NGC banner

Guideline Summary NGC-8222

Guideline Title

Standards of medical care in diabetes. VII. Diabetes care in specific populations.

Bibliographic Source(s)

American Diabetes Association (ADA). Standards of medical care in diabetes. VII. Diabetes care in specific populations. Diabetes Care 2011 Jan;34(Suppl 1):S38-43.

Guideline Status

Note: This guideline has been updated. The National Guideline Clearinghouse (NGC) is working to update this summary.

FDA Warning/Regulatory Alert

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- March 1, 2012 – Statins and HIV or Hepatitis C drugs: The U.S. Food and Drug Administration (FDA) notified healthcare professionals of updates to the prescribing information concerning interactions between protease inhibitors and certain statin drugs. Protease inhibitors and statins taken together may raise the blood levels of statins and increase the risk for muscle injury (myopathy). The most serious form of myopathy, called rhabdomyolysis, can damage the kidneys and lead to kidney failure, which can be fatal.

- February 28, 2012 – Statin drugs: The U.S. Food and Drug Administration (FDA) has approved important safety label changes for the class of cholesterol-lowering drugs known as statins. The changes include removal of routine monitoring of liver enzymes from drug labels. Information about the potential for generally non-serious and reversible cognitive side effects and reports of increased blood sugar and glycosylated hemoglobin (HbA1c) levels has been added to the statin labels. The lovastatin label has been extensively updated with new contraindications and dose limitations when it is taken with certain medicines that can increase the risk for muscle injury.

- June 8, 2011 – Zocor (simvastatin): The U.S. Food and Drug Administration (FDA) notified healthcare professionals that it is recommending limiting the use of the highest approved dose of the cholesterol-lowering medication simvastatin (80 mg) because of increased risk of muscle damage. FDA is requiring changes to the simvastatin label to add new contraindications (should not be used with certain medications) and dose limitations for using simvastatin with certain medicines.

Scope

Disease/Condition(s)

- Type 1 and type 2 diabetes
- Chronic complications of diabetes, including nephropathy, hypertension, dyslipidemia, retinopathy, celiac disease, and hypothyroidism
- Cystic fibrosis–related diabetes

Guideline Category

Evaluation

Management

Prevention

Risk Assessment

Screening

Treatment

Clinical Specialty

Cardiology

Endocrinology

Family Practice

Gastroenterology

Geriatrics

Internal Medicine

Nephrology

Nursing

Nutrition

Obstetrics and Gynecology

Ophthalmology

Pediatrics

Preventive Medicine

Intended Users

Advanced Practice Nurses

Allied Health Personnel

Dietitians

Health Care Providers

Health Plans

Hospitals

Managed Care Organizations

Nurses

Optometrists

Patients

Physician Assistants

Physicians

Public Health Departments

Guideline Objective(s)

- To provide recommendations for diabetes care in specific populations with respect to:
  - Screening and treating complications in children and adolescents with type 1 or type 2 diabetes mellitus
  - Preconception care in women
  - Management of diabetes in older individuals
- To provide clinicians, patients, researchers, payers, and other interested individuals with the components of diabetes care, treatment goals, and tools to evaluate the quality of care

Target Population

- Children and adolescents with type 1 diabetes mellitus
- Children and adolescents with type 2 diabetes mellitus (no specific recommendations provided)
- Women of child-bearing age with diabetes
- Older individuals (>65 years of age)

Interventions and Practices Considered

Screening for Complications in Children and Adolescents with Type 1 Diabetes Mellitus

Screening for the following:

- Microalbuminuria with a random spot urine sample for urine microalbumin-to-creatinine ratio
- Dyslipidemia (fasting lipid profile)
- Retinopathy (ophthalmologic examination)
- Celiac disease using tissue transglutaminase antibodies or an antiendomysial antibody
- Thyroid peroxidase and thyroglobulin antibodies and measurement of thyroid-stimulating hormone (TSH) concentrations

Management/Treatment of Diabetes Complications in Children and Adolescents

1. Optimizing glucose control
2. Angiotensin-converting enzyme (ACE) inhibitor
3. Lifestyle interventions

- Dietary interventions, including gluten-free diet for celiac disease
- Dietary interventions for weight control
- Exercise

4. Medical nutrition therapy (MNT) aimed at decreased intake of saturated fats (Step 2 American Heart Association diet)
5. Antihypertensive agents
6. Lipid-lowering agents (statin therapy)
7. Annual monitoring and follow-up exams
8. Referral to specialists, as needed

Preconception Care

1. Attainment of target A1C levels before conception
2. Patient education/counseling/family planning
3. Preconception evaluation and treatment of diabetic retinopathy, nephropathy, neuropathy, and cardiovascular disease
4. Discontinuation of drugs contraindicated in pregnancy

Management of Diabetes in Older Individuals

1. Individualized screening for diabetes complications
2. Consideration of special needs of older individuals, as well as the heterogeneity of the older population, in relation to treatment goals, including glycemic control, blood pressure, and lipid control
3. Treatment using goals for younger adults, as appropriate
4. Multidisciplinary interventions, including patient education

Major Outcomes Considered

- Rate of congenital malformations
- Rate of early pregnancy loss
- Glycemic control
- Hypertension
- Lipid levels
- Retinopathy
- Nephropathy
- Patient self-management ability
- Morbidity
- Mortality

Methodology

Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Not stated

Number of Source Documents

Not stated

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

American Diabetes Association's Evidence Grading System for Clinical Practice Recommendations

A

Clear evidence from well-conducted, generalizable, randomized controlled trials that are adequately powered, including:

- Evidence from a well-conducted multicenter trial
- Evidence from a meta-analysis that incorporated quality ratings in the analysis

Compelling nonexperimental evidence (i.e., "all or none" rule developed by the Centre for Evidence-Based Medicine at Oxford)

Supportive evidence from well-conducted randomized controlled trials that are adequately powered, including:

- Evidence from a well-conducted trial at one or more institutions
- Evidence from a meta-analysis that incorporated quality ratings in the analysis

B

Supportive evidence from well-conducted cohort studies, including:

- Evidence from a well-conducted prospective cohort study or registry
- Evidence from a well-conducted meta-analysis of cohort studies

Supportive evidence from a well-conducted case-control study

C

Supportive evidence from poorly controlled or uncontrolled studies, including:

- Evidence from randomized clinical trials with one or more major or three or more minor methodological flaws that could invalidate the results
- Evidence from observational studies with high potential for bias (such as case series with comparison to historical controls)
- Evidence from case series or case reports

Conflicting evidence with the weight of evidence supporting the recommendation

E

Expert consensus or clinical experience

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review

Description of the Methods Used to Analyze the Evidence

Not stated

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Not stated

Rating Scheme for the Strength of the Recommendations

Recommendations have been assigned ratings of A, B, or C, depending on the quality of evidence (see "Rating Scheme for the Strength of the Evidence"). Expert opinion (E) is a separate category for recommendations in which there is as yet no evidence from clinical trials, in which clinical trials may be impractical, or in which there is conflicting evidence. Recommendations with an "A" rating are based on large, well-designed clinical trials or well-done meta-analyses. Generally, these recommendations have the best chance of improving outcomes when applied to the population to which they are appropriate. Recommendations with lower levels of evidence may be equally important but are not as well supported.

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

Internal Peer Review

Description of Method of Guideline Validation

The recommendations were reviewed and approved by the Professional Practice Committee and, subsequently, by the Executive Committee of the Board of Directors.

Recommendations

Major Recommendations

Note: This guideline has been updated. The National Guideline Clearinghouse (NGC) is working to update this summary. The recommendations that follow are based on the previous version of the guideline.

The evidence grading system for clinical practice recommendations (A–C, E) is defined at the end of the "Major Recommendations" field.

Children and Adolescents

Type 1 Diabetes

Ideally, the care of a child or adolescent with type 1 diabetes should be provided by a multidisciplinary team of specialists trained in the care of children with pediatric diabetes. At the very least, education of the child and family should be provided by health care providers trained and experienced in childhood diabetes and sensitive to the challenges posed by diabetes in this age group. At the time of initial diagnosis, it is essential that diabetes education be provided in a timely fashion, with the expectation that the balance between adult supervision and self-care should be defined by, and will evolve according to, physical, psychological, and emotional maturity. Medical nutrition therapy (MNT) and psychological support should be provided at diagnosis, and regularly thereafter, by an individual experienced with the nutritional and behavioral needs of the growing child and family.

Glycemic Control

Consider age when setting glycemic goals in children and adolescents with type 1 diabetes. (E)

Table. Plasma Blood Glucose and A1C Goals for Type 1 Diabetes by Age Group

	Plasma Blood Glucose Goal Range (mg/dL)			
Values by Age (years)	**Before Meals**	**Bedtime/Overnight**	**A1C (%)**	**Rationale**
Toddlers and preschoolers (0 to 6)	100 to 180	110 to 200	<8.5%	• Vulnerability to hypoglycemia • Insulin sensitivity • Unpredictability in dietary intake and physical activity • A lower goal (<8.0%) is reasonable if it can be achieved without excessive hypoglycemia
School age (6 to 12)	90 to 180	100 to 180	<8%	• Vulnerability to hypoglycemia • A lower goal (<7.5%) is reasonable if it can be achieved without excessive hypoglycemia
Adolescents and young adults (13 to 19)	90 to 130	90 to 150	<7.5%	• A lower goal (<7.0%) is reasonable if it can be achieved without excessive hypoglycemia
Key concepts in setting glycemic goals: • Goals should be individualized and lower goals may be reasonable based on benefit-risk assessment. • Blood glucose goals should be modified in children with frequent hypoglycemia or hypoglycemia unawareness. • Postprandial blood glucose values should be measured when there is a discrepancy between preprandial blood glucose values and A1C levels and to help assess glycemia in those on basal/bolus regimens.				

Screening and Management of Chronic Complications in Children and Adolescents with Type 1 Diabetes

Nephropathy

- Annual screening for microalbuminuria, with a random spot urine sample for albumin-to-creatinine (ACR) ratio, should be considered once the child is 10 years of age and has had diabetes for 5 years. (E)
- Confirmed, persistently elevated ACR on two additional urine specimens from different days should be treated with an angiotensin-converting enzyme (ACE) inhibitor, titrated to normalization of albumin excretion if possible. (E)

Hypertension

- Treatment of high-normal blood pressure (systolic or diastolic blood pressure consistently above the 90th percentile for age, sex, and height) should include dietary intervention and exercise, aimed at weight control and increased physical activity, if appropriate. If target blood pressure is not reached within 3 to 6 months of lifestyle intervention, pharmacologic treatment should be considered. (E)
- Pharmacologic treatment of hypertension (systolic or diastolic blood pressure consistently above the 95th percentile for age, sex, and height or consistently >130/80 mm Hg, if 95% exceeds that value) should be initiated as soon as the diagnosis is confirmed. (E)
- ACE inhibitors should be considered for the initial treatment of hypertension, following appropriate reproductive counseling due to its potential teratogenic effects. (E)
- The goal of treatment is a blood pressure consistently <130/80 mm Hg or below the 90th percentile for age, sex, and height, whichever is lower. (E)

Dyslipidemia

Screening

- If there is a family history of hypercholesterolemia (total cholesterol >240 mg/dL) or a cardiovascular event before age 55 years, or if family history is unknown, then a fasting lipid profile should be performed on children >2 years of age soon after diagnosis (after glucose control has been established). If family history is not of concern, then the first lipid screening should be considered at puberty (≥10 years). All children diagnosed with diabetes at or after puberty should have a fasting lipid profile performed soon after diagnosis (after glucose control has been established). (E)
- For both age-groups, if lipids are abnormal, annual monitoring is recommended. If low-density lipoprotein (LDL) cholesterol values are within the accepted risk levels (<100 mg/dL [2.6 mmol/L]), a lipid profile should be repeated every 5 years. (E)

Treatment

- Initial therapy should consist of optimization of glucose control and MNT using a Step 2 American Heart Association (AHA) diet aimed at a decrease in the amount of saturated fat in the diet. (E)
- After the age of 10 years, the addition of a statin in patients who, after MNT and lifestyle changes, have LDL cholesterol >160 mg/dL (4.1 mmol/L) or have LDL cholesterol >130 mg/dL (3.4 mmol/L) and one or more cardiovascular disease (CVD) risk factors, is recommended. (E)
- The goal of therapy is an LDL cholesterol value <100 mg/dL (2.6 mmol/L). (E)

Retinopathy

- The first ophthalmologic examination should be obtained once the child is 10 years of age and has had diabetes for 3 to 5 years. (E)
- 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. (E)

