

The MARCOM GOLD award recognizes excellence in marketing communications.



NOVO NORDISK BEST PRACTICES IN DIABETES MANAGEMENT: Rethinking the Role of Carbohydrates

Carbohydrate Counting as a Tool for Preventing Hypoglycemia

Because endocrinologists in the Middle East deal with hypoglycemia among a large percentage of their patients with diabetes, any tools that can help them are welcome.

Two of the best tools are carbohydrate exchange and carbohydrate counting, related methods for tracking how many and how much carbohydrates people with diabetes eat at each meal. The link between them and the prevention of hypoglycemia takes two forms:

- Improperly counted carbohydrates can lead to overdosing bolus insulin, resulting in hypoglycemia. (Diabetes patients can also develop a habit of using large amounts of insulin to “cover” their consumption of large amounts of carbohydrates. See “The Revolt Against Carbohydrates.”)
- Estimating the amount of bolus insulin to inject without knowing the carbohydrate content of a meal can result in blood glucose levels that are dangerously low.

Carbohydrate exchange lists carbohydrates by the number they are assigned in the glycemic index, an idea first published in 1981 by David Jenkins, MD, professor, Department of Nutritional Sciences, University of Toronto, Canada, and refined over the years since.¹ A high number on a scale of 1 to 100 means that a carbohydrate is rapidly turned into glucose, while a lower number means that a carbohydrate will take longer to be metabolized into glucose. To make the system easy to use, these days carbohydrate exchange

groups carbohydrates into 15-gram portions that share calorie counts and structural similarities, such as fruits or grains.

Using this system, a person with diabetes can “exchange” one carbohydrate portion of a meal for another. As long as the exchanges are between equal grams of carbohydrate and have similar caloric values, the system allows diabetics to quickly substitute a meal’s courses without having to do time-consuming calculations.

Healthy eating basics

Healthy eating is important for everyone, but it’s even more important for people with diabetes.

To manage your diabetes, you’ll want to:

- Eat a variety of foods in the right amounts
- Be sure to check food labels for calorie, carbohydrate, total fat, and sodium amounts
- Eat regularly
- Match how much you eat with your activity level
- Eat fewer foods high in calories, cholesterol, saturated fat, trans fat, and sodium

You don’t need to ban any foods from your meal plan. But you may need to limit the amounts you eat or how often you eat some of them.

Good diabetes self-care means following your meal plan, being active, and taking your diabetes medicines as directed. Your meal plan should:

- Include a wide variety of foods so that you get needed nutrients (the healthy things in food)
- Include many of your favorite foods so that you enjoy what you eat
- Be easy to follow

Visit Cornerstones4Care.com to find a personal menu planner that will create a meal plan made up of your favorite foods. Your plan comes complete with diabetes-friendly recipes and a shopping list. The first time you visit you will need to register. Registration is fast and easy!

4

Planning healthy meals

The American Diabetes Association’s “Create Your Plate” shows how to manage your portion sizes and eat balanced meals. To Create Your Plate, split your plate down the middle. Then divide one of the halves into two. Put nonstarchy vegetables (like spinach or broccoli) in the big half. Put starchy foods (like potatoes or rice) in one of the small sections. Put meat or meat substitute (like eggs or tofu) in the other small section. You may want to add an 8-ounce glass of fat-free milk or low-fat milk and a piece of fruit, and you’re ready to eat!

The goals of your meal plan are to help you:

- Keep your blood sugar within your goal range
- Manage your weight
- Manage blood cholesterol and blood fat levels
- Manage blood pressure



Ask your diabetes care team to refer you to a registered dietitian (RD) if there is not already one on your team. This person can help you make a meal plan. You want to have the right balance of food, medicine, and activity.

5

Pages from a Novo Nordisk educational brochure, “Carb Counting and Meal Planning.”

Using carbohydrate exchange, a person with diabetes can “exchange” one carbohydrate portion of a meal for another.

While carbohydrate exchange focuses on calories as well as grams of carbohydrate, carbohydrate counting takes a different approach. Dr. Jenkins saw that it wasn't enough to know the grams and calories of carbohydrates. He began focusing on the effects a particular carbohydrate has on blood glucose levels rather than on its molecular structure.²

Carbohydrate exchange assumed that because of their complex molecular structure, starches such as white rice would be slower to be converted into glucose, so they ranked lower on the glycemic index. On the other hand, sugars, which are metabolized more quickly, ranked high.

Dr. Jenkins and his research team found that some foods did not produce the results expected by carbohydrate exchange. For example, starchy white bread with a high glycemic index rating was metabolized more slowly than sugary ice cream—the opposite of the predicted effect. For Dr. Jenkins and his successors, a carbohydrate's ranking in the glycemic index is not as important as how quickly the body metabolizes it.³

Carbohydrates and Cardiovascular Disease

For several decades and until recently, governments in European countries and the United States have advised their citizens that high consumption of fats and protein can increase the risk of heart attack and stroke. They based their advice on scientific data that correlated a rise in rates of heart attacks and strokes among Western populations with the consumption of fats in the diet. Postmortem analyses of fatal cardiovascular events of-

The 3 main types of carbohydrates

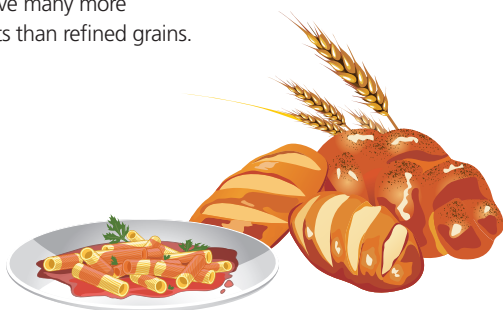
Carbohydrates are made up of fiber, starch, and sugar. On a Nutrition Facts label, the term “total carbohydrate” includes all 3 types. This is the number you should pay attention to if you are counting carbs

Starch

Foods that are high in starch include:

- Foods that contain grains, like bread, cereal, crackers, rice, and pasta
- Starchy vegetables, like peas, corn, lima beans, and potatoes
- Dried beans, lentils, and peas (such as pinto beans, kidney beans, black-eyed peas, and split peas)

Starches may contain carbohydrates and fiber. Grain-containing foods can be broken down further into whole grains and refined grains. Whole-grain foods contain the entire grain, so they have many more nutrients than refined grains.



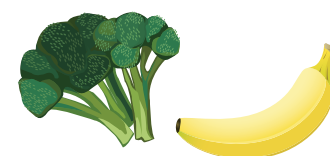
Sugar

Sugary foods are another type of carbohydrates. There are 2 main kinds:

- Naturally occurring sugars, like those in milk and fruit
- Added sugars, like those added to make, for example, cookies, candy, pies, or ice cream




Added sugars contain carbohydrates but have little to no nutritional value. On a Nutrition Facts label, the number of sugar grams includes both natural and added sugars.



Fiber

Fiber is the part of plant foods (like vegetables, fruits, nuts, beans, and whole grains) that cannot be digested. Fiber helps regulate bowel movements and helps you feel full after eating. It may also reduce cholesterol levels.

The American Diabetes Association says that adults should try to eat 25 to 30 grams of fiber a day. But most of us eat only about half that. It is best to get fiber from food rather than supplements because high-fiber foods contain many important vitamins and minerals.



ten revealed arteries blocked by fatty plaque buildup as well as fat on the heart muscle itself. The reasoning at the time was that the source of fat in the cardiovascular system was fat in the diet.⁴ The remedy was simple: Significantly lower the amount of fat in the diet while significantly increasing carbohydrates. A diet that had once been dominated by the high consumption of fats and protein was now focused on higher carbohydrate/ lower fat consumption.

Millions of people began following those dietary guidelines, but the conventional wisdom about fat and protein started to unravel as scientists and healthcare providers began noticing a large increase in the number of persons developing type 2 diabetes. What had been a relatively rare disease among adults now was reaching almost epidemic levels. As the frequency of cardiovascular events increased among the adult population, the trend was first seen as a side effect of increased life spans. Thanks to modern medical technology, people were living longer, so they could be expected to have diseases common to old age, such as heart disease and diabetes, develop.

As the incidence of type 2 diabetes began increasing among persons 30 years and younger who previously had been relatively immune to the disease, however, medical experts focused on differentiating between “good” and “bad” carbohydrates. Bad carbohydrates were ones that the body could more quickly metabolize, and therefore were faster to show up as a spike in blood sugar levels. This helped lead to the creation of the glycemic index, which quickly became a standard reference for endocrinologists and diabetes patients.⁵ For a few years, application of the glycemic index helped avert attention from flaws in the “more carbohydrate/less fat” diet model. If there were problems with carbohydrates, it wasn’t because of high carbohydrate consumption. Instead, they came from not taking into account how fast the body metabolized carbohydrates.

The Revolt Against Carbohydrates

While carbohydrate exchange and counting are reliable ways to measure carbohydrate consumption, carbohydrates themselves have come under intense scrutiny as some experts question whether they are good for people with diabetes in any but a much smaller dietary role.

For years after experts began recommending high-carbohydrate diets, there was little dissent from the belief that such diets would help prevent heart disease, arterial thrombosis, stroke, and other cardiovascular-related maladies. It was a commonly accepted belief in the medical community.

But there were some dissenters. One of the first was Richard K. Bernstein of New York, who had a diagnosis of type 1 diabetes at age 12.⁶ By the time he was in his thirties, his diabetes had begun affecting his vital organs. Seeking answers, Mr. Bernstein enrolled in medical school. As Dr. Bernstein, endocrinologist, he began a close study of type 1 and type 2 diabetes.

At his diabetes treatment clinic, Dr. Bernstein began noticing that certain approaches to treating patients with the disease did not appear to be effective. Some, he concluded, were even dangerous if continued for long periods. He found that a focus on carbohydrates as an essential part of the treatment for patients with diabetes was actually harmful. He noted that mainstream organizations like the American Diabetes Association (ADA) said that diabetics could consume up to 180 grams per day of carbohydrates and should consume at least 30 grams of carbohydrates at each meal—breakfast, lunch, and dinner.⁷ But Dr. Bernstein found that higher carbohydrate intake, although it could be moderated by insulin, led to diabetics injecting themselves with larger bolus insulin doses to “cover” the blood sugar spikes created by the officially recommended high amounts of carbohydrates. He noticed that high insulin use by some with type 2 diabetes often led to substantial weight gain. Insulin, he noted, was a fