pharmacists, and mental health professionals with expertise and special interest in diabetes. It is essential in this collaborative and integrated team approach that persons with diabetes assume an active role in their care.[28]

The management plan should be formulated as an individualized therapeutic alliance among the person with diabetes, his/her family, the physician, and other members of the health care team. Any plan should recognize diabetes self-management education (DSME) as an integral component of care. In developing the plan, consideration should be given to the age, school or work schedule and conditions, physical activity, eating patterns, social situation and personality, cultural factors, and presence of complications of diabetes or other medical conditions of the person with diabetes. A variety of strategies and techniques should be used to provide adequate education and development of problem-solving skills in the various aspects of diabetes management. Implementation of the management plan requires that each aspect is understood and agreed upon by the person with diabetes and the care providers, and that the goals and treatment plan are reasonable.[28]

General Recommendations

A diabetes focused visit is one that is regularly scheduled for the primary purpose of assessing diabetes care treatment goals, management plans, and problems that might be barriers to optimal control. Until treatment goals are achieved, standard care should be provided at least quarterly for persons with diabetes taking insulin, and every three to six months for those not using insulin. The frequency of visits may also vary depending on the type of diabetes, blood glucose goals and outcomes, changes in treatment, and the presence of complications and/or other medical conditions.

Many persons with diabetes have other conditions or concerns not related to diabetes. Focusing entirely on diabetes may not be possible during a non-diabetes-related visit. Some providers elect to use a diabetes checklist or flow sheet to assist them in outlining the essential components of diabetes care. A flow sheet may be useful for efficiently integrating diabetes care with other concerns during the non-diabetes-related visit.

At each diabetes focused visit, the plan of care for persons with diabetes should include the assessment or reassessment of all of the following components of diabetes care:

- Review the management plan, problems, and goals
- Assess nutrition/weight/body mass index/growth
- Review oral medications, insulin use, goals, side effects, and frequency of hypoglycemia
- Review self-monitoring blood glucose (SMBG) data and most recent hemoglobin A1C level
- Perform or refer for preventive exams (e.g., dilated eye exam, comprehensive foot exam, oral/dental screening, and any other preventive exams for general health)
- Assess blood pressure control and lipid management
- Advise regarding the benefits from an exercise program
- Assess current self-care management skills, needs, and barriers
- Review lifestyle modifications
- Assess psychosocial concerns (i.e., screening for depression)
- Assess for functional and activity limitations
- Assess contraception/discuss family planning
- Assess tobacco use and assist in tobacco cessation (e.g., pharmacologic therapy, referral, etc)
- Consider referrals to other team members and schedule follow-up with primary care provider

Personal goals need to be realistic and obtainable. Evaluation of an individual's treatment/management plan may be measured by the following: SMBG data, hemoglobin A1C level, lipid levels, body weight, body mass index, blood pressure control, self-reported quality of life, the presence or absence of complications, and the reduced need for emergency services.[1]

Cardiovascular

Treatment with angiotensin converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARBs) favorably affects the progression of diabetic nephropathy and reduces microalbuminuria; ARBs have been shown to reduce progression to macroalbuminuria.[3]

ACE inhibitors are contraindicated during pregnancy because of association with fetal growth, oligohydramnios, neonatal renal failure, and neonatal death.[2,4] Although no data are available on human use of angiotensin II receptor antagonists, adverse effects are likely to be similar to those reported with ACE inhibitors, and these agents should be avoided.[4] A U.S. Food and Drug Administration (FDA) Alert dated June 2006, called attention to a June 8, 2006, article in the New England Journal of Medicine reporting a study that showed babies whose mothers had taken an ACE inhibitor during the first three months of pregnancy had an increased risk of birth defects. Before this study, it was known that ACE inhibitors can harm an unborn baby when taken during the last six months of pregnancy (second and third trimester).[29]

The National Cholesterol Education Program Adult Treatment Panel III (ATP III) guidelines, which were issued in May 2001, introduced new features that more accurately identify patients at risk: a secondary goal for non-high density lipoprotein (non-HDL) cholesterol if triglycerides are ≥200 mg/dL after the low density lipoprotein (LDL) cholesterol goal is achieved. The goal for non-HDL cholesterol can be established at 30 mg/dL higher than that for LDL cholesterol. This is perhaps the least utilized feature of ATP III in clinical practice, despite the ease of calculating non-HDL cholesterol (total cholesterol minus HDL cholesterol) as non-HDL cholesterol represents the sum of the atherogenic particles that carry cholesterol.[5]

Also, recent clinical trials in high-risk patients, such as those with acute coronary syndromes or previous cardiovascular events, have demonstrated that more aggressive therapy with high doses of statins to achieve an LDL of <70 mg/dL led to a significant reduction in further events.[6]

The cholesterol-lowering "statin" drugs are contraindicated in pregnancy.[6] Statins are classified Pregnancy Category X for fetal risk. Pregnancy Category X, as developed by the FDA in 1979, indicates that studies in animals or humans have demonstrated fetal abnormalities and/or there is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience, and the risks involved in use of the drug in pregnant women clearly outweigh potential benefits.

Diabetes Self-Management Training (DSMT)

The primary goal of diabetes education is to provide knowledge and skill training that helps persons with diabetes identify barriers and to facilitate problem-solving and coping skills to achieve effective self-care behavior and behavior change. The terms diabetes self-management training (DSMT) and diabetes self-management education (DSME) are often used interchangeably. The American Association of Diabetes Educators (AADE) has published standards to define the scope, role, and minimal level of quality performance of the diabetes educator to promote DSMT as an integral part of diabetes care and to facilitate excellence in DSMT.[7] The AADE7 Self Care Behaviors™ framework reflects the best practice of DSMT by measuring, monitoring, and managing outcomes—including behavioral outcomes as specified by the National Standards for DSMT. The "7" AADE behaviors include: Healthy Eating, Being Active, Monitoring, Taking Medication, Problem Solving, Healthy Coping, and Reducing Risks.[30] The AADE7 Self Care Behaviors™ Goal Sheet is designed to assist diabetes educators as an ongoing tracking and measurement tool. Information on the AADE7 Self Care Behaviors™ framework and Goal Sheet can be accessed at http://www.aadenet.org/AADE7. The American Dietetic Association has published standards of practice and standards of professional performance for registered dietitians that identify the competencies needed to provide diabetes care inclusive of diabetes self-management training and medical nutrition training.[31]

Disability

Disabilities are more prevalent among older adults with diabetes than among those without diabetes (estimated prevalence is 20-50%). Though disabilities may or may not be directly related to the diabetes, most disabilities impact a person's ability to carry out some of the self-management skills required for optimal diabetes control.[32]

Examples of disabilities include, but are not limited to, amputation of all or part of a limb, blindness, deafness, low vision, hemiparesis, learning disabilities, manual neuropathy, mental retardation or developmental disabilities, and serious mental illness.[10] The needs assessment for disabilities should also include physical and psychosocial factors including age, mobility, visual acuity, hearing, manual dexterity, alertness, attention span, and ability to concentrate.

Eye Care

Women with pre-existing diabetes should have a comprehensive eye exam if planning a pregnancy and/or during their first trimester. [11]

Family Planning

The goals of preconception care are to:

- Integrate persons with diabetes into the management of their diabetes,
- Achieve the lowest hemoglobin A1C test results possible without excessive hypoglycemia,
- Assure effective contraception until stable and acceptable glycemia is achieved, and
- Identify, evaluate, and treat long-term diabetes complications such as retinopathy, nephropathy, neuropathy, hypertension, and coronary artery disease.[12]

Foot Care

The foot examination can be accomplished in a primary care setting and should include the use of a monofilament, tuning fork, palpation, and a visual examination. This examination should include assessment of protective sensation, foot structure and biomechanics, vascular status, and skin integrity. Evaluation of neurological status should include a quantitative somatosensory threshold test, using the Semmes-Weinstein 5.07 (10-g) monofilament.[14]

Kidney Function

Diabetic nephropathy is the single leading cause of end-stage renal disease. Microalbuminuria and/or glomerular filtration rate (GFR) <60 ml/min per 1.73 m^2 are independent risk factors for cardiovascular disease. If detected, reduction of all modifiable risk factors is strongly advised. At least two of three tests measured within a six-month period should show elevated levels before persons with diabetes are designated as having microalbuminuria.[20]

In the treatment of both micro- and macroalbuminuria, either ACE inhibitors or ARBs should be used except during pregnancy. While there are no adequate head-to-head comparisons of ACE inhibitors and ARBs, there is clinical trial support for each of the following statements:

- In persons with type 1 diabetes, hypertension, and any degree of albuminuria, ACE inhibitors have been shown to delay the progression of nephropathy.
- In persons with type 2 diabetes, hypertension, and microalbuminuria, ACE inhibitors and ARBs have been shown to delay the progression to macroalbuminuria.
- In persons with type 2 diabetes, hypertension, macroalbuminuria, and renal insufficiency (serum creatinine >1.5 mg/dL), ARBs have been shown to delay the progression of nephropathy.
- In the setting of albuminuria or nephropathy, in persons with diabetes unable to tolerate ACE inhibitors and/or ARBs, consider the use of non-dihydropyridine calcium channel blockers (DCCBs), beta-blockers, or diuretics for the management of blood pressure. Use of non-DCCBs may reduce albuminuria in persons with diabetes, including during pregnancy.[20]

Medical Nutrition Therapy (MNT)

Medical nutrition therapy, along with exercise, is a cornerstone of diabetes self-management. The American Dietetic Association provides evidence-based practice guidelines to ensure consistent MNT delivery that should be utilized at each nutrition training session.[33] The American Dietetic Association has developed flow sheets to assist with the implementation of their guidelines. These flow sheets can be found at http://www.dhss.mo.gov/diabetes/Guidelines.html.

Oral Health

Evaluation of dental symptoms/complaints can include detection of bad breath, visual inspection for swollen or bleeding gums, loose or spreading teeth, obvious decay, and noting patient comments about conditions of dry mouth, altered taste, or any complaint focused upon the mouth. Determine that the patient has a "dental home," and if not, refer to a dentist or periodontist.

In addition to gum disease, which is the most common oral health condition related to diabetes, other mouth problems include oral infections (such as swelling or pus around teeth or gums), fungal infections (such as thrush), and dry mouth, which may be a side effect of prescription medications or high blood sugar. Nationwide surveys have demonstrated that persons with diabetes, especially poorly controlled diabetes, have a significantly higher prevalence of severe periodontitis. Also, evidence supports that periodontal infections contribute to problems with glycemic control.[34] A comprehensive summary of diabetes and oral health published in the Journal of the American Dental Association can be found on the American Dental Association website at http://www.ada.org/prof/resources/pubs/jada/reports/diabetes.asp.

A thorough dental exam should include:

- Inquire about dental symptoms or complaints,
- Inspect the mouth for loose teeth, bad breath, swollen/bleeding gums, and obvious decay,
- Inquire about dry mouth and be aware of xerostomia-producing drugs that the patient is taking,
- Advise daily performance of effective brushing and flossing—and use of Xylitol containing products to reduce decay, and
- Evaluate denture patients for denture cleanliness with focus on ulcerations and/or oral yeast infection.

The American Dental Association has developed a web animation series that shows effective techniques for brushing and flossing. It can be accessed at http://www.ada.org/public/games/animation/interface.asp.

Physical Activity

Initial physical activity recommendations should be modest and based on the person's willingness and ability, gradually increasing the duration and frequency to 30-45 minutes of moderate aerobic activity, 3-5 days/week (goal of at least 150 minutes/week). Greater activity levels of at least 1 hour/day of moderate (walking) or 30 minutes/day of vigorous (jogging) activity may be needed to achieve successful long-term weight loss. To improve glycemic control, assist with weight maintenance, and reduce risk of cardiovascular disease, at least 150 minutes/week of moderate-intensity aerobic physical activity (50-70% of maximum heart rate) is recommended and/or at least 90 minutes/week of vigorous aerobic exercise (>70% of maximum heart rate). The physical activity should be distributed over at least 3 days/week and with no more than two consecutive days without physical activity.[23] Before beginning a program of physical activity more vigorous than brisk walking, people with diabetes should be assessed for conditions that might be associated with increased likelihood of cardiovascular disease or might contraindicate certain types of exercise or predispose to injury, such as uncontrolled hypertension, severe autonomic neuropathy, severe peripheral neuropathy, and preproliferative or

proliferative retinopathy or macular edema. Cardiac stress tests should be considered in individuals with a risk for coronary artery disease who have a coronary artery disease risk score of ≥10% over ten years.[35]

Social Support System

Cultural and linguistic competence is a set of congruent behaviors, attitudes, and policies that come together in a system, agency, or among professionals that enables effective work in cross-cultural situations. Culture refers to integrated patterns of human behavior that include the language, thoughts, communications, actions, customs, beliefs, values, and institutions of racial, ethnic, religious, or social groups. Competence implies having the capacity to function effectively as an individual and an organization within the context of the cultural beliefs, behaviors, and needs presented by consumers and their communities.[36]

Pre-diabetes and diabetes screening guidelines for adults and children can be found at http://www.dhss.mo.gov/diabetes/Guidelines.html.

