Standards of Medical Care In Diabetes
2017 ADA Updates

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Standards of Care

- Funded out of Association's general revenues and *does not use* industry support.
- Slides correspond with sections within the Standards of Medical Care in Diabetes - 2017.
- Reviewed and approved by the Association's Board of Directors.

Process

- ADA's Professional Practice Committee (PPC) conducts annual review & revision.
- Searched Medline for human studies related to each subsection and published since January 1, 2016.
- Recommendations revised per new evidence, for clarity, or to better match text to strength of evidence.
- Professional.diabetes.org/SOC

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Chronic Care Model

Six Core Elements:

1. Delivery system design
2. Self-management support
3. Decision support
4. Clinical information systems
5. Community resources & policies
6. Health systems

American Diabetes Association Standards of Medical Care in Diabetes.
Promoting Health and Reducing Disparities in Populations. *Diabetes Care* 2017; 40 (Suppl. 1): S6-S10

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Strategies for System-Level Improvement

www.BetterDiabetesCare.nih.gov

Three Key Objectives

1. Optimize Provider and Team Behavior
2. Support Patient Self-Management
3. Change the Care System

American Diabetes Association Standards of Medical Care in Diabetes.
Promoting Health and Reducing Disparities in Populations. *Diabetes Care* 2017; 40 (Suppl. 1): S6-S10

Objective 1: Optimize Provider and Team Behavior

For patients who have not achieved beneficial levels of control in blood pressure, lipids, or glucose, the care team should prioritize timely & appropriate intensification of lifestyle and/or pharmaceutical therapy.

Strategies include:

- Explicit goal setting with patients
- Identifying and addressing language, numeracy, and/or cultural barriers to care
- Integrating evidence-based guidelines
- Incorporating care management teams

Objective 2: Support Patient Self-management

Implement a systematic approach to support patient behavior change efforts, including:

- Healthy lifestyle
- Disease self-management
- Prevention of diabetes complications
- Identification of self-management problems and development of strategies to solve those problems

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Objective 3: Change the Care System

Successful practices prioritize providing a high quality of care. Changes that have been shown to increase quality of care include:

1. Basing care on evidence-based guidelines
2. Expanding the role of teams to implement more intensive disease management strategies
3. Redesigning the care process
4. Implementing electronic health record tools
5. Activating and educating patients

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Objective 3: Change the Care System

Successful practices prioritize providing a high quality of care. Changes that have been shown to increase quality of care include:

6. Removing financial barriers and reducing patient out-of-pocket costs
7. Identifying community resources and public policy that supports healthy lifestyles
8. Coordinated primary care, e.g., through Patient-Centered Medical Home
9. Changes to reimbursement structure

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Tailoring Treatment to Reduce Disparities

Key Recommendation

- Providers should assess social context, including potential food insecurity, housing stability, and financial barriers, and apply that information to treatment decisions.

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System-Level Interventions

Key Recommendations

- Patients should be referred to local community resources when available. B
- Patients should be provided with self-management support from lay health coaches, navigators, or community health workers when available. A

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Classification of Diabetes

1. Type 1 diabetes
   - β-cell destruction
2. Type 2 diabetes
   - Progressive insulin secretory defect
3. Gestational Diabetes Mellitus (GDM)
4. Other specific types of diabetes
   - Monogenic diabetes syndromes
   - Diseases of the exocrine pancreas, e.g., cystic fibrosis
   - Drug- or chemical-induced diabetes

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Diagnostic Criteria

Fasting plasma glucose (FPG)
≥126 mg/dL (7.0 mmol/L)

OR

2-h plasma glucose ≥200 mg/dL (11.1 mmol/L) during an OGTT

OR

A1C ≥6.5%

OR

Classic diabetes symptoms + random plasma glucose
≥200 mg/dL (11.1 mmol/L)

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Recommendations: Type 1 Diabetes

- Blood glucose rather than A1C should be used to dx type 1 diabetes in symptomatic individuals. E
- Screening for type 1 diabetes with an antibody panel is recommended only in the setting of a clinical research study or in a first-degree family members of a proband with type 1 diabetes. B

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Recommendations: Prediabetes

- Screening for prediabetes with an informal assessment of risk factors or validated tools should be considered in asymptomatic adults. B
- Testing should begin at age 45 for all people. B
- Consider testing for prediabetes in asymptomatic adults of any age w/ BMI ≥25 kg/m2 or ≥23 kg/m2 (in Asian Americans) who have 1 or more addt'l risk factors for diabetes. B
- If tests are normal, repeat at a minimum of 3-year intervals. C

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Risk Factors for Prediabetes and T2D

- A1C ≥5.7% (39 mmol/mol), IGT, or IFG on previous testing
- first-degree relative with diabetes
- high-risk race/ethnicity (e.g., African American, Latino, Native American, Asian American, Pacific Islander)
- women who were diagnosed with GDM
- history of CVD
- hypertension (≥140/90 mmHg or on therapy for hypertension)
- HDL cholesterol level <35 mg/dL (0.90 mmol/L) and/or a triglyceride level >250 mg/dL (2.82 mmol/L)
- women with polycystic ovary syndrome
- physical inactivity
- other clinical conditions associated with insulin resistance (e.g., severe obesity, acanthosis nigricans).

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Prediabetes

FPG 100–125 mg/dL
(5.6–6.9 mmol/L): IFG
OR
2-h plasma glucose 140–199 mg/dL (7.8–11.0 mmol/L): IGT
OR
A1C 5.7–6.4%

* For all three tests, risk is continuous, extending below the lower limit of a range and becoming disproportionately greater at higher ends of the range.

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Criteria for Testing for T2DM in Children & Adolescents

- Overweight plus any 2 :
  - Family history of type 2 diabetes in 1st or 2nd degree relative
  - Race/ethnicity
  - Signs of insulin resistance or conditions associated with insulin resistance
  - Maternal history of diabetes or GDM
- Age of initiation 10 years or at onset of puberty
- Frequency: every 3 years
- Test with FPG, OGTT, or A1C

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Recommendations: Detection and Diagnosis of GDM

- Women with GDM history should have lifelong screening for development of diabetes or prediabetes at least every 3 years. B
- Women with GDM history found to have prediabetes should receive lifestyle interventions or metformin to prevent diabetes. A

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Medical History (3):

- History of increased blood pressure, abnormal lipids
- Microvascular: retinopathy, nephropathy, and neuropathy (sensory, including history of foot lesions; autonomic, including sexual dysfunction and gastroparesis)
- Macrovascular: coronary heart disease, cerebrovascular disease, and peripheral arterial disease

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Common Comorbidities

- Autoimmune Diseases (T1D) – esp thyroid and celiac
- Cancer
- Cognitive Impairment/Dementia
- Fatty Liver Disease
- Fractures
- Hearing Impairment
- Obstructive Sleep Apnea
- Periodontal Disease
- Psychosocial Disorders – Anxiety/Depression

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Diabetes Self-Management Education & Support

- All people with diabetes should participate in DSME and DSMS both at diagnosis and as needed thereafter. B
- Effective self-management, improved clinical outcomes, health status, and quality-of-life are key outcomes of DSME and DSMS and should be measured and monitored as part of care. C
- DSME/S should be patient-centered, respectful, and responsive to individual patient preferences, needs, and values that should guide clinical decisions. A

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Diabetes Self-Management Education & Support

Four critical time points for DSME/S delivery:

1. At diagnosis
2. Annually for assessment of education, nutrition, and emotional needs
3. When new complicating factors arise that influence self-management; and
4. When transitions in care occur

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Goals of Nutrition Therapy

1. To maintain the pleasure of eating by providing non- judgmental messages about food choices.
2. Provide practical tools for developing healthful eating patterns rather than focusing on individual macronutrients, micro-nutrients, or single foods.

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Nutrition Recommendations

- For people with T1D or T2D on a flexible insulin program, education on carb counting and, in some cases, fat and protein gram estimation can improve glycemic control. A
- For people whose daily insulin dosing is fixed, a consistent pattern of carb intake can result in improved glycemic control and a reduced risk of hypoglycemia. B

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Nutrition Recommendations

- Emphasizing healthy food choices and portion control may be more helpful for those with type 2 diabetes who are not taking insulin, who have limited health literacy or numeracy, and who are elderly and prone to hypoglycemia. B
- Modest weight loss achievable by the combination of lifestyle modification and the reduction of calorie intake benefits overweight or obese adults with type 2 diabetes and also those with prediabetes. Intervention programs to facilitate this process are recommended. A

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Nutrition Recommendations

- Macronutrient distribution should be individualized while keeping total calorie and metabolic goals in mind. E
- Carbohydrate intake from whole grains, vegetables, fruits, legumes, and dairy products, with an emphasis on **foods higher in fiber and lower in glycemic load**, should be advised over other sources, especially those containing sugars. B