Celiac Disease

- Children with type 1 diabetes should be screened for celiac disease by measuring tissue transglutaminase or antiendomysial antibodies, with documentation of normal serum immunoglobulin A (IgA) levels, soon after the diagnosis of diabetes. (E)
- Testing should be repeated in children with growth failure, failure to gain weight, weight loss, diarrhea, flatulence, abdominal pain, or signs of malabsorption, or in children with frequent unexplained hypoglycemia or deterioration in glycemic control. (E)
- Children with positive antibodies should be referred to a gastroenterologist for evaluation with endoscopy and biopsy. (E)
- Children with biopsy-confirmed celiac disease should be placed on a gluten-free diet and have consultation with a dietitian experienced in managing both diabetes and celiac disease. (E)

Hypothyroidism

- Children with type 1 diabetes should be screened for thyroid peroxidase and thyroglobulin antibodies at diagnosis. (E)
- Thyroid-stimulating hormone (TSH) concentrations should be measured after metabolic control has been established. If normal, they should be rechecked every 1 to 2 years, or if the patient develops symptoms of thyroid dysfunction, thyromegaly, or an abnormal growth rate. (E)

Type 2 Diabetes

Distinction between type 1 and type 2 diabetes in children can be difficult, since the prevalence of overweight in children continues to rise and since autoantigens and ketosis may be present in a substantial number of patients with features of type 2 diabetes (including obesity and acanthosis nigricans). Such a distinction at the time of diagnosis is critical since treatment regimens, educational approaches, and dietary counsel will differ markedly between the two diagnoses.

Type 2 diabetes has a significant prevalence of comorbidities already present at the time of diagnosis. It is recommended that blood pressure measurement, a fasting lipid profile, microalbuminuria assessment, and dilated eye examination be performed at the time of diagnosis. Thereafter, screening guidelines and treatment recommendations for hypertension, dyslipidemia, microalbuminuria, and retinopathy in youth with type 2 diabetes are similar to those for youth with type 1 diabetes. Additional problems that may need to be addressed include polycystic ovary disease and the various comorbidities associated with pediatric obesity such as sleep apnea, hepatic steatosis, orthopedic complications, and psychosocial concerns. The American Diabetes Association (ADA) consensus statement on this subject provides guidance on the prevention, screening, and treatment of type 2 diabetes and its comorbidities in young people.

Preconception Care

- A1C levels should be as close to normal as possible (<7%) in an individual patient before conception is attempted. (B)
- Starting at puberty, preconception counseling should be incorporated in the routine diabetes clinic visit for all women of child-bearing potential. (C)
- Women with diabetes who are contemplating pregnancy should be evaluated and, if indicated, treated for diabetic retinopathy, nephropathy, neuropathy, and cardiovascular disease (CVD). (E)
- Medications used by such women should be evaluated prior to conception, since drugs commonly used to treat diabetes and its complications may be contraindicated or not recommended in pregnancy, including statins, ACE inhibitors, angiotensin receptor blockers (ARBs), and most noninsulin therapies. (E)
- Since many pregnancies are unplanned, consider the potential risks and benefits of medications that are contraindicated in pregnancy in all women of childbearing potential, and counsel women using such medications accordingly. (E)

Older Adults

- Older adults who are functional, cognitively intact, and have significant life expectancy should receive diabetes care using goals developed for younger adults. (E)
- Glycemic goals for older adults not meeting the above criteria may be relaxed using individual criteria, but hyperglycemia leading to symptoms or risk of acute hyperglycemic complications should be avoided in all patients. (E)
- Other cardiovascular risk factors should be treated in older adults with consideration of the timeframe of benefit and the individual patient. Treatment of hypertension is indicated in virtually all older adults, and lipid and aspirin therapy may benefit those with life expectancy at least equal to the timeframe of primary or secondary prevention trials. (E)
- Screening for diabetic complications should be individualized in older adults, but particular attention should be

paid to complications that would lead to functional impairment. (E)

Cystic Fibrosis–related Diabetes

Cystic fibrosis–related diabetes (CFRD) is the most common comorbidity in people with cystic fibrosis, occurring in about 20% of adolescents and 40% to 50% of adults. The additional diagnosis of diabetes in this population is associated with worse nutritional status, more severe inflammatory lung disease, and greater mortality from respiratory failure. For reasons that are not well understood, women with CFRD are particularly vulnerable to excess morbidity and mortality. Insulin insufficiency related to partial fibrotic destruction of the islet mass is the primary defect in CFRD. Genetically determined function of the remaining beta-cells and insulin resistance associated with infection and inflammation may also play a role. Encouraging new data suggest that early detection and aggressive insulin therapy have narrowed the gap in mortality between cystic fibrosis patients with and without diabetes and have eliminated the sex difference in mortality.

