OUTPATIENT MANAGEMENT OF

Adult Diabetes Mellitus

2021 update

This Care Process Model (CPM) was created by the Expert Guidance Council in the diabetes program at Intermountain Healthcare. It summarizes current medical literature and, where clear evidence is lacking, provides expert advice on diagnosing and treating diabetes. It provides clinicians with treatment goals and interventions that are known or believed to favorably affect health outcomes for adult patients with diabetes.

This CPM is part of Intermountain's comprehensive, team-based care approach for adults with diabetes in the outpatient setting. Other components of this system include:

- Education materials and programs for providers and patients
- Data systems that allow for population health management of patients with diabetes
- Enhancements to the electronic medical record and other tools to make it easier for clinicians to provide quality care
- Multidisciplinary coordination of diabetes care

▶ What's New IN THIS UPDATE?

The primary changes to this CPM involve recommendations for:

- **New antihyperglycemic recommendations for type 2 diabetes. See three algorithms starting on** page 14.

- **Enhanced role of continuous glucose monitoring (CGMs)** for patients with Type 1 and Type 2, including improved coverage. See pages 8-9.

- **Cardiovascular and renal risk reduction.** Recommendations from the American Diabetes Association (ADA) and the American Association for Clinical Endocrinologists (AACE) now support the use of SGLT-2 inhibitors as second line therapy for patients with type 2 diabetes and cardiovascular or diabetic kidney disease, and the use of GLP-1 inhibitors as second line therapy for patients with type 2 diabetes and cardiovascular disease. The FDA has also expanded the approved indications for some of these products. See pages 25-26.

- **Changes in guidelines to be reported for nephropathy care.** Estimated GFR needs to be obtained. See page 31.

- **Icosapent ethyl indicated to reduce CV risk after statin use** in those with high triglyceride level. See sidebar on page 27.

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▶ Why Focus ON DIABETES?

- **Diabetes is a growing problem.** According to the CDC among the US population overall, crude estimates for 2018 were:

  - 34.1 million adults aged 18 years or older—or 13.0% of all US adults—had diabetes.

  - 7.3 million adults aged 18 years or older who met laboratory criteria for diabetes were not aware of or did not report having diabetes. This number represents 2.8% of all US adults and 21.4% of all US adults with diabetes.[CDC3]

- **The healthcare cost burden is high and increasing.** The ADA estimated that the annual cost of diagnosed diabetes in 2017 was $327 billion, including $237 billion in direct medical costs and $90 billion in reduced productivity. After adjusting for inflation, the economic costs of diabetes increased by 26% from 2012 to 2017. [ADAE2]

- **Late diagnosis negatively affects outcomes.** Better screening and early diagnosis of diabetes are crucial to improving patient outcomes. Many patients with type 2 diabetes develop complications just before or immediately after diagnosis. Approximately 25% of type 2 diabetes cases may be currently undiagnosed.[ADA]

- **Good management can preserve and improve quality of life.** Uncontrolled diabetes can result in catastrophic health problems, including heart disease, congestive heart failure, stroke, blindness, kidney disease, nervous system disease, amputations, dental disease, and pregnancy complications. Following the diabetes management recommendations outlined in this CPM can help delay or prevent these complications.

▶ TREATMENT GOALS & MEASURES

TABLE 1: Treatment Goals	
Measure	GOAL
HbA1c (test at least every 6 months)	**< 7.0%***
Blood pressure (check at each office visit)	**< 140 / 90 mm Hg* (lower in some)**
Foot exam (perform at least every year — every visit if abnormal)	**Normal**
Statin medication	**Taking statin medication at appropriate level of intensity**
Urine albumin/creatinine ratio (test at least every year)	**< 30 mg albumin / g of creatinine**
Serum creatinine (every year, estimate GFR)	**Normal**
Retinal or dilated eye exam, or retinal photograph with prompt referral to a specialist for abnormalities (check every year or every 2 years if diabetes is well controlled)	**Normal**

*Although these blood glucose and blood pressure goals are recommended generally for most people with diabetes, these goals should be individualized. See the sidebar discussion on <u>page 7</u> (HbA1c goal) and <u>pages 29–30</u> (management of hypertension algorithm and notes).

Throughout this CPM the 📊 icon indicates places where data is collected about each patient.

▶ SCREENING AND DIAGNOSIS

Timely, accurate screening and diagnosis is important because **it can prevent or delay diabetes complications.** The length of time between the onset of hyperglycemia and appropriate treatment can be a significant factor in complication development and severity. Type 2 diabetes is often asymptomatic, and at the time of diagnosis, a significant number of type 2 patients already have complications, such as neuropathy, nephropathy, or retinopathy.

This CPM recommends:

- **Routine screening for type 2 diabetes.** Note that in addition to testing the patients specified in the algorithm on <u>page 4</u>, physicians should consider testing adults older than age 30 every three to five years. This is a cost-effective strategy; the benefits of early detection of type 2 diabetes include a reduced incidence of myocardial infarction and microvascular complications.[KAH]

- **No routine screening for type 1 diabetes.** People with type 1 typically present with acute symptoms and markedly elevated blood glucose, and most cases are diagnosed soon after the onset of hyperglycemia. First-degree family members of type 1 patients can be referred to a research study (e.g., <u>trialnet.org</u>).

For pregnant patients, routine screening for gestational diabetes is recommended per the Intermountain care process model *Management of Gestational Diabetes*.

Diagnosis

Recommended diagnostic tools for type 2 diabetes include:

- **Hemoglobin A1c (HbA1c).**[ADA] HbA1c measurement does not require the patient to fast or undergo a glucose tolerance test, and required specimens are stable at room temperature. Venipuncture is preferred to point-of-care testing. Further, HbA1c testing can be done even during illness. This test's limitations are that the HbA1c normal range is modestly higher in certain ethnic groups (e.g., those of African-American or Asian-Indian descent), and increases with age. False low values can occur in patients with rapid red cell turnover, some anemias, and recent onset of diabetes.

- **Fasting plasma glucose (FPG).** The FPG is more reproducible, less costly, and easier to administer than the two-hour oral glucose tolerance test (OGTT).

- **Other acceptable diagnostic tests include a two-hour, 75-gram oral glucose tolerance test (OGTT).** This test may be required when evaluating patients with impaired fasting glucose (IFG) or if diabetes is still suspected despite a normal FPG or HbA1c result.

Diagnostic criteria for diabetes are listed in algorithm note (d) on <u>page 6.</u> Note that in the absence of unequivocal hyperglycemia, repeat testing is required to make a diagnosis of diabetes.[ADA] In an outpatient setting, if a patient has new onset hyperglycemia, causes other than diabetes should be considered. The differential diagnosis of hyperglycemia includes type 1 and type 2 diabetes, Cushing's syndrome, electrolyte abnormalities, acromegaly, pheochromocytoma, and pancreatic cancer.

Profiles: Type 2, type 1 (including LADA), and miscellaneous diabetes

Most new diabetes patients over the age of 30 will have type 2 diabetes. Nevertheless, when the type of diabetes is uncertain by clinical presentation, antibody testing is recommended. Note the following key considerations:

Type 2:

- Onset is usually slow.
- Occurs mainly in older adults, but can occur in children.
- Common features at diagnosis are obesity, insulin resistance, and neuropathy.
- Includes a ketosis-prone subtype, formerly known as "Flatbush diabetes."
- Family history usually includes a first-degree relative with type 2 diabetes.
- Condition usually responds to oral and non-insulin injectable medications for years.

Type 1 or Autoimmune:

- Onset is usually rapid.
- Occurs primarily in children and younger adults.
- Common features at diagnosis are DKA, recent weight loss, and insulin deficiency.
- Family history including a first-degree relative with diabetes is less common.
- Condition requires insulin from onset.
- First degree family members of type 1 patients can be referred to a research study, e.g., trialnet.org.

LADA (Latent Autoimmune Diabetes in Adults), a special case of Type 1:

- Onset is slow.
- Occurs in adults age 30 and older (does not occur in children).
- Prevalence among patients with adult-onset diabetes is about 10 %.[HAW]
- In LADA patients, glutamic acid decarboxylase (GAD) antibodies are present close to 90 % of the time, with only a small additional fraction of patients having other autoantibodies.[HAW]
- In comparison to diabetic patients without autoantibodies, LADA patients are more often female, younger at diagnosis, have a smaller waist circumference (are overweight but not obese), and do not exhibit DKA.
- Family or personal history often includes an autoimmune disorder.
- Condition may initially respond to oral medications and other therapies but will eventually require insulin.

Miscellaneous:

Pancreatic, monogenetic, steroid-induced, or CF-related diabetes.

▶ ALGORITHM 1: SCREENING AND DIAGNOSIS

Patient appropriate for SCREENING or with symptoms (a)

TEST by measuring one of the following:
- **Plasma glucose** (not capillary glucose): FPG or 2-hour OGTT
- **HbA1c**

NORMAL	ABNORMAL (b) but below diagnostic threshold	ABNORMAL (b) meets criteria for diagnosis
• HbA1c < 5.7 %	• HbA1c 5.7 % − 6.4 %	• HbA1c ≥ 6.5 %
• FPG < 100 mg/dL	• FPG 100 − 125 mg/dL	• FPG ≥ 126 mg/dL
• 2-hour OGTT < 140 mg/dL	• 2-hour OGTT 140 − 199 mg/dL	• 2-hour OGTT ≥ 200 mg/dL

- **EDUCATE** on lifestyle management
- **REPEAT TESTING** every 3 years for: **(a)**
  - All adults age ≥ 45 **OR**
  - Adults of any age if overweight and ≥ 1 other risk factors

In the absence of unequivocal elevated blood glucose, **REPEAT** same or alternative test using a new blood sample

no ← **Meets criteria for DIAGNOSIS (d)?**

yes

PREDIABETES (c)

Diabetes mellitus

If suspected type 1 or LADA (see profiles page 4),

CONSIDER ANTIBODY TESTS (e)

REFER to Diabetes Prevention Care Process Model for follow-up plan

See **ALGORITHM:** Antihyperglycemic Therapy in Type 2 Diabetes on page 14

Indicates an Intermountain measure

ALGORITHM NOTES

(a) Diabetes screening

Screen these patients at least every 3 years
or more frequently depending on initial results and risk status:

- **Adults ≥ 45 years**
- **Adults of any age who are overweight or obese**
  (BMI ≥ 25 kg/m² or ≥ 23 kg/m² in Asian Americans) **and have any of these additional risk factors:***
  - Hypertension > 140/90 mm Hg or on therapy for hypertension
  - Family history: first-degree relative with diabetes
  - Habitual physical inactivity
  - High-risk ethnicity (African American, Latino, Native American, Asian American, Pacific Islander)
  - Previous gestational diabetes mellitus (GDM)
  - Dyslipidemia (HDL cholesterol < 35 mg/dL and/or triglycerides > 250 mg/dL)
  - Polycystic ovary syndrome (PCOS)
  - History of vascular disease
  - Other clinical conditions associated with insulin resistance (e.g., acanthosis nigricans, sleep apnea, multiple skin tags, peripheral neuropathy, and gout)

*For SelectHealth patients, obesity must be listed in the first position for billing.

Screen these patients annually:

- History of elevated HbA1c ≥ 5.7 %, impaired fasting glucose (≥ 100 mg/dL), or impaired glucose tolerance (≥ 140 mg/dL)
- Women who are overweight or obese, and/or have one or more additional risk factors for diabetes and are planning a pregnancy

(b) Investigating abnormal values

- **Ensure the integrity of plasma glucose values:** Must be obtained from a correctly collected/stored specimen, NOT from finger stick.
- **If repeat testing is indicated by an abnormal value, use ICD-10 code R79.89** "other specified abnormal findings of blood chemistry" to order follow-up test.
- **If patient has hemoglobinopathy and diabetes is suspected** based on blood glucose or symptoms, measure two FPG values for confirmation.

(c) Prediabetes

Prediabetes is not a clinical entity of itself. It is the term used for individuals with impaired fasting glucose (IFG) and/or impaired glucose tolerance (IGT), which are risk factors for developing diabetes and cardiovascular disease. The _Diabetes Prevention Care Process Model_ provides system-wide support for helping patients prevent these conditions. Criteria for prediabetes include:

- HbA1c 5.7 % – 6.4 %
  OR
- FPG 100 – 125 mg/dL
  OR
- 2-hour OGTT 140 – 199 mg/dL

(d) Criteria for diabetes diagnosis

Criteria for diabetes diagnosis:
- TWO HbA1c values ≥ 6.5 %
  OR
- TWO FPG values ≥ 126 mg/dL
  OR
- TWO, 2-hour OGTT values > 200 mg/dL
  OR
- Random PG < 200 mg/dL in presence of classic symptoms of diabetes (polyuria, polydipsia)

Remember: Plasma glucose values must NOT come from a finger stick.

(e) Antibody testing

- Glutamic acid decarboxylase (GAD) antibodies account for 90 % of diabetes-associated autoantibodies.
- Insulinoma associated-2 antibodies and zinc transporter 8 antibodies account for only the remaining 10 %.
- See **page 4** for more further discussion of LADA and information on ordering tests.

HBA1C: INDIVIDUALIZED GOALS

Current ADA standards stress individualizing management goals for specific circumstances including duration of diabetes, life expectancy, comorbid conditions, CVD, hypoglycemia, and patient self-care capacity.[INZ,ADA]

- **Most nonpregnant adults:** < **7.0 %.**
- **For pregnant adults:** < **6.0 %.**
- **Adults with limited life expectancy: 7.5 % to 8.0 %**

Results of the ACCORD,[GER] ADVANCE,[CHA] and VADT[DUC] studies did not show increased cardiovascular benefits from tight control of diabetes. Hypoglycemia should strongly be avoided in geriatric patients and in those with extensive comorbid conditions. However, tight control has consistently been shown to reduce the risk of microvascular and neuropathic complications.

Indicates an Intermountain measure

Approximate comparison of HbA1c and plasma glucose values[ADA]	
HbA1c	Plasma Glucose
6 %	126 mg / dL
7 %	154 mg / dL
8 %	183 mg / dL
9 %	212 mg / dL
10 %	240 mg / dL
11 %	269 mg / dL
12 %	298 mg / dL

▶ MANAGEMENT OVERVIEW

Diabetes care is complex, requiring regular medical care and follow up. Patients with well-controlled diabetes should be seen at least every six months; those who are not meeting treatment goals should be seen even more frequently. Some insurance companies require patients to be seen every 3 months depending on their treatment regimens.

Good diabetes care focuses on comprehensive management of the following:

- Blood glucose monitoring (A1C, SMBG review, CGM review, etc.)
- Blood pressure
- Lipids
- Regular eye exams
- Regular screening of kidney function and urine albumin/creatinine ratio
- Regular foot exams and screening for neuropathy

This section of the CPM focuses on some important elements of diabetes care and self-management, namely blood glucose monitoring, medical nutrition therapy (MNT), physical activity, and medication. **It emphasizes individualization of treatment to address the patient's needs, preferences, and values.**
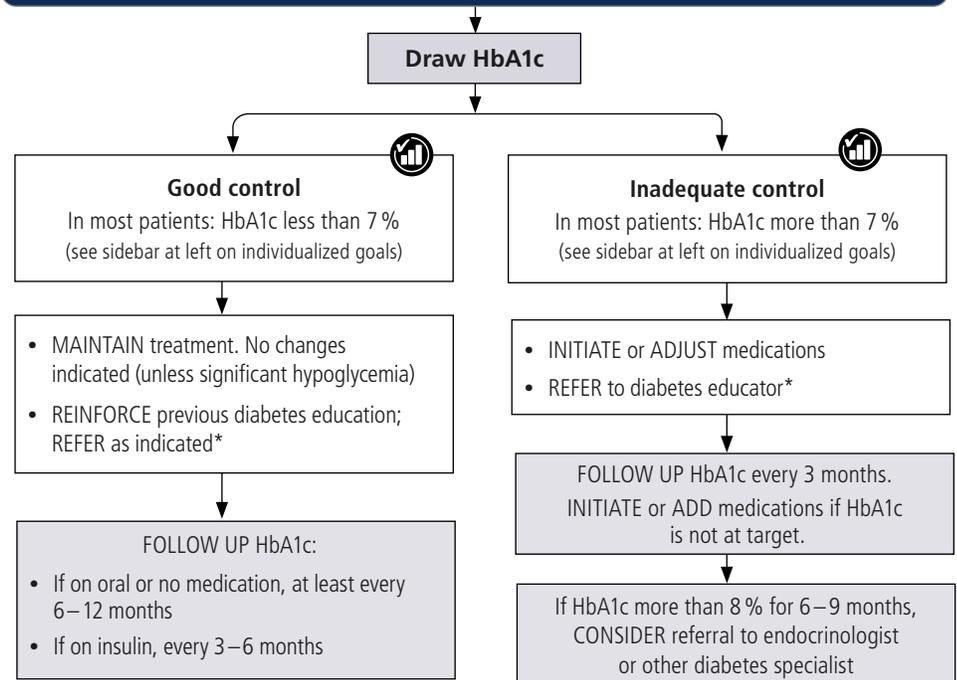
Monitoring blood glucose: The role of HbA1c

HbA1c testing is an indication of the overall trend of blood glucose levels for the previous two to three months and usually reflects overall diabetes control during that period.

HbA1c measurement can validate or call into question a patient's home record of glucose testing or glucose testing performed in the office. In situations where higher home glucose readings do not match in-office HbA1c, consider conditions causing rapid or delayed RBC turnover.[BRU]

▶ ALGORITHM 2: MONITORING HBA1C

Office visit for patient with confirmed diabetes mellitus

↓

Draw HbA1c

Good control
In most patients: HbA1c less than 7 %
(see sidebar at left on individualized goals)

- MAINTAIN treatment. No changes indicated (unless significant hypoglycemia)
- REINFORCE previous diabetes education; REFER as indicated*

FOLLOW UP HbA1c:
- If on oral or no medication, at least every 6 – 12 months
- If on insulin, every 3 – 6 months

Inadequate control
In most patients: HbA1c more than 7 %
(see sidebar at left on individualized goals)

- INITIATE or ADJUST medications
- REFER to diabetes educator*

FOLLOW UP HbA1c every 3 months. INITIATE or ADD medications if HbA1c is not at target.

If HbA1c more than 8 % for 6 – 9 months, CONSIDER referral to endocrinologist or other diabetes specialist

*At least annually, reinforce / update a patient's diabetes knowledge and skills. Certified diabetes educators (CDEs), RNs, and registered dietitian nutritionists (RDNs) can provide individualized medical nutrition therapy (MNT).

SMBG GUIDELINES

Although we recommend tailoring the frequency and timing of SMBG to individual patients and circumstances, some general guidelines appear below.

Test once a day or less often:

Patients who are controlling their diabetes with oral agents or with diet and exercise alone

Test 3 or fewer times a day:

Patients using less-frequent insulin injections

Test 3 to 4 times a day:

Patients using multiple insulin doses

Test 4 or more times a day:

- Pregnant women or patients with hypoglycemic unawareness (4 to 8 times per day)

- Patients having sick days

- Patients modifying therapy

- Patients having hypoglycemia

- Any patient motivated to test this often to achieve best control possible

CMG Coverage

Select Health and many other commercial insurances cover CGM use for Type 2 Diabetes patients who use multiple daily dose insulin. Dexcom and Freestyle brands are both commonly used and covered.

For patients with Select Health insurance, this is a pharmacy benefit. Therefore, providers can send the prescriptions for CGM to the pharmacy (which is not usually true for Medicare A/B plans).

The role of self-monitoring blood glucose systems (SMBG)

SMBG helps patients and providers evaluate response to therapy (medications or insulin), medical nutrition, physical activity, avoid hypoglycemia and adjust therapy when appropriate. Physicians and diabetes educators should teach patients how to do SMBG accurately and routinely. Providers who manage patients using multiple daily insulin injections or insulin pumps must be able to appropriately analyze patients' SMBG data, including control over specific time intervals or time of day, testing frequency, and glucose variability. Software for this purpose is provided by the blood glucose device manufacturers at no cost. See sidebar for testing guidelines.

Coverage for SMBG test strips depends on the insurance carrier, however coverage generally follows the guidelines provided. Patients should check to see if their coverage is better under the durable medical equipment or pharmacy benefit. Medicare allows for three test strips for patients on insulin therapy. To cover more test strips, Medicare does require proof of higher frequency testing for patients who test 4 or more times per day (download record from glucose monitor, provider statement attestation, or office visit notes recommending SMBG > 4 times per day). For patients without insurance, simple meters found at grocery stores or pharmacies (usually with no memory or download capabilities) can be less expensive.

The role of continuous glucose monitoring systems (CGM) [ADA4, BEC, LU]

Continuous glucose monitors (CGMs) provide continuous or intermittent feedback to patients about their glycemic control. When used to monitor and adjust therapy consistently, they can help lower HbA1c and possibly decrease morbidity and mortality.

In addition, CGMs can be valuable tools for patients with frequent hypoglycemic episodes and / or hypoglycemia unawareness. Most CGMs have predictive alarms that alert patients when their glucose values are crossing prespecified thresholds (low or high), thus allowing the patients to intervene more rapidly. Furthermore, some CGM systems communicate with automated insulin pumps to make changes to insulin delivery. Lastly, CGMs reduce the pain of frequent blood glucose testing.

CGM devices consist of three basic elements:

- A sensor inserted into the subcutaneous tissue that measures interstitial glucose levels

- A transmitter attached to the sensor that sends data

- A receiver to accepts the data or insulin pump to store and display glucose readings

CGM systems can be purchased for personal use by the patient. More insurance companies are expanding their coverage criteria to include CGMs, however most Medicaid plans do not cover them. Medicare typically will cover a CGM if the patient has a diagnosis of diabetes, is performing SBGM four times per day and is using three or more insulin injections per day, or has an insulin pump.

Hospitals or clinics are also able to purchase professional CGM systems that can be used by patients for a short period of time. These devices can help identify patterns leading to hypoglycemia, hyperglycemia, and significant glucose variability.

The role of CGMs (continued)

Whether using a personal or professional CGM, providers should be comfortable analyzing data from CGM downloads, such as:

- **Average blood glucose**
- **Time in range (TIR):** percent of time when blood glucose levels are 70–180 mg/dL
- **Time below range (TBR):** percent of time when blood glucose levels are <70 mg/dL (low); percent of time when blood glucose levels are time <54 mg/dL (very low)
- **Time above range (TAR):** percent of time when blood glucose levels are >180 mg/dL (high); percent of time when blood glucose levels are >250 mg/dL (very high)
- **Markers of glucose variability:** Standard deviation (SD) and coefficient of variation (CV)
- **GMI**: Estimated A1C for the time the data was collected
- **Identification of recurrent daily patterns or trends** that are leading to significant hyperglycemia or hypoglycemia

> ## CGM DATA TARGETS[ADA4]
> - **For most healthy patients with T1DM or T2DM**, a good TIR target should be >70%, which correlates with a HbA1c of around 7%. TBR should be <4%.
> - **For older patients or those with significant comorbidities with T1DM or T2DM**, an appropriate TIR target should be >50%. TBR should <1%.
> - **Coefficient of variation (CV), which is a marker of glucose variability**, should be less <36%. A low CV means the patient is not having significant glucose variability with their treatment regimen.

The role of continuous subcutaneous insulin infusion (CSII)

CSII (also called insulin pump therapy) is recommended for selected patients with type 1 diabetes and for some patients with insulin-treated type 2 diabetes. **Insulin pump therapy should only be prescribed by experienced clinicians who have the knowledge, skills, and resources to monitor for pump failure.** Adequate pump programs should involve a multidisciplinary team.

Providers and patients should be aware that insulin pumps require a great deal of patient interaction and maintenance, hence are not great options for patients who are not currently engaged in their diabetes care. Identifying patients appropriate for insulin pumps is complex and beyond the scope of this discussion.

FREQUENT LIFESTYLE COUNSELING HELPS PATIENTS ACHIEVE TARGETS FASTER

Lifestyle counseling in the primary care setting is strongly associated with faster achievement of HbA1c, blood pressure, and LDL cholesterol control. A large retrospective study found that with a face-to-face counseling rate of **at least one time per month,** patients reached goals much faster than with less-frequent rates.[MOR]

Average face-to-face lifestyle counseling rate
(unique patients / combined periods)

Legend:
- ≥1 per month (2, 154/3, 434)
- between 1 per month and 1 per 6 months (13, 455/29, 546)
- < 1 per 6 months (24, 687/52, 807)

Y-axis: % of Patients with A1c ≥7.0% SBP/DBP ≥ 130/85 mmHg, or LDL ≥100 mg/dL

X-axis: Time in days from first elevated A1c, BP, or LDL
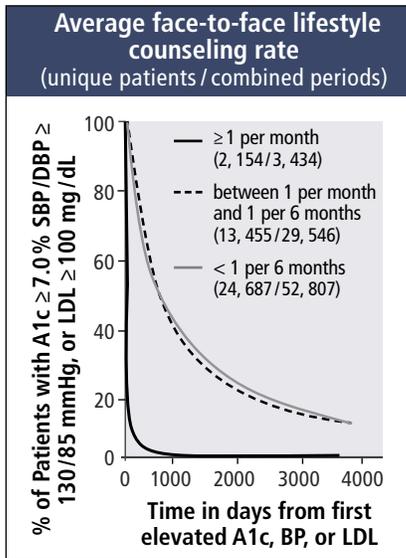
SUPPORT FOR LIFESTYLE MANAGEMENT

The 2015 *Lifestyle and Weight Management CPM* provides detailed strategies and tools to help build a team process around evidence-based guidelines for behavior change, physical activity, nutrition, weight management, and other lifestyle factors.

Click the image to open the document, or see page 39 for ordering information.

THE LOOK AHEAD TRIAL

The Look AHEAD trial was a large clinical trial designed to examine the long-term effects of an intensive lifestyle intervention (ILI) in overweight volunteers with type 2 diabetes.[DEL] Although the trial showed no difference in CVD endpoints compared to the control group, study participants who received ILI experienced:

• Average weight loss of 8.6 %
• Significant reduction of HbA1c
• Reduction in several CVD risk factors

The Look AHEAD findings suggest that ILI is associated with partial diabetes remission in patients with type 2 diabetes, particularly in those whose diabetes is of short duration, who have lower HbA1c levels, and who do not yet require insulin therapy.

▶ LIFESTYLE MANAGEMENT

All patients with diabetes and prediabetes should be counseled on lifestyle measures. Lifestyle counseling is associated with better control of HbA1c, blood pressure, LDL cholesterol, and weight as well as improved overall well-being.[MOR]

The two, principal goals of lifestyle intervention are to **achieve a mean loss of ≥ 7 % of initial body weight in overweight patients** and to **increase patient physical activity to ≥ 175 minutes of moderate intensity a week.** Key components of lifestyle management are medical nutrition therapy, physical activity, behavior modification and accountability, and intensive lifestyle interventions.

Nutrition counseling

All patients with diabetes should be referred for nutrition education.

Medical Nutrition Therapy (MNT) is an integral component of diabetes management and is covered by most commercial insurance providers and by Medicare. It includes an individualized meal plan that accommodates the patient's medications and metabolic needs as well as their eating habits, lifestyle, and readiness to change. Meal plans are adjusted as needed to help patients comply with needed changes and meet goals. At a minimum, a meal plan addresses the following:

- **Amount and type of carbohydrates consumed.** Both quality and quantity of carbohydrate in foods influence blood glucose levels and glycemic response. However, there is no standard regarding the ideal amount of carbohydrate intake for people with diabetes.[ADA] Individualized recommendations should address the total amount of carbohydrate that should be distributed through the day. Consistency in method of carbohydrate monitoring should be encouraged. A number of dietary interventions exist. This CPM recommends referral to a registered dietitian nutritionist (RDN) for implementation as well as patient guidance and support.

- **Timing of meals and snacks.** Monitoring and maintaining a consistent pattern of carbohydrate intake is key to achieving glycemic control. Meals should include a mix of macronutrients (carbohydrate, protein, and fat) individualized to meet the patient's metabolic goals and personal preferences.

- **Caloric restriction combined with physical activity to support any needed weight loss.** Weight loss should be gradual and slow. Aim for a rate of one to two pounds per week. Mediterranean, low-fat, calorie-restricted, or low-carbohydrate diets may be effective for weight loss.[ADA] Until an RDN can provide an individualized meal plan, counsel overweight patients to reduce calories. Recommendations include:

  – As a temporary guideline, an initial goal is to reduce dietary intake by 500 total calories per day from their current intake until a plan can be individualized by an RDN.

  – Additional recommendations could include limiting fat to < 30 % of calories (with < 7 % from saturated fat) and limiting carbohydrates per meal (or split between meal and snack) to 45 to 60 grams for women and 60 to 75 grams for men.

  – Resources, such as CalorieKing.com, can provide nutrition content of foods. Assistance with healthy food choices is available at ChooseMyPlate.gov. Smart phone apps, such as MyFitnessPal, can also help patients track nutrients and physical activity.

RECOMMENDATIONS

- **Increase activity to ≥175 minutes per week** of moderate-to-vigorous intensity aerobic activity (heart beating faster than normal and breathing harder than normal, such as a brisk walk). Spread activity over at least three days per week, with no more than two consecutive days between bouts of aerobic activity. While the ADA guidelines recommend ≥ 150 minutes per week, **Intermountain endorses the target of ≥175 minutes** used in the Look AHEAD trial (see sidebar on page 10) based on findings that higher levels of physical activity significantly improve weight-loss maintenance and other health outcomes.[DEL] Record patient activity in the Physical Activity Vital Sign in iCentra.

- **Gradually increase activity.** Patients who are currently sedentary should start with 10 minutes of walking at moderate intensity three days per week, gradually increasing to five days per week. Once they are walking on most days, patients should add minutes to achieve 20 minutes on most days and build toward the goal of 30 to 60 minutes on most days of the week.

- Unless contraindicated, **undertake muscle strength training two days per week**, focusing on major muscle groups and core body conditioning.

- **Decrease time sitting and increase daily movement.** All individuals should be encouraged to break up extended amounts of time sitting (>90 minutes).[ADA] Taking a two- to three-minute walk every 20 minutes has been demonstrated to reduce postprandial glucose and insulin levels in overweight and obese adults.[DUN] Individuals can increase daily movement through activities, such as taking the stairs, walking rather than riding in a car, etc. A brisk walk for 30 minutes after meals is associated with clinically meaningful decreases in blood glucose levels.[REY]

- **Patients taking insulin or sulfonylureas should monitor blood glucose before, during, and after physical activity.** Once patients have a sense of how exercise works with their medication, food choices, and other factors that affect blood glucose, they won't need to check levels as often.

Physical activity

Regular physical activity improves blood glucose control and can prevent or delay type 2 diabetes.[COLB] Regular activity also positively affects cholesterol, blood pressure, cardiovascular risk, mortality rates, and quality of life.

Preexercise evaluation. Sedentary patients should be encouraged to engage in regular physical activity. Preexercise health screening should be based on the following three factors:

1. **The individual's current level of physical activity**
2. **The presence of signs or symptoms** and/or known cardiovascular, metabolic, or renal disease
3. **Desired exercise intensity.** The table below outlines recommendations from the American College of Sports Medicine regarding recommendations for pre-exercise evaluation.[REI]

Refer to appropriate specialists, or provide suggestions for adapting exercise based on individual needs. **Note: Even patients with known coronary artery disease and stable angina benefit from regular physical activity.**[BOD]

TABLE 2. Recommendations based on pre-exercise evaluation[REI, USDH, PES]

Current exercise status	Medical status	Medical clearance?	Exercise recommendations (discontinue or level of intensity)
Does NOT participate	A	No	Light[1]-to-moderate[2] intensity exercise recommended. Progress to vigorous-intensity per ACSM guidelines.[3]
	B	Yes	Moderate-intensity exercise recommended. Progress gradually per ACSM guidelines.
	C	Yes	
Participates	A	No	Continue moderate- or vigorous-intensity exercise. May gradually progress following ACSM guidelines.
	B	No	Continue moderate-intensity exercise. Medical clearance (with NO change in signs of symptoms in the preceeding 12 months) recommended before participating in vigorous-intensity exercise.
	C	Yes	Discontinue. May return to exercise after obtaining medical clearance. Progress gradually per ACSM guidelines.

Medical status:

A. No cardiovascular (CV), metabolic (e.g., diabetes), or renal disease **AND** no signs or symptoms suggestive of CV, metabolic disease or renal disease

B. Known CV, metabolic, or renal disease AND asymptomatic

C. Any signs or symptoms of CV, metabolic, or renal disease (regardless of whether or not disease is known)

[1] Light-intensity exercise, 35−50% of age-predicted maximal heart rate, an intensity that causes slight increases in HR and breathing

[2] Moderate-intensity exercise, 50−70% of age-predicted maximal heart rate, an intensity that causes noticeable increases in HR and breathing

[3] Vigorous-intensity exercise, 70−85% of age-predicted maximal heart rate, an intensity that causes substantial increases in HR and breathing

Age-predicted maximal heart rate: 220 - age = HR (max)

THE WEIGH TO HEALTH® PROGRAM

Intermountain Healthcare's *The Weigh to Health®* program is an example of an intensive lifestyle intervention. The program is fully recognized as a Diabetes Prevention Program by the CDC. It consists of:

- Three individual sessions with an RDN
- Sixteen group sessions over six months, followed by seven additional sessions over the next six months covering nutrition, exercise, behavior change, and more.

There is no cost for SelectHealth members who:
- Have a BMI over 30

  OR
- Have a comorbidity for a diet-related chronic condition (such as diabetes)

  AND
- Complete the program

Patients who **do not** complete the program pay for the sessions they attended.

Click the image to open the brochure, or refer to for ordering information.

Behavior modification and accountability

Diabetes self-care requires modification to daily behaviors that most patients find challenging. For detailed, evidence-based support of this process, see the "Behavior Change Techniques and Tools" section of the *Lifestyle and Weight Management CPM.*

Patients experiencing difficulty adhering to diet and exercise recommendations, or who lose < 1 % of weight per month, may require additional assistance. Referral to an intensive lifestyle intervention program (such as *The Weigh to Health®*) or additional contact with a clinician may help. See sidebar at left for more information.

Intensive lifestyle intervention (ILI)

An intensive lifestyle intervention (also referred to as behavioral intervention) can provide the support and follow up necessary for behavior modification. The Affordable Care Act (ACA) requires commercial payers to cover an intensive lifestyle intervention at no cost to patients with BMI ≥ 30 or with BMI ≥ 25 and one or more cardiovascular disease risk factors. Intermountain's *The Weigh to Health®* program (see sidebar) is an example of an intensive lifestyle intervention that may be covered by a plan. Medicare and Medicare Advantage do not cover *The Weigh to Health®* but may cover medical nutrition therapy for select patients.

Weight-loss medications [HAN, ADA]

Weight-loss medications (see table 2 below) may be used in conjunction with lifestyle modification to support weight-loss goals. This CPM recommends that a patient should either see a loss of at least 5 % in three months or the medication should be stopped. Check the patient's insurance coverage before ordering medications as they are costly and rarely covered. The ADA and AACE recommend:

- **ADA:** Weight-loss medications may be effective as adjuncts to diet, physical activity, and behavioral counseling for selected patients with type 2 diabetes and BMI ≥ 27. Potential benefits must be weighed against the potential risks of the medications. (Grade A)

- **AACE:** Weight-loss medications should be considered as an adjunct to lifestyle therapy in all patients with type 2 diabetes as needed for weight loss sufficient to improve glycemic control, lipids, and BP. (Grade A)

TABLE 2. Weight-loss medications used in the treatment of type 2 diabetes								
Medication name — generic (Brand)	Δ Weight	Δ A1c	Δ DM medications	Δ SBP	Δ LDL	Risk of hypoglycemia	Drug interactions	Contraindications
liraglutide (Saxenda)*	-4 kg	-0.9 %	Decreased	-2.4 mmHg	No difference	Increased	N / A	Pregnancy Severe hepatic disease
naltrexone / bupropion (Contrave)*	-3 kg	-0.5 %	Decreased	No difference	No difference	No difference	Antidepressants Opioids	Pregnancy Severe hepatic disease CrCl < 30 ml / min
phentermine / topiramate (Qsymia)*	-6 kg	-4.0 %	Decreased	-4.8 mm Hg	No difference	Increased	Antidepressants	Pregnancy Severe hepatic disease CrCl < 30 ml / min
orlistat (Xenical or Alli)	-3 kg	-0.4 %	Decreased	No difference	-4.9 mg/dL	Increased	Vitamins A, D, E, K Warfarin Levothyroxine Anticonvulsants	Pregnancy Severe hepatic disease

Δ = change in measure; * = new

DIABETES IN REMISSION

In patients who have had gastric bypass surgery or banding or who have implemented lifestyle and weight management changes, glycemia measures may fall below diagnostic thresholds. Because chronic conditions, such as diabetes, are never considered to be completely cured, these patients are considered to be in remission. An ADA consensus statement defines remission as the following: [ADA]

- **Partial remission**. Hyperglycemia below diagnostic thresholds for at least one year with no active pharmacologic intervention

- **Complete remission**. Normal glycemia measures for at least one year with no active pharmacologic therapy

- **Prolonged remission**. Complete remission for at least five years

Follow up for patients in remission

The science is limited regarding patient risk for macrovascular and microvascular complications in remission. The ADA currently recommends the following care: [ADA]

- Until the patient is in prolonged remission, continue the same follow-up practices as for a patient with diabetes.

