



The New England Comparative Effectiveness Public Advisory Council
An Action Guide for Type 2 Diabetes Management
Next Steps for Patients
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Completed by:

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Introduction

About ICER and CEPAC

The Institute for Clinical and Economic Review (ICER) is an independent non-profit health care research organization dedicated to improving the interpretation and application of evidence in the health care system. The New England Comparative Effectiveness Advisory Council (CEPAC) is one of ICER's two core programs. CEPAC is a regional body whose goal is to provide objective, independent guidance on the application of medical evidence to clinical practice and payer policy decisions across New England. Backed from a consortium of New England state health policy leaders, CEPAC holds public meetings to consider evidence reviews of a range of topics, including clinical interventions and models for care delivery, and provides judgments regarding how the evidence can best be used across New England to improve the quality and value of health care services. ICER manages the day-to-day operations of CEPAC as one of its core programs designed to translate and implement evidence reviews to improve their usefulness for patients, clinicians, payers, and policymakers.

About this Guide

This document is a companion policy guide designed to help patients with type 2 diabetes make use of the results from a recent ICER evidence review and meeting of the New England Comparative Effectiveness Public Advisory Council (CEPAC) on "[Controversies in Type 2 Diabetes Management.](#)"

CEPAC held its meeting on type 2 diabetes management on October 29, 2014 in Providence, RI. During the meeting, CEPAC voted on the comparative clinical effectiveness and value of different management approaches, and explored how best to apply the evidence to practice and policy with a distinguished Policy Expert Roundtable of patient advocates, clinical experts, and policy leaders from across New England.

This guide is intended to provide patients with a series of action steps that can be taken to improve the efficiency and quality of their care. The content provided here is based on the published evidence as well as best practices recommended from subject matter experts during the CEPAC meeting. This guide is for informational purposes only, and it is not designed to replace professional medical advice.

TAKE STEPS TO MANAGE YOUR DIABETES THROUGH LIFESTYLE CHANGES

The first step to managing your diabetes is to determine whether there are healthful changes you can make in your lifestyle, including your exercise and eating habits. While medications can help lower your blood sugar levels to a healthy range, there may be steps you can take to delay your need for medications and to lower your risk for developing complications. Eating a healthful diet, starting an exercise program, and learning strategies to control your blood sugar levels are all important steps in managing your diabetes. Talk with your health care provider(s) to receive their guidance, resources, and support for adopting healthful behaviors. Following are links to information on maintaining a healthful diet, beginning an exercise program, and managing your diabetes.

Choosing healthier food options will help you control your blood sugar levels, lose weight, and lower your risk for complications from diabetes. The links in the box at right can help you build a healthier diet that fits your lifestyle and unique needs.

Tips for Healthier Eating

The following resources are available to help patients build a healthier diet that can be personalized to meet each patient's unique needs and goals.

- [Tips for Healthy Eating on a Budget](#)
- [Healthy Recipes](#)
- [Weight Management and Healthy Eating Tips](#) from MyPlate.gov
- [MyFoodAdvisor](#) from the American Diabetes Association (ADA)
- [Diabetes tracking apps](#) to help track what you eat and monitor your status

Exercise is important in helping you lose weight and control your blood sugar levels. The box at right provides links to information that can help you decide what types of activity are right for you and how you can fit exercise into your usual routine.

Starting an Exercise Program

The resources below are available to help patients develop an exercise plan.

- [Tips on overcoming barriers to exercise](#) from the ADA
- [Other fitness information](#) from the ADA
- [Tips for increasing physical activity](#) from ChooseMyPlate.gov

Controlling blood sugar levels is essential to diabetes management. The links in the box at right provide tools and guidance to help you recognize when blood sugar is too low and what steps you can take to reduce your chances of complications.

Managing your Diabetes

The resources below are available to help patients understand their blood sugar levels and take steps to reduce complications.

- [Manage Your Diabetes for Life](#): Actions you can take to care for your diabetes from the National Diabetes Education Program. [\(Also available in Spanish\)](#)
- [Educational tools for self-care](#) from the American Association of Diabetes Educators
- [Tools and calculators](#) for measuring glucose and carbohydrate intake
- [A guide to carbohydrate counting](#) to manage your blood sugar levels
- [Managing Diabetes](#). Resources from the Joslin Diabetes Center
- Additional educational materials on a variety of topics are available from [Learning about Diabetes](#)

Understand your Medication Choices

Patients with type 2 diabetes face many decisions in choosing the right management program for their needs. Different medications will work best for different patients. When talking with your doctor, be sure to share information about your diet and exercise habits, daily schedule, or concerns about medications. You should also ask your doctor about the risks of each medication and if they might interact with other medications you are taking. Sharing this information will help your doctor understand which treatments will fit best with your lifestyle.