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Nutrition Recommendations

- People with diabetes and those at risk should avoid sugar-sweetened beverages to control weight and reduce their risk for CVD and fatty liver B and should minimize the consumption of foods with added sugar that have the capacity to displace healthier, more nutrient-dense food choices. A
- A variety of eating patterns are acceptable for the management of type 2 diabetes and prediabetes including Mediterranean, DASH, and plant-based diets. B
- Ingested protein appears to increase insulin response without increasing plasma glucose concentrations. Therefore, carbohydrate sources high in protein should not be used to treat or prevent hypoglycemia

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Nutrition: Dietary Fat

- An eating plan emphasizing elements of a Mediterranean-style diet rich in monounsaturated fats may improve glucose metabolism and lower CVD risk and can be an effective alternative to a low-fat, high-carb diet. B
- Eating foods containing long-chain ω-3 fatty acids, such as fatty fish, nuts, and seeds, is recommended to prevent or treat CVD B;
- However, evidence does not support a beneficial role for ω-3 dietary supplements. A

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Micronutrients and herbal supplements:

- There is no clear evidence that dietary supplementation with vitamins, minerals, herbs, or spices can improve diabetes, and there may be safety concerns regarding the long-term use of antioxidant supplements such as vitamins E and C and carotene. C

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Nutrition

- ETOH only in moderation: increases hypoglycemia risk, esp with insulin/secretagogues.
- Na^+: <2.3g/day or more restrictive
- Nonnutritive sweeteners: generally safe and effective

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Exercise

- Children w/ prediabetes/DM: at least 60 min/day
- Most adults with DM1/2: 150+min/wk of moderate-to-vigorous activity.
- Resistance training 2-3x/wk.
- Decrease sedentary behavior, interrupt sitting every 30 min – improves BS control
- Flexibility/Balance training 2-3x/wk for older DM.

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DM Prevention / Delay

- Patients with prediabetes should be referred to an intensive diet and physical activity behavioral counseling program adhering to the tenets of the DPP targeting a loss of 7% of body weight, and should increase their moderate physical activity to at least 150 min/week. A
- Metformin therapy for prevention of type 2 diabetes should be considered in those with prediabetes, especially for those with BMI >35 kg/m2, aged < 60 years, women with prior gestational diabetes (GDM), those with rising A1C despite lifestyle intervention. A

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New Metformin Recommendation

- Long-term use of metformin may be associated with biochemical vitamin B12 deficiency, and periodic measurement of vitamin B12 levels should be considered in metformin-treated patients, especially in those with anemia or peripheral neuropathy. B

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DM Prevention / Delay

- DSME and DSMS programs are appropriate for people with prediabetes to receive education and support to develop and maintain behaviors that can prevent or delay the onset of diabetes.
- Monitor at least annually for the development of diabetes in those with prediabetes. E
- Screening for and treatment of modifiable risk factors for CVD is suggested. B

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Recommendations: Glucose Monitoring

- Most patients on multiple-dose insulin (MDI) or insulin pump therapy should do SMBG
  - Prior to meals and snacks
  - At bedtime
  - Prior to exercise
  - When they suspect low blood glucose
  - After treating low blood glucose until they are normoglycemic
  - Prior to critical tasks such as driving
  - Occasionally postprandially

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Recommendations: A1C Testing

- Perform the A1C test at least 2x annually in patients that meet treatment goals (and have stable glycemic control). E
- Perform the A1C test *quarterly* in patients whose therapy has changed or who are not meeting glycemic goals. E
- Use of point-of-care (POC) testing for A1C provides the opportunity for more timely treatment changes. E

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Glycemic Goals in Adults

- A reasonable A1C goal for many nonpregnant adults is <7% (53 mmol/mol). A
- Consider more stringent goals (e.g. <6.5%) for select patients if achievable without significant hypos or other adverse effects. C
- Consider less stringent goals (e.g. <8%) for patients with a history of severe hypoglycemia, limited life expectancy, or other conditions that make <7% difficult to attain. B

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A1C and CVD Outcomes

- DCCT: Trend toward lower risk of CVD events with intensive control (T1D)
- EDIC: 57% reduction in risk of nonfatal MI, stroke, or CVD death (T1D)
- UKPDS: non-significant reduction in CVD events (T2D).
- ACCORD, ADVANCE, VADT suggested no significant reduction in CVD outcomes with intensive glycemic control. (T2D)

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Nonpregnant Adults with Diabetes

- A1C <7.0%* (<53 mmol/mol)
- 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)

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Recommendations: Hypoglycemia

- Individuals at risk for hypoglycemia should be asked about symptomatic and asymptomatic hypoglycemia at each encounter. C
- Glucose (15–20 g) preferred treatment for conscious individual with blood glucose < 70 mg/dL. E
- Glucagon should be prescribed for those at increased risk of clinically significant hypoglycemia, defined as blood glucose < 54 mg/dL, so it is available if needed. E
- Hypoglycemia unawareness or episodes of severe hypoglycemia should trigger treatment re-evaluation. E

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Recommendations: Hypoglycemia

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

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Benefits of Weight Loss

- Delay progression from prediabetes to type 2 diabetes
- Positive impact on treatment of type 2 diabetes
  - Most likely to occur early in disease development
- Improves mobility, physical and sexual functioning & health-related quality of life

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Weight Loss

- Diets should be individualized, as those that provide the same caloric restriction but differ in protein, carbohydrate, and fat content are equally effective in achieving weight loss. A
- Diet, physical activity & behavioral therapy designed to achieve >5% weight loss should be prescribed for overweight & obese patients with T2DM ready to achieve weight loss. A
- Interventions should be high-intensity (≥16 sessions in 6 months) and focus on diet, physical activity & behavioral strategies to achieve a 500 - 750 kcal/day energy deficit. A

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DM Pharmacologic Therapy

- DM1: Multiple Daily Injections + Basal, OR
- Continuous Subcutaneous Insulin Infusion.
- Consider education / self-adjustment based on carb intake and anticipated activity.

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T2DM Pharmacologic Therapy

- Metformin, if not contraindicated and if tolerated, is the preferred initial pharmacologic agent for T2DM. A
- Consider insulin therapy (with or without additional agents) in patients with newly dx'd T2DM who are markedly symptomatic and/or have elevated blood glucose levels (>300 mg/dL) or A1C (>10%). E
- If noninsulin monotherapy does not achieve the A1C target over 3 months, add a second oral agent, a GLP-1 receptor agonist, or basal insulin. A
- Don't delay insulin initiation in patients not achieving glycemic goals. B

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Start with Monotherapy unless:

A1C is greater than or equal to 9%, **consider Dual Therapy.**

A1C is greater than or equal to 10%, blood glucose is greater than or equal to 300 mg/dL, or patient is markedly symptomatic, **consider Combination Injectable Therapy** (See Figure 8.2).

Monotherapy — Metformin — Lifestyle Management

EFFICACY*	high
HYPO RISK	low risk
WEIGHT	neutral/loss
SIDE EFFECTS	GI/lactic acidosis
COSTS*	low

If A1C target not achieved after approximately 3 months of monotherapy, proceed to 2-drug combination (order not meant to denote any specific preference — choice dependent on a variety of patient- & disease-specific factors):

Dual Therapy — Metformin + — Lifestyle Management

	Sulfonylurea	Thiazolidinedione	DPP-4 inhibitor	SGLT2 inhibitor	GLP-1 receptor agonist	Insulin (basal)
EFFICACY*	high	high	intermediate	intermediate	high	highest
HYPO RISK	moderate risk	low risk	low risk	low risk	low risk	high risk
WEIGHT	gain	gain	neutral	loss	loss	gain
SIDE EFFECTS	hypoglycemia	edema, HF, fxs	rare	GU, dehydration, fxs	GI	hypoglycemia
COSTS*	low	low	high	high	high	high

If A1C target not achieved after approximately 3 months of dual therapy, proceed to 3-drug combination (order not meant to denote any specific preference — choice dependent on a variety of patient- & disease-specific factors):

Triple Therapy — Metformin + — Lifestyle Management

Sulfonylurea +	Thiazolidinedione +	DPP-4 inhibitor +	SGLT2 inhibitor +	GLP-1 receptor agonist +	Insulin (basal) +
TZD	SU	SU	SU	SU	TZD
or DPP-4-i	or DPP-4-i	or TZD	or TZD	or TZD	or DPP-4-i
or SGLT2-i	or SGLT2-i	or SGLT2-i	or DPP-4-i	or SGLT2-i	or SGLT2-i
or GLP-1-RA	or GLP-1-RA	or Insulin[§]	or GLP-1-RA	or Insulin[§]	or GLP-1-RA
or Insulin[§]	or Insulin[§]		or Insulin[§]		

If A1C target not achieved after approximately 3 months of triple therapy and patient (1) on oral combination, move to basal insulin or GLP-1 RA, (2) on GLP-1 RA, add basal insulin, or (3) on optimally titrated basal insulin, add GLP-1 RA or mealtime insulin. Metformin therapy should be maintained, while other oral agents may be discontinued on an individual basis to avoid unnecessarily complex or costly regimens (i.e., adding a fourth antihyperglycemic agent).

