CLINICAL PRACTICE GUIDELINES FOR DIABETES AND ASSOCIATED COMORBIDITIES

KADE Symposium
March 6, 2015
Michael Cronyn, PA-C, MPAS, BC-ADM, RN, CDE
DISCLOSURES

Mr. Cronyn is on the speakers bureau for Health-Scripts, representing Janssen Pharmaceuticals
OBJECTIVES

1. At the completion of the program, participants will be able to recognize the updated clinical practice guidelines for diabetes.

2. At the completion of the program, participants will be able to recognize the updated clinical practice guidelines for associated comorbidities.

3. At the completion of the program, participants will use a case study to develop a patient program with use of the practice guidelines for a patient with diabetes.

4. At the completion of the program, participants will use a case study to create instructions for those with diabetes co-morbidities using practice guidelines.
Clinical Practice Guidelines for Diabetes

- Clinical guidelines help define the goals for both educators, clinicians, and patients.
- Changes in the clinical guidelines help all participants in education and practice to be the authority that patients can trust to provide up-to-date guidance in their journey with diabetes.
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCORD</td>
<td>Action to Control Cardiovascular Risk in Diabetes</td>
</tr>
<tr>
<td>ADVANCE</td>
<td>Action in Diabetes and Vascular Disease: Preterax and Diamicron MR Controlled Evaluation</td>
</tr>
<tr>
<td>CAD</td>
<td>Cardiovascular Autonomic Neuropathy</td>
</tr>
<tr>
<td>CCM</td>
<td>Chronic Care Model</td>
</tr>
<tr>
<td>CGM</td>
<td>Continuous Glucose Monitoring</td>
</tr>
<tr>
<td>DCCT</td>
<td>Diabetes Control and Complications Trial (type 1)</td>
</tr>
<tr>
<td>DPN</td>
<td>Diabetic Peripheral Neuropathy</td>
</tr>
<tr>
<td>DPR</td>
<td>Diabetic Proliferative Retinopathy</td>
</tr>
<tr>
<td>DSME</td>
<td>Diabetes Self-management Education</td>
</tr>
<tr>
<td>DSMS</td>
<td>Diabetes self-management support</td>
</tr>
<tr>
<td>EDIC</td>
<td>Epidemiology of Diabetes Interventions and Complications (DCCT follow up study)</td>
</tr>
<tr>
<td>EMR</td>
<td>Electronic medical records</td>
</tr>
<tr>
<td>GDM</td>
<td>Gestational diabetes mellitus</td>
</tr>
<tr>
<td>IFG</td>
<td>Impaired fasting glucose</td>
</tr>
<tr>
<td>IGT</td>
<td>Impaired glucose tolerance</td>
</tr>
<tr>
<td>LADA</td>
<td>Latent autoimmune diabetes of adults</td>
</tr>
<tr>
<td>LSM</td>
<td>Lifestyle Modification</td>
</tr>
<tr>
<td>NPDR</td>
<td>Nonproliferative Diabetic Retinopathy</td>
</tr>
<tr>
<td>OSA</td>
<td>Obstructive sleep apnea</td>
</tr>
<tr>
<td>MNT</td>
<td>Medical Nutrition Therapy</td>
</tr>
<tr>
<td>MODY</td>
<td>Maturity onset diabetes of youth</td>
</tr>
<tr>
<td>SMBG</td>
<td>Self-monitoring of Blood Glucose</td>
</tr>
<tr>
<td>UKPDS</td>
<td>UK Prospective Diabetes Study (type 2)</td>
</tr>
<tr>
<td>VADT</td>
<td>Veterans Affairs Diabetes Trial</td>
</tr>
</tbody>
</table>
THE CLINICAL MANAGEMENT OF DIABETES

- Diabetes self-management education (DSME) is the ongoing process of facilitating the knowledge, skill, and ability necessary for diabetes self-care. This process incorporates the needs, goals, and life experiences of the person with diabetes and is guided by evidence-based standards. The overall objectives of DSME are to support informed decision-making, self-care behaviors, problem-solving and active collaboration with the health care team and to improve clinical outcomes, health status, and quality of life.

THE CLINICAL MANAGEMENT OF DIABETES COMORBIDITIES

- **Comorbidity** is the presence of one or more additional disorders (or diseases) co-occurring with a primary disease or disorder; or the effect of such additional disorders or diseases. The additional disorder may also be a behavioral or mental disorder.

- In medicine, the term "comorbid" can be either medical condition(s) existing simultaneously but independently with another condition; or it can indicate a related medical condition or conditions.

Types of Diabetes

- Type 1 diabetes
- Type 2 diabetes
- Gestational diabetes
- Maturity Onset diabetes of youth (MODY)
- Latent autoimmune diabetes of adults (LADA)
- Surgically induced diabetes
- Chemically induced diabetes
GOALS OF TREATMENT
 Normalization of blood glucose, as near to euglycemic levels as possible
 Nutritional counseling to assist in blood glucose regulation, balancing required calories for weight management and blood glucose regulation
 Physical activity to improve metabolism, lower insulin resistance, assist with weight reduction or maintenance, increase insulin sensitivity
 Medications to aid in blood glucose regulation
 Minimizing episodes of hypoglycemia with all applied treatments
 Concomitant treatment of comorbidities
Clinical Practice Guidelines for Diabetes

- Reviewing the updated American Diabetes Association: Standards of Medical Care in Diabetes - 2015
- Reviewing the Guidelines for the Practice of Diabetes Education
1. STRATEGIES FOR IMPROVING CARE

- A patient-centered communication style that incorporates patient preferences, assesses literacy and numeracy, and addresses cultural barriers to care should be used.

- Treatment decisions should be timely and founded on evidence-based guidelines that are tailored to individual patient preferences, prognoses, and comorbidities.

- Care should be aligned with components of the Chronic Care Model (CCM) to ensure productive interactions between a prepared proactive practice team and an informed activated patient.

- When feasible, care systems should support team-based care, community involvement, patient registries, and decision support tools to meet patient needs.
1. Strategies for Improving Care

- Treatment focus is centered on the patient; full assessment of diabetes and underlying comorbidities
- Delivering quality and sustained healthcare across the life-span of patients (type 1 become adults, greater longevity type 2, etc.)
- Providing an expanding advocacy for patients with diabetes, striving for improvement in the lives of those with diabetes
**CHRONIC CARE MODEL, PRACTICE STRATEGIES**

- Optimize Provider and Team behavior: goal setting, intensifying appropriate treatments, identifying barriers, developing care management teams.


- Change the care system: expand the roles of the diabetes team members, redesigning processes, electronic medical records (EMR), cost containment for education/specialty care/etc.
2. **Classification and Diagnosis of Diabetes**

- **Type 1 diabetes**: due to beta cell destruction, leading to absolute insulin deficiency.
- **Type 2 diabetes**: due to progressive insulin secretory defect on the background of insulin resistance.
- **Gestational diabetes**: diabetes diagnosed in the second or third trimester of pregnancy that is not clearly overt diabetes.
- **Specific types of diabetes due to other causes**: neonatal diabetes and maturity onset diabetes of youth (MODY), disease of exocrine pancreas (cystic fibrosis), drug or chemical induced (treatment for HIV/AIDS, organ transplantation), surgical pancreatectomy.
DIAGNOSTIC TESTING

- Please refer to the ADA Standards of Medical Care in Diabetes – 2015, for: risks for diabetes, diagnostic testing and criteria.
- Outlining standard diagnostic criteria of diabetes, prediabetes, gestational diabetes, cystic fibrosis, monogenic diabetes (neonatal, MODY).

Diabetes Care 2015;38(Suppl. 1):S8–S16 | DOI: 10.2337/dc15-S005
Reduced BMI cut point for overweight or obese Asian Americans changed to 23 kg/m² (from 25 kg/m²).

Diabetes Care 2015;38(Supp1):S4/DOI: 10.2337/dc15-S003
3. INITIAL EVALUATION AND DIABETES MANAGEMENT PLANNING

- Medical Evaluation:
  a) Classify diabetes
  b) Detect diabetes complications
  c) Review previous treatments and risk factor control in patients with established diabetes
  d) Assist in formulating a management plan
  e) Provide a basis for continuing care

Laboratory testing: based on patients medical conditions, and with type 1 diabetes consider autoimmune screening (thyroid dysfunction, celiac disease, etc.).
**Management Plan**

- Engaging the patient with a collaborative and comprehensive medical team with expertise in diabetes management.
- Team can consist of: physician, nurse practitioners, physician assistants, nurses, dietitians, pharmacist, and mental health professionals.
- DSME and ongoing support should be an integral part of the diabetes management plan.
COMORBID CONDITION SCREENING

- Obstructive sleep apnea (OSA)
- Fatty liver disease
- Fractures (hips for both, osteoporosis type1)
- Low testosterone in men
- Periodontal disease (more severe and not more common)
- Hearing impairment (twice as prevalent with diabetes)
- Depression
- Mental health (incidence of all-cause dementia, Alzheimer disease, and vascular dementia)
- Cancer (associated with increased risk of cancers of the liver, pancreas, endometrium, colon/rectum, breast, and bladder)

Diabetes Care 2015;38(Suppl. 1):S17–S19 | DOI: 10.2337/dc15-S006
4. **Foundations of Care: Education, Nutrition, Physical Activity, Smoking Cessation, Psychosocial Care, and Immunization**

- **Diabetes Self-Management Education and Support:**
  a) People with diabetes should receive DSME and diabetes self-management support (DSMS) when their diabetes is diagnosed and as needed thereafter.
  b) Effective self-management and quality of life are the key outcomes of DSME and DSMS and should be measured and monitored as part of care.
  c) DSME and DSMS should address psychosocial issues, as emotional well-being is associated with positive diabetes outcomes.
  d) DSME and DSMS programs are appropriate venues for people with prediabetes to receive education and support to develop and maintain behaviors that can prevent or delay the onset of diabetes.
  e) Because DSME and DSMS can result in cost-savings and improved outcomes, DSME and DSMS should be adequately reimbursed by third-party payers.
DSME AND DSMS

- Ongoing process providing knowledge, skill, and ability necessary for diabetes self care
- Incorporating the needs, goals and life experiences of the person with diabetes
- Support informed decision making, self-care behaviors, problem solving and active collaboration with health care team to improve outcomes, health status and quality of life
- Life-long DSME provides initial effective self-management skills, and reinforcement of effective skills throughout a lifetime
- Skill based education approach helps with informed self-management choices, being patient centered and gaining support through the support systems in place
DSME and DSMS cont.

- Medical Nutrition Therapy (MNT)
- Physical Activity
- Smoking cessation
- Psychosocial assessment and care
- Immunization

Diabetes Care 2015;38(Suppl. 1):S20–S30 | DOI: 10.2337/dc15-S007
**Updated Changes to Foundations of Care, Section 4**

- Physical activity section was revised to reflect that all individuals, including those with diabetes, should limit the amount of time spent being sedentary by breaking up extended amounts of time (90 minutes) spent sitting.
- E-cigarettes are not supported as an alternative to smoking or to facilitate smoking.
- Immunization recommendations were revised to reflect recent CDC and prevention guidelines PVC13 and PPSV23 vaccinations in adults.

Diabetes Care 2015;38(Supp1):S4/DOI: 10.2337/dc15-S003
5. **Prevention or Delay of Type 2 Diabetes**

- Patients with IGT, IFG, or an A1C 5.7–6.4% should be referred to an intensive diet and physical activity behavioral counseling program targeting loss of 7% of body weight and increasing moderate-intensity physical activity (such as brisk walking) to at least 150 min/week.

- Follow-up counseling may be important for success.

- Based on the cost-effectiveness of diabetes prevention, such programs should be covered by third-party payers.

- Metformin therapy for prevention of type 2 diabetes may be considered in those with IGT, IFG, or an A1C 5.7–6.4%, especially for those with BMI >35 kg/m², aged <60 years, and women with prior gestational diabetes mellitus (GDM).
PREVENTION OR DELAY OF TYPE 2 DIABETES

- At least annual monitoring for the development of diabetes in those with prediabetes is suggested.
- Screening for and treatment of modifiable risk factors for cardiovascular disease is suggested.
- Diabetes self-management education (DSME) and support (DSMS) programs are appropriate venues for people with prediabetes to receive education and support to develop and maintain behaviors that can prevent or delay the onset of diabetes.
Prevention or Delay of Type 2 Diabetes

- Lifestyle Modifications (LSM)
- Pharmacological Interventions
- Diabetes Self-management Education
- Diabetes Self-management Support

Diabetes Care 2015;38(Suppl. 1):S31–S32 / DOI: 10.2337/dc15-S008
6. Glycemic Targets

- When prescribed as part of a broader educational context, SMBG results may help guide treatment decisions and/or self-management for patients using less frequent insulin injections or noninsulin therapies.

- When prescribing SMBG, ensure that patients receive ongoing instruction and regular evaluation of SMBG technique, SMBG results, and their ability to use SMBG data to adjust therapy.

- Patients on multiple-dose insulin or insulin pump therapy should perform SMBG prior to meals and snacks, occasionally postprandially, at bedtime, prior to exercise, when they suspect low blood glucose, after treating low blood glucose until they are normoglycemic, and prior to critical tasks such as driving.

- When used properly, CGM in conjunction with intensive insulin regimens is a useful tool to lower A1C in selected adults (aged 25 years) with type 1 diabetes.
GLYCEMIC TARGETS

- Although the evidence for A1C lowering is less strong in children, teens, and younger adults, CGM may be helpful in these groups. Success correlates with adherence to ongoing use of the device.

- CGM may be a supplemental tool to SMBG in those with hypoglycemia unawareness and/or frequent hypoglycemic episodes.

- Given variable adherence to CGM, assess individual readiness for continuing use of CGM prior to prescribing.

- When prescribing CGM, robust diabetes education, training, and support are required for optimal CGM implementation and ongoing use.
A1C Testing

- Perform test twice yearly for individuals meeting treatment goals.
- Perform the A1C test quarterly in patients whose therapy has changed or who are not meeting glycemic goals.
- Use of point-of-care testing for A1C provides the opportunity for more timely treatment changes.
A1C Goals

- Lowering A1C to approximately 7% or less has been shown to reduce microvascular complications of diabetes, and, if implemented soon after the diagnosis of diabetes, it is associated with long-term reduction in macrovascular disease. Therefore, a reasonable A1C goal for many nonpregnant adults is 7%.

- Providers might reasonably suggest more stringent A1C goals (such as 6.5%) for selected individual patients if this can be achieved without significant hypoglycemia or other adverse effects of treatment. Appropriate patients might include those with short duration of diabetes, type 2 diabetes treated with lifestyle or Metformin only, long life expectancy, or no significant cardiovascular disease (CVD).
A1C Goals

- Less stringent A1C goals (such as 8%) may be appropriate for patients with a history of severe hypoglycemia, limited life expectancy, advanced microvascular or macrovascular complications, extensive comorbid conditions, or long-standing diabetes in whom the general goal is difficult to attain despite diabetes self-management education, appropriate glucose monitoring, and effective doses of multiple glucose-lowering agents including insulin.
A1C AND MICROVASCULAR COMPLICATIONS

- Hyperglycemia defines diabetes, and glycemic control is fundamental to diabetes management.
- Reduction of onset of microvascular and neuropathic complications and or progression were seen in studies: DCCT, EDIC, Kumamoto, UKPDS, ACCORD, ADVANCE, and VADT; each associated with lower A1C targets.
- These complications include: diabetic retinopathy, diabetic nephropathy, diabetic neuropathic disease.
A1C AND MACROVASCULAR COMPLICATIONS

- CVD is a more common cause of death than microvascular complications in populations with diabetes. There is evidence for a cardiovascular benefit of intensive glycemic control after long-term follow-up of study cohorts treated early in the course of type 1 and type 2 diabetes.

- In the 9-year post DCCT follow-up of the EDIC cohort, participants previously randomized to the intensive arm had a significant 57% reduction in the risk of nonfatal myocardial infarction (MI), stroke, or CVD death compared with those previously in the standard arm.
A1C AND MACROVASCULAR COMPLICATIONS

- A group-level meta-analysis of ACCORD (A1C < 6), ADVANCE A1C (< 6.5%), and VADT (A1C reduced < 1.5% from baseline) suggested that glucose lowering had a modest (9%) but statistically significant reduction in major CVD outcomes, primarily nonfatal MI, with no significant effect on mortality.

- The glycemic control comparison in ACCORD was halted early due to an increased mortality rate in the intensive compared with the standard arm (1.41% vs. 1.14% per year; hazard ratio 1.22 [95% CI 1.01–1.46]), with a similar increase in cardiovascular deaths.

- Those with long duration of diabetes, known history of severe hypoglycemia, advanced atherosclerosis, or advanced age/frailty may benefit from less aggressive targets.
A1C AND GLYCEMIC TARGETS

Summary of glycemic recommendations for nonpregnant adults with diabetes

A1C < 7.0%*

Preprandial capillary plasma glucose 80 – 130 mg/dL* (4.4 – 7.2 mmol/L)

Peak postprandial capillary plasma glucose < 180 mg/dL (10.0 mmol/L)

*More or less stringent glycemic goals may be appropriate for individual patients. Goals should be individualized based on duration of diabetes, age/life expectancy, comorbid conditions, known CVD or advanced microvascular complications, hypoglycemia unawareness, and individual patient considerations.

Postprandial glucose may be targeted if A1C goals are not met despite reaching preprandial glucose goals. Postprandial glucose measurements should be made 1 – 2 h after the beginning of the meal, generally peak levels in patients with diabetes.
HYPOGLYCEMIA

- Individuals at risk for hypoglycemia should be asked about symptomatic and asymptomatic hypoglycemia at each encounter.

- Glucose (15–20 g) is the preferred treatment for the conscious individual with hypoglycemia, although any form of carbohydrate that contains glucose may be used. 15 minutes after treatment, if SMBG shows continued hypoglycemia, the treatment should be repeated. Once SMBG returns to normal, the individual should consume a meal or snack to prevent recurrence of hypoglycemia.

- Glucagon should be prescribed for all individuals at an increased risk of severe hypoglycemia, and caregivers or family members of these individuals should be instructed on its administration. Glucagon administration is not limited to health care professionals.
HYPOGLYCEMIA

- Hypoglycemia unawareness or one or more episodes of severe hypoglycemia should trigger reevaluation of the treatment regimen.

- Insulin-treated patients with hypoglycemia unawareness or an episode of severe hypoglycemia should be advised to raise their glycemic targets to strictly avoid further hypoglycemia for at least several weeks in order to partially reverse hypoglycemia unawareness and reduce risk of future episodes.

- Ongoing assessment of cognitive function is suggested with increased vigilance for hypoglycemia by the clinician, patient, and caregivers if low cognition and/or declining cognition is found.
UPDATED CHANGES TO GLYCEMIC TARGETS

- The ADA now recommends a premeal BG target of 80-130 mg/dL, rather than 70-130 mg/dL, to better reflect new data comparing actual average glucose levels with target A1C.

- To provide additional guidance on the successful implementation of CGM, the standards include new recommendations on assessing a patient’s readiness for CGM and on providing ongoing CGM support.

Diabetes Care 2015;38(Supp1):S4/DOI: 10.2337/dc15-S003
Most people with type 1 diabetes should be treated with multiple-dose insulin (MDI) injections (three to four injections per day of basal and prandial insulin) or continuous subcutaneous insulin infusion (CSII).

Most people with type 1 diabetes should be educated in how to match prandial insulin dose to carbohydrate intake, premeal blood glucose, and anticipated activity.

Most people with type 1 diabetes should use insulin analogs to reduce hypoglycemia risk.
APPROACHES TO GLYCEMIC TREATMENT (THERAPY FOR TYPE 2)

- Metformin, if not contraindicated and if tolerated, is the preferred initial pharmacological agent for type 2 diabetes.
- In patients with newly diagnosed Type 2 diabetes and markedly symptomatic and/or elevated blood glucose levels or A1C, consider initiating insulin therapy (with or without additional agents).
- If noninsulin monotherapy at maximum tolerated dose does not achieve or maintain the A1C target over 3 months, add a second oral agent, a GLP-1 receptor agonist, or basal insulin.
- A patient-centered approach should be used to guide choice of pharmacological agents. Considerations include efficacy, cost, potential side effects, weight, comorbidities, hypoglycemia risk, and patient preferences.
APPROACHES TO GLYCEMIC TREATMENT (THERAPY FOR TYPE 2)

- Due to the progressive nature of type 2 diabetes, insulin therapy is eventually indicated for many patients with type 2 diabetes.

- Refer to antihyperglycemic therapy in type 2 diabetes chart and algorithm, S43 - S46.
**Bariatric Surgery**

- Bariatric surgery may be considered for adults with BMI > 35 kg/m² and type 2 diabetes, especially if diabetes or associated comorbidities are difficult to control with lifestyle and pharmacological therapy.
- Patients with type 2 diabetes who have undergone bariatric surgery need lifelong lifestyle support and medical monitoring.
- Although small trials have shown glycemic benefit of bariatric surgery in patients with type 2 diabetes and BMI 30 – 35 kg/m², there is currently insufficient evidence to generally recommend surgery in patients with BMI < 35 kg/m².
  - After 2 years a 72% normalization of glycemia
  - Lower mortality and morbidity, best for younger age, shorter duration of DM-2, lower A1C, higher endogenous insulin, and non-insulin use

Diabetes Care 2015;38(Suppl. 1):S41–S48 | DOI: 10.2337/dc15-S010
UPDATING CHANGES TO APPROACHES TO GLYCEMIC TREATMENT

- The type 2 diabetes management algorithm was updated to reflect all of the currently available therapies for diabetes management.
8. Cardiovascular Disease and Risk Management

Screening and Diagnosis

- Blood pressure should be measured at every routine visit. Patients found to have elevated blood pressure should have blood pressure confirmed on a separate day.

Goals

- People with diabetes and hypertension should be treated to a systolic blood pressure (SBP) goal of < 140 mmHg.
- Lower systolic targets, such as < 130 mmHg, may be appropriate for certain individuals, such as younger patients, if they can be achieved without undue treatment burden.
- Individuals with diabetes should be treated to a diastolic blood pressure (DBP) < 90 mmHg.
- Lower diastolic targets, such as < 80 mmHg, may be appropriate for certain individuals, such as younger patients, if they can be achieved without undue treatment burden.
**Cardiovascular Disease and Risk Management**

**Treatment**

- Patients with blood pressure > 120/80 mmHg should be advised on lifestyle changes to reduce blood pressure.

- Patients with confirmed office-based blood pressure higher than 140/90 mmHg should, in addition to lifestyle therapy, have prompt initiation and timely subsequent titration of pharmacological therapy to achieve blood pressure goals.

- Lifestyle therapy for elevated blood pressure consists of weight loss, if overweight or obese; a Dietary Approaches to Stop Hypertension (DASH)-style dietary pattern including reducing sodium and increasing potassium intake; moderation of alcohol intake; and increased physical activity.
Pharmacological therapy for patients with diabetes and hypertension should comprise a regimen that includes either an ACE inhibitor or an angiotensin receptor blocker (ARB). If one class is not tolerated, the other should be substituted.

Multiple-drug therapy (including a thiazide diuretic and ACE inhibitor/ARB, at maximal doses) is generally required to achieve blood pressure targets.

If ACE inhibitors, ARBs, or diuretics are used, serum creatinine / estimated glomerular filtration rate (eGFR) and serum potassium levels should be monitored.

In pregnant patients with diabetes and chronic hypertension, blood pressure targets of 110–129/65–79 mmHg are suggested in the interest of optimizing long-term maternal health and minimizing impaired fetal growth. ACE inhibitors and ARBs are contraindicated during pregnancy.
CARDIOVASCULAR DISEASE AND RISK MANAGEMENT

- Cardiovascular disease (CVD) is the major cause of morbidity and mortality for individuals with diabetes and is the largest contributor to the direct and indirect costs of diabetes.
- The common conditions coexisting with type 2 diabetes (e.g., hypertension and dyslipidemia) are clear risk factors for CVD, and diabetes itself confers independent risk.
- Randomized clinical trials have demonstrated the benefit (reduction of CHD events, stroke, and diabetic kidney disease) of lowering blood pressure to < 140 mmHg systolic and < 90 mmHg diastolic in individuals with diabetes.
DYSLIPIDEMIA AND LIPID MANAGEMENT

Screening
 In adults, a screening lipid profile is reasonable at the time of first diagnosis, at the initial medical evaluation, and/or at age 40 years and periodically (e.g., every 1–2 years) thereafter.

Treatment Recommendations and Goals
 Lifestyle modification focusing on the reduction of saturated fat, transfat, and cholesterol intake; increase of omega-3 fatty acids, viscous fiber, and plant stanols/sterols; weight loss (if indicated); and increased physical activity should be recommended to improve the lipid profile in patients with diabetes.
**Dyslipidemia and Lipid Management**

- Intensify lifestyle therapy and optimize glycemic control for patients with elevated triglyceride levels (>150 mg/dL [1.7 mmol/L]) and/or low HDL cholesterol (<40 mg/dL [1.0 mmol/L] for men, <50 mg/dL [1.3 mmol/L] for women). For patients with fasting triglyceride levels >500 mg/dL (5.7 mmol/L), evaluate for secondary causes and consider medical therapy to reduce risk of pancreatitis.

- For patients of all ages with diabetes and overt CVD, high-intensity statin therapy should be added to lifestyle therapy.

- For patients with diabetes aged <40 years with additional CVD risk factors, consider using moderate- or high-intensity statin and lifestyle therapy.

- For patients with diabetes aged 40–75 years without additional CVD risk factors, consider using moderate-intensity statin and lifestyle therapy.

- For patients with diabetes aged 40–75 years with additional CVD risk factors, consider using high-intensity statin and lifestyle therapy.

- For patients with diabetes aged >75 years without additional CVD risk factors, consider using moderate-intensity statin therapy and lifestyle therapy.
DYSLIPIDEMIA AND LIPID MANAGEMENT

- For patients with diabetes aged > 75 years with additional CVD risk factors, consider using moderate- or high-intensity statin therapy and lifestyle therapy.

- In clinical practice, providers may need to adjust intensity of statin therapy based on individual patient response to medication (e.g., side effects, tolerability, LDL cholesterol levels).

- Cholesterol laboratory testing may be helpful in monitoring adherence to therapy, but may not be needed once the patient is stable on therapy.

- Combination therapy (statin/fibrate and statin/niacin) has not been shown to provide additional cardiovascular benefit above statin therapy alone and is not generally recommended.

- Statin therapy is contraindicated in pregnancy.
ANTIPLATELET THERAPY

- Consider aspirin therapy (75–162 mg/day) as a primary prevention strategy in those with type 1 or type 2 diabetes at increased cardiovascular risk (10-year risk > 10%). This includes most men aged > 50 years or women aged > 60 years who have at least one additional major risk factor (family history of CVD, hypertension, smoking, dyslipidemia, or albuminuria).

- Aspirin should not be recommended for CVD prevention for adults with diabetes at low CVD risk (10-year CVD risk < 5%, such as in men aged < 50 years and women aged < 60 years with no major additional CVD risk factors), since the potential adverse effects from bleeding likely offset the potential benefits.
ANTIPLATELET THERAPY

- In patients in these age-groups with multiple other risk factors (e.g., 10-year risk 5–10%), clinical judgment is required.
- Use aspirin therapy (75–162 mg/day) as a secondary prevention strategy in those with diabetes and a history of CVD.
- For patients with CVD and documented aspirin allergy, clopidogrel (75 mg/day) should be used.
- Dual antiplatelet therapy is reasonable for up to a year after an acute coronary syndrome.
CORONARY HEART DISEASE

Screening
- In asymptomatic patients, routine screening for coronary artery disease (CAD) is not recommended because it does not improve outcomes as long as CVD risk factors are treated.

Treatment
- In patients with known CVD, use aspirin and statin therapy (if not contraindicated) and consider ACE inhibitor therapy to reduce the risk of cardiovascular events.
- Inpatients with a prior MI, Beta-blockers should be continued for at least 2 years after the event.
- In patients with symptomatic heart failure, Thiazolidinedione treatment should not be used.
- In patients with stable CHF, Metformin may be used if renal function is normal but should be avoided in unstable or hospitalized patients with CHF.

Diabetes Care 2015;38(Suppl. 1):S49–S57 | DOI: 10.2337/dc15-S011
**Updated Changes to Cardiovascular Disease and Risk Management**

- The recommended goal for diastolic blood pressure was changed from 80 mmHg to 90 mmHg for most people with diabetes and hypertension to better reflect evidence from randomized clinical trials. Lower diastolic targets may still be appropriate for certain individuals.

- Recommendation for statin treatment and lipid monitoring were revised after consideration of 2013 American College of Cardiology/American Heart Association guidelines on the treatment of blood cholesterol. Treatment initiation (and initial statin dose) is now driven primarily by risk status rather than LDL cholesterol level.
With consideration for the new statin treatment recommendations, the Standards now provide the following lipid monitoring guidance: a screening lipid profile is reasonable at diabetes diagnosis, at an initial medical evaluation and/or at age 40 years, and periodically thereafter.

Diabetes Care 2015;38(Supp1):S4/DOI: 10.2337/dc15-S003
9. MICROVASCULAR COMPLICATIONS AND FOOT CARE

- Optimize glucose control to reduce the risk or slow the progression of diabetic kidney disease. Optimize blood pressure control to reduce the risk or slow the progression of diabetic kidney disease.

Screening - Renal

- At least once a year, quantitatively assess urinary albumin (e.g., urine albumin-to-creatinine ratio [UACR]) and estimated glomerular filtration rate (eGFR) in patients with type 1 diabetes duration of > 5 years and in all patients with type 2 diabetes
MICROVASCULAR COMPLICATIONS AND FOOT CARE

Treatment

- An ACE inhibitor or angiotensin receptor blocker (ARB) is not recommended for the primary prevention of diabetic kidney disease in patients with diabetes who have normal blood pressure and normal UACR (< 30 mg/g).
- Either an ACE inhibitor or ARB is suggested for the treatment of the non-pregnant patient with modestly elevated urinary albumin excretion (30–299 mg/day) and is recommended for those with urinary albumin excretion > 300 mg/day.
- When ACE inhibitors, ARBs, or diuretics are used, monitor serum creatinine and potassium levels for the development of increased creatinine or changes in potassium.
- Continued monitoring of UACR in patients with albuminuria is reasonable to assess progression of diabetic kidney disease.
**Microvascular Complications and Foot Care**

- When eGFR is 60 mL/min/1.73 m², evaluate and manage potential complications of chronic kidney disease (CKD).
- Consider referral to a physician experienced in the care of kidney disease when there is uncertainty about the etiology of kidney disease, difficult management issues, or advanced kidney disease.