Metformin is the first medication used to treat most patients with type 2 diabetes who are unable to control blood sugar through diet and exercise changes alone. When metformin alone does not control blood sugar levels, additional medication(s) may be added. The chart below outlines the benefits, side effects, and costs of a selection of medications that may be used in combination with metformin for type 2 diabetes. Further information, including links to more information about each type of medication, is provided on the pages that follow. You can use this information to talk to your doctor about your options.

Select Type 2 Diabetes Drug Class Comparison Chart

Drug Type	Drug Names	Benefits	Side Effects*	How It's Taken	Monthly Cost**
Sulfonylurea	Glucotrol® <i>glipizide</i> Micronase® <i>glyburide</i> Amaryl® <i>glimepiride</i>	<ul style="list-style-type: none"> Lowers blood sugar levels 	<ul style="list-style-type: none"> Too low blood sugar Possible weight gain Upset stomach Heart problems 	By mouth once every day with a meal	\$55
DPP-4 Inhibitors	Januvia® <i>sitagliptin</i> Onglyza® <i>saxagliptin</i> Tajenta® <i>linagliptin</i> Nesina® <i>alogliptin</i>	<ul style="list-style-type: none"> Lowers blood sugar levels Lower risk of blood sugar going too low 	<ul style="list-style-type: none"> Upper airway infection Headaches In some cases, may be associated with pancreatitis 	By mouth once every day	\$326
GLP-1 Receptor Agonists	Byetta® <i>exenatide</i> Bydureon® <i>exenatide extended-release</i> Victoza® <i>liraglutide</i> Trulicity® <i>dulaglutide</i> Tanzeum® <i>albiglutide</i>	<ul style="list-style-type: none"> Lowers blood sugar levels Lower risk of blood sugar going too low May help some patients lose weight 	<ul style="list-style-type: none"> Upset stomach, vomiting, diarrhea Headache In some cases, may be associated with pancreatitis 	By injection. How frequently you take it varies from once a week to once a day	\$233
NPH Insulin	Humulin N® Novolin N®	<ul style="list-style-type: none"> Lowers blood sugar levels 	<ul style="list-style-type: none"> Risk blood sugar that is too low Possible weight gain 	By injection, usually twice each day	~\$80
Insulin Analog	Levemir® <i>Insulin detemir</i> Lantus® <i>Insulin glargine</i>	<ul style="list-style-type: none"> Lower blood sugar levels Decreased risk for low blood sugar while sleeping 	<ul style="list-style-type: none"> Some risk for blood sugar going too low Heart problems when combined with certain medications 	By injection, usually once each day	~\$220

Micromedex Healthcare Series. RED BOOK® Online. Greenwood Village, CO: Truven Health Analytics, 2014. <http://truvenhealth.com/>. Accessed May, 2014.

*Only most common and most serious side effects included. Discuss all risks, side effects, and interactions with your doctor.

**Monthly costs are estimates. Your cost will vary depending on your insurance plan and on how much of the medication your doctor suggests you take.

Treatment Options:

Metformin

Metformin is the first medication used to treat most patients with type 2 diabetes. Metformin is proven to be effective, is inexpensive, and its side effects are usually mild.

Sulfonylurea

When metformin by itself does not bring down your blood sugar levels, your doctor may add another medication, such as a sulfonylurea. Common types of sulfonylureas include glyburide, glimepiride, and glipizide. Sulfonylureas are sometimes associated with side effects such as weight gain or abnormally low blood sugar (a condition known as hypoglycemia), but these effects happen infrequently and can often be easily managed. Some studies suggest that oral medications that lower blood sugar, including sulfonylureas, may slightly increase your risk of heart attack or stroke, so it is important to discuss these concerns with your doctor. Sulfonylureas are generally low cost, and evidence shows that they are effective at lowering blood sugar for most patients.

GLP-1 Receptor Agonists

GLP-1 receptor agonists are usually used with metformin or in combination with both metformin and a sulfonylurea drug. Some common brand names are Byetta®, Bydureon®, and Victoza®. When using a GLP-1 receptor agonist, patients give themselves an injection of the medication, typically once per week. Evidence shows that these medications are effective at lowering blood sugar, but they are much more expensive than sulfonylureas. They can have added benefits for some patients, such as less frequent cases of low blood sugar, and they may help some people lose weight.