*Adult is defined as a non-pregnant, individual 18 years of age or older.

APPENDIX B: References

Missouri Consensus Diabetes Management Guideline for Adults

[1] American Diabetes Association. (2006). Clinical practice recommendations. Position statement: Standards of medical care in diabetes. *Diabetes Care,* 29 (Suppl. 1), S8-9. Retrieved from the Web June 29, 2006. http://care.diabetesjournals.org/content/vol29/suppl_1/

[2] American Diabetes Association. (2006). Clinical practice recommendations. Position statement: Standards of medical care in diabetes. *Diabetes Care,* 29 (Suppl. 1), S17-18. Retrieved from the Web June 29, 2006. http://care.diabetesjournals.org/content/vol29/suppl_1/

[3] United States Department of Health and Human Services. National Institutes of Health, National Heart, Lung, and Blood Institute. (December 2003). The 7th report of the Joint National Committee on prevention, detection, evaluation, and treatment of high blood pressure. Volume 7 (NIH Publication No. 03-5233), p. 14-15. Retrieved from the Web June 29, 2006. http://www.nhlbi.nih.gov/guidelines/hypertension/express.pdf

[4] National Institutes of Health, National Heart, Lung, and Blood Institute, and National High Blood Pressure Education Program. (Originally printed 1990, revised July 2000). National High Blood Pressure Education Program working group report on high blood pressure in pregnancy. (NIH Publication No. 00-3029), p. 13. Retrieved from the Web July 10, 2006. http://www.nhlbi.nih.gov/health/prof/heart/hbp/hbp_preg.pdf

[5] National Institutes of Health, National Heart, Lung, and Blood Institute. National Cholesterol Education Program. (May 2001). Third report of the National Cholesterol Education Program (NCEP) expert panel on detection, evaluation, and treatment of high blood cholesterol in adults (Adult Treatment Panel III). Volume 3 (NIH Publication No. 01-3670), p. 16, 18. Retrieved from the Web June 29, 2006. http://www.nhlbi.nih.gov/guidelines/cholesterol/atp3xsum.pdf

[6] American Diabetes Association. (2006). Clinical practice recommendations. Position statement: Standards of medical care in diabetes. *Diabetes Care,* 29 (Suppl. 1), S18-20. Retrieved from the Web June 29, 2006. http://care.diabetesjournals.org/content/vol29/suppl_1/

[7] American Association of Diabetes Educators. (2005). The scope of practice, standards of practice, and standards of professional performance for diabetes educators. *Diabetes Educator,* 31(4), 487-512. Retrieved from the Web June 29, 2006. http://www.diabeteseducator.org/AboutUs/scope_overview.shtml

[8] American Diabetes Association. (2006). Clinical practice recommendations. Standards and review criteria: National standards for diabetes self-management education. *Diabetes Care*, 29 (Suppl. 1), S80. Retrieved from the Web June 29, 2006. http://care.diabetesjournals.org/content/vol29/suppl_1/

[9] American Diabetes Association. (2006). Clinical practice recommendations. Position statement: Standards of medical care in diabetes. *Diabetes Care,* 29 (Suppl. 1), S14. Retrieved from the Web June 29, 2006. http://care.diabetesjournals.org/content/vol29/suppl_1/

[10] American Association of Diabetes Educators. (August 2002). Position statement: Diabetes education for people with disabilities. pages 1-6. Retrieved from the Web June 29, 2006. http://www.aadenet.org/pdf/DiabEducDisab.pdf

[11] American Diabetes Association. (2006). Clinical practice recommendations. Position statement: Standards of medical care in diabetes. *Diabetes Care,* 29 (Suppl. 1), S23. Retrieved from the Web June 29, 2006. http://care.diabetesjournals.org/content/vol29/suppl_1/

[12] American Diabetes Association. (2006). Clinical practice recommendations. Position statement: Standards of medical care in diabetes. *Diabetes Care,* 29 (Suppl. 1), S28. Retrieved from the Web June 29, 2006. http://care.diabetesjournals.org/content/vol29/suppl_1/

[13] American Diabetes Association. (2004). Position statement: Preconception care of women with diabetes. *Diabetes Care*, 27 (Suppl. 1), S76-78. Retrieved from the Web June 29, 2006. http://care.diabetesjournals.org/cgi/reprint/27/suppl_1/s76?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&searchid=1&FIRSTINDEX=0&sortspec=relevance&volume=27&firstpage=76&resourcetype=HWCIT

[14] American Diabetes Association. (2006). Clinical practice recommendations. Position statement: Standards of medical care in diabetes. *Diabetes Care,* 29 (Suppl. 1), S25-26. Retrieved from the Web June 29, 2006. http://care.diabetesjournals.org/content/vol29/suppl_1/

[15] American Diabetes Association. (2006). Clinical practice recommendations. Position statement: Standards of medical care in diabetes. *Diabetes Care,* 29 (Suppl. 1), S10-11. Retrieved from the Web June 29, 2006. http://care.diabetesjournals.org/content/vol29/suppl_1/

[16] The American Association of Clinical Endocrinologists (AACE). (January/February 2002). Medical guidelines for the management of diabetes mellitus: The AACE system of intensive diabetes self-management—2002 update. *Endocrine Practice*, 8 (Suppl. 1), 43. Retrieved from the Web June 29, 2006. http://www.aace.com/pub/pdf/guidelines/diabetes_2002.pdf

[17] Centers for Disease Control and Prevention. (2005) Prevention and control of influenza: recommendations of the Advisory Committee on Immunization Practices (ACIP). *Morbidity and Mortality Weekly Report*, 54 (No. RR-08), 1-40. Retrieved from the Web June 29, 2006. http://www.cdc.gov/mmwr/PDF/rr/rr5408.pdf

[18] Centers for Disease Control and Prevention. (1997). Prevention of pneumococcal disease: recommendations of the Advisory Committee on Immunization Practices (ACIP). *Morbidity and Mortality Weekly Report*, 46 (No. RR-8), 11-13. Retrieved from the Web June 29, 2006. http://www.cdc.gov/mmwr/PDF/rr/rr4608.pdf

[19] The American Association of Clinical Endocrinologists (AACE). (January/February 2002). Medical guidelines for the management of diabetes mellitus: The AACE system of intensive diabetes self-management—2002 update. *Endocrine Practice*, 8 (Suppl. 1), 59. Retrieved from the Web June 29, 2006. http://www.aace.com/pub/pdf/guidelines/diabetes_2002.pdf

[20] American Diabetes Association. (2006). Clinical practice recommendations. Position statement: Standards of medical care in diabetes. *Diabetes Care,* 29 (Suppl. 1), S21-22. Retrieved from the Web June 29, 2006. http://care.diabetesjournals.org/content/vol29/suppl_1/

[21] American Diabetes Association. (2006). Clinical practice recommendations. Position statement: Standards of medical care in diabetes. *Diabetes Care,* 29 (Suppl. 1), S24. Retrieved from the Web June 29, 2006. http://care.diabetesjournals.org/content/vol29/suppl_1/

[22] National Diabetes Education Program. (April 2004). Guiding principles for diabetes care: For health providers. Publication Number 99-4343, 7. Retrieved from the Web June 29, 2006. http://ndep.nih.gov/diabetes/pubs/GuidPrin_HC_Eng.pdf

[23] American Diabetes Association. (2006). Clinical practice recommendations. Position statement: Standards of medical care in diabetes. *Diabetes Care,* 29 (Suppl. 1), S12, S14. Retrieved from the Web June 29, 2006. http://care.diabetesjournals.org/content/vol29/suppl_1/

[24] American Diabetes Association (2006). Clinical practice recommendations. Position statement: diagnosis and classification of diabetes mellitus. *Diabetes Care*, 29 (Suppl. 1), S47. Retrieved from the Web June 29, 2006. http://care.diabetesjournals.org/content/vol29/suppl_1/

[25] Missouri Department of Health and Senior Services. Missouri Association of Health Plans Education and Research Foundation. Diabetes Screening Guidelines Work Group. (January 18, 2006). State of Missouri consensus screening guidelines for pre-diabetes and diabetes in a medical setting. Retrieved from the Web June 29, 2006. http://www.dhss.mo.gov/diabetes/FinalScreeningGuidelines.pdf