- Once the patient is in prolonged remission, make a shared decision with the patient on how to monitor based on personal risk factors. At a minimum, this should include HbA1c monitoring every three years, which matches the preventive care guidelines.

Metabolic and bariatric surgery (MBS)

Lifestyle modifications are often not enough to help people who are severely overweight.[ADM] Metabolic surgery should be recommended to treat type 2 diabetes in appropriate adult surgical candidates as follows:[ADA]

- BMI > 40 regardless of the level of glycemic control or complexity of glucose-lowering regimens

- BMI of 35 – 39.9 when hyperglycemia is inadequately controlled despite lifestyle and optimal medical therapy

- Type 2 diabetes and a BMI of 30 – 34.9 if hyperglycemia is inadequately controlled despite optimal medical control by either oral or injectable medications, including insulin

Clinical efficacy. Studies show that MBS can produce a remission in type 2 diabetes (normal or near-normal glycemia in approximately 55 % to 95 % of patients with type 2, depending on the surgery).[ADA] Rates of remission tend to be greater with malabsorptive (bypass) procedures versus restrictive procedures. Additionally, patients with type 2 diabetes of less than two years' duration tend to have the best response to bariatric surgery, while those who have had type 2 diabetes for more than 10 years or require insulin therapy may be less responsive.[VET] For further discussion of diabetes in remission. See the sidebar at left.

A study by LDS Hospital researchers, published in the *Journal of the American Medical Association* showed the following benefits for patients who underwent gastric bypass (Roux-en-Y):[ADM]

- **Diabetes benefits are enduring.** Among diabetes patients who had diabetes before surgery, 62 % were in remission after six years and 52 % at 12 years. That compares to 8 % and 6 % for the nonsurgical groups. Gastric bypass patients who did not have diabetes before the surgery were five to nine times less likely to develop the disease than nonsurgical participants.

- **Weight loss benefits are enduring.** Surgical patients lost an average of 34.9 % of their initial weight by two years after gastric bypass surgery, maintaining a loss of 27.7 % of the weight at 6 years and 26.9 % at 12 years. Of these patients, 96 % maintained more than 10 % weight loss from baseline, and 76 % maintained more than a 20 % loss. By contrast, patients who did not have bariatric surgery either lost no weight or gained weight over the next six years.

- **Other health risks:** Surgical patients also showed improvements in hypertension, cholesterol, and triglyceride levels — three factors associated with an increased risk of heart disease and stroke.

Primary care recommendations. This CPM recommends:

- **Considering bariatric surgery for patients ≥ 18 with type 2 diabetes who have a BMI ≥ 35,** particularly when diabetes or its comorbidities are present. This recommendation follows national guidelines.[ADA]

- **Referring patient candidates to an accredited Intermountain bariatric surgery center**. These centers provide a board-certified physician with a practice devoted to bariatric medicine, presurgical consultation with RDNs, social workers, and other staff who can help patients with nutritional, psychological, and logistical (insurance) issues as well as robust postoperative processes. A list of accredited Intermountain centers is available in the *Metabolic and Bariatric Surgery for the Treatment of Obesity CPM*.

- **Offering and referring to ongoing lifestyle support.** This is critical for long-term weight-loss success.

▶ GLUCOSE CONTROL WITH MEDICATION

Medication therapy includes oral and injectable antidiabetic agents as well as several classes of insulin.

- **For type 2 diabetes,** oral medications are required for glycemic control if lifestyle modifications don't achieve glycemic control within two to three months (see page 10). Prescribing considerations include the patient's age, weight, any renal or hepatic impairment, and cardiopulmonary comorbidities. Insulin may be used initially (often temporarily) for significant hyperglycemia and is a long-term option for patients on oral agents who still have HbA1c values more than 1% above goal. Metformin is first-line therapy. Recommendations now support prescribing one of three medications as second-line therapy for all patients with type 2 diabetes and cardiovascular disease (see page 25). [GAR, ADA2] For those without cardiovascular disease, follow algorithm 3 below.

- **For type 1 diabetes,** insulin therapy is essential. A regimen that combines peakless insulin (also called long-acting or basal insulin) and rapid-acting insulin (bolus) most closely mimics normal physiologic insulin production (see page 20).

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ALGORITHM 3A AND 3B ARE AVAILABLE TO VIEW ON THE FOLLOWING PAGES.

TO VIEW THE ORIGINAL ALGORITHMS FROM THE ADA GUIDELINE, CLICK ON THE LINKS BELOW.

https://care.diabetesjournals.org/content/44/Supplement_1/S111.figures-only
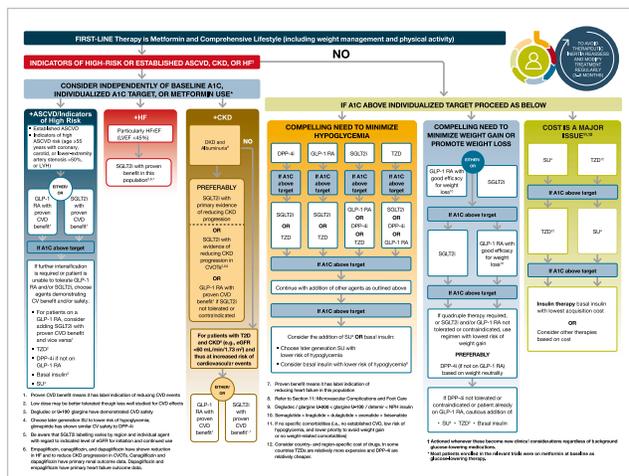
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diacare/44/Supplement_1/S111.full.pdf#page=6
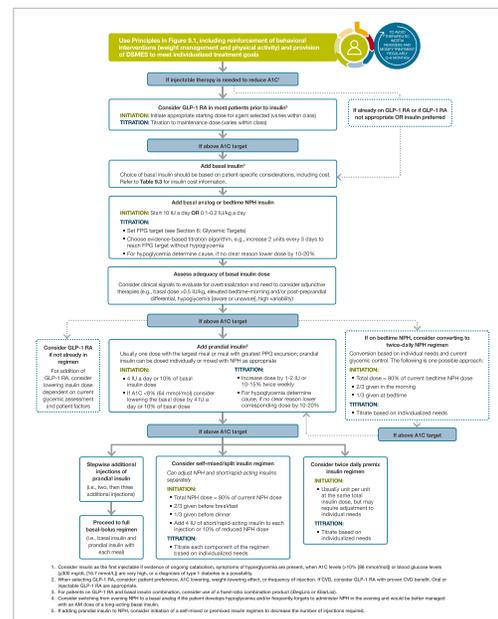
https://care.diabetesjournals.org/content/
diacare/44/Supplement_1/S111.full.pdf#page=7

▶ ALGORITHM 3A: ANTIHYPERGLYCEMIC THERAPY IN TYPE 2 DIABETES

TO AVOID THERAPEUTIC INERTIA REASSESS AND MODIFY TREATMENT REGULARLY (3–6 MONTHS)

FIRST-LINE Therapy is Metformin and Comprehensive Lifestyle (including weight management and physical activity)

INDICATORS OF HIGH-RISK OR ESTABLISHED ASCVD, CKD, OR HF†

NO

CONSIDER INDEPENDENTLY OF BASELINE A1C, INDIVIDUALIZED A1C TARGET, OR METFORMIN USE*

IF A1C ABOVE INDIVIDUALIZED TARGET PROCEED AS BELOW

+ASCVD/Indicators of High Risk

- Established ASCVD
- Indicators of high ASCVD risk (age ≥55 years with coronary, carotid, or lower-extremity artery stenosis >50%, or LVH)

GLP-1 RA with proven CVD benefit†

EITHER/ OR

SGLT2i with proven CVD benefit†

If A1C above target

If further intensification is required or patient is unable to tolerate GLP-1 RA and/or SGLT2i, choose agents demonstrating CV benefit and/or safety:

- For patients on a GLP-1 RA, consider adding SGLT2i with proven CVD benefit and vice versa[1]
- TZD[2]
- DPP-4i if not on GLP-1 RA
- Basal insulin[3]
- SU[4]

+HF

Particularly HFrEF (LVEF <45%)

SGLT2i with proven benefit in this population[5,6,7]

+CKD

DKD and Albuminuria[8]

NO

PREFERABLY

SGLT2i with primary evidence of reducing CKD progression

OR

SGLT2i with evidence of reducing CKD progression in CVOTs[5,6,8]

OR

GLP-1 RA with proven CVD benefit† if SGLT2i not tolerated or contraindicated

For patients with T2D and CKD[8] (e.g., eGFR <60 mL/min/1.73 m²) and thus at increased risk of cardiovascular events

GLP-1 RA with proven CVD benefit†

EITHER/ OR

SGLT2i with proven CVD benefit[1,7]

COMPELLING NEED TO MINIMIZE HYPOGLYCEMIA

DPP-4i

If A1C above target

SGLT2i OR TZD

GLP-1 RA

If A1C above target

SGLT2i OR TZD

SGLT2i

If A1C above target

TZD

If A1C above target

GLP-1 RA OR DPP-4i OR TZD

GLP-1 RA OR DPP-4i OR TZD

SGLT2i OR DPP-4i OR GLP-1 RA

If A1C above target

If A1C above target

Continue with addition of other agents as outlined above

Consider the addition of SU[4] OR basal insulin:

- Choose later generation SU with lower risk of hypoglycemia
- Consider basal insulin with lower risk of hypoglycemia[9]

COMPELLING NEED TO MINIMIZE WEIGHT GAIN OR PROMOTE WEIGHT LOSS

GLP-1 RA with good efficacy for weight loss[10]

EITHER/ OR

SGLT2i

If A1C above target

SGLT2i

GLP-1 RA with good efficacy for weight loss[10]

If A1C above target

If quadruple therapy required, or SGLT2i and/or GLP-1 RA not tolerated or contraindicated, use regimen with lowest risk of weight gain

PREFERABLY

DPP-4i (if not on GLP-1 RA) based on weight neutrality

If DPP-4i not tolerated or contraindicated or patient already on GLP-1 RA, cautious addition of:

- SU[4] • TZD[2] • Basal insulin

COST IS A MAJOR ISSUE[11,12]

SU[4]

If A1C above target

TZD[12]

TZD[12]

If A1C above target

SU[4]

If A1C above target

Insulin therapy basal insulin with lowest acquisition cost

OR

Consider other therapies based on cost

---

1. Proven CVD benefit means it has label indication of reducing CVD events
2. Low dose may be better tolerated though less well studied for CVD effects
3. Degludec or U-100 glargine have demonstrated CVD safety
4. Choose later generation SU to lower risk of hypoglycemia; glimepiride has shown similar CV safety to DPP-4i
5. Be aware that SGLT2i labelling varies by region and individual agent with regard to indicated level of eGFR for initiation and continued use
6. Empagliflozin, canagliflozin, and dapagliflozin have shown reduction in HF and to reduce CKD progression in CVOTs. Canagliflozin and dapagliflozin have primary renal outcome data. Dapagliflozin and empagliflozin have primary heart failure outcome data.
7. Proven benefit means it has label indication of reducing heart failure in this population
8. Refer to Section 11: Microvascular Complications and Foot Care
9. Degludec / glargine U-300 < glargine U-100 / detemir < NPH insulin
10. Semaglutide > liraglutide > dulaglutide > exenatide > lixisenatide
11. If no specific comorbidities (i.e., no established CVD, low risk of hypoglycemia, and lower priority to avoid weight gain or no weight-related comorbidities)
12. Consider country- and region-specific cost of drugs. In some countries TZDs are relatively more expensive and DPP-4i are relatively cheaper.

† Actioned whenever these become new clinical considerations regardless of background glucose-lowering medications.

* Most patients enrolled in the relevant trials were on metformin at baseline as glucose-lowering therapy.
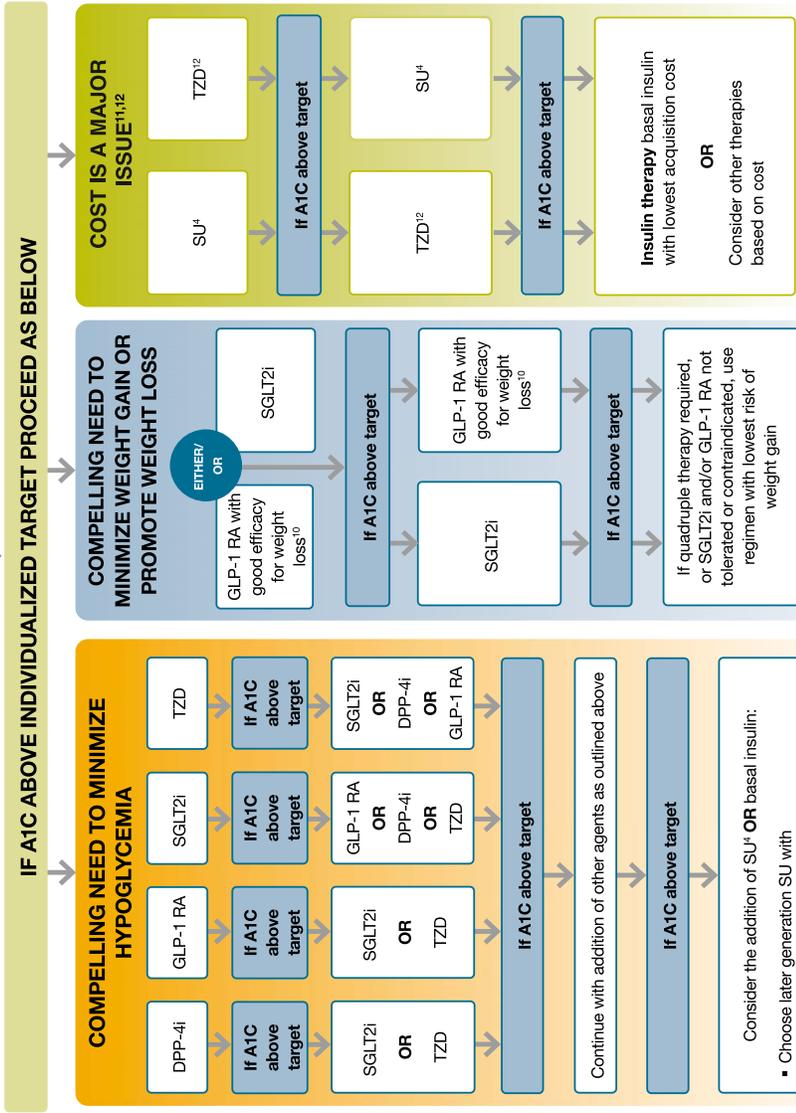
▶ **ALGORITHM 3B:** ANTIHYPERGLYCEMIC THERAPY IN TYPE 2 DIABETES: COMBINATION INJECTABLE THERAPY [ADA]

Use Principles in Figure 9.1, including reinforcement of behavioral interventions (weight management and physical activity) and provision of DSMES to meet individualized treatment goals

TO AVOID THERAPEUTIC INERTIA REASSESS AND MODIFY TREATMENT REGULARLY (3–6 MONTHS)

If injectable therapy is needed to reduce A1C[1]

Consider GLP-1 RA in most patients prior to insulin[2]
INITIATION: Initiate appropriate starting dose for agent selected (varies within class)
TITRATION: Titration to maintenance dose (varies within class)

If already on GLP-1 RA or if GLP-1 RA not appropriate OR insulin preferred

If above A1C target

Add basal insulin[3]
Choice of basal insulin should be based on patient-specific considerations, including cost. Refer to **Table 9.3** for insulin cost information.

Add basal analog or bedtime NPH insulin

INITIATION: Start 10 IU a day **OR** 0.1-0.2 IU/kg a day

TITRATION:
- Set FPG target (see Section 6: Glycemic Targets)
- Choose evidence-based titration algorithm, e.g., increase 2 units every 3 days to reach FPG target without hypoglycemia
- For hypoglycemia determine cause, if no clear reason lower dose by 10-20%

Assess adequacy of basal insulin dose
Consider clinical signals to evaluate for overbasalization and need to consider adjunctive therapies (e.g., basal dose >0.5 IU/kg, elevated bedtime-morning and/or post-preprandial differential, hypoglycemia [aware or unaware], high variability)

If above A1C target

Consider GLP-1 RA if not already in regimen
For addition of GLP-1 RA, consider lowering insulin dose dependent on current glycemic assessment and patient factors

Add prandial insulin[5]
Usually one dose with the largest meal or meal with greatest PPG excursion; prandial insulin can be dosed individually or mixed with NPH as appropriate

INITIATION:
- 4 IU a day or 10% of basal insulin dose
- If A1C <8% (64 mmol/mol) consider lowering the basal dose by 4 IU a day or 10% of basal dose

TITRATION:
- Increase dose by 1-2 IU or 10-15% twice weekly
- For hypoglycemia determine cause, if no clear reason lower corresponding dose by 10-20%

If on bedtime NPH, consider converting to twice-daily NPH regimen
Conversion based on individual needs and current glycemic control. The following is one possible approach:
INITIATION:
- Total dose = 80% of current bedtime NPH dose
- 2/3 given in the morning
- 1/3 given at bedtime
TITRATION:
- Titrate based on individualized needs

If above A1C target

If above A1C target

Stepwise additional injections of prandial insulin
(i.e., two, then three additional injections)

Proceed to full basal-bolus regimen
(i.e., basal insulin and prandial insulin with each meal)

Consider self-mixed/split insulin regimen
Can adjust NPH and short/rapid-acting insulins separately
INITIATION:
- Total NPH dose = 80% of current NPH dose
- 2/3 given before breakfast
- 1/3 given before dinner
- Add 4 IU of short/rapid-acting insulin to each injection or 10% of reduced NPH dose
TITRATION:
- Titrate each component of the regimen based on individualized needs

Consider twice daily premix insulin regimen
INITIATION:
- Usually unit per unit at the same total insulin dose, but may require adjustment to individual needs
TITRATION:
- Titrate based on individualized needs

1. Consider insulin as the first injectable if evidence of ongoing catabolism, symptoms of hyperglycemia are present, when A1C levels (>10% [86 mmol/mol]) or blood glucose levels (≥300 mg/dL [16.7 mmol/L]) are very high, or a diagnosis of type 1 diabetes is a possibility.
2. When selecting GLP-1 RA, consider: patient preference, A1C lowering, weight-lowering effect, or frequency of injection. If CVD, consider GLP-1 RA with proven CVD benefit. Oral or injectable GLP-1 RA are appropriate.
3. For patients on GLP-1 RA and basal insulin combination, consider use of a fixed-ratio combination product (iDegLira or iGlarLixi).
4. Consider switching from evening NPH to a basal analog if the patient develops hypoglycemia and/or frequently forgets to administer NPH in the evening and would be better managed with an AM dose of a long-acting basal insulin.
5. If adding prandial insulin to NPH, consider initiation of a self-mixed or premixed insulin regimen to decrease the number of injections required.