DPP-4 Inhibitors

Like GLP-1 receptor agonists, DPP-4 inhibitors may be prescribed in addition to metformin or in combination with other medications. Common brand names include Januvia®, Onglyza®, and Tradjenta®. There is no evidence showing that DPP-4 inhibitors are better than sulfonylureas in reducing blood sugar, but they may offer some benefits compared to other medications, such as less weight gain and lower risk of blood sugar dropping too low.

Human Insulin

Human insulin has been used since the 1980s in treatment of diabetes. Long-acting human insulin, or NPH, is typically given two times each day by injection. Some patients using NPH insulin find it more difficult to control their blood sugar levels and experience episodes of low blood sugar as a result. These episodes are usually minor and can be managed by eating or drinking something with sugar, but rarely they can be severe, requiring treatment from a clinician. Your doctor and other members of your diabetes care team can help you learn strategies to control your blood sugar and prevent it from getting too low while taking insulin.

Insulin analogs

Insulin analogs are a synthetic version of human insulin. Evidence shows that insulin analogs are no more effective than human insulin in lowering your blood sugar, but they may reduce the risk of blood sugar going too low. To some patients, such as those who are unable to manage low blood sugar on their own, this is an important benefit. For most people, low blood sugar can be controlled through diet and careful monitoring, so analogs do not provide substantial additional benefits. Insulin analogs are more expensive than NPH insulin, so NPH insulin may be a good first choice for patients without a history of severe episodes of low blood sugar.

The following links provide more information about type 2 diabetes medications:	
Medication Decision Aid	A patient decision tool from the Mayo Clinic, including information on risks, benefits, and costs
Medicines for Type 2 Diabetes	A guide from the Agency for Healthcare Research and Quality that includes information on side effects, how medications work, and what they cost
What to ask your doctor about your medications	A guide to talking with your doctor from the National Institute of Health (NIH)
What Are My Options?	A medication guide from the American Diabetes Association discussing the benefits and risks of different drug classes
Consumer Reports: "Best Buy" Medications	A guide comparing the effectiveness, safety, and price of different oral medication options
Saving money on medications	Tips to help you avoid high costs at the pharmacy
Tips for taking medications	A guide from the American Association of Diabetes Educators to help patients improve their experience with medication
What you need to know about medications	A series of resources from the National Diabetes Information Clearinghouse providing an overview of the different treatment options available
Types of Diabetes Medications	The New York Times Health Guide explains the different types of medications, including their risks and benefits

Further information on insulin is available at these links	
Types of Insulin	A guide to the different types of insulin
A guide to starting insulin	Instructions on how to start using insulin
Managing and Preventing Hypoglycemia	Information to help you manage blood sugar levels. This is especially important when taking NPH insulin because of the higher risk for hypoglycemia.

YOUR DIABETES CARE TEAM

Type 2 diabetes is a disease that involves many different types of care. Often, you will be treated by a team of doctors, nurses, and other medical professionals who each play an important role in your care. While your doctor will monitor your health and prescribe you any medications that you need, other professionals such as [diabetes educators](#) may help train you in self-care techniques that will help you to manage your diabetes. [Nutritionists or dietitians](#) may help you develop a healthful eating plan, while [exercise specialists](#) may help you start an exercise program that works for you. [Community health workers](#) can help with scheduling appointments, connect you to transportation and other community resources, and help communicate with other members of your care team to help manage your disease. In some cases, you may need to see doctors who specialize in care for your eyes, kidneys, or feet if you develop complications. The resources listed below will help you learn more about diabetes care teams and how they can help you to manage your diabetes.

According to the [Joslin Diabetes Center](#), a successful care team may include:

- Diabetes Physicians
- Certified Diabetes Educators
- Nurses
- Dietitians
- Exercise Specialists
- Nurse Practitioners
- Mental Health Counselors

For patients with more advanced disease, other specialist doctors may be included, such as eye doctors, cardiologists, nephrologists, and podiatrists to monitor your eyes, heart, kidneys, and feet.

Learn more about [your diabetes care team](#) from the American Diabetes Association.

ABOUT DIABETES EDUCATORS

Diabetes educators are trained to help people with diabetes learn how to manage all aspects of the disease. According to the American Association of Diabetes Educators, an educator can help to:

- Understand how diabetes affects your body
- Explain how medications work
- Develop meal plans that work for you
- Suggest tools to help you to monitor your status
- Offer strategies to deal with stress

To learn more, visit the [AADE website](#). You can also search for an [educator near you](#) and learn [what to expect](#) at your appointment.

If your care plan does not involve these specialists and you think you may benefit from their services, be sure to speak with your doctor.