

The Nebraska Diabetes Consensus Guidelines

The Nebraska Health and Human Services System has developed and distributed the Nebraska Diabetes Consensus Guidelines of Diabetes Care for both adult and pediatric patients to health professionals throughout the State since 1999. These guidelines were developed in conjunction with multiple primary and specialty care physicians, diabetes educators, and representatives of major managed care plans in the State of Nebraska and were based on the American Diabetes Association's (ADA) Standards of Care.

After implementation of the guidelines by physicians, diabetes educators and insurance plans, some revisions were indicated; also, the ADA Guidelines have been updated annually (latest changes were published in Diabetes Care, Volume 32, Supplement 1, 2009) which changes some of the indicator goals. These changes have been incorporated in the revised Nebraska Diabetes Consensus Guidelines, which are attached.

We have placed the guidelines in several formats as flow sheets that can be used in patient charts for documenting results. All of these may be copied as they are or revised to better serve your needs. An electronic copy can be obtained from our website. The goals of developing the consensus guidelines and the flow sheets are:

- ◆ to reach agreement on a consistent set of guidelines suggested for use in the management of diabetes in Nebraska; and
- ◆ to increase awareness that good blood glucose control can lead to decreased complications, decreased hospitalizations, and improved quantity and quality of life for people with diabetes.

In addition to the guidelines flow sheets, we have enclosed a summary of the ADA's testing criteria, as well as information and charts on foot, eye, and dental examinations which we hope you will find useful. Again, these may be copied or modified to meet your needs.

We hope these guidelines will be useful to you. They will be placed on the Nebraska Diabetes Prevention and Control Program's website in the near future at:

<http://www.dhhs.ne.gov/diabetes>. If you have any questions or concerns, or would like information on other diabetes materials that are available, please contact the Nebraska Diabetes Prevention and Control Program of the Department of Health and Human Services at 1-800-745-9311 and ask for the Diabetes Section or e-mail: diabetes@nebraska.gov.



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The following are the authors of the Nebraska Diabetes Consensus Guidelines and represent dedicated individuals and organizations committed to improving diabetes care in Nebraska. The Nebraska Diabetes Prevention and Control Program wishes to thank them for giving of their time and expertise to help with this project.

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An Overview of Self-Management Education for Adults and Children with Diabetes

1. Lifestyle Review

A number of lifestyle behaviors and situations, including tobacco use, use of alcohol and street drugs, stress, depression and unplanned pregnancies, can affect immediate and long-term outcomes of diabetes. Patients should be instructed regarding tobacco use prevention and cessation, effects and risks of alcohol and/or street drugs, and the effects and management of stress/depression. Women of childbearing age from adolescence to menopause must be adequately informed of pre-pregnancy planning with optimum control of blood glucose before and during pregnancy. This would include instruction regarding options for birth control.

2. Physical Activity

Physical activity has a key role in the management of diabetes and must be integrated into the overall plan of care. Physical activity has important physiologic and metabolic benefits for people with both type 1 and type 2 diabetes. Cardiovascular fitness and psychological well being also improve with increased physical activity. In persons with type 2 diabetes and insulin resistance, physical activity will increase sensitivity to insulin. Self-monitoring of blood glucose is essential to avoid hypoglycemia as well as a motivator for continuing the effort. Special attention is needed to design an exercise program that takes into consideration the person's special needs and the type of exercise that is practical for that individual. Prior to starting an exercise program, patients should have an assessment of cardiovascular risk and evaluation for previously undiagnosed hypertension, retinopathy, neuropathy, nephropathy and lower extremity pathology. A graded exercise test is recommended for all individuals with type 2 diabetes more than 35 years of age and individuals with type 1 diabetes with duration of disease greater than 15 years. Patients should be taught how to recognize symptoms that indicate they should stop exercising and/or consult a health care provider.

3. Sick Day Management and Urine Ketone Testing

Patients need to know how to manage their diabetes during an episodic illness to prevent extreme hyperglycemia and maintain hydration and nutrition. Patients with type 1 diabetes should be instructed on how to prevent or detect ketoacidosis with frequent blood glucose monitoring and urine ketone testing. Some people benefit from instruction on how to give additional insulin when blood glucose levels are increasing to prevent hospitalization and when it is appropriate to their care. All people with diabetes should be taught when to call their health care provider during an illness and when to go to the emergency department.

4. Medication Administration

Instruction includes the action and side effects of insulin and diabetes medications. The exact dosage and administration schedule should be written out clearly and provided as a resource for the patient. The administration schedule should be tailored to the patient's daily work hours, school, exercise and meal schedule. Instruction in insulin administration includes accuracy in the technique of drawing up and injecting the dose, rotation of injection sites, rotation of injection areas (i.e., abdomen to thigh) and storage of insulin at home and away. Any use of insulin adjustment schedules should be carefully explained and written out for the patient. Patients should be taught to record the doses of both insulin and oral agents in the blood glucose record book. Metformin is safe to use with all ages. It can be used for children and young adults with type 2 diabetes. Metformin should be considered as the first line drug of choice used with children that have type 2 diabetes. There is an acceptable liquid formulation of Metformin (Riomet) available. (Ref. Diabetes Care, Volume 32, Supplement 1, January 2009, p. S20.) (For a list of currently approved diabetes medications, see http://ndep.nih.gov/diabetes/pubs/Drug_tables_supplement.pdf.)