A consensus conference on CFRD was cosponsored in 2009 by ADA, the Cystic Fibrosis Foundation, and the Pediatric Endocrine Society. Recommendations for the clinical management of CFRD can be found in an ADA position statement.

Definitions:

American Diabetes Association's Evidence Grading System for Clinical Practice Recommendations

A

Clear evidence from well-conducted, generalizable, randomized controlled trials that are adequately powered, including:

- Evidence from a well-conducted multicenter trial
- Evidence from a meta-analysis that incorporated quality ratings in the analysis

Compelling nonexperimental evidence (i.e., "all or none" rule developed by the Centre for Evidence-Based Medicine at Oxford)

Supportive evidence from well-conducted randomized controlled trials that are adequately powered, including:

- Evidence from a well-conducted trial at one or more institutions
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B

Supportive evidence from well-conducted cohort studies, including:

- Evidence from a well-conducted prospective cohort study or registry
- Evidence from a well-conducted meta-analysis of cohort studies

Supportive evidence from a well-conducted case-control study

C

Supportive evidence from poorly controlled or uncontrolled studies, including:

- Evidence from randomized clinical trials with one or more major or three or more minor methodological flaws that could invalidate the results
- Evidence from observational studies with high potential for bias (such as case series with comparison to historical controls)
- Evidence from case series or case reports

Conflicting evidence with the weight of evidence supporting the recommendation

E

Expert consensus or clinical experience

Clinical Algorithm(s)

None provided

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

- Appropriate diabetes care in children and adolescents, older adults, women of child-bearing age, and patients with cystic fibrosis–related diabetes
- Preconception care of diabetes appears to reduce the risk of congenital malformations.

Potential Harms

- *Considerations for diabetic women of child-bearing age*: Among the oral antidiabetic agents, metformin and acarbose are classified as category B and all others as category C; potential risks and benefits of oral antidiabetic

agents in the preconception period must be carefully weighed, recognizing that data are insufficient to establish the safety of these agents in pregnancy. Angiotensin-converting enzyme (ACE) inhibitors are associated with potential teratogenic effects.

- *Considerations for older individuals*: Special care is required in prescribing and monitoring pharmacologic therapy in older adults. Metformin is often contraindicated because of renal insufficiency or significant heart failure. Sulfonylureas, other insulin secretagogues, and insulin can cause hypoglycemia. Insulin use requires that patient or caregivers have good visual and motor skills and cognitive ability. Drugs should be started at the lowest dose and titrated up gradually until targets are reached or side effects develop.

Contraindications

Contraindications

- Among the drugs commonly used in the treatment of patients with diabetes, a number may be relatively or absolutely contraindicated during pregnancy. Statins are category X (contraindicated for use in pregnancy) and should be discontinued before conception, as should angiotensin-converting enzyme (ACE) inhibitors. Angiotensin receptor blockers (ARBs) are category C (risk cannot be ruled out) in the first trimester, but category D (positive evidence of risk) in later pregnancy, and should generally be discontinued before pregnancy.
- Thiazolidinediones (TZDs) can cause fluid retention, which may exacerbate or lead to heart failure. They are contraindicated in patients with congestive heart failure (CHF) (New York Heart Association class III and IV), and, if used at all, should be used very cautiously in those with, or at risk for, milder degrees of CHF.

See also "Potential Harms" field above for information on metformin use in older individuals.

Qualifying Statements

Qualifying Statements

- Evidence is only one component of clinical decision-making. Clinicians care for patients, not populations; guidelines must always be interpreted with the needs of the individual patient in mind. Individual circumstances, such as comorbid and coexisting diseases, age, education, disability, and, above all, patient's values and preferences, must also be considered and may lead to different treatment targets and strategies. Also, conventional evidence hierarchies, such as the one adapted by the American Diabetes Association, may miss some nuances that are important in diabetes care. For example, while there is excellent evidence from clinical trials supporting the importance of achieving glycemic control, the optimal way to achieve this result is less clear. It is difficult to assess each component of such a complex intervention.
- While individual preferences, comorbidities, and other patient factors may require modification of goals, targets that are desirable for most patients with diabetes are provided. These standards are not intended to preclude clinical judgment or more extensive evaluation and management of the patient by other specialists as needed.