**Nutrition**

- For people with diabetic kidney disease, reducing the amount of dietary protein below the recommended daily allowance of 0.8 g/kg/day (based on ideal body weight) is not recommended because it does not alter glycemic measures, cardiovascular risk measures, or the course of GFR decline.
**RETINOPATHY**

- Optimize glycemic control to reduce the risk or slow the progression of retinopathy.
- Optimize blood pressure control to reduce the risk or slow the progression of retinopathy.

**Screening**

- Adults with type 1 diabetes should have an initial dilated and comprehensive eye examination by an ophthalmologist or optometrist within 5 years after the onset of diabetes.
- Patients with type 2 diabetes should have an initial dilated and comprehensive eye examination by an ophthalmologist or optometrist shortly after the diagnosis of diabetes.
RETINOPATHY

- If there is no evidence of retinopathy for one or more eye exams, then exams every 2 years may be considered. If diabetic retinopathy is present, subsequent examinations for patients with type 1 and type 2 diabetes should be repeated annually by an ophthalmologist or optometrist. If retinopathy is progressing or sight-threatening, then examinations will be required more frequently.

- High-quality fundus photographs can detect most clinically significant diabetic retinopathy. Interpretation of the images should be performed by a trained eye care provider. While retinal photography may serve as a screening tool for retinopathy, it is not a substitute for a comprehensive eye exam, which should be performed at least initially and at intervals thereafter as recommended by an eye care professional.
RETINOPATHY

- Women with preexisting diabetes who are planning pregnancy or who have become pregnant should have a comprehensive eye examination and be counseled on the risk of development and/or progression of diabetic retinopathy. Eye examination should occur in the first trimester with close follow-up throughout pregnancy and for 1 year postpartum.

Treatment

- Promptly refer patients with any level of macular edema, severe nonproliferative diabetic retinopathy (NPDR), or any proliferative diabetic retinopathy (PDR) to an ophthalmologist who is knowledgeable and experienced in the management and treatment of diabetic retinopathy.
Retinopathy

- Laser photocoagulation therapy is indicated to reduce the risk of vision loss in patients with high-risk PDR, clinically significant macular edema, and, in some cases, severe NPDR.
- Antivascular endothelial growth factor (VEGF) therapy is indicated for diabetic macular edema.
- The presence of retinopathy is not a contraindication to aspirin therapy for cardioprotection, as aspirin does not increase the risk of retinal hemorrhage.
NEUROPATHY

- All patients should be screened for diabetic peripheral neuropathy (DPN) starting at diagnosis of type 2 diabetes and 5 years after the diagnosis of type 1 diabetes and at least annually thereafter, using simple clinical tests, such as a 10-g monofilament.

- Screening for signs and symptoms (e.g., orthostasis, resting tachycardia) of cardiovascular autonomic neuropathy (CAN) should be considered with more advanced disease.

- Tight glycemic control is the only strategy convincingly shown to prevent or delay the development of DPN and CAN in patients with type 1 diabetes and to slow the progression of neuropathy in some patients with type 2 diabetes.

- Assess and treat patients to reduce pain related to DPN and symptoms of autonomic neuropathy and to improve quality of life.
NEUROPATHY

- **Peripheral neuropathy** symptoms vary according to the class of sensory fibers involved. The most common symptoms are induced by the involvement of small fibers and include pain, dysesthesias (unpleasant abnormal sensations of burning and tingling), and numbness.

- **Diabetic autonomic neuropathy** include resting tachycardia, exercise intolerance, orthostatic hypotension, gastroparesis, constipation, erectile dysfunction, sudomotor dysfunction, impaired neurovascular function, and potentially, autonomic failure in response to hypoglycemia.
FOOT CARE

- For all patients with diabetes, perform an annual comprehensive foot examination to identify risk factors predictive of ulcers and amputations. The foot examination should include inspection and assessment of foot pulses.

- Patients with insensate feet, foot deformities, and ulcers should have their feet examined at every visit.

- Provide general foot self-care education to all patients with diabetes.

- A multidisciplinary approach is recommended for individuals with foot ulcers and high-risk feet (e.g., dialysis patients and those with Charcot foot, prior ulcers, or amputation).
**Foot Care**

- Refer patients who smoke or who have a loss of protective sensation (LOPS), structural abnormalities, or a history of prior lower extremity complications to foot care specialists for ongoing preventive care and lifelong surveillance.

- Initial screening for peripheral arterial disease (PAD) should include a history for claudication and an assessment of the pedal pulses.

- Refer patients with significant claudication or a positive ankle-brachial index (ABI) for further vascular assessment and consider exercise, medications, and surgical options.

  Diabetes Care 2015;38(Suppl. 1):S58–S66 | DOI: 10.2337/dc15-S012
To better target those at high risk for foot complications, the Standards emphasize that all patients with insensate feet, foot deformities, or a history of foot ulcers have their feet examined at every visit.

Diabetes Care 2015;38(Supp1):S4/DOI: 10.2337/dc15-S003
10. Older Adults

- Older adults who are functional and cognitively intact and have significant life expectancy should receive diabetes care with goals similar to those developed for younger adults.
- Glycemic goals for some older adults might reasonably be relaxed, using individual criteria, but hyperglycemia leading to symptoms or risk of acute hyperglycemic complications should be avoided in all patients.
- Other cardiovascular risk factors should be treated in older adults with consideration of the time frame of benefit and the individual patient. Treatment of hypertension is indicated in virtually all older adults, and lipid-lowering and aspirin therapy may benefit those with life expectancy at least equal to the time frame of primary or secondary prevention trials.
- Screening for diabetes complications should be individualized in older adults, but particular attention should be paid to complications that would lead to functional impairment.
- Older adults (> 65 years of age) with diabetes should be considered a high priority population for depression screening and treatment.

11. Children and Adolescents

- An A1C goal of < 7.5% is recommended across all pediatric age-groups.

Table 11.1 — Plasma blood glucose and A1C goals for type 1 diabetes across all pediatric age-groups

<table>
<thead>
<tr>
<th>Plasma blood glucose goal range</th>
<th>Before meals</th>
<th>Bedtime/overnight</th>
<th>A1C</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 – 130 mg/dL</td>
<td>90 – 150 mg/dL</td>
<td>&lt;7.5%</td>
<td>&lt;7.0% *</td>
<td></td>
</tr>
</tbody>
</table>

*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.
AUTOIMMUNE CONDITIONS

- Assess for the presence of additional autoimmune conditions at diagnosis and if symptoms develop.
  - Celiac Disease
  - Thyroid Disease
Management of Cardiovascular Risk Factors

- Blood pressure should be measured at each routine visit. Children found to have high-normal blood pressure (systolic blood pressure [SBP] or diastolic blood pressure [DBP] ≥ 90th percentile for age, sex, and height) or hypertension (SBP or DBP ≥ 95th percentile for age, sex, and height) should have blood pressure confirmed on three separate days.
**DYSLIPIDEMIA**

**Testing**
- Obtain a fasting lipid profile on children ≥ 2 years of age soon after the diagnosis (after glucose control has been established).
- If lipids are abnormal, annual monitoring is reasonable. If LDL cholesterol values are within the accepted risk levels (< 100 mg/dL [2.6 mol/L]), a lipid profile repeated every 5 years is reasonable.

**Treatment**
- Initial therapy may 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.
- 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 LDL cholesterol > 130 mg/dL (3.4 mmol/L) and one or more cardiovascular disease (CVD) risk factors is reasonable.
- The goal of therapy is an LDL cholesterol value < 100 mg/dL (2.6 mmol/L).
SMOKING

DON’T DO IT!!!!

- Elicit smoking history at initial and follow-up diabetes visits and discourage smoking in nonsmoking youth and encourage smoking cessation in those who smoke.
MICROVASCULAR DISEASE – NEPHROPATHY

Screening
- At least an annual screening for albuminuria, with a random spot urine sample for albumin-to-creatinine ratio (UACR), should be considered once the child has had diabetes for 5 years.
- Measure creatinine clearance/estimated glomerular filtration rate at initial evaluation and then based on age, diabetes duration, and treatment.

Treatment
- Treatment with an ACE inhibitor, titrated to normalization of albumin excretion, should be considered when elevated UACR (> 30 mg/g) is documented with at least two of three urine samples. This should be obtained over a 6-month interval following efforts to improve glycemic control and normalize blood pressure for age.
Microvascular Disease – Retinopathy / Neuropathy

- An initial dilated and comprehensive eye examination should be considered for the child at the start of puberty or at age ≥ 10 years, whichever is earlier, once the youth has had diabetes for 3–5 years.

- After the initial examination, annual routine follow-up is generally recommended. Less frequent examinations, every 2 years, may be acceptable on the advice of an eye care professional.

- Consider an annual comprehensive foot exam for the child at the start of puberty or at age ≥ 10 years, whichever is earlier, once the youth has had type 1 diabetes for 5 years.
Diabetes Self-management Education and Support

- Youth with type 1 diabetes and parents / caregivers (for patients aged < 18 years) should receive culturally sensitive and developmentally appropriate individualized DSME and DSMS according to national standards when their diabetes is diagnosed and routinely thereafter.
As teens transition into emerging adulthood, health care providers and families must recognize their many vulnerabilities and prepare the developing teen, beginning in early to mid-adolescence and at least 1 year prior to the transition.

Both pediatricians and adult health care providers should assist in providing support and links to resources for the teen and emerging adult.
PSYCHOSOCIAL ISSUES

- At diagnosis and during routine follow-up care, assess psychosocial issues and family stresses that could impact adherence with diabetes management and provide appropriate referrals to trained mental health professionals, preferably experienced in childhood diabetes.

- Encourage developmentally appropriate family involvement in diabetes management tasks for children and adolescents, recognizing that premature transfer of diabetes care to the child can result in nonadherence and deterioration in glycemic control.

Diabetes Care 2015;38(Suppl. 1):S70–S76 | DOI: 10.2337/dc15-S014
Updated Changes to Children and Adolescents

To reflect new evidence regarding the risks and benefits of tight glycemic control in children and adolescents with diabetes, the Standards now recommend a target A1C of < 7.5% for all pediatric age-groups; however, individualization is still encouraged.
MANAGEMENT OF DIABETES IN PREGNANCY

- Provide preconception counseling that addresses the importance of tight control in reducing the risk of congenital anomalies with an emphasis on achieving A1C < 7%, if this can be achieved without hypoglycemia.

- Potentially teratogenic medications (ACE inhibitors, statins, etc.) should be avoided in sexually active women of childbearing age who are not using reliable contraception.

- GDM should be managed first with diet and exercise, and medications should be added if needed.
**Management of Diabetes in Pregnancy**

- Women with pregestational diabetes should have a baseline ophthalmology exam in the first trimester and then be monitored every trimester as indicated by degree of retinopathy.

- Due to alterations in red blood cell turnover that lower the normal A1C level in pregnancy, the A1C target in pregnancy is < 6% if this can be achieved without significant hypoglycemia.

- Medications widely used in pregnancy include insulin, Metformin, and Glyburide; most oral agents cross the placenta or lack long-term safety data.

Diabetes Care 2015;38(Suppl. 1):S77–S79 | DOI: 10.2337/dc15-S015
This new section was added to the Standards to provide recommendations related to pregnancy and diabetes, including recommendations regarding preconception counseling, medications, blood glucose targets, and monitoring.
13. Diabetes Care in the Hospital, Nursing Home, and Skilled Nursing Facility

- Diabetes discharge planning should start at hospital admission, and clear diabetes management instructions should be provided at discharge.
- The sole use of sliding scale insulin (SSI) in the inpatient hospital setting is strongly discouraged.
- All patients with diabetes admitted to the hospital should have their diabetes type clearly identified in the medical record.
Diabetes Care in the Hospital, Nursing Home, and Skilled Nursing Facility

Critically Ill Patients

- Insulin therapy should be initiated for treatment of persistent hyperglycemia starting at a threshold of no greater than 180 mg/dL (10 mmol/L). Once insulin therapy is started, a glucose range of 140–180 mg/dL (7.8–10 mmol/L) is recommended for the majority of critically ill patients.