Medication details

The tables on pages 17-20 give detailed information on oral agents and non-insulin injectables. Insulin for the treatment of adult diabetes is covered on page 20. Providers should be aware that SelectHealth requires a step-therapy approach or preauthorization for many medications that might be used for diabetes management as a cost-reduction measure. In general, there must be evidence of lack of adequate effect, adverse side effects, or contraindications to at least two medications in the class of sulfonylurea, metformin, or pioglitazone before other non-generic medications may be prescribed. Keep in mind that the choice of non-generic medication is also influenced by the specific SelectHealth plan (SelectMed, SelectMed Advantage, SelectMed Community Health, etc.).

Access SelectHealth's preauthorization and step-therapy information.

If the patient has chronic kidney disease beyond Stage G2, refer to the _Chronic Kidney Disease CPM_ for necessary dose adjustments.

TABLE 3. Oral agents and non-insulin injectable medications

Class	SelectHealth commercial formulary status		Usual dosing	2020 AWP cost for 30-day supply* (MAC Cost for generics)	Pros	Cons
	generic	Brand				
biguanides	**metformin** (Tier 1)	Glucophage (Not covered)	500 mg twice daily (once daily to start) to 1,000 mg twice daily (max) Most benefit obtained between 1,500 – 1,700 mg / day	**Generic:** 500 mg twice daily: $6 850 mg twice daily: $7 1000 mg twice daily: $7 **Brand name:** 500 mg twice daily: $52 850 mg twice daily: $120 1000 mg twice daily: $146	• Extensive experience • No hypoglycemia • ↓ weight (preferred for obese patients — most type 2 diabetics) • Favorable lipid effects • Maximum PG effect at 3 – 4 weeks. • ↓ insulin resistance • Consensus first-line agent • Very cost-effective	• GI distress (nausea / diarrhea) • B12 deficiency — suggest periodic testing • CHF patients should be stable • **Risk of acidosis:** STOP with acute illness, dehydration, or IV contrast dyes • **Multiple contraindications:** Do not use for patients with chronic liver disease, alcoholism, or chronic kidney disease (eGFR < 30)
	metformin ER (Tier 1)	Glucophage XR (Not covered)	500 mg to 1,500 mg once daily at dinner	**Generic ER:** 500 mg twice daily: $9 750 mg twice daily: $17 2,000 mg (4 × 500 mg): $27 **Brand name ER:** 500 mg twice daily: $64 750 mg twice daily: $109		
sulfonylureas	**glipizide XL** (Tier 1)	Glucotrol XL (Not covered)	2.5 mg to 20 mg daily (max) May give dose once or twice daily	**Generic:** 5 mg once daily: $12 10 mg once daily: $24	• Extensive experience • Well tolerated • Maximum PG effect at 5 to 7 days	• ↑ hypoglycemia, especially with reduced GFR • ↑ weight • Do not use with Prandin, Starlix, or other sulfonylureas • Limited duration of effect
	glimepiride (Tier 1)	Amaryl (Not covered)	1 mg to 8 mg (max) daily May give dose once or twice daily	**Generic:** 2 mg once daily: $36 4 mg once daily: $68		
thiazolidinediones	**pioglitazone** (Tier 1)	Actos (Not covered)	15 mg to 45 mg once daily (dosing at bedtime may decrease edema)	**Generic:** 15 mg once daily: $11 30 mg once daily: $13 45 mg once daily: $14	• Option for patients intolerant of metformin • No hypoglycemia • ↓ serum insulin • Durability • ↓ triglycerides • Possible ↓ CVD events	• Edema, especially if given with insulin; adding spironolactone can help • Fluid retention may lead to or exacerbate heart failure or macular edema (if so, discontinue) • Bone fractures • May change metabolism of birth control pills • Slow onset: max effect in 6 – 12 weeks

*AWP = Average Wholesale Pricing; **MAC** = Maximum Allowable Cost. Many patients may benefit from manufacturers' discounts or patient assistance programs.

 Tier: Tier 1: generic; Tier 2: preferred brand; Tier 3: Preferred brand; Tier 4: non-preferred brand: † = Risk reduction of cardiovascular mortality and/or cardiovascular events; ‡ = Risk reduction of hospitalization for heart failure; § = Risk reduction of end-stage kidney disease

TABLE 3. Oral agents and non-insulin injectable medications (continued)

Class	SelectHealth commerical formulary status		Usual dosing	2020 AWP cost for 30-day supply* (MAC Cost for generics)	Pros	Cons
	generic	Brand				
DPP-4 inhibitors	**sitagliptin phosphate**	Januvia (Not covered)	100 mg once daily (as monotherapy or as combination therapy with metformin or glitazones)	25 mg, 50 mg, or 100 mg once daily: $568	• Can be taken with or without food • No hypoglycemia • No weight gain • Most PG effect within 1–2 weeks of initiation	• Increased cost • Can be used only for type 2 diabetes • Reduce dose with decreasing creatinine clearance < 50 (except linagliptin) • Possible acute pancreatitis • Possible ↑ heart failure hospitalizations
	saxagliptin	Onglyza (Not covered)	2.5 mg or 5 mg once daily	2.5 mg or 5 mg once daily: $530		
	linagliptin	Tradjenta (Tier 3, step edit)	5 mg once daily	5 mg once daily: $555		
	alogliptin (Tier 1, step edit)	Nesina (Not covered)	25 mg orally once daily	All generic strengths: $234		

SGLT2 inhibitors	**canagliflozin**	Invokana (Not covered)	100 mg or 300 mg once daily	All strengths: $622	• Non-insulin dependent; novel MOA
					• Low incidence of hypoglycemia
					• ↓ weight
					• Potential cardiovascular and renal benefit:
					  – canagliflozin
					  – empagliflozin
					  – dapagliflozin
						• ↑ female genital mycotic infections, UTIs, and increased urination
						• Volume depletion; use cautiously in elderly and patients already on diuretic
						• Possible ↑ risk of bladder cancer (dapagliflozin)
						• Requires normal renal function (<30 mL/min for canagliflozin 100mg; > 45 mL/min for empagliflozin and dapagliflozin; > 60 mL/min for ertugliflozin)

	dapagliflozin	Farxiga (Tier 3, step edit)	5 mg or 10 mg once daily	All strengths: $621		
	empagliflozin	Jardiance (Tier 2, step edit)	10 mg or 25 mg once daily	All strengths: $627		
	ertugliflozin	Steglatro (Tier 4, step edit)	5 mg or 15 mg once daily	All strengths: $354		

GLP-1 receptor agonists	**exenatide**	Byetta (Tier 3, PA)	5 mcg twice daily (within 60 minutes before breakfast and dinner) May be increased to 10 mcg twice daily after 1 month	5 mcg or 10 mcg twice daily: $902	• No hypoglycemia
					• ↓ Weight
					• ↓ Postprandial glycemia
					• Exhibits many of the same glucoregulatory actions of naturally occurring hormones
						• Exenatide: Use caution when initiating or when increasing dose from 5 mcg to 10 mcg in CKD Stage G3
						• All in this class:
						  – Gastrointestinal side effects (nausea, vomiting, diarrhea)
						  – Training requirements
						  – ↑ Heart rate
						  – Possible acute pancreatitis

	exenatide ER	Bydureon (Tier 3, PA)	2 mg once every 7 days	2 mg once every 7 days: $882		
	liraglutide	Victoza (Not covered)	1.2 mg or 1.8 mg once daily	1.2 mg once daily: (18 mg / 3 mL pen): $774 1.8 mg once daily: (18 mg / 3 mL pen): $1161		
	dulaglutide	Trulicity (Tier 2, step edit)	0.75 mg or 1.5 mg, 3 mg, or 4.5 mg once every 7 days	0.75 mg or 1.5 mg once every 7 days: $957		
	semaglutide	Ozempic (Not covered)	0.25 mg once every 7 days for 4 weeks, then 0.5 mg once weekly. May increase to 1 mg once weekly after one month	0.5 mg or 1 mg every 7 days: $973		
		Rybelsus (Not covered)	3 mg once daily for 30 days then 7 mg once daily. May increase to 14 mg once daily after one month	All strengths: $927		

*AWP = Average Wholesale Pricing; **MAC** = Maximum Allowable Cost. Many patients may benefit from manufacturers' discounts or patient assistance programs.

Tier: Tier 1: generic; Tier 2: preferred brand; Tier 3: Preferred brand; Tier 4: non-preferred brand: † = Risk reduction of cardiovascular mortality and/or cardiovascular events; ‡ = Risk reduction of hospitalization for heart failure; § = Risk reduction of end-stage kidney disease

TABLE 3. Oral agents and non-insulin injectable medications (continued)

Class	SelectHealth commerical formulary status		Usual dosing	2020 AWP cost for 30-day supply* (MAC Cost for generics)	Pros	Cons
	generic	Brand				
amylin mimetic	pramlintide acetate	Symlin (Prior authorization)	**See inset	60 injection pen (1.5 mL): $2,048	Very positive effect on weight loss	Symlin should only be used by providers with significant knowledge of its properties. Three injections per day bring significant risk of severe nausea and hypoglycemia.

Dosing instructions for Symlin:
Type 1: 15 mcg immediately prior to major meals; increase at 15-mcg increments to a maintenance dose of 60 mcg or as tolerated.
Type 2: 60 mcg immediately prior to major meals; increase to 120 mcg as tolerated.
When initiating Symlin, reduce insulin dosages including premixed insulins (70/30).

Class	generic	Brand	Usual dosing	2020 AWP cost for 30-day supply* (MAC Cost for generics)	Pros	Cons
combinations (examples only)	sitagliptin + metformin XR	Janumet XR (Not covered)	Once daily: 100 mg / 1,000 mg 50 mg / 500 mg Two 50mg/1,000mg	5/500 mg and 5/1000 mg: $530 2.5/1000 mg: $265	See notes for individual components (page 18)	
	saxagliptin + metformin XR	Kombiglyze XR (Not covered)	Once daily: 5 mg / 500 mg 5 mg / 1,000 mg 2.5 mg / 1,000 mg	5mg/500mg and 5-1000mg: $530 2.5-1000mg: $265		
	linagliptin + metformin	Jentadueto (Tier 3, step edit)	Twice daily: 2.5 mg / 500 mg 2.5 mg / 1,000 mg	All strengths: $555		
	alogliptin + metformin (Tier 1, step edit)	Kazano (Not covered)	Twice daily: 12.5 mg / 500 mg 12.5 mg / 1,000 mg	All strengths: $234		
	alogliptin + pioglitazone (Tier 1, step edit)	Oseni (Not covered)	Once a day: 25 mg/45 mg 25mg/30mg 25mg/15mg	$234		
Insulin combinations	Insulin degludec + liraglutide	Xultophy (Not covered)	**Initial:** insulin degludec 16 units + liraglutide 0.58 mg once daily **Maximum:** 50 units (insulin degludec 50 units + liraglutide 1.8 mg) once daily	50 units + liraglutide 1.8mg daily: $1,310	• Single injection of two medications • Consistent coverage of glycemic control • Large potential for HbA1c reduction through combination therapy	• Fixed dose combination • Limited to 50 units of insulin degludec per day
	Insulin glargine + lixisenatide	Soliqua (Tier 3, step edit)	**Initial:** 15 units (insulin glargine 15 units + lixisenatide 5 mcg) once daily. **Maximum:** 60 units (insulin glargine 60 units + lixisenatide 20 mcg) once daily	60 units + lixisenatide 20mcg once daily: $883	• Single injection of two medications • Consistent coverage of glycemic control • Large potential for HbA1c reduction through combination therapy	• Fixed dose combination • Limited to 60 units of insulin glargine per day

*AWP = Average Wholesale Pricing; **MAC** = Maximum Allowable Cost. Many patients may benefit from manufacturers' discounts or patient assistance programs.
Tier: Tier 1: generic; Tier 2: preferred brand; Tier 3: Preferred brand; Tier 4: non-preferred brand: † = Risk reduction of cardiovascular mortality and/or cardiovascular events; ‡ = Risk reduction of hospitalization for heart failure; § = Risk reduction of end-stage kidney disease

TABLE 4. Insulin profiles

Insulin type	Generic (Brand) name	Onset (min. or hrs.)	Peak (hours)	Usual effective duration (hours)	2020 30-Day AWP	SelectHealth commercial formulary status**
Rapid acting (clear, except Afrezza)	aspart (NovoLog)	10 to 20 min.	1 to 2	3 to 5	10 mL brand: $347 10 mL generic: $174 FlexPen 15 mL brand: $671 15 mL generic: $280	Tier 1 (generic) Tier 3 (brand)
	aspart with niacinamide (Fiasp)	10 to 20 min.	1	2 to 3	10 mL: $347 FlexPen 15 mL: $671	Not covered
	glulisine (Apidra)	10 to 20 min.	1 to 2	3 to 5	10 mL: $341 SoloSTAR pen 15 mL: $658	Not covered
	lispro (Humalog)	10 to 20 min.	1 to 2	3 to 5	10 mL brand: $330 10 mL generic: $165 KwikPen 15 mL brand: $637 15 mL generic: $318	Not covered
	lispro (Admelog)	10 to 20 min.	1 to 2	3 to 5	10 mL: $157 Pen 15 mL: $303	Not covered
	human (Afrezza)* (inhalation powder)	10 to 15 min.	1	2 to 3	equivalent to 10 mL vial: $1,180 available in 4-unit ($5), 8-unit ($9) and 12-unit ($14) cartridges	Not covered
Regular (rapid acting) (clear)	Novolin R Humulin R ReliOn R	30 to 60 min.	2 to 4	4 to 8	10 mL: $165 ReliOn R 10 mL: $28	Novolin R: Tier 2 Humulin R: Not covered ReliOn R: Not covered†
Intermediate acting (cloudy)	NPH (Novolin N) NPH (Humulin N) ReliOn N	1 to 3 hrs	4 to 10	10 to 18	10 mL: $165 ReliOn N 10 mL: $28	Novolin R: Tier 1 Humulin R: Not covered ReliOn R: Not covered†
Peakless (clear)	detemir (Levemir)‡	1 hr		18 to 24	10 mL: $370 FlexTouch 15 mL: $555	Not covered
	glargine U-100 (Lantus)‡	2 to 3 hrs		24 +	10 mL: $340 SoloSTAR pen 15 mL: $510	Tier 3
	glargine U-100 (Basaglar)	2 to 3 hrs		24 +	Kwikpen 15 mL: $392	Not covered
	glargine U-300 (Toujeo)	develops over 6 hrs		24 +	SoloSTAR pen 15 mL: $467	Tier 3
	degludec U-100, U-200 (Tresiba)	~ 1 hr		24 to 48	FlexTouch 100 unit/mL, 15 mL: $610 200 unit/mL, 15 mL: $1,220	Not covered
Insulin mixes	70/30 (NovoLog Mix) 75/25 (Humalog Mix) 50/50 (Humalog Mix) 70/30 (ReliOn Mix)				10 mL: $407; pen: $610 10 mL: $406; pen: $636 10 mL: $252; pen: $636 10 mL: $28	70/30 NovoLog mix: Tier 3 Humalog mixes: Not covered ReliOn mix: Not covered†

* **Afrezza contraindications:** Asthma, COPD, smoking. Requires PFT monitoring at baseline, 6 months, and then yearly. Supplied in 4-unit and 8-unit, single-dose cartridges. Dose adjustments are made in 4-unit increments.

Tier: Tier 1: generic; Tier 2: preferred brand; Tier 3: non-preferred brand

† **ReliOn** is available at Walmart and is a possible option for cash-paying patients. Cash price is about $25–$30 per vial.

‡ **Peakless insulin (detemir, glargine, and degludec). Administer as follows:**
- **Detemir** insulin twice a day for type 1 diabetes and at bedtime for type 2 diabetes.
- **Glargine** insulin once a day at the same time for type 1 and type 2 diabetics who require long-acting insulin for control of hyperglycemia.
- **Degludec** for type 1 and type 2 diabetics who require long-acting insulin once a day at any time.
- Peakless insulin cannot be diluted or mixed with other types of insulin or solutions.
- Administer peakless insulin subcutaneously only — DO NOT give it intravenously.

INITIATING INSULIN FOR TYPE 2 DIABETES

Step 1: Determine the starting dose of basal insulin for patients with type 2.

Starting dose example:

Patient weighs 100 kg. Bedtime dose:

10 units

OR

0.2 units / kg x 100 kg = 20 units

Step 2: Determine the need for insulin intensification. If HbA1c is above target despite FPG at target, or basal dose is > 0.5 IU / kg, add prandial insulin. Add one dose given with the largest meal or the meal that has the largest postprandial glucose excursion.

Prandial insulin dosing example:

4 units per day

OR

10% of basal insulin dose

If A1c still above target, add additional injections of prandial insulin.

Step 3: Titrate each component of the regimen based on regular SMBG results.

Injectable therapy for type 2 diabetes

If treatment goals cannot be reached with oral agents alone, injectable therapy should be considered. In most patients, GLP-1 receptor agonists are preferred prior to insulin therapy when possible. If the patient is already on a GLP-1RA or if GLP-1RA is not appropriate, then insulin is preferred.

To treat patients with type 2 diabetes, keep these general principles in mind when using oral agents with insulin:

- **Follow basal insulin regimen (bedtime dose of peakless insulin) as the recommended first choice** when adding insulin to treatment with oral agents. A starting dose of basal insulin for patients with type 2 is usually 0.2 – 0.4 units/kg. See table 4 on page 20 for insulin profiles.

- **Use the following principles for modifying insulin + oral regimens:**

  – Control morning FPG with peakless insulin at bedtime.

  – Control daytime PPG with sulfonylureas, DPP-4 inhibitors, and GLP-1 agonists. When morning FPG is controlled with peakless insulin, daytime PPG readings frequently come under control with an oral agent and dietary modification.

  – Consider the timing of the patient's hyperglycemia when adding or adjusting insulin.

  – Consider a physiologic insulin regimen if 2-hour postprandial PG is still above goal with FBG > 100 mg / dL, generally while continuing metformin. See algorithm 3B on page 16.

Example of a weekly titration schedule
(Treat-to-Target Trial) [ADA3]

A large, randomized controlled trial showed that systematically titrating **bedtime basal insulin added to oral therapy** can safely achieve 7 % HbA1c in overweight patients with type 2 diabetes as compared to 7.5 % to 10 % HbA1c in patients on oral agents alone. To titrate:

- **Start with 10 IU at bedtime.** Initial dose can be higher based on patient weight (0.2 – 0.4 units/kg).

- **The initial dose should be titrated up based on FBG values.** Titration can be based on a simple rule of 2 or 3 units every 3 days until goal FBG is reached.

  OR

- **Titrate weekly** based on FBG values over three days as shown in the table at right.

Forced weekly insulin titration schedule (for treat-to-target FBG of <120 mg / dL)	
Mean of FBG values over 3 days	Increase of insulin dosage (IU / day)
> 180 mg / dL	+ 8
160 – 180 mg / dL	+ 6
140 – 159 mg / dL	+ 4
120 – 139 mg / dL	+ 2

Use a peakless insulin with this titration schedule to significantly reduce nocturnal hypoglycemia. This can help achieve recommended standards of diabetes care more quickly. Recognize that the initial insulin dose or formulation will always need increase and/or change. Encourage the patient not to give up if the initial dose is not immediately controlling their blood sugar

HIGHER DIETARY FAT AND POSTMEAL HYPERGLYCEMIA

Higher dietary fat intake can cause **late postprandial hyperglycemia.** This can be addressed either by reducing fat intake (especially for type 2 patients on nonphysiologic regimens) and/or by adjusting premeal insulin doses (for type 1 patients on rapid-acting insulin).

Practical ways to compensate for a high-fat meal include splitting premeal insulin into two injections from one to three hours apart or using an extended bolus.

The total amount of insulin provided may need to be increased from the usual dose as well. The response to dietary fat will vary according to the individual and the specific foods, so defining insulin adjustments may require multiple attempts.

Some recent discussions suggest using ⅓ of the grams of fat in the meal and adding that to the grams of carbohydrates to use in calculating the total meal insulin.

GLUCOSE MANAGEMENT IN SPECIAL CIRCUMSTANCES

Some circumstances — such as when a patient is preparing for a test or procedure, has had a cortisone injection, etc. — may require temporary adjustment to diabetes treatment. Recommendations are as follows:

- **Before surgery:** Optimize glycemic control, and temporarily stop metformin and sulfonylureas if appropriate.

- **When patient receives a steroid (injection or oral):** Patients often experience a elevation of plasma glucose. Advise more frequent SMBG, and either increase medication doses or initiate low-dose insulin as needed.

- **When patient is fasting prior to a test or procedure.** Temporarily stop metformin and sulfonylureas if appropriate.

- **Illness.** Consider increasing frequency of blood glucose monitoring. Metformin may need to be held if the patient is at risk for dehydration.

When to intensify insulin

When basal insulin dose reaches 0.5 – 0.8 units/kg/day, the addition of a GLP-1 RA may be appropriate.

Physiologic insulin regimen: Peakless + rapid-acting insulin (see page 20). A patient with type 2 diabetes who is not controlled on peakless basal insulin + GLP-1 RA or oral medications may be able to reach blood glucose goals using a multiple daily injection (MDI) regimen. (See Algorithm 3B on page 16.)

Basic (nonphysiologic) regimen: NPH + rapid-acting insulin

Basic insulin therapy is not designed to mimic normal insulin physiology. Although a basic regimen is not recommended for type 1 patients, it may provide adequate control for type 2 patients who either have been unsuccessful with oral medication combinations or are unable to manage a multiple daily dose regimen as required in physiologic insulin therapy.

For a basic insulin therapy regimen to be successful, a patient must be consistent with meals and adhere to a medical nutrition therapy (MNT) plan. The following are examples of basic insulin regimens:

- **Premixed insulins.** These insulins are given twice a day (before breakfast and before the evening meal). They must be given before a meal and are not appropriate for patients with variable meal schedules:
  - 70% aspart protamine suspension/30% aspart injection (NovoLog Mix 70/30)
  - 70% NPH/30% regular (Novolin 70/30)

- **Split-mixed insulins.** NPH is given twice a day (either morning and before the evening meal, or morning and bedtime) with regular or rapid-acting insulin before breakfast and before the evening meal

USING THE 1,700 RULE

The **1,700 Rule** can be used to calculate a correction dose of rapid-acting insulin for either a high plasma glucose (PG) reading or an insulin-to-carb ratio to approximate the rapid-acting insulin needed to cover a meal's carbohydrate content.

- **Determine the current total daily dose (TDD).** Add up ALL the insulin (rapid and long-acting) the patient takes in a 24-hour period. If the patient is not yet on a stable insulin dose, then use 0.5 U/kg to calculate a TDD.

> **TDD calculation example:**
> - Patient weighs 100 kg
> - 0.5 units/kg x 100 kg = 50 units
> - 25 units basal insulin + 25 bolus split over 3 meals = 7 to 8 units per meal

- **To calculate a correction dose:** Divide 1,700 by the TDD. This is the predicted amount (mg/dL) the PG will decrease for each unit of rapid-acting insulin added (called the Correction Factor or CF).

> **Correction dose example:**
> - Patient takes 50 units of insulin per day: TDD = 50.
> - 1,700 ÷ 50 = 34 (Round to 35, which means that one unit of insulin will lower PG by 35 points—a correction factor of 35).
> - If the goal is 130 and PG is 165, then 35 is the desired lowering amount. 35/35 is 1, so 1 unit of insulin. PG of 200 results in 2 units and 235 in 3 units, etc.
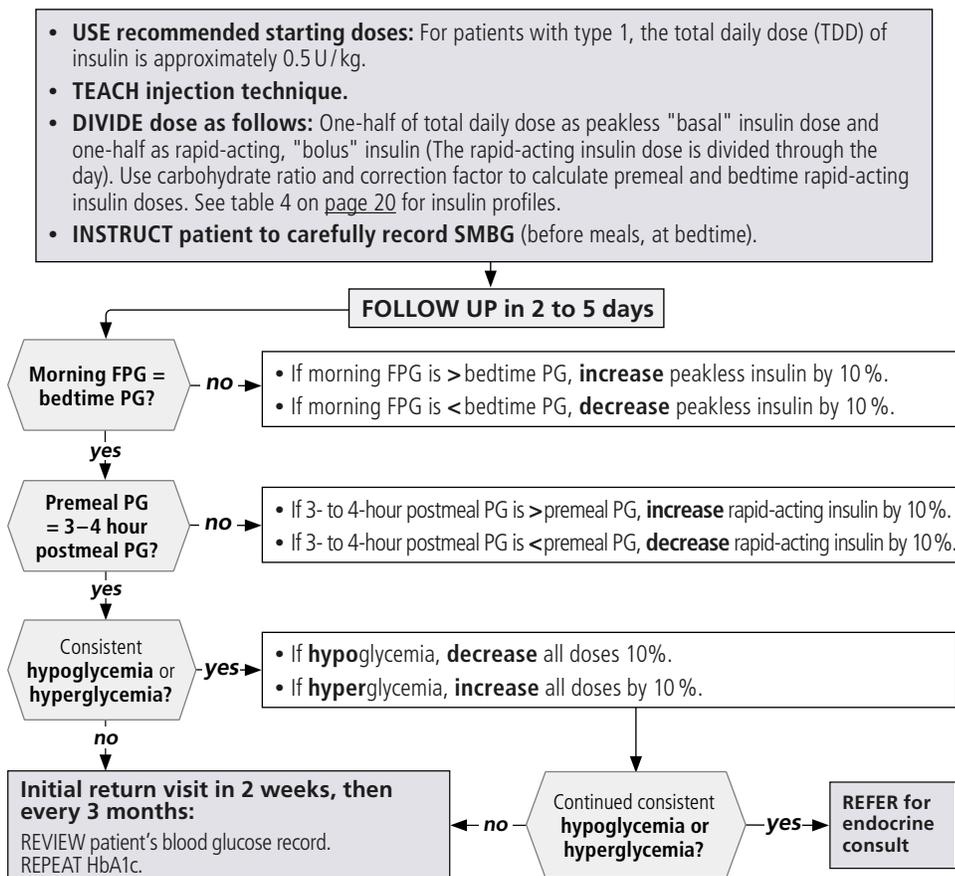
- **To calculate a carb ratio:** Multiply the CF by 0.33. This is the number of grams of carbohydrate covered by 1 unit of rapid-acting insulin. A CR of 15 is common for people with Type 1 and a CR of 10 is common for people with Type 2..

> **Carb Ratio example:**
> - TDD is 50 units and CF is 35
> - 35 x 0.33 = 11.5
> - Round CR to 10 or 12.
> - If a patient eats 40 carbs in a meal then divide 40 by 10 = 4 units insulin.

Insulin therapy for type 1 diabetes

▶ ALGORITHM 4: INITIAL PHYSIOLOGIC INSULIN REGIMEN*

- **USE recommended starting doses:** For patients with type 1, the total daily dose (TDD) of insulin is approximately 0.5 U/kg.
- **TEACH injection technique.**
- **DIVIDE dose as follows:** One-half of total daily dose as peakless "basal" insulin dose and one-half as rapid-acting, "bolus" insulin (The rapid-acting insulin dose is divided through the day). Use carbohydrate ratio and correction factor to calculate premeal and bedtime rapid-acting insulin doses. See table 4 on page 20 for insulin profiles.
- **INSTRUCT patient to carefully record SMBG** (before meals, at bedtime).

FOLLOW UP in 2 to 5 days

Morning FPG = bedtime PG? —*no*→
- If morning FPG is > bedtime PG, **increase** peakless insulin by 10%.
- If morning FPG is < bedtime PG, **decrease** peakless insulin by 10%.

yes

Premeal PG = 3–4 hour postmeal PG? —*no*→
- If 3- to 4-hour postmeal PG is > premeal PG, **increase** rapid-acting insulin by 10%.
- If 3- to 4-hour postmeal PG is < premeal PG, **decrease** rapid-acting insulin by 10%.

yes

Consistent hypoglycemia or hyperglycemia? —*yes*→
- If **hypo**glycemia, **decrease** all doses 10%.
- If **hyper**glycemia, **increase** all doses by 10%.

no

Initial return visit in 2 weeks, then every 3 months:
REVIEW patient's blood glucose record.
REPEAT HbA1c.

←*no*— **Continued consistent hypoglycemia or hyperglycemia?** —*yes*→ **REFER for endocrine consult**

*Insulin requirements vary considerably from patient to patient depending on the degree of insulin deficiency and resistance. These formulas are guidelines for estimating insulin doses. Providers will likely need to adjust these estimates.

. . . .

Physiologic insulin regimen: Peakless + rapid-acting insulins

Using multiple daily injections (MDI), a physiologic insulin regimen most closely mimics normal insulin physiology. This intensive regimen uses peakless insulin as the basal dose and rapid-acting insulin for control with meals. Almost all type 1 patients require this physiologic (basal/bolus) regimen.

- **Use peakless insulin to control blood glucose when not eating.** The period between bedtime and breakfast is the best reflection of how this method is working; prebreakfast blood glucose should approximate bedtime blood glucose. A bedtime snack is not required; if desirable, match the carb content of the snack with a rapid-acting insulin dose.

- **Add rapid-acting insulin prior to each meal and planned snack.**
  - Adjust to prevent post-meal hyperglycemia or hypoglycemia. Blood glucose levels four hours after a meal should approximate premeal levels.
  - Determine premeal rapid-insulin doses by counting carbohydrates and using an insulin-carbohydrate ratio. Alternatively, base premeal insulin dose on a fixed-meal plan (budgeted carbohydrates).
  - Train patients in MNT and insulin use; refer to diabetes educator/RDN.
  - Train patients in use of correction dose to treat hyperglycemia. (At bedtime, the correction dose may be reduced to as much as 50% of the usual correction dose.)

- **Teach patients how to modify insulin doses** when exercising, on sick days, to combat significant premeal hypoglycemia, or to prevent delayed postmeal hyperglycemia due to higher-fat meals (see sidebar on page 22). Support with referral to diabetes educator/RDN.

RELATED CONDITIONS

Patients with diabetes are likely to have related conditions that often accompany or result from diabetes, such as:
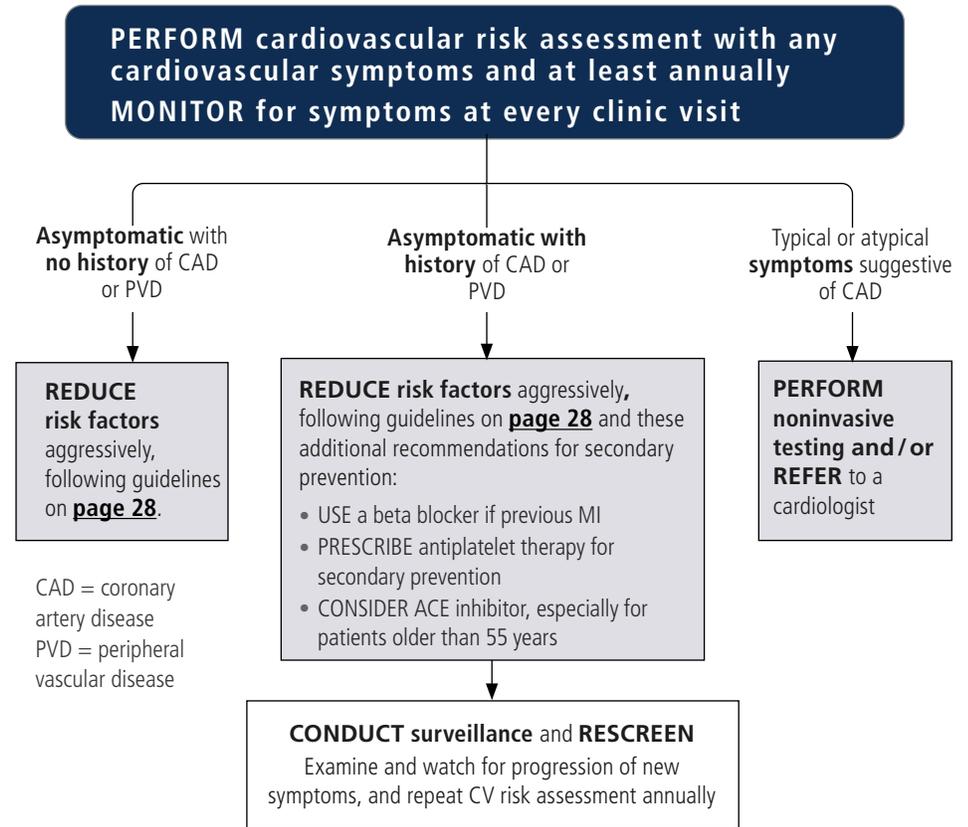
The pages that follow highlight the risks, goals, and management options for these related conditions.

▶ PREVENTION AND MANAGEMENT OF RELATED CONDITIONS

Cardiovascular disease

Diabetes is considered a cardiovascular disease equivalent, and patients with diabetes have a two to eight times higher prevalence of, incidence of, and mortality from all forms of cardiovascular disease than those without diabetes.[GRU] All patients with diabetes should be assessed annually for cardiovascular risk. Treat all risk factors aggressively, and perform further screening and diagnostic testing as suggested in the algorithm below.

▶ ALGORITHM 5: RISK ASSESSMENT & SCREENING FOR CARDIOVASCULAR DISEASE

PERFORM cardiovascular risk assessment with any cardiovascular symptoms and at least annually MONITOR for symptoms at every clinic visit

Asymptomatic with **no history** of CAD or PVD	**Asymptomatic with history** of CAD or PVD	Typical or atypical **symptoms** suggestive of CAD
REDUCE risk factors aggressively, following guidelines on **page 28**.	**REDUCE risk factors** aggressively, following guidelines on **page 28** and these additional recommendations for secondary prevention: • USE a beta blocker if previous MI • PRESCRIBE antiplatelet therapy for secondary prevention • CONSIDER ACE inhibitor, especially for patients older than 55 years	**PERFORM noninvasive testing and/or REFER** to a cardiologist

CAD = coronary artery disease
PVD = peripheral vascular disease

CONDUCT surveillance and **RESCREEN**
Examine and watch for progression of new symptoms, and repeat CV risk assessment annually

Multifactorial risk reduction for cardiovascular disease

In patients with diabetes, risk factors for cardiovascular disease and cardiovascular events are similar to those in patients without diabetes. However, the magnitude of risk may be greater. Research suggests that long-term control of blood glucose, blood pressure, and lipids can substantially reduce these risks in all patients, but patients with diabetes may benefit to an even greater extent.[ADA]

This CPM recommends helping patients lower their cardiovascular risk by promoting lifestyle modifications as needed (smoking cessation, weight loss, etc.) and following the guidelines for good management of glucose, lipids, and blood pressure. **Also consider using proven medications in appropriate patients; see discussion on** page 25.

In addition to heart disease, many complex factors contribute to reduced cardiopulmonary function in patients with diabetes, including:

- Obstructive sleep apnea
- Diastolic dysfunction
- Reduced pulmonary diffusing capacity
- Functional restrictive lung disease

These conditions are commonly underdiagnosed in patients with diabetes. However, they can aggravate hypertension, cause fatigue, and reduce exercise capacity. The cornerstones of therapy are:

- Tight blood pressure control
- Blood glucose control
- Weight loss

Calculate 10-year CVD risk

The American Heart Association and American College of Cardiology recommend the new Risk Calculator to evaluate 10-year risk and lifetime risk of ASCVD.[GOF] This calculator is available at: tools.acc.org/ASCVD-Risk-Estimator-Plus/#!/calculate/estimate//

Medications for CV risk reduction

The ADA and the AACE support prescribing sodium-glucose co-transporter 2 (SGLT-2) inhibitor and glucagon-like peptide 1 (GLP-1) receptor agonist medications with proven cardiovascular benefit as second-line therapy for all patients with type 2 diabetes and cardiovascular disease to reduce major cardiovascular events and mortality. The following agents have been shown to reduce cardiovascular and renal outcomes in patients with diabetes:[GAR, ADA2]

Canagliflozin:

- CANVAS
  - Reduced risk of composite of CV death, nonfatal MI, and nonfatal stroke
  - Reduced risk of hospitalization for heart failure
- CREDENCE
  - Reduced risk of progression to end-stage kidney disease, doubling of serum creatinine, or death from renal or cardiovascular causes in patient with type 2 diabetes and albuminuric chronic kidney disease
  - Additional FDA approved Indications
  - Reduce risk of MI, stroke, or CV death in adults with T2DM and CV disease
  - Reduce risk of ESKD, doubling of SCr, CV death and hospitalization for HF in patients with T2DM and DKD with albuminuria

Dapagliflozin

- DECLARE-TIMI: Reduced risk of composite of CV death or hospitalization for HF
- DAPA-HF: Reduced risk of CV death and hospitalization for heart failure in patients with heart failure with reduced ejection fraction (HFrEF), ≤40%, with or without diabetes
- DAPA-CKD
  - Reduced risk of sustained decline in eGFR, progression to ESKD, or death from renal or CV causes
  - Additional FDA approved indications
  - Reduce risk of hospitalization for HF in adults with T2DM and established CV disease or multiple CV risk factors
  - Reduce risk of CV death and hospitalization for HF in adults with HFrEF.