Implementation of the Guideline

Description of Implementation Strategy

While numerous interventions to improve adherence to the recommended standards have been implemented, a major contributor to suboptimal care is a delivery system that too often is fragmented, lacks clinical information capabilities, often duplicates services, and is poorly designed for the delivery of chronic care. The Chronic Care Model (CCM) includes six core elements for the provision of optimal care of patients with chronic disease: 1) delivery system design (moving from a *reactive* to a *proactive* care delivery system, where planned visits are coordinated through a team-based approach; 2) self-management support; 3) decision support (basing care on consistent, effective care guidelines); 4) clinical information systems (using registries that can provide patient-specific and population-based support to the care team); 5) community resources and policies (identifying or developing resources to support healthy lifestyles); and 6) health systems (to create a quality-oriented culture). Alterations in reimbursement that reward the provision of quality care, as defined by the attainment of evidence-based quality measures, will also be required to achieve desired outcome goals. Redefinition of the roles of the clinic staff and promoting self-management on the part of the patient are fundamental to the successful implementation of the CCM. Collaborative, multidisciplinary teams are best suited to provide such care for people with chronic conditions like diabetes and to facilitate patients' performance of appropriate self-management.

A rapidly evolving literature suggests that there are three major strategies to successfully improve the quality of diabetes care delivered by a team of providers. National Diabetes Education Program (NDEP) maintains an online resource (www.betterdiabetescare.nih.gov) to help health care professionals design and implement more effective health care delivery systems for those with diabetes.

Three specific objectives are outlined below.

Objective 1

Provider and team behavior change: Facilitate timely and appropriate intensification of lifestyle and/or pharmaceutical therapy of patients who have not achieved beneficial levels of blood pressure, lipid, or glucose control.

- Clinical information systems including registries that can prospectively identify and track those requiring assessments and/or treatment modifications by the team.
- Electronic medical record-based clinical decision support at the point of care, both personalize and standardize care and can be used by multiple providers
- Use of checklists and/or flow sheets that mirror guidelines.

- Detailed treatment algorithms enabling multiple team members to "treat to target" and appropriately intensify therapy.
- Availability of care or disease management service by nurses, pharmacists, and other providers using detailed algorithms often catalyzing reduction in A1C, blood pressure, and low-density lipoprotein (LDL) cholesterol.

Objective 2

Patient behavior change: Implement a systematic approach to support patients' behavior change efforts as needed including 1) healthy lifestyle (physical activity, healthy eating, nonuse of tobacco, weight management, effective coping, medication taking and management); 2) prevention of diabetes complications (screening for eye, foot, and renal complications; immunizations); and 3) achievement of appropriate blood pressure, lipid, and glucose goals.

- Delivery of high-quality diabetes self-management education (DSME), which has been shown to improve patient self-management, satisfaction, and glucose control.
- Delivery of ongoing diabetes self-management support (DSMS) to ensure that gains achieved during DSME are sustained. National DSME standards call for an integrated approach that includes clinical content and skills, behavioral strategies (goal-setting, problem solving), and addressing emotional concerns in each needed curriculum content area. Provision of continuing education and support (DSMS) improves maintenance of gains regardless of the educational methodology.
- Provision of automated reminders via multiple communication channels to various subgroups of diabetic patients.

Objective 3

Change the system of care: Research on the comprehensive CCM suggests additional strategies to improve diabetes care, including the following:

- Basing care on consistent, evidence-based care guidelines
- Redefining and expanding the roles of the clinic staff
- Collaborative, multidisciplinary teams to provide high-quality care and support patients' appropriate self-management
- Audit and feedback of process and outcome data to providers to encourage population-based care improvement strategies
- Care management, one of the most effective diabetes quality improvement strategies to improve glycemic control
- Identifying and/or developing community resources and public policy that support healthy lifestyles
- Alterations in reimbursement that reward the provision of appropriate and high-quality care and accommodate the need to personalize care goals, providing additional incentives to improve diabetes care

The most successful practices have an institutional priority for quality of care, expanding the role of teams and staff, redesigning their delivery system, activating and educating their patients, and using electronic health record tools. Recent initiatives such as the Patient Centered Medical Home show promise in improving outcomes through coordinated primary care and offer new opportunities for team-based chronic disease care.