Combination Injectable Therapy (See Figure 8.2)

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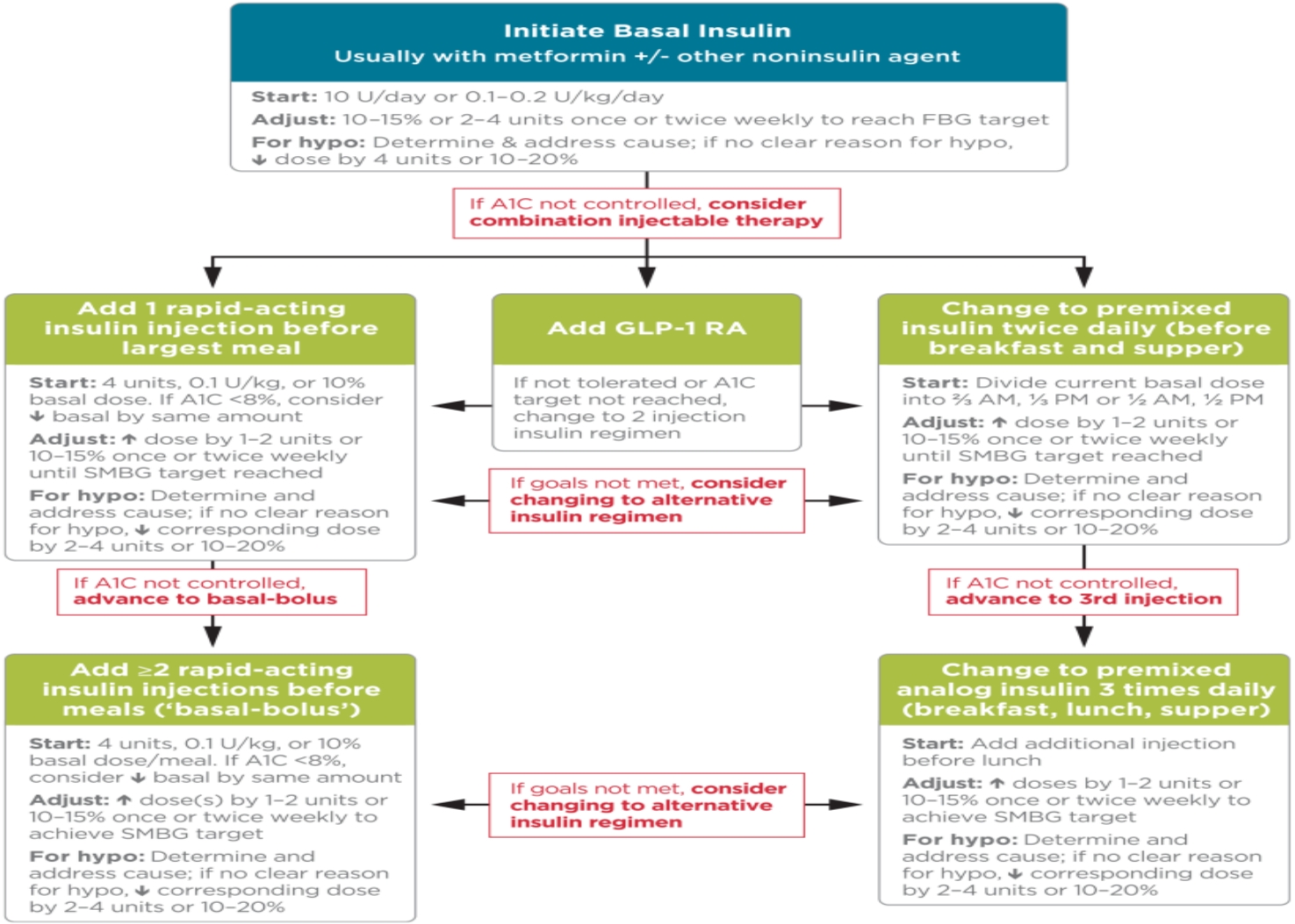
Initiate Basal Insulin
Usually with metformin +/- other noninsulin agent
Start: 10 U/day or 0.1–0.2 U/kg/day
Adjust: 10–15% or 2–4 units once or twice weekly to reach FBG target
For hypo: Determine & address cause; if no clear reason for hypo, ↓ dose by 4 units or 10–20%
If A1C not controlled, consider combination injectable therapy
Add 1 rapid-acting insulin injection before largest meal
Start: 4 units, 0.1 U/kg, or 10% basal dose. If A1C <8%, consider ↓ basal by same amount
Adjust: ↑ dose by 1–2 units or 10–15% once or twice weekly until SMBG target reached
For hypo: Determine and address cause; if no clear reason for hypo, ↓ corresponding dose by 2–4 units or 10–20%
If A1C not controlled, advance to basal-bolus
Add ≥2 rapid-acting insulin injections before meals ('basal-bolus')
Start: 4 units, 0.1 U/kg, or 10% basal dose/meal. If A1C <8%, consider ↓ basal by same amount
Adjust: ↑ dose(s) by 1–2 units or 10–15% once or twice weekly to achieve SMBG target
For hypo: Determine and address cause; if no clear reason for hypo, ↓ corresponding dose by 2–4 units or 10–20%
Add GLP-1 RA
If not tolerated or A1C target not reached, change to 2 injection insulin regimen
If goals not met, consider changing to alternative insulin regimen
If goals not met, consider changing to alternative insulin regimen
Change to premixed insulin twice daily (before breakfast and supper)
Start: Divide current basal dose into ⅔ AM, ⅓ PM or ½ AM, ½ PM
Adjust: ↑ dose by 1–2 units or 10–15% once or twice weekly until SMBG target reached
For hypo: Determine and address cause; if no clear reason for hypo, ↓ corresponding dose by 2–4 units or 10–20%
If A1C not controlled, advance to 3rd injection
Change to premixed analog insulin 3 times daily (breakfast, lunch, supper)
Start: Add additional injection before lunch
Adjust: ↑ doses by 1–2 units or 10–15% once or twice weekly to achieve SMBG target
For hypo: Determine and address cause; if no clear reason for hypo, ↓ corresponding dose by 2–4 units or 10–20%

Avera Medical Group Type 2 Diabetes Treatment Algorithm

Glycemic Targets: Individualized to minimize hypoglycemia | **HbA1c:** < 7% | **Glucose:** Pre-meal 80 – 130 mg/dL, 2 hour post-meal <180 mg/dL

Education, Self-Management, Nutrition, Exercise, & Mental Health

Education / Healthy Body & Mind
- Initial education for all patients
- Annual education refresher

Self-Management
- Refer to diabetes education program
- Self-monitoring of glucose with regular reporting to provider for medication titration

Medical Nutrition Therapy & Activity
- Meal plan prepared by Registered Dietitian
- Walk / Aerobic activity 30 min – 5d/week
- Resistance training 2d/week

Mental Health
- Psychosocial support
- Depression/Anxiety screening
- PHQ9 at every visit

Medication

SEE SIDE 2 FOR MEDICATION DETAIL

A1C 6.5 – 7.5%

Step One

Metformin
Unless not tolerated or GFR <30mL/min
→ Skip to Step Two

Titrate to effective dose
If not to target in 3 months, proceed to Step Two

Step Two
Maintain Metformin

Choose from below:

DPP-4 ($$)
Pros: No hypoglycemia
Cons: None

GLP-1 ($$$$)
Pros: No hypoglycemia
Cons: Injectable

SGLT-2 ($$$)
Pros: No hypoglycemia
Weight loss
Cons: None

SU ($)
Pros: Inexpensive
Cons: Hypoglycemia, Weight gain

A1C 7.5 – 9%

Step One

Metformin plus one of the following combinations:

DPP-4	$$
GLP-1	$$$$
SGLT-2	$$$
SU	$

If not to target in 3 months, proceed to Step Two

Step Two
Maintain Metformin

Insulin Therapy

Basal insulin*

May consider dual or triple therapy

Basal insulin*
Plus GLP-1 or SGLT-2

Basal insulin*
plus short acting insulin at mealtimes

Pre-mix insulin

A1C > 9%

Step One

Metformin
maintain if possible

Basal insulin* plus either of the following:

GLP-1
SGLT-2

If not to target in 3 months, proceed to Step Two

Step Two
Maintain Metformin

Basal insulin* with short acting insulin at mealtimes when needed plus either of the following:

GLP-1
SGLT-2

*Basal Insulin: start at 0.1 - 0.2 units/kg daily at HS for Type 2 Diabetes patients

SEE SIDE 2 FOR MEDICATION DETAIL

Combination oral medications are available. For additional information consult a pharmacist or PDR.net

June 2016

SEE SIDE 2 FOR MEDICATION DETAIL

New Recommendation: T2DM

- In patients with long-standing sub-optimally controlled type 2 diabetes and **established atherosclerotic cardiovascular disease**, empagliflozin or liraglutide should be considered as they have been shown to reduce cardiovascular and all-cause mortality when added to standard care. Ongoing studies are investigating the cardiovascular benefits of other agents in these drug classes. B

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Table 8.2—Median monthly cost of maximum approved daily dose of noninsulin glucose-lowering agents in the U.S. (48)

Class	Compound(s)	Dosage strength/product (if applicable)	Median AWP (min, max)†	Maximum approved daily dose*
Biguanides	• Metformin	500 mg (IR)	$84 ($5, $94)	2,000 mg
		850 mg (IR)	$108 ($5, $108)	2,550 mg
		1,000 mg (IR)	$86 ($4, $87)	2,000 mg
		500 mg (ER)	$90 ($82, $6,672)	2,000 mg
		750 mg (ER)	$72 ($65, $92)	1,500 mg
		1,000 mg (ER)	$1,028 ($1,010, $7,213)	2,000 mg
Sulfonylureas (2nd Gen)	• Glyburide	5 mg	$94 ($64, $103)	20 mg
		6 mg (micronized)	$50 ($48, $71)	12 mg (micronized)
	• Glipizide	10 mg (IR)	$74 ($67, $97)	40 mg (IR)
		10 mg (XL)	$97	20 mg (XL)
	• Glimepiride	4 mg	$74 ($71, $198)	8 mg
Meglitinides (glinides)	• Repaglinide	2 mg	$799 ($163, $878)	16 mg
	• Nateglinide	120 mg	$156	360 mg
TZDs	• Pioglitazone	45 mg	$349 ($348, $349)	45 mg
	• Rosiglitazone	4 mg	$355	8 mg
α-Glucosidase inhibitors	• Acarbose	100 mg	$104 ($104, 105)	300 mg
	• Miglitol	100 mg	$241	300 mg
DPP-4 inhibitors	• Sitagliptin	100 mg	$436	100 mg
	• Saxagliptin	5 mg	$436	5 mg
	• Linagliptin	5 mg	$428	5 mg
	• Alogliptin	25 mg	$436	25 mg
Bile acid sequestrant	• Colesevelam	625 mg tabs	$679	3.75 g
		1.875 g suspension	$1,357	3.75 g
Dopamine-2 agonists	• Bromocriptine	0.8 mg	$719	4.8 mg
SGLT2 inhibitors	• Canagliflozin	300 mg	$470	300 mg
	• Dapagliflozin	10 mg	$470	10 mg
	• Empagliflozin	25 mg	$470	25 mg
GLP-1 receptor agonists	• Exenatide	10 μg pen	$729	20 μg
	• Exenatide (extended-release)	2 mg powder for suspension or pen	$692	2 mg**
	• Liraglutide	18 mg/3 mL pen	$831	1.8 mg
	• Albiglutide	50 mg pen	$527	50 mg**
	• Dulaglutide	1.5/0.5 mL pen	$690	1.5 mg**
Amylin mimetics	• Pramlintide	120 μg pen	$2,124	120 μg/injection††

ER and XL, extended release; IR, immediate release; TZD, thiazolidinedione. †Calculated for 30 day supply (AWP unit price × number of doses required to provide maximum approved daily dose × 30 days); median AWP listed alone when only one product and/or price. *Utilized to calculate median AWP (min, max); generic prices used, if available commercially. **Administered once weekly. ††AWP calculated based on 120 μg three times daily.

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Table 8.3—Median cost of insulins in the U.S. calculated as average wholesale price per 1,000 units of specified dosage form/product (48)

Insulins	Compounds	Dosage form/product	Median AWP package price (min, max)*
Rapid-acting analogs			
	• Lispro	U-100 vial	$306
		U-100 3 mL cartridges	$306 ($306, $379)
		U-100 prefilled pen; U-200 prefilled pen	$394
	• Aspart	U-100 vial	$306
		U-100 3 mL cartridges	$380
		U-100 prefilled pen	$395
	• Glulisine	U-100 vial	$283
		U-100 prefilled pen	$365
	• Inhaled insulin	Inhalation cartridges	$557 ($453, $754)
Short-acting			
	• Human Regular	U-100 vial	$165
Intermediate-acting			
	• Human NPH	U-100 vial	$165
		U-100 prefilled pen	$350
Concentrated Human Regular insulin			
	• U-500 Human Regular insulin	U-500 vial	$165
		U-500 prefilled pen	$213
Basal analogs			
	• Glargine	U-100 vial; U-100 prefilled pen; U-300 prefilled pen	$298
	• Detemir	U-100 vial; U-100 prefilled pen	$323
	• Degludec	U-100 prefilled pen; U-200 prefilled pen	$355
Premixed products			
	• NPH/Regular 70/30	U-100 vial	$165
		U-100 prefilled pen	$350
	• Lispro 50/50	U-100 vial	$317
		U-100 prefilled pen	$394
	• Lispro 75/25	U-100 vial	$317
		U-100 prefilled pen	$394
	• Aspart 70/30	U-100 vial	$318
		U-100 prefilled pen	$395

AWP listed alone when only one product and/or price.

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DM HTN Targets

- Blood pressure goal of <140/90 mmHg. A
- Lower targets, such as <130/80 mmHg, may be appropriate for certain individuals at high risk of CVD, if they can be achieved without undue treatment burden. C

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DM HTN Treatment

- If initial BP >160/100mmHg, in addition to lifestyle therapy, have prompt initiation and timely titration of two drug regimen. A
- Lifestyle intervention including:
  - Weight loss if overweight
  - DASH-style diet
  - Moderation of alcohol intake
  - Increased physical activity

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HTN Treatment

- Treatment for hypertension should include A
  - ACE inhibitor
  - Angiotensin II receptor blocker (ARB)
  - Thiazide-like diuretic
  - Dihydropyridine calcium channel blockers
- Multiple drug therapy (two or more agents at maximal doses) generally required to achieve BP targets.
- An ACE inhibitor or angiotensin receptor blocker, at the maximum tolerated dose indicated for blood pressure treatment, is the recommended first-line treatment for hypertension in patients with diabetes and urinary albumin–to– creatinine ratio >300 mg/g creatinine (A) or 30–299 mg/g creatinine (B). If one class is not tolerated, the other should be substituted. B

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Lipid Management

- Lipid screening at dx and at least every 5 years.
- To improve lipid profile in patients with diabetes, recommend lifestyle modification A, focusing on:
  - Weight loss (if indicated)
  - Reduction of saturated fat, trans fat, cholesterol intake
  - Increase of ω-3 fatty acids, viscous fiber, plant stanols/sterols
  - Increased physical activity

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Recommendations: Antiplatelet Agents

Consider aspirin therapy (75–162 mg/day) C

- As a primary prevention strategy in those with type 1 or type 2 diabetes at increased cardiovascular risk
- Includes most men or women with diabetes age ≥50 years who have at least one additional major risk factor, including:
  - Family history of premature ASCVD
  - Hypertension
  - Smoking
  - Dyslipidemia
  - Albuminuria

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Coronary Heart Disease

- In patients with known ASCVD, use aspirin and statin therapy (if not contraindicated) A
- and consider ACE inhibitor therapy to reduce risk of cardiovascular events. C
- In patients with a prior MI, β-blockers should be continued for at least 2 years after the event. B

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Microvascular Screening

- Annual nephropathy screening and GFR
- Control HTN
- Dietary protein intake 0.8g/kg/d (HD higher)
- ACEi/ARB if urine microalbumin > 30 mg/g
- Annual Dilated Comprehensive Eye Exam (optometrist or ophthalmologist)

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Neuropathy

- Annual Screening (5 yr after T1DM, all T2DM)
- Monofilament & vibration & (temp or pinprick)
- Pregabalin or Duloxetine 1st line for symptom control.
- Foot inspection at every visit

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Hospitalized Patients

- Insulin therapy should be initiated for treatment of persistent hyperglycemia starting at a threshold ≥180 mg/dL. Then a target glucose of 140–180 mg/dL is recommended for the majority of critically ill A and noncritically ill patients. C
- More stringent goals, such as <140 mg/dL mmol/L) may be appropriate for selected critically ill patients, if achievable without significant hypoglycemia. C

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Hospitalized Patients

- Basal insulin or basal + bolus correction regimen is the preferred treatment for noncritically ill patients with poor oral intake or those who are taking nothing by mouth. An insulin regimen with basal, nutritional & correction components is the preferred treatment for noncritically ill patients with good nutritional intake. A
- The sole use of sliding scale insulin in the inpatient hospital setting is strongly discouraged. A

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2017 ADA Updates

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