5. Monitoring Blood Glucose Control

Blood glucose testing and recording of results give individuals an active role in their health care and encourage responsibility. Self-blood glucose monitoring is essential to management of diabetes and must be stressed as such. The monitoring system must be easy to use, easily portable, accurate and reliable. The frequency and timing of testing varies depending on the treatment regimen. The patient who is treated with dietary changes and exercise can use blood glucose test results as immediate feedback regarding the effects of their efforts. Positive feedback can reinforce those efforts and increase self-motivation. Patients should be given goals in writing for the blood glucose results. Recording of the results should be documented in a patient record book to enable the patient and health care provider to look at trends, recognize successes and assess the effectiveness of the medication changes. Patients should understand the use of A1C monitoring and the specific goal in diabetes management. They should know their A1C goal and current results.

6. Hypoglycemia Treatment

Instruction about hypoglycemia includes recognition of symptoms, level of blood glucose, treatment and prevention. Symptoms of hypoglycemia vary between individuals; patients should use blood glucose testing to determine the actual meaning of symptoms. The plan for treatment should include options for the fast-acting sugar source and the follow-up snacks, what to carry with them and how to prevent hypoglycemia (i.e., regular meals and snacks, testing as often as needed, particularly before exercise, or increased physical activity). Patients' family and friends should be taught the symptoms to look for and how to recognize when the person needs assistance. Hypoglycemia unawareness can be a complication of the body's response to chronic low blood sugar levels. People who develop hypoglycemia may not recognize its signs or symptoms. Frequency and severity of low blood glucose episodes should be monitored and treatment should not be delayed. Patients on insulin need to have glucagon injections available and their families and friends should be taught to administer the drug when necessary. Schools should provide for administration of glucagon in the event of severe hypoglycemia at school. Instruction should include effects of beta-blockers on symptoms of hypoglycemia.

7. Nutrition Management

A consultation with a dietitian is the most effective method of promoting good nutrition in the management of diabetes. Individualized nutrition recommendations and instruction must take into consideration lifestyle, ethnic differences, metabolic needs and metabolic control (lipids, blood glucose, weight management). The nutrition plan must be integrated into the overall diabetes management plan through a multi-disciplinary approach. There are numerous strategies and teaching or education tools that can be used to implement the plan and achieve the glucose, lipid and nutrition goals. An individualized approach is recommended.

7. Foot Care

The goal of instructing a patient in daily foot care is the identification and prevention of foot problems that could lead to amputation. Most important is the daily inspection for problems and when to seek help from a health care professional. Other topics include appropriate footwear, management of minor foot problems, benefits of extra depth shoes, and the dangers of soaking feet, hot water bottles and heating pads. Additional information includes the avoidance of foot trauma and tobacco use cessation. Presence and degree of neuropathy, presence of peripheral vascular disease, and the implications for foot care. They should be instructed to remove their shoes and stockings and have their feet examined at each visit.

8. Eye Care

Early detection and treatment of diabetic retinopathy is essential to preventing blindness in persons with diabetes. Diabetic retinopathy is the most frequent cause of new cases of blindness among adults aged 20-74 years. During the first two decades following the onset of diabetes, nearly all patients with type 1 diabetes and more than 60% of patients with type 2 diabetes have retinopathy. More than 32,000 people in Nebraska age 18 and older have diabetic retinopathy.

Knowledge of the presence of retinopathy is one more piece of evidence for the Primary Care Physician to utilize in the overall management of the diabetic patient.

The American Diabetes Association (ADA) recommends a dilated retinal eye examination by an ophthalmologist or optometrist as an annual standard of care for persons with diabetes. The ADA (2009) states that examinations can also be done by taking retinal photographs and having these read by experts in this field. In-person exams are still necessary when the photos are unacceptable and for follow-up of abnormalities detected. This technology has its greatest potential in areas where qualified eye care professionals are not available. The use of non-mydratic, non-stereoscopic fundus photography has been questioned and found to be inferior to a clinical retinal exam done by an ophthalmologist. However, the use of mydratic stereoscopic photography, if performed by a trained photographer and read by a trained eye care provider, can be an improvement of the aforementioned photography. The use of non-mydratic, stereoscopic photography is under continued study.

Screening for Adults

Type 1: ADA (2009) - Initial dilated and comprehensive exam within 3-5 years after onset with annual follow-up dilated exams. *American Academy of Ophthalmology* - Five years after onset and annually thereafter.

Type 2: ADA (2009) - Initial exam at the time of diagnosis, with annual follow-up dilated exams.