It is clear that optimal diabetes management requires an organized, systematic approach and involvement of a coordinated team of dedicated health care professionals working in an environment where patient-centered high-quality care is a priority.

Implementation Tools

Personal Digital Assistant (PDA) Downloads

Quick Reference Guides/Physician Guides

Slide Presentation

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Living with Illness

Staying Healthy

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

American Diabetes Association (ADA). Standards of medical care in diabetes. VII. Diabetes care in specific populations. Diabetes Care 2011 Jan;34(Suppl 1):S38-43.

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

1998 (revised 2011 Jan)

Guideline Developer(s)

American Diabetes Association - Professional Association

Source(s) of Funding

American Diabetes Association (ADA)

Guideline Committee

Professional Practice Committee

Composition of Group That Authored the Guideline

Committee Members: John Anderson, MD; John Buse, MD, PhD; Martha Funnell; Robert Gabbay, MD; Silvio Inzucchi (*Chairman*); Jane Kadohiro, DrPH, APRN, CDE; Daniel Lorber, MD; Michelle Magee, MD; Sunder Mudaliar, MD; Patrick O'Connor, MD, MPH; Peter Reaven, MD; Susan Braithwaite, MD; Guillermo Umpierrez, MD; Stuart Weinzimer, MD; Carol Wysham, MD; Gretchen Youssef, MS, RD, CDE; Judy Fradkin, MD (*Ex officio*); Stephanie Dunbar, RD, MPH (*Staff*); Sue Kirkman, MD (*Staff*)

Financial Disclosures/Conflicts of Interest

All members of the Professional Practice Committee are required to disclose potential conflicts of interest.

Conflict of interest disclosures for the 2010 Professional Practice Committee Members are available from the American Diabetes Association (ADA) Web site (see "Availability of Companion Documents" field).

Guideline Status

Note: This guideline has been updated. The National Guideline Clearinghouse (NGC) is working to update this summary.

Guideline Availability

Electronic copies of the updated guideline: Available from the American Diabetes Association (ADA) Web site.

Print copies: Available from the American Diabetes Association, 1701 North Beauregard Street, Alexandria, VA 22311.

Availability of Companion Documents

The following are available:

- Introduction. Diabetes Care 34:S1-S2, 2011.
- Summary of revisions for the 2011 clinical practice recommendations. Diabetes Care 34:S3, 2011.
- Executive summary: standards of medical care in diabetes. Diabetes Care 34:S4-S10, 2011.
- Professional Practice Committee Members (includes conflict of interest disclosure). Diabetes Care 34:S97-S98, 2011.

Electronic copies: Available from the American Diabetes Association (ADA) Web site.

Print copies: Available from the American Diabetes Association, 1701 North Beauregard Street, Alexandria, VA 22311.

The following are also available:

- Diagnosis and classification of diabetes mellitus. Diabetes Care 2011 Jan; 34(Suppl 1):S62-S69. Electronic copies: Available from the ADA Web site.
- 2011 Standards of medical care in diabetes. Clinical practice recommendations. Slide set. American Diabetes Association; 2011 Jan. 130 p. Electronic copies: Available from the ADA Web site.
- 2011 Standards of medical care in diabetes. Clinical practice recommendations. Personal Digital Assistant (PDA). American Diabetes Association; 2011 Jan. Electronic copies: Available for download from the ADA Web site.

Patient Resources

None available

NGC Status

This summary was completed by ECRI on April 2, 2001. The information was verified by the guideline developer on August 24, 2001. This summary was updated by ECRI on January 29, 2002, April 21, 2003, March 23, 2004, July 1,

2005, and March 17, 2006 and April 26, 2007. This summary was updated by ECRI Institute on March 31, 2008. The updated information was verified by the guideline developer on May 15, 2008. This summary was updated by ECRI Institute on May 20, 2010. The information was verified by the guideline developer on May 25, 2010. This summary was updated by ECRI Institute on November 8, 2010 following the U.S. Food and Drug Administration advisory on Avandia (rosiglitazone). This summary was updated by ECRI Institute on February 26, 2011. This summary was updated by ECRI Institute on June 27, 2011 following the U.S. Food and Drug Administration advisory on Zocor (simvastatin). This summary was updated by ECRI Institute on April 13, 2012 following the U.S. Food and Drug Administration advisories on Statin Drugs and Statins and HIV or Hepatitis C drugs.

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