[26] American Diabetes Association. (2006). Clinical practice recommendations. Position statement: Standards of medical care in diabetes. *Diabetes Care,* 29 (Suppl. 1), S16. Retrieved from the Web June 29, 2006. http://care.diabetesjournals.org/content/vol29/suppl_1/

[27] American Diabetes Association. (2004). Position statement: Smoking and diabetes. *Diabetes Care*, 27 (Suppl. 1), S74-75. Retrieved from the Web June 29, 2006. http://care.diabetesjournals.org/cgi/reprint/27/suppl_1/s74?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&andorexactfulltext=and&searchid=1&FIRSTINDEX=0&sortspec=relevance&volume=27&firstpage=74&resourcetype=HWCIT

[28] American Diabetes Association. (2006). Standards of medical care in diabetes v. diabetes care. *Diabetes Care,* (Suppl 1), S8-17. Source: National Guideline Clearinghouse Guideline: Standards of medical care in diabetes v. diabetes care. Retrieved from the Web June 29, 2006. http://www.guideline.gov/summary/summary.aspx?doc_id=8620&nbr=004800&string=Standards+AND+medical+AND+care+AND+diabetes

[29] FDA Alert. (June 2006). Information for healthcare professionals. Angiotensin-converting enzyme inhibitor (ACE inhibitors) drug class. William O. Cooper, Sonia Hernandez-Diaz, Patrick G. Arbogast, Judith A. Dudley, Shannon Dyer, Patricia S. Gideon, Kathi Hall, and Wayne A. Ray. (June 8, 2006). Major congenital malformations after first-trimester exposure to ACE inhibitors. *New England Journal of Medicine*, 354(23), 2443-2451. This study was supported in part by the FDA (FDA 221-02-3003). Retrieved from the Web June 28, 2006. http://www.fda.gov/cder/drug/infopage/ace_inhibitors/default.htm

[30] American Association of Diabetes Educators. (2003). Position statement: Standards for outcomes measurement of diabetes self-management education. *Diabetes Educator*, 29(5), 804-816. Retrieved from the Web June 29, 2006. http://www.diabeteseducator.org/pdf/PS-Outcomes.pdf

[31] Kulkarni K, Boucher JL, Daly A, et al. (2005). American Dietetic Association: Standards of practice and standards of professional performance for registered dietitians (generalist, specialty, and advanced) in diabetes care. *Journal of the American Dietetic Association,* 105(5), 819-824. Retrieved from the Web June 29, 2006. http://www.adajournal.org/

[32] Gregg EW, Beckles, GLA, Williamson DR, et al. (2000). Diabetes and physical ability among older U.S. adults. *Diabetes Care*, 23(9), 1272-1277. Retrieved from the Web June 29, 2006. http://care.diabetesjournals.org/cgi/reprint/23/9/1272?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&searchid=1&FIRSTINDEX=0&sortspec=relevance&volume=23&firstpage=1272&resourcetype=HWCIT

[33] American Dietetic Association. (2003). Position statement: Integration of medical nutrition therapy and pharmacotherapy. *Journal of the American Dietetic Association*, Vol. 103, p. 1363-1370. Retrieved from the Web June 29, 2006. http://www.eatright.org/cps/rde/xchg/ada/hs.xsl/advocacy_adap0299_ENU_HTML.htm

[34] Ship JA. (2003). Diabetes and oral health: an overview. *Journal of the American Dental Association*, Vol. 134, p. 4S-10S. Retrieved from the Web June 29, 2006. http://www.ada.org/prof/resources/pubs/jada/reports/suppl_diabetes_02.pdf

[35] American Diabetes Association. (2006). Clinical practice recommendations. Position statement: Standards of medical care in diabetes. *Diabetes Care,* 29 (Suppl. 1), S15. Retrieved from the Web June 29, 2006. http://care.diabetesjournals.org/content/vol29/suppl_1/

[36] Cross, T., Bazron, B., Dennis K., & Isaacs, M. (1989). Towards a culturally competent system of care: A monograph on effective services for minority children who are severely emotionally disturbed. Washington, D.C.: National Technical Assistance Center for Children's Mental Health, Georgetown University Child Development Center.