Screening for Children

American Diabetes Association:

The first ophthalmologic examination (ADA, 2009) should be obtained once the child is ≥ 10 years of age and has had diabetes for 3-5 years. After the initial examination, annual routine follow-up is generally recommended. Less frequent examinations may be acceptable on the advice of an eye care professional. Although retinopathy most commonly occurs after the onset of puberty and after 5-10 years of diabetes duration, it has been reported in prepubertal children and with diabetes duration of only 1-2 years. Referrals should be made to eye care professionals with expertise in diabetic retinopathy, an understanding of the risk for retinopathy in the pediatric population, and experience of counseling the pediatric patient and family on the importance of early prevention/intervention.

American Academy of Pediatrics recommendations:

Screening in children 3-5 years after diagnosis if >9 years old and annually thereafter.

Pediatric Endocrinologist recommendations:

Screening in children with a dilated retinal exam the first year after diagnosis, and not annually until adolescence or after puberty, but based on clinical judgment for each individual.

Further studies are warranted in the area of screening for youth. The frequency of exams may be determined based on the mutual findings of the primary care physician and eye care provider.

More frequent exams (than above recommendations) for both adults and children may be necessary based upon clinical findings. Regular eye examinations also allow for early diagnosis and treatment of other conditions affecting those with diabetes.

9. Dental Care

Diabetes patients must maintain a rigorous oral self-care regimen to minimize oral health problems that may complicate glycemic control since the mouth is the first part of the digestive process. Regular visits (generally twice a year) to their dentist for a dental examination and dental prophylaxis and necessary radiographs are recommended to achieve an optimal oral health status. This rate of dental visitation is dependent on the patient's oral health status. Regular brushing and flossing are essential to keep the teeth and gums healthy. A history of stroke or musculoskeletal disorders might necessitate the use of other mechanical or electric dental devices to accomplish optimal goals of oral health.

10. Nephropathy Screening

Diabetic nephropathy occurs in 20-40% of patients with diabetes and is the single leading cause of End Stage Renal Disease. Annual screening for microalbuminuria is recommended. Either a spot urine for microalbumin/creatinine ratio or a 24-hour urine test for microalbumin is acceptable. Treatment with an Angiotensin Converting Enzyme (ACE) Inhibitor should be considered for Type 1 patients with any degree of microalbuminuria and for Type 2 patients with microalbuminuria. ARB's (angiotensin receptor blocker) may be used alternatively where the patient experiences intolerance to or hyperkalemia from ACE-1 therapy. Annual testing should be continued after ACE or ARB therapy in order to monitor effectiveness and titrate dosage of medication. Patients with Glomerular Filtration Rate of <60 ml/min should be referred to a nephrologist.

11. Hypertension (High Blood Pressure)

Blood pressure should be measured at every diabetes-related visit. Hypertension (blood pressure at or above 140/90) affects the majority of patients with diabetes. Hypertension is a major risk factor for heart attack and stroke, as well as diabetic complications such as retinopathy and nephropathy. Randomized clinical trials have demonstrated reduced risk for these conditions when the blood pressure is lowered below 130/80. Many different medications may be used to treat hypertension. Most patients with diabetes will need to take at least two medications in order to achieve blood pressures below 130/80. Almost all patients with diabetes and hypertension should be treated with a medication regimen that includes either an angiotensin-converting enzyme inhibitor ("ACE") or an angiotensin receptor blocker ("ARB"), as these agents have been shown to reduce the risk of complications more than other classes of medications. ACE inhibitors and ARBs are contraindicated during pregnancy. Diuretics, beta-blockers, and calcium channel blockers are also beneficial for patients with diabetes and hypertension. In addition to medications, lifestyle modifications can help lower blood pressure. These modifications include increased consumption of fruits, vegetables, and low-fat dairy products; reduced intake of sodium and alcohol; increased physical activity; weight loss (when indicated); and quitting tobacco use.

12. Diagnosis of Pre-diabetes and Prevention/Delay of Type 2 Diabetes

(ADA Diabetes Care Vol. 32, Supp. 1 2009)

Hyperglycemia not sufficient to meet the diagnostic criteria for diabetes is categorized as either impaired fasting glucose (IFG) or impaired glucose tolerance (IGT), depending on whether it is identified through the fasting plasma glucose (FPG) or the oral glucose tolerance test (OGTT):

- IFG = FPG 100 mg/dl (5.6 mmol/l) to 125 mg/dl (6.9 mmol/l)
- IGT = 2-h plasma glucose 140 mg/dl (7.8 mmol/l) to 199 mg/dl (11.0 mmol/l)

IFG and IGT have been officially termed "pre-diabetes". Both categories of pre-diabetes are risk factors for future diabetes and for cardiovascular disease (CVD).

Prevention/delay of type 2 diabetes:

- Patients with IGT or IFG should be given counseling on weight loss of 5-10% of body weight, as well as on increasing physical activity to at least 150 minutes per week of moderate activity such as walking.
- Follow-up counseling appears to be important for success.
- Based on potential cost savings of diabetes prevention, such counseling should be covered by third-party payers.
- In addition to lifestyle counseling, metformin may be considered in those who are at very high risk (combined IFG and IGT plus other risk factors) and who are obese and under 60 years of age.
- Monitoring for the development of diabetes in those with pre-diabetes should be performed every year.