- More stringent goals, such as 110–140 mg/dL (6.1–7.8 mmol/L), may be appropriate for selected patients, as long as this can be achieved without significant hypoglycemia.

- Critically ill patients require an intravenous insulin protocol that has demonstrated efficacy and safety in achieving the desired glucose range without increasing risk for severe hypoglycemia.
DIABETES CARE IN THE HOSPITAL, NURSING HOME, AND SKILLED NURSING FACILITY

Noncritically Ill Patients

- If treated with insulin, generally premeal blood glucose targets of < 140 mg/dL (7.8 mmol/L) with random blood glucose < 180 mg/dL (10.0 mmol/L) are reasonable, provided these targets can be safely achieved. More stringent targets may be appropriate in stable patients with previous tight glycemic control. Less stringent targets may be appropriate in those with severe comorbidities.

- A basal plus correction insulin regimen is the preferred treatment for patients with poor oral intake or who are taking nothing by mouth (NPO). An insulin regimen with basal, nutritional, and correction components is the preferred treatment for patients with good nutritional intake.

- A hypoglycemia management protocol should be adopted and implemented by each hospital or hospital system. A plan for preventing and treating hypoglycemia should be established for each patient. Episodes of hypoglycemia in the hospital should be documented in the medical record and tracked.
**Diabetes Care in the Hospital, Nursing Home, and Skilled Nursing Facility**

- Consider obtaining an A1C in patients with diabetes admitted to the hospital if the result of testing in the previous 3 months is not available.
- Consider obtaining an A1C in patients with risk factors for undiagnosed diabetes who exhibit hyperglycemia in the hospital.
- Patients with hyperglycemia in the hospital who do not have a prior diagnosis of diabetes should have appropriate follow-up testing and care documented at discharge.
14. DIABETES ADVOCACY

- Managing the daily health demands of diabetes can be challenging. People living with diabetes should not have to face additional discrimination due to diabetes. By advocating for the rights of those with diabetes at all levels, the American Diabetes Association (ADA) can help ensure that they live a healthy and productive life. A strategic goal of the ADA is that by the end of 2015, more children and adults with diabetes will be living free from the burden of discrimination.
DIABETES ADVOCACY

- One tactic for achieving this goal is to implement the ADA’s Standards of Medical Care through advocacy-oriented position statements. The ADA publishes evidence-based, peer-reviewed statements on topics such as diabetes and employment, diabetes and driving, and diabetes management in certain settings such as schools, child care programs, and correctional institutions. In addition to ADA’s clinical position statements, these advocacy position statements are important tools in educating schools, employers, licensing agencies, policy makers, and others about the intersection of diabetes medicine and the law.

Diabetes Care 2015;38(Suppl. 1):S86–S87 | DOI: 10.2337/dc15-S017
LEFT OFF ON PAGE S73, SECTION 5


National Standards for Diabetes Self-Management Education

**Standard 1:** The DSME entity will have documentation of its organizational structure, mission statement, and goals and will recognize and support quality DSME as an integral component of diabetes care.

**Standard 2:** The DSME entity shall appoint an advisory group to promote quality. This group shall include representatives from the health professions, people with diabetes, the community, and other stakeholders.
National Standards for Diabetes Self-Management Education

- **Standard 3:** The DSME entity will determine the diabetes educational needs of the target population(s) and identify resources necessary to meet these needs.

- **Standard 4:** A coordinator will be designated to oversee the planning, implementation, and evaluation of diabetes self-management education. The coordinator will have academic or experiential preparation in chronic disease care and education and in program management.
**NATIONAL STANDARDS FOR DIABETES SELF-MANAGEMENT EDUCATION**

- **Standard 5:** DSME will be provided by one or more instructors. The instructors will have recent educational and experiential preparation in education and diabetes management or will be a certified diabetes educator. The instructor(s) will obtain regular continuing education in the field of diabetes management and education. At least one of the instructors will be a registered nurse, dietitian, or pharmacist. A mechanism must be in place to ensure that the participant's needs are met if those needs are outside the instructors' scope of practice and expertise.
National Standards for Diabetes Self-Management Education

**Standard 6:** A written curriculum reflecting current evidence and practice guidelines, with criteria for evaluating outcomes, will serve as the framework for the DSME entity. Assessed needs of the individual with pre-diabetes and diabetes will determine which of the content areas listed below are to be provided:

- Describing the diabetes disease process and treatment options;
- Incorporating nutritional management into lifestyle;
- Incorporating physical activity into lifestyle;
- Using medication(s) safely and for maximum therapeutic effectiveness;
- Monitoring blood glucose and other parameters and interpreting and using the results for self-management decision making;
- Preventing, detecting, and treating acute complications;
- Preventing detecting, and treating chronic complications;
- Developing personal strategies to address psychosocial issues and concerns;
- Developing personal strategies to promote health and behavior change.
Standard 7: An individual assessment and education plan will be developed collaboratively by the participant and instructor(s) to direct the selection of appropriate educational interventions and self-management support strategies. This assessment and education plan and the intervention and outcomes will be documented in the education record.

Standard 8: A personalized follow-up plan for ongoing self management support will be developed collaboratively by the participant and instructor(s). The patient's outcomes and goals and the plan for ongoing self management support will be communicated to the referring provider.
National Standards for Diabetes Self-Management Education

- **Standard 9:** A personalized follow-up plan for ongoing self-management support will be developed collaboratively by the participant and instructor(s). The patient's outcomes and goals and the plan for ongoing self-management support will be communicated to the referring provider.

- **Standard 10:** The DSME entity will measure the effectiveness of the education process and determine opportunities for improvement using a written continuous quality improvement plan that describes and documents a systematic review of the entities' process and outcome data.

CASE STUDY 1
CASE STUDY 2
QUESTIONS