Empagliflozin

- EMPA-REG OUTCOME
  - Reduced risk of nonfatal MI, nonfatal stroke, and CV death
  - Reduced risk of hospitalization for HF
  - Reduced risk of deterioration from normo-albuminuria to micro- or macro-albuminuria
  - Emperor-Reduced
  - Reduced risk of CV death or hospitalization for HF for patients with HFrEF with or without diabetes
  - Additional FDA approved indication
  - Reduce risk of CV death in adults with T2DM and established CV disease

Dulaglutide

- REWIND
  - Reduced the risk of 3-point MACE
  - Additional FDA approved indication
  - Reduce risk of 3-point MACE for adults with T2DM with and without established CV disease

Dulaglutide

- REWIND
  - Reduced the risk of 3-point MACE
  - Additional FDA approved indication
  - Reduce risk of 3-point MACE for adults with T2DM with and without established CV disease
  - Liraglutide
- LEADER
  - Reduced risk of all cause death and CV mortality
  - Additional FDA approved indication
  - Reduce the risk of MI, CVA, or CV death in adults with T2DM and CV disease.
  - Semaglutide Injectable
- SUSTAIN-6
  - Reduced risk of 3-point MACE, and renal composite outcome (development of macroalbuminuria, doubling of serum creatinine, 40% or greater decline in eGFR, development of ESKD, or death due to renal causes)
  - Additional FDA approved indication
  - Reduce the risk of MI, CVA, or CV death in adults with T2DM and CV disease

ACE inhibitors (ACEIs). Several studies have shown ACEIs can reduce cardiovascular complications even more than can be explained by blood pressure reduction alone. For example, the HOPE trial showed a reduction in cardiovascular events in diabetes patients over 55 years of age with normal blood pressure. If not contraindicated, consider an ACEI in all patients over 55 years of age, with or without hypertension, with any additional risk factor such as history of cardiovascular disease, dyslipidemia, increased urinary albumin, or smoking.[DAG]

Beta blockers. Patients with diabetes and significant coronary artery disease may benefit from beta blockers, especially those who have had a coronary event within the previous two years.

Aspirin therapy. [ADA] For secondary prevention in people with atherosclerotic vascular disease, low-dose aspirin provides a substantial 20% relative risk reduction (RRR) and 1.5% per year absolute risk reduction (ARR) in recurrent cardiovascular disease (CVD) events. However, for primary prevention the relative and absolute benefits of aspirin are much lower — just 12% RRR and 0.06% per year ARR in CVD events. For primary prevention in people with diabetes, recent randomized trials and meta-analyses of available trials have found a similar 10% RRR in CVD events. Given the uncertain efficacy of aspirin for primary CVD prevention in adults with diabetes and its recognized risk for upper gastrointestinal bleeds and hemorrhagic stroke, a **2010 expert consensus document suggested that for primary prevention, aspirin therapy should be guided by a combined assessment of either age, sex, and other CVD risk factors or by an estimate of absolute, 10-year CVD risk.** Risk can be calculated via the resource noted in the sidebar on page 25.

For patients with no history of CVD who are not at increased risk for bleeding (no history of prior gastrointestinal bleeding, no prior peptic ulcer disease, no concurrent warfarin or NSAID therapy), **we recommend aspirin at a dose of 75 to 162 mg/day following the guidelines in table 5 at right.**

TABLE 5. Aspirin guidelines		
Recommended for:	**May be considered** for:	**NOT recommended** for:
• Adults with > 10% 10-year CVD risk* **OR FOR** • Most men > 50 years and women > 60 years with any of these **risk factors:** ❑ Smoking ❑ High blood pressure ❑ Albuminuria ❑ High cholesterol ❑ Family history of premature CVD	• Adults with 5 – 10% 10-year CVD risk* **OR FOR** • Men > 50 years or women > 60 years with none of the risk factors noted in the first column **OR FOR** • Men ≤ 50 years or women ≤ 60 years with one or more risk factors noted in the first column	• Adults with < 5% 10-year CVD risk* **OR FOR** • Men < 50 years and women < 60 years with none of the risk factors noted in the first column

STATIN INTOLERANCE

Statin intolerance may occur in 5 % to 15 % of patients. Symptoms:

- Include myalgias, proximal and symmetrical, often in the thighs.

- Typically occur one month after statin start or change

- Are often dose-dependent. (Confirmation of intolerance may require a two- to six-week trial off statin.)

Treatment:

- Includes lowering statin dose by 50 %

- Reducing frequency to every other day or less often

- Trials of other statins (e.g., pravastatin or rosuvastatin).

OTHER ISSUES

Triglycerides: If triglycerides are over 500 mg / dL, treat to reduce risk of pancreatitis. There is no evidence of cardiovascular risk reduction from treatment.

Blood glucose: The impact of statins on blood glucose is small and should not influence the decision to prescribe.

Other classes of lipid-lowering medications:

- **Icosapent Ethyl.** In patients with ASCVD on a statin with controlled LDL cholesterol but with triglycerides 135–499 mg/dL, the addition of icosapent ethyl has been shown to reduce cardiovascular risk.

- **Fibrates.** Gemfibrozil should not be initiated in patients on statin therapy because of an increased risk for muscle symptoms and rhabdomyolysis. Fenofibrates may be considered concurrent with low- or moderate-intensity statin only if benefits are judged to outweigh risks.

- **Ezetimibe.** May show some benefit. Make shared decision with patient.

- **Omega-3 fatty acids** (fish oil supplements). Not recommended.

- **Bile-acid sequestrants**. Consider using colesevelam for statin-intolerant patients.

High cholesterol

Diabetes mellitus is associated with multiple lipid abnormalities including hypertriglyceridemia, low HDL cholesterol, and increased LDL especially the small dense LDL particles. Multiple studies have demonstrated that treating dyslipidemia can improve cardiovascular disease outcomes in people with diabetes.[HEA, SEV] Cholesterol treatment decisions involve assessment of clinical risk and use of diet, exercise and pharmaceuticals.

For all patients with diabetes who are between the ages of 40 to 75, clinical risk is sufficient to warrant use of moderate-intensity statin medication as tolerated.

For those who are 40 to 75 who have demonstrated atherosclerotic cardiovascular disease or multiple risk factors, use of high-intensity statin therapy is recommended. Risk factors include:

- Long duration of diabetes (Type 2, ≥10 years; Type 1, ≥20 years)

- Urine albumin/creatinine ratio > 30 mcg

- eGFR < 60 mL/min/1.73m

- Retinopathy

- Neuropathy

- ABI < 0.9

The goal is to reduce LDL cholesterol by 50 percent or more (some guidelines recommend LDL < 70 mg/dl for secondary prevention). If high-intensity statins are not tolerated, then whatever dose of statin is tolerated should be used (see sidebar). Supplemental ezetimibe or a PCSK-9 inhibitor is recommended if needed to achieve LDL goals.

For those who are < 40 or > 75, shared decision making with patients is recommended because the risk and benefits are not as clear in these age groups.
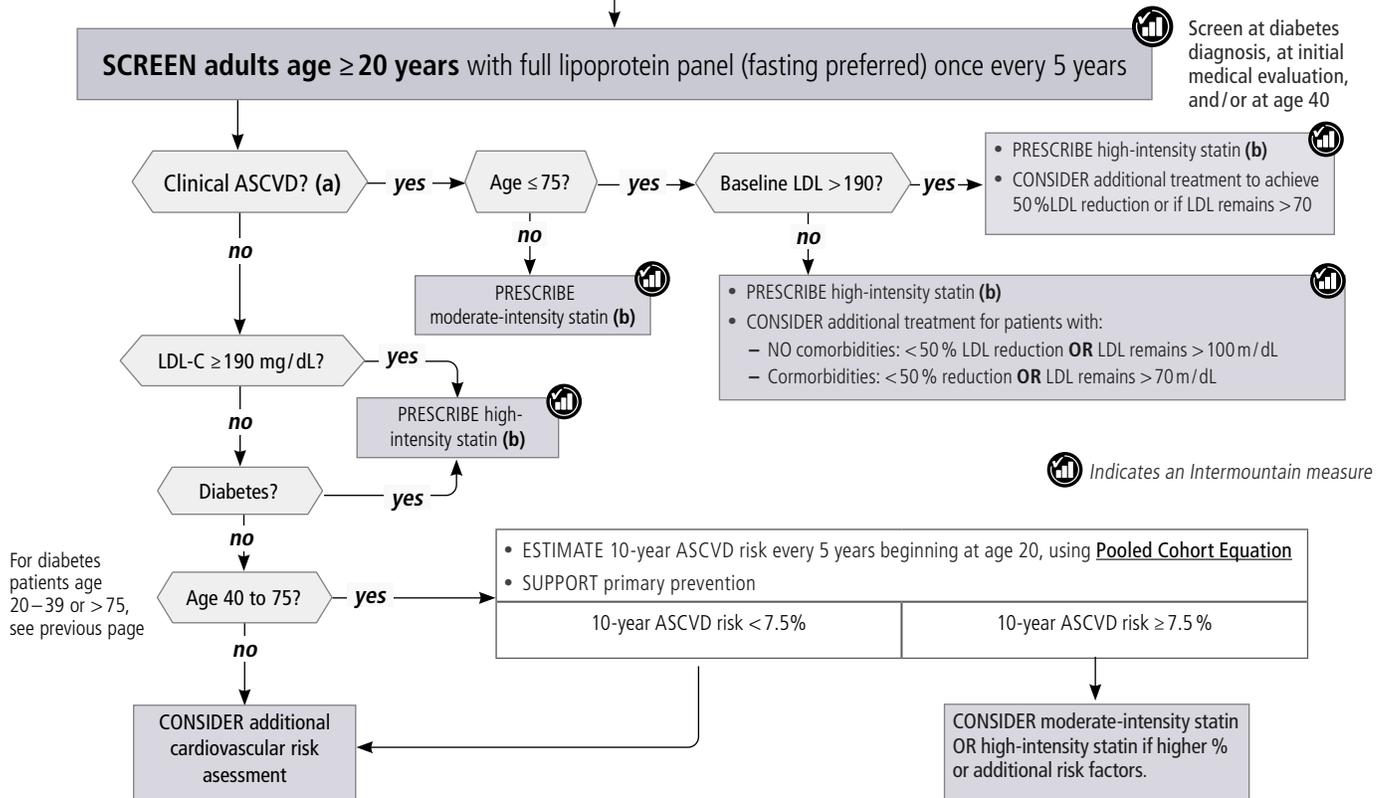
- Generally, those over 75 years old should remain on a statin. If the patient is not already on a statin, preform a thorough risk analysis to inform your decision before initiating statin therapy.

- For patients between the ages of 20–39 who are not pregnant and will not get pregnant, consider a low- or moderate-intensity statin for those with additional risk factors (see list above).

Many professional associations and organizations have developed guidelines for cholesterol management.

The American Heart Association and American College of Cardiology recommend the new Risk Calculator available at tools.acc.org/ASCVD-Risk-Estimator-Plus/#!/calculate/estimate/ to evaluate 10-year and lifetime risk of ASCVD and more accurately identify higher-risk patients who may benefit from statin therapy.[GOF]

▶ **ALGORITHM 6: ASSESSING AND MANAGING CHOLESTEROL LEVELS AND ASCVD RISK**

PROMOTE heart-healthy lifestyle habits as the foundation of ASCVD risk reduction (See page 10)

SCREEN adults age ≥ 20 years with full lipoprotein panel (fasting preferred) once every 5 years

Screen at diabetes diagnosis, at initial medical evaluation, and/or at age 40

Clinical ASCVD? **(a)** → *yes* → Age ≤ 75? → *yes* → Baseline LDL > 190? → *yes* →
- PRESCRIBE high-intensity statin **(b)**
- CONSIDER additional treatment to achieve 50% LDL reduction or if LDL remains > 70

no (Clinical ASCVD?)

no (Age ≤ 75?) → PRESCRIBE moderate-intensity statin **(b)**

no (Baseline LDL > 190?) →
- PRESCRIBE high-intensity statin **(b)**
- CONSIDER additional treatment for patients with:
  – NO comorbidities: < 50% LDL reduction **OR** LDL remains > 100 m/dL
  – Cormorbidities: < 50% reduction **OR** LDL remains > 70 m/dL

LDL-C ≥ 190 mg/dL? → *yes* → PRESCRIBE high-intensity statin **(b)**

no

Diabetes? → *yes* → PRESCRIBE high-intensity statin **(b)**

no

For diabetes patients age 20 – 39 or > 75, see previous page

Age 40 to 75? → *yes* →
- ESTIMATE 10-year ASCVD risk every 5 years beginning at age 20, using Pooled Cohort Equation
- SUPPORT primary prevention

| 10-year ASCVD risk < 7.5% | 10-year ASCVD risk ≥ 7.5% |

no

CONSIDER additional cardiovascular risk asessment

CONSIDER moderate-intensity statin OR high-intensity statin if higher % or additional risk factors.

Indicates an Intermountain measure

ALGORITHM NOTES

(a) Clinical ASCVD

Clinical ASCVD is defined as one or more of the following:
- Acute coronary syndromes
- History of MI
- Stable or unstable angina
- Coronary or other arterial revascularization
- Atherosclerotic stroke
- Atherosclerotic TIA
- Atherosclerotic peripheral artery disease
- Abdominal aortic aneurysm

Treatment fundamentals for patients with clinical ASCVD:
A — Aspirin/antiplatelet therapy
B — Blood pressure control
C — Cholesterol control and cigarette smoking cessation
D — Diet and weight management and diabetes and blood glucose control
E — Exercise

(b) Statin therapy[GOF] (Do not prescribe if patient is pregnant or lactating)

High-intensity statin therapy	Moderate-intensity statin therapy	Low-intensity statin therapy
(For patients with clinical ASCVD and age < 75, LDL-C > 190, diabetes and age 40 to 75 with other risk factors, or > 7.5% 10-year ASCVD risk)	(For patients with clinical ASCVD and age > 75, diabetes and age 40 to 75 without other risk factors, or 5% – 7.5% 10-year ASCVD risk)	(For patients with < 5% 10-year ASCVD risk and other risk factors)
Daily dose lowers LDL-C on average by approximately 50% or more	Daily dose lowers LDL-C on average by approximately 30% to 50%[1]	Daily dose lowers LDL-C on average by up to 30%[1]
• **atorvastatin (40[2])–80 mg** • rosuvastatin 20 (40) mg	• **atorvastatin 10** (20) **mg** • **simvastatin 20 – 40 mg**[3] • **pravastatin 40** (80) **mg** • **lovastatin 40 mg** • fluvastatin XL 80 mg • fluvastatin 40 mg bid • pitavastatin 2 – 4 mg • rosuvastatin (5) 10 mg	• **pravastatin 10 – 20 mg** • **lovastatin 20 mg** • simvastatin 10 mg • fluvastatin 20 – 40 mg • pitavastatin 1 mg

NOTES: Beware of drug interactions with atorvastatin (80 mg) and simvastatin (40 mg), including clarithromycin, erythromycin, amiodarone, calcium channel blockers, or fluconazole.

1 Individual responses to statin therapy should be expected to vary in clinical practice. There may be a biologic basis for less-than-average response.

2 Evidence from 1 RCT only: Down-titrate if unable to tolerate atorvastatin 80 mg in IDEAL[PED].

3 Although simvastatin 80 mg was evaluated in RCTs, initiation of simvastatin 80 mg or titration to 80 mg is not recommended by the FDA due to the increased risk of myopathy, including rhabdomyolysis.

HIGH BLOOD PRESSURE CPM

The 2018 *High Blood Pressure CPM* provides further guidance on treating high blood pressure. It recommends a standardized medication cascade for most patients.

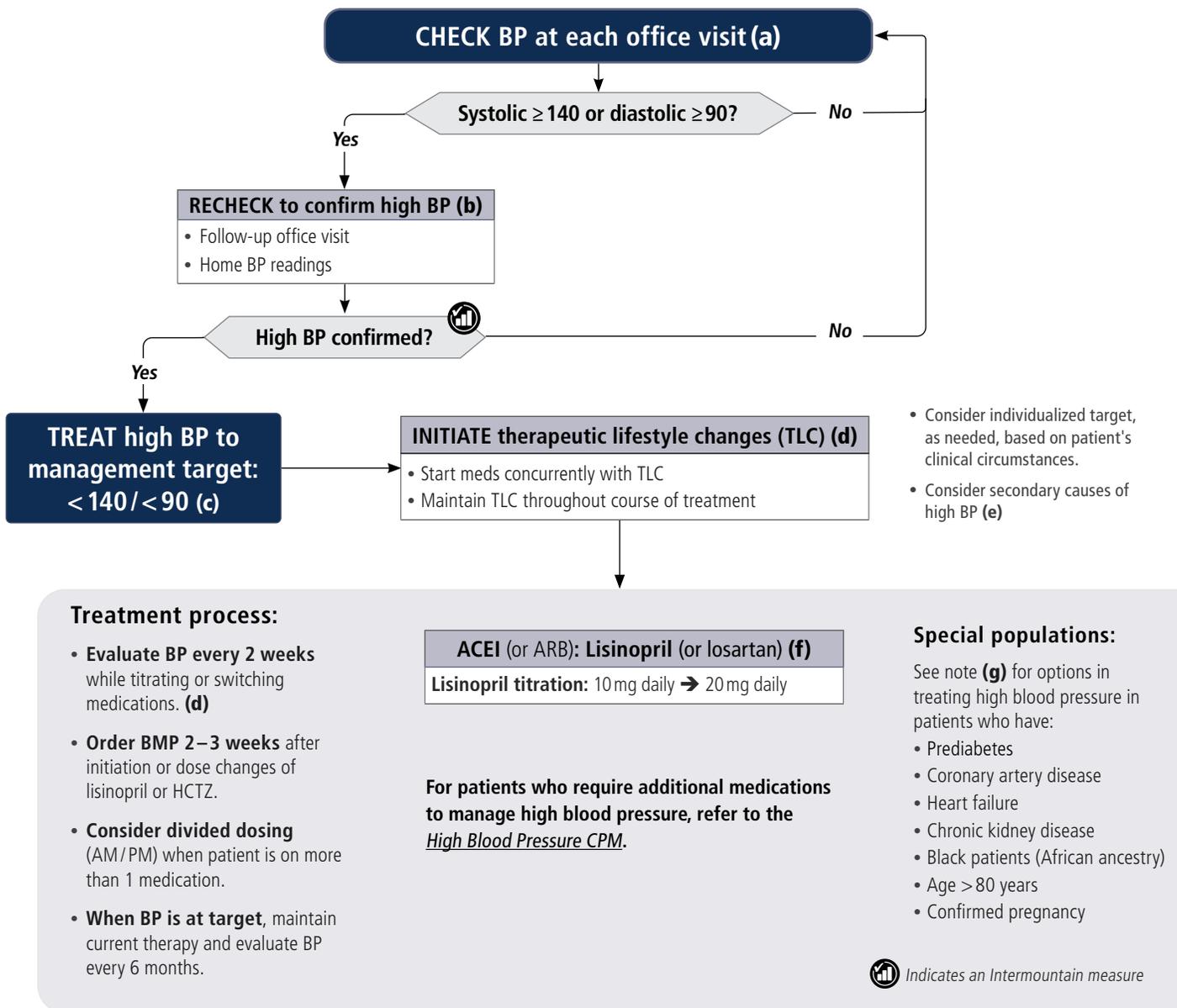Click the image to open the document, or see for ordering information.

High blood pressure

High blood pressure affects most patients with diabetes. Aggressive treatment of high blood pressure has been convincingly shown to reduce cardiovascular risk in these patients **to an extent equal to or greater than the effect of glucose control.** [JAM]

The algorithm below is a shortened version of the algorithm in the *High Blood Pressure CPM* and is consistent with the recommendations in the ADA standards. Using the same treatment protocol across the system has been shown to facilitate consistent team-based care.

▶ ALGORITHM 7: MANAGEMENT OF HYPERTENSION

General approach for most patients under 80 years old

CHECK BP at each office visit (a)

Systolic ≥ 140 or diastolic ≥ 90? — No

↓ Yes

RECHECK to confirm high BP (b)
- Follow-up office visit
- Home BP readings

High BP confirmed? — No

↓ Yes

TREAT high BP to management target: < 140 / < 90 (c)

INITIATE therapeutic lifestyle changes (TLC) (d)
- Start meds concurrently with TLC
- Maintain TLC throughout course of treatment

- Consider individualized target, as needed, based on patient's clinical circumstances.
- Consider secondary causes of high BP (e)

Treatment process:

- **Evaluate BP every 2 weeks** while titrating or switching medications. **(d)**

- **Order BMP 2–3 weeks** after initiation or dose changes of lisinopril or HCTZ.

- **Consider divided dosing** (AM/PM) when patient is on more than 1 medication.

- **When BP is at target**, maintain current therapy and evaluate BP every 6 months.

ACEI (or ARB): **Lisinopril** (or losartan) **(f)**

Lisinopril titration: 10 mg daily ➔ 20 mg daily

For patients who require additional medications to manage high blood pressure, refer to the *High Blood Pressure CPM*.

Special populations:

See note **(g)** for options in treating high blood pressure in patients who have:
- Prediabetes
- Coronary artery disease
- Heart failure
- Chronic kidney disease
- Black patients (African ancestry)
- Age > 80 years
- Confirmed pregnancy

Indicates an Intermountain measure

ALGORITHM NOTES

(a) Check BP at each office visit

Best practices for consistent BP readings:

- Seat patient with feet on the floor, back supported, and arm supported at heart level.
- Allow patient to rest for 5 minutes. Empty air bladder if necessary. Ensure reading is at least 30 minutes after last heavy meal, heavy exercise, or intake of caffeine, alcohol, or nicotine.
- Use appropriate-size cuff (not too small).
- Avoid talking with the patient or asking questions while taking BP.

See the _High Blood Pressure CPM_ for more detail.

(b) Confirming high BP

Methods

Follow-up office visit	High BP can be confirmed through two office visits total, with two BP checks in each visit.
Home BP monitoring	• Train patient on checking BP at home, and make sure patient has appropriate home BP monitor. • Patient takes at least 6 – 10 home BP readings over two weeks or more. Make sure patient brings monitor to office visit to verify consistency of readings.

(c) Blood pressure targets

Most patients	The 2015 ADA standards recommend management to **< 140 / < 90** for most patients with diabetes, but allow for individualized targets for patients with chronic kidney disease or other risk factors.
Younger or at risk for stroke	Consider a target of **< 130 / < 80** for some patients, including younger patients, if the burden of more aggressive therapy is not excessive.
Elderly	In elderly patients, avoid reducing diastolic BP below an average of 60. Lower diastolic BP may cause symptoms of hypotension and increase risk of myocardial infarction and stroke.

(d) Therapeutic lifestyle changes (TLC)

TLC elements include weight reduction, the DASH eating plan, sodium reduction, regular physical activity, limiting alcohol, and smoking cessation. For more information on the effects of TLC on blood pressure, see page 10 of the _High Blood Pressure CPM_.

(e) Secondary causes of uncontrolled BP

If a patient is on multiple medications and still not meeting BP goals, explore these possible secondary causes: Primary aldosteronism, sleep apnea, chronic kidney disease, coarctation of aorta, Cushing's syndrome or steroid therapy, drug-induced hypertension, pheochromocytoma, renovascular disease, thyroid / parathyroid disease, alcohol use.

(f) Medication notes

- **Consider nonadherence.** Ask how many doses were missed since the last visit.
- **Consider interfering agents,** such as NSAIDs.

Medications in the algorithm

lisinopril / losartan	• Use either drug as a first-line choice. • Switch to losartan if dry cough with lisinopril. • Avoid all ACEI or ARB medications in pregnancy. • Do NOT combine an ACEI or an ARB. • Avoid the direct renin inhibitor aliskiren.

Other preferred blood pressure medications

amlodipine	• Monitor for peripheral edema. • Consider alternative statin due to drug interaction if patient is on simvastatin > 20 mg daily. • Consider starting with 2.5 mg daily in elderly patients. Maximum therapeutic effect can take up to three weeks.
HCTZ	• Prescribe as single combination with an ACEI / ARB.
carvedilol	• Monitor for bradycardia (keep HR > 55 BPM).

(g) Special populations

Prediabetes	Consider avoiding thiazides and beta blockers as they can increase blood glucose. However, if a beta blocker is used, carvedilol is preferred as it may help with insulin resistance.

The recommendations below are for patients with both diabetes and the condition listed:

Coronary artery disease	Consider adding carvedilol (preferred) or metoprolol succinate to ACEI / ARB. As needed, add amlodipine and then a diuretic.
Heart failure	Prescribe ACEI / ARB, plus carvedilol (preferred) or metoprolol succinate, plus spironolactone (if not contraindicated) IF ejection fraction </= to 40%.
Chronic kidney disease	Treat to < 140 / <90; consider < 130 / 80 if ACR > 300. Monitor K+ and creatinine with ACEI / ARBs.
African ancestry	Consider starting with CCB or thiazide; then, add thiazide or CCB as 2nd line.
Age > 80 years	Consider target of < 150 / < 90 and individualized approach; consider starting with CCB or thiazide.
Confirmed pregnancy	Avoid ACEI / ARB medications. Consider labetalol, CCB (nifedipine preferred), hydralazine, or methyldopa.

Kidney Disease

Diabetic nephropathy occurs in 20 % to 40 % of patients with diabetes and is the leading cause of end-stage renal disease. Increased urinary albumin excretion, a marker for development of nephropathy in type 2 diabetics, is also a well-established marker for increased cardiovascular disease risk.[ADA]

Screening and management recommendations[ADA, HAN, NKF]

Detect the onset of diabetic kidney disease at its earliest stage with an **annual albumin-creatinine ratio.** (Morning spot urine specimens are preferred.) In addition, this CPM recommends measuring **serum creatinine with calculation of estimated Glomerular Filtration Rate (eGFR) at least every year.** Some patients with diabetic kidney disease will have normal albumin excretion in the presence of reduced renal function. GFR is also used to monitor for improvement or progression of preexisting nephropathy and to establish stages of chronic kidney disease (as defined by the National Kidney Foundation).

To reduce the risk of progression of diabetic nephropathy:

- **Optimize blood glucose control** (HbA1c less than 7 %).

- **Optimize blood pressure control**. In patients with increased urinary albumin excretion or nephropathy, treat to a blood pressure goal of 130 / 80 or lower.

- **Use ACE inhibitors or ARBs** in nonpregnant patients, even in patients with normal blood pressure. If one class of medication is not tolerated, substitute the other class.

- **Restrict dietary protein.** Reducing protein to 0.8 to 1 g / kg / day for patients in earlier-stage CKD and to 0.8 g / kg / day for patients in later stages of CKD may improve measures of renal function, including eGFR.

For patients with increased urinary albumin excretion, nonsteroidal inflammatory medications are discouraged. Note also that in this population, **intravenous contrast dyes may precipitate renal failure.**

ALGORITHM NOTES

(a) Urine testing

Two specimens — collected three months apart — should be positive before considering a patient to have increased urinary albumin excretion. Vigorous exercise within 24 hours of the test, infection, fever, CHF, marked hyperglycemia, and marked hypertension all may elevate urinary albumin excretion.

Note that a 24-hour urine test for albumin is no longer typically recommended.

(b) Causes of nephropathy

Consider other causes of chronic kidney disease when patients have:
- No diabetic retinopathy
- No albuminuria
- Low or rapidly decreasing eGFR
- Rapidly increasing proteinuria or nephrotic syndrome
- Refractory hypertension
- Active urinary sediment present
- Signs or symptoms of other systemic disease
- Greater than 30 % reduction in eGFR within two to three months after initiation of an ACEI or ARB

▶ ALGORITHM 8: NEPHROPATHY SCREENING

Indicates an Intermountain measure

Retinopathy

In the U.S., diabetes is the leading cause of new cases of blindness for adults ages 20 to 74 years.[ANT] Good glycemic and blood pressure control can help prevent or slow the progression of diabetic retinopathy; early treatment of retinopathy can be the key to preventing blindness. This CPM recommends the following practices:[ADA]

- **Screening**. Early signs of retinopathy frequently go unnoticed by patients but can be seen with retinal photography (on a dilated fundus exam) or with optical coherence tomography. These tests, with remote reading by an ophthalmologist or optometrist, are acceptable for screening but do not replace comprehensive, in-person exams.

  Follow the screening schedule below:

  – **For type 2 diabetes, initial screening should occur at diagnosis.** Repeat dilated eye exam or use retinal photography every one to two years in patients without retinopathy. Patients with retinopathy should be seen by a specialist every year at minimum and usually more frequently.
  – **For type 1, initial screening should occur within five years of diagnosis.** Repeat dilated eye exam or use retinal camera every year or alternatively every one to two years if eye exams remain normal. If a patient has progressive retinopathy, usually more frequent exams are required.
  – **For women with diabetes who are pregnant or considering pregnancy,** dilated eye exams should occur before conception, during the first trimester of pregnancy, and every three months thereafter or as recommended by the ophthalmologist.

- **Referral**. Refer to an ophthalmologist experienced in managing diabetic retinopathy for patients with diabetes and:

  – **Become pregnant.** (Women who develop gestational diabetes are not at increased risk.)
  – **Have macular edema or any retinopathy.**

Diabetic neuropathy

Neuropathies are among the most-common chronic complications of both type 1 and type 2 diabetes. They are asymptomatic up to 50% of the time, and early recognition is important.

Early control of glucose may help to prevent or delay the development of peripheral neuropathy in both type 1 and type 2 diabetes and development of autonomic neuropathy in type 1 diabetes.

Peripheral polyneuropathy is generally symmetrical and is felt first in the lower extremities, but it may affect the upper extremities as well. It can cause pain, numbness, or both. It can also affect position sense and increase the risk of falls. The pain associated with neuropathy can be treated with medication. Peripheral neuropathy is generally a clinical diagnosis, and nerve conduction tests are usually not needed except in complicated cases. Once the diagnosis is made, it may be worth considering other causes for neuropathy, such as vitamin B12 deficiency, liver, kidney, or thyroid disease, in selected patients.

Autonomic neuropathy is also common and may cause symptoms in multiple organ systems, such as tachycardia, orthostatic hypotension, gastroparesis, sexual dysfunction, and bladder dysfunction.

Although loss of sensation from neuropathy cannot be reversed, the medications listed in table 6 at left could be considered for treatment of discomfort due to peripheral polyneuropathy.

TABLE 6: Medication options for peripheral polyneuropathy

Class	Examples	Typical Doses
Tricyclic drugs	Amitriptyline	10–75 mg at bedtime
	Nortriptyline	25–75 mg at bedtime
	Imipramine	25–75 mg at bedtime
Anticonvulsants	Gabapentin	300–1,200 mg 3 times a day
	Carbamazepine	200–400 mg 3 times a day
	Pregabalin	100 mg 3 times a day
5-hydroxytryptamine and norepinephrine uptake inhibitor	Duloxetine	60–120 mg a day
Substance P inhibitor	Capsaicin cream	0.025–0.075% applied 3 to 4 times a day

Note: Peripheral polyneuropathy has been associated with vitamin B12 deficiency, a potential side-effect of metformin use.

Foot problems

Foot problems are a frequent cause of morbidity and mortality in patients with diabetes. In the U.S., diabetes patients account for over 60 % of non-traumatic, lower-limb amputations.[CDC1]

Foot ulcers are consequences of **peripheral vascular disease (PVD)** and **peripheral neuropathy**. PVD leads to decreased circulation, clearance of wound healing by products, and relative hypoxia. Peripheral neuropathy can cause loss of protective sensation and impaired proprioception.

Patients with diabetes often have decreased sensation and proprioception. They develop calluses over areas of friction, which can lead to ulcers. Often they don't seek care until a serious infection has been established — one that may have already reached a bone. The CDC estimates that comprehensive foot care programs can have a positive impact for those with diabetes, reducing amputations by 45 % to 85 %.[CDC2]

Risk factors for ulcers or amputations:

- Poor glycemic control
- Peripheral neuropathy with LOPS
- Cigarette smoking
- Foot deformities
- Preulcerative callus or corn
- PAD
- History of foot ulcer
- Amputation
- Visual impairment
- CKD (especially patients on dialysis)

Early recognition and prevention is key to preventing amputations, sepsis and other adverse outcomes. Refer patients with any open ulcers or wounds to a podiatrist. Most of these wounds will require debridement and off-weighting techniques to heal. Diabetic patients with neuropathy or peripheral vascular disease qualify for routine nail care every 61 days. This allows regular follow-up and prevention of problems.

Preventive foot care: Three major components

1. **Perform routine foot exams**. For patients with insensate feet, foot deformities, or a history of foot ulcers, examine feet every visit. If no risk factors, then screen annually. See for foot exam guidelines. Note that no single test of sensation is 100 % sensitive in detecting sensory deficits. The examination of the foot should include:

- Inspection of the skin
- Assessment of foot deformities
- Neurological assessment (10 g monofilament testing with at least one other assessment, including pinprick, temperature, or vibration)
- Vascular assessment, including pulses in the legs and feet.

For monofilment testing, there are no standardized locations to test, but it is recommended to assess 5 sites on distal foot and toes. If numbness is present, then test sites in ascending order to determine the level of numbness.

Patients with symptoms of claudication or decreased or absent pedal pulses should be referred for ankle-brachial index and for further vascular assessment as appropriate.

Vibratory sensation testing may be the most sensitive test. An abnormal monofilament fiber test result most accurately predicts ulcer risk.

2. **Educate patients on daily foot care,** which includes the following:

- Check feet daily for problems.
- Wear white socks to help identify drainage from an unknown ulcer.
- Use a hand, rather than a foot, to check bathtub and other water temperatures.
- Avoid going barefoot.

- Avoid medicated corn pads as well as cutting corns and calluses with a blade. Use a pumice stone or nail file.
- Trim nails straight across.
- Moisturize and hydrate to avoid skin cracking (portal of entry for infection)
- Treat tinea pedis to avoid skin cracks

3. **Emphasize the importance of appropriate footwear.**

Patients should select soft-fitting, extra-depth shoes. They should not expect shoes to stretch out and should break in new shoes slowly.

IMMUNIZATIONS

Influenza and pneumonia are common and preventable infectious diseases. These diseases are associated with high mortality and morbidity in people with chronic diseases, such as diabetes. This CPM recommends the following vaccinations for patients with diabetes:

- **Influenza: Annual vaccination against influenza is recommended for all people >6 months of age**, especially those with diabetes.

- **Pneumococcal vaccine for all adult patients with diabetes.** People with diabetes ages 2 through 64 years should receive 23-valent pneumococcal polysaccharide vaccine (PPSV23) in addition to PCV13.

  – **Age 18 to 64:** One dose PPSV23.

  – **Age 65 or older:** An additional PPSV23 vaccination is necessary, regardless of vaccination history.

  – **Note:** CMS-Medicare Part B now covers both PCV13 and PPSV23 when given at least one year apart.

- **Hepatitis B vaccination for unvaccinated adults with diabetes under 60.** In 2013, the Advisory Committee on Immunization Practices of the CDC recommended the following: [ADA]

  – **Ages 18 through 59:** Administer 2 to 3 doses of hepatitis B vaccine, depending on the vaccine, to unvaccinated adults with diabetes

  – **Age 60 or older:** Consider administering a 3-dose series of hepatitis B vaccine to unvaccinated adults with diabetes

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HOW TO PERFORM A SENSORY EXAM

Using a Semmes-Weinstein 5.07 monofilament, test several toes on each foot, being careful not to test directly over a callus, ulcer, scar, or necrotic tissue. [LEW,ADAM]

Apply the monofilament perpendicular to the skin's surface forcefully enough to bend the filament. Do not let it slide or make repetitive contact.
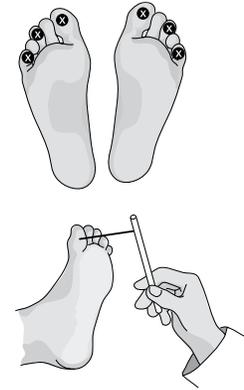
Diabetic Footwear[CMS]

Diabetes shoes can be helpful for patients who have or are at high risk of developing foot problems. They are constructed with softer insoles and higher tow boxes and are easier to put on. This extra depth can help prevent friction that leads to callus formation and ulceration. They can also be made to accommodate foot deformities. Medicare pays for one pair of diabetic shoes per year for patients who meet one or more of the following criteria:

- Peripheral neuropathy with evidence of callus formation

- History of pre-ulcerative calluses

- History of previous ulceration

- Foot deformity

- Previous amputation of all or part of the foot

- Poor circulation

- The physician who treats the patient must certify that the patient has diabetes and that they need diabetic shoes as part of a comprehensive treatment plan. **This need must be documented in the medical record.** The prescription for diabetic shoes can be written by a podiatrist or a physician who is knowledgeable in the fitting of diabetic shoes.

USING THE STOP-BANG SCREENING TOOL

There is some concern that the STOP-BANG screen may be too sensitive for the primary care setting, since such a large percentage of the general population may be overweight, over 50, male, and/or hypertensive. In addition, other literature defines a large neck size as over 16 inches for women and over 17 inches for men. [KAP]

Of greater concern, however, is that OSA is under-diagnosed and under-treated in the primary care setting. Therefore, using a sensitive screen helps alert providers to the possibility of OSA. Providers should weigh all these factors, along with specific patient characteristics, when determining next steps for referral and sleep testing.

Evaluate Patient and Administer STOP-BANG OSA screening questionnaire

☐ **S**noring: Do you snore loudly (louder than talking or loud enough to be heard through closed doors)?

☐ **T**ired: Do you often feel tired, fatigued, or sleepy during the daytime, even after a "good" night's sleep?

☐ **O**bserved: Has anyone observed you stop breathing during your sleep?

☐ **P**ressure: Do you have or are you being treated for high blood pressure?

☐ **B**ody mass index (BMI) greater than **35**?

☐ **A**ge older than **50** years?

☐ **N**eck circumference greater than **16** inches (41 cm) for females or **17** inches (43 cm) for males?

☐ **G**ender = **male**?

Obstructive sleep apnea (OSA)

OSA affects one in five patients with type 2 diabetes and the prevalence of any sleep disordered breathing exceed 50%. Age-adjusted rates of OSA are significantly higher (4- to 10-fold) with obesity. In obese participants enrolled in the Action for Health in Diabetes (Look AHEAD) trial, it exceeded 80%. [DEL] OSA is a risk factor for cardiovascular disease, weight gain, and decreased QOL scores. There is mounting evidence that OSA, along with sleep deprivation in general, is associated with insulin resistance, increased insulin secretion, and impaired glucose metabolism.

- **Screening.** All patients with diabetes should be screened for OSA, particularly those patients with waist circumference above normal. Intermountain recommends using the _OSA STOP-BANG Screening Questionnaire_.

- **Referral.** For patients with three or more STOP-BANG risk factors (see below), consider referral to a sleep specialist.

- **Treatment**. Treatment of sleep apnea significantly improves quality of life and blood pressure control. Evidence for an effect on glycemic control is mixed, and preliminary evidence is hopeful that treatment can improve visual acuity in those struggling with diabetic retinopathy. [ADA, ANT, MAS]

  Treatment should follow standard guidelines for OSA as outlined in the Intermountain care process model _Management of Obstructive Sleep Apnea_. Extra effort toward weight loss, however, will likely be of great benefit to patients who suffer from diabetes and its comorbidities.

Low testosterone in men

Type 2 diabetes is a known risk factor for low testosterone levels in men. Consider evaluating male patients who have diabetes and symptoms of hypogonadism.

Obesity is a major confounder. It can cause low sex-hormone binding globulin, the storage molecule for testosterone, which lowers the total testosterone value, while the free and bioavailable testosterone numbers remain normal. Testosterone replacement increases coronary artery plaque volume and increases cardiovascular event risk. Risks and benefit should be considered if prescribing testosterone.

Conditions associated with type 1 diabetes

An adult diagnosed with autoimmune diabetes (type 1) has an increased risk for other autoimmune disorders, most commonly celiac disease and thyroid disease. Since both of these can be silent early on, routine screening is recommended.

- **Thyroid disease.** Perform thyroid-stimulating hormone (TSH) testing as part of an initial evaluation. If the diagnosis of diabetes is confirmed, repeat this testing periodically.

- **Celiac disease (sprue).** This disease is common in patients with type 1 diabetes (1% to 16% of individuals compared with 0.3% to 1% in the general population). Perform a tissue transglutaminase test as the initial screening for this disease in all patients with type 1 diabetes. Repeat testing may be appropriate. Symptoms of celiac disease may be subtle and include diarrhea, abdominal pain, and chronic fatigue.

- **Pernicious anemia.** Measurement of vitamin B12 levels should be considered for patients with type 1 diabetes and peripheral neuropathy or unexplained anemia.

▶ DATA AND REPORTS

The Intermountain Primary Care Clinical Program maintains a database of 130,000 patients with diabetes who have been seen within the Intermountain system (see sidebar at left for inclusion criteria). The purpose of the database is to improve clinical care. It includes information on HbA1c, lipids, blood pressure, urinary albumin excretion, eye exams, foot exams, and ACEI or ARB use. Using this information, reports are developed for primary care physicians and endocrinologists to identify patients who either may not have had testing done or who have test results outside standards of good diabetes management.

Data for the reports is obtained from insurance claims, billing records, lab results, and the electronic medical record (EMR). Physicians can review their data and submit corrections if needed (see sidebar at left).

The diabetes bundle

Good management of diabetes is key to delaying and preventing complications, which improves patient satisfaction, medical outcomes, and appropriate healthcare resource utilization. The "diabetes bundle" is a set of four elements that together represent a measure of an individual's diabetes control. This set allows for comparison of management within the Medical Group and with other groups nationally and leads to more coordinated and accountable, team-based care. One of the quality measures for the Primary Care Clinical Program is to increase the percentage of diabetes patients ages 18 to 75 who meet the targets indicated in the bundle.

The diabetes bundle targets are set to allow for appropriate individualization of care.

The diabetes bundle consists of the following targets:

1. Hemoglobin A1c less than 8 %

2. Blood pressure less than 140 / 90 mm Hg

3. Nephropathy evaluation and care (one of the following):
   - Spot urine microalbumin-to-creatinine ratio
   - Estimated Glomerular Filtration Rate (eGFR)

4. Eye exam: A retinal or dilated eye exam by an ophthalmologist or optometrist or with a retinal camera within the last two years

For most patients with diabetes, recommended treatment goals for HbA1c are lower than those in the diabetes bundle. For some patients with diabetes, recommended treatment goals for blood pressure as well. The bundle targets were selected so care plans could be individualized for each patient as clinically indicated. Most patients with diabetes should be treated to at least the levels indicated in the diabetes bundle.

SelectHealth support

SelectHealth is actively partnering with healthcare providers to care for patients with diabetes. SelectHealth uses interactive voice response telephone calls, diabetes care managers, and newsletters to reach out to members with diabetes, actively promoting good self-management, proper medical follow up, and continued education.

PROPOSED ORDERS

The medical assistant should propose orders for the following tests as the appropriate advisories fire in iCentra:*

- HbA1c every three months, or as directed by the provider.

Yearly:

- Comprehensive metabolic panel (CMP)
- Fasting lipid panel (FLP)
- Urine ACR
- B12 (for patients taking metformin)
- Retinavue camera exam, if available (for all insurances but Select Health, which is every 2 years)

Biennially:

- Two-year exam scheduled with ophthalmologist, or date of last eye exam entered.

*It's important that visits be scheduled with the appropriate diagnosis.

ADDITIONAL SUPPORT FROM THE CARE MANAGEMENT TEAM

The role of the care management team is to provide support by:

- Tracking population health resource utilization, including
  – Diabetes bundle reports
  – HealtheAdvisories
- Collaborating with providers on:
  – Managing patients and providing education
  – Identifying and referring patients who need specialty care
  – Arranging transitions of care
- Counseling patients via face-to-face visits or phone calls to help them achieve their lifestyle management goals
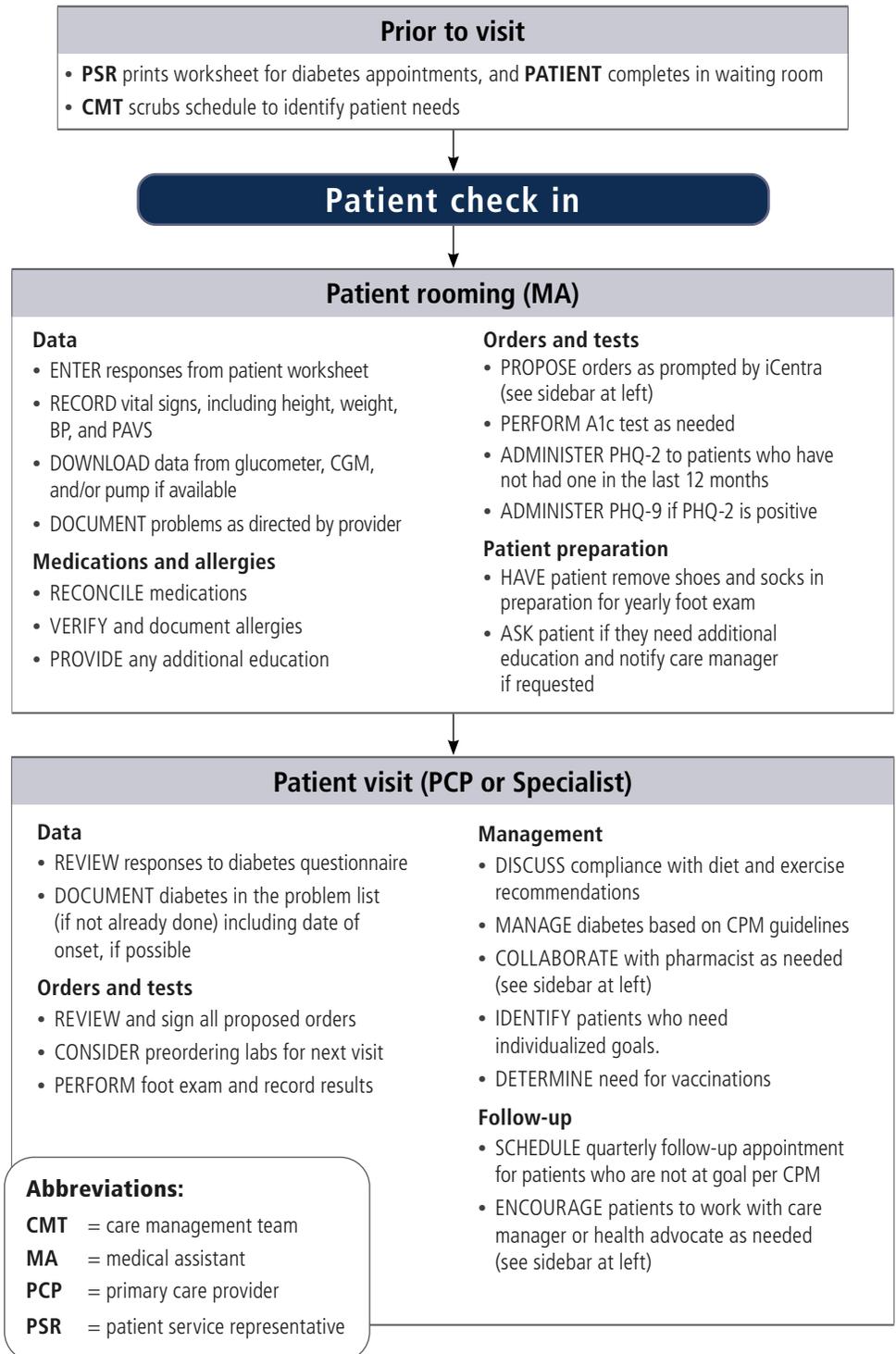
COLLABORATIVE PHARMACY MANAGEMENT

The collaborative pharmacy model of disease management provides a pharmacist embedded into a primary care clinic. The pharmacist prescribes, titrates and monitors medications for select patients in the clinic.

▶ CARE TEAM ROLES

A clinic visit for a patient with diabetes requires the support of the entire team to assure comprehensive care. Algorithm 9 below suggests general responsibilities to help a clinic team share accountability for diabetes management.

▶ ALGORITHM 9: PATIENT VISIT

Prior to visit

- **PSR** prints worksheet for diabetes appointments, and **PATIENT** completes in waiting room
- **CMT** scrubs schedule to identify patient needs

Patient check in

Patient rooming (MA)

Data

- ENTER responses from patient worksheet
- RECORD vital signs, including height, weight, BP, and PAVS
- DOWNLOAD data from glucometer, CGM, and/or pump if available
- DOCUMENT problems as directed by provider

Medications and allergies

- RECONCILE medications
- VERIFY and document allergies
- PROVIDE any additional education

Orders and tests

- PROPOSE orders as prompted by iCentra (see sidebar at left)
- PERFORM A1c test as needed
- ADMINISTER PHQ-2 to patients who have not had one in the last 12 months
- ADMINISTER PHQ-9 if PHQ-2 is positive

Patient preparation

- HAVE patient remove shoes and socks in preparation for yearly foot exam
- ASK patient if they need additional education and notify care manager if requested

Patient visit (PCP or Specialist)

Data

- REVIEW responses to diabetes questionnaire
- DOCUMENT diabetes in the problem list (if not already done) including date of onset, if possible

Orders and tests

- REVIEW and sign all proposed orders
- CONSIDER preordering labs for next visit
- PERFORM foot exam and record results

Management

- DISCUSS compliance with diet and exercise recommendations
- MANAGE diabetes based on CPM guidelines
- COLLABORATE with pharmacist as needed (see sidebar at left)
- IDENTIFY patients who need individualized goals.
- DETERMINE need for vaccinations

Follow-up

- SCHEDULE quarterly follow-up appointment for patients who are not at goal per CPM
- ENCOURAGE patients to work with care manager or health advocate as needed (see sidebar at left)

Abbreviations:

CMT	= care management team
MA	= medical assistant
PCP	= primary care provider
PSR	= patient service representative

▶ TRANSITIONS OF CARE

To ensure the coordination and continuity of care as patients transfer between locations or levels of care, follow these guidelines:

- **Care Manager for PCP should call the patient within 48 hours.**
  - Review discharge notes. Discuss each medication with the patient and verify with discharge medication instructions.
  - Confirm that new medications were picked up and whether the patient is taking and tolerating the medications.
  - Relay any questions to the PCP.
  - Update any insulin dosing changes on the patient's medication list. The most up-to-date information is likely to located in the notes from the primary care provider (PCP), endocrinologist, or Certified Diabetes Educator (CDE).

- **Follow up with patients** after any discharge from the hospital and schedule a follow-up appointment within an appropriate time frame.

- **Ensure admissions and discharge information is sent to the PCP** with each hospitalization.

- **Consider Transitional Care Management visit and billing** within 7 – 14 days.

▶ PROVIDER RESOURCES

Go to: InentermountainPhysician.org/ClinicalPrograms, and select **"Diabetes"** from the topic list. See the tab titled **"Clinical Guidelines and CPMs"** for the following:

Outpatient Management of Adult Diabetes Mellitus (this care process model)

Prediabetes CPM

Gestational Diabetes CPM

Lifestyle and Weight Management CPM

Care process models and clinical guidelines for related conditions include the following:

Metabolic and Bariatric Surgery for the Treatment of Obesity CPM
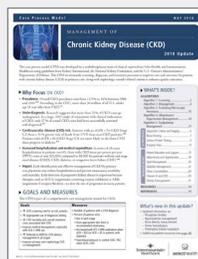
Chronic Kidney Disease CPM

High Blood Pressure CPM

Obstructive Sleep Apnea CPM

LOCATING PATIENT EDUCATION MATERIALS

Intermountain education materials are designed to support your efforts to educate and engage patients and families. They complement and reinforce diabetes team interventions by providing a means for patients to reflect and learn in another mode and at their own pace. To access these materials:

- **Search for Intermountain items in iCentra.** Look for items tagged with "_Title (IH)" in the patient education module.
- **Go to https:// intermountainhealthcare.org/ health-information/health-library/patient-handouts/,** and type in the topic of interest.
- **Use Intermountain's PrintIt!** for one-stop access and ordering for all Intermountain-approved education, such as fact sheets, booklets, and trackers.

▶ DIABETES EDUCATION RESOURCES

The Intermountain Diabetes Workgroup, diabetes educators, and Patient and Provider Publications team have developed patient education materials to directly support treatment recommendations in this care process model. Education for patients and families increases patient compliance with a treatment plan.

Intermountain-approved patient education materials

The following Intermountain-approved patient education resources can be accessed and ordered online at minimal cost. **See access and ordering information at left.**
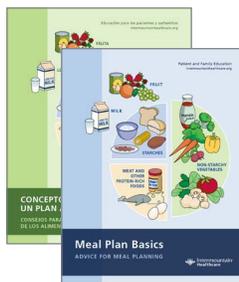
Living Well: A Diabetes Care Handbook

Intermountain's comprehensive guide to diabetes and diabetes self-management

Available in English and Spanish
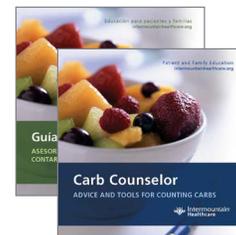
Carb Counselor: Advice and Tools for Counting Carbs

Available in English and Spanish

Meal Plan Basics

Available in English and Spanish

BG Tracker

Available in English and Spanish

Meal Plan

Available in English and Spanish

Diabetes Care Card

Available in English and Spanish

FACT SHEETS from Intermountain (All available in English and Spanish):

Diabetes Medications: What you should know (Spanish)

Diabetes: First steps after diagnosis (Spanish)

Weight-loss Surgery: A Decision Tool (Spanish)

Diabetes Resources (Spanish)

Diabetes educators and diabetes education programs

Diabetes education and medical nutrition therapy are covered by most commercial insurance providers and by Medicare. For help locating diabetes educators in the area of your practice, call the numbers listed below.

Salt Lake Valley Area

Salt Lake City, UT

Salt Lake Clinic
389 South 900 East
385-282-2600, *option 2*

Murray, UT

Intermountain Medical Center
5121 Cottonwood Street
801-507-3366

Intermountain Medical Group Comprehensive Care Clinic
5171 Cottonwood Street
801-507-9369

Cottonwood Endocrine and Diabetes Center
181 Medical Tower Drive
801-314-4500

Internal Medicine Associates
9844 South 1300 East, Suite 200
(Alta View Hospital Campus)
801-572-1472

Bountiful, UT

Bountiful Health Center
390 North Main Street
801-294-1000

Taylorsville, UT

Taylorsville Health Center
3845 West 4700 South
801-840-2000

Central Utah

Heber, UT

Heber Valley Medical Center
1485 South Highway 40
435-657-4311

American Fork, UT

American Fork Hospital
98 North 1100 East, Suite 302
801-492-2200

Provo, UT

Utah Valley Regional Hospital
1034 North 500 West
801-357-7546

Mt. Pleasant, UT

Sanpete Valley Hospital
1100 South Medical Drive
435-462-2441

Fillmore, UT

Fillmore Community Hospital
674 South Highway 99
435-743-5591

Richfield, UT

Sevier Valley Hospital
1000 North Main
435-893-0371

Northern Utah

Logan, UT

Logan Regional Hospital
500 East 1400 North
435-716-5310

Budge Diabetes Clinic
1350 North 500 East
435-792-1710

Ogden, UT

McKay-Dee Hospital
4401 Harrison Blvd
801-387-7520

McKay-Dee Endocrine and Diabetes Clinic
4403 Harrison Blvd, #3630
801-387-7900

North Ogden Clinic
2400 North 400 East
(Washington Blvd)
801-786-7500

Tremonton, UT

Bear River Valley Diabetes Education
440 West 600 North
435-716-5310

Southern Utah

Panguitch, UT

Garfield Memorial Hospital
200 North 400 East
435-676-8811

Cedar City, UT

Cedar City Hospital
110 West 1325 North, Suite 100
435-868-5576

St. George, UT

Dixie Regional Diabetes Clinic
348 East 600 South
435-251-2888

Southern Idaho

Burley, ID

Cassia Regional Hospital
1501 Hiland Avenue
208-677-6035

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This CPM presents a model of best care based on the best evidence available at the time of publication. It is not a prescription for every patient, and it is not meant to replace clinical judgment. Although physicians are encouraged to follow the CPM to help focus on and measure quality, deviations are a means for discovering improvements in patient care and expanding the knowledge base. Send feedback to Christopher Jones, MD, Intermountain Healthcare, (Christopher.Jones@imail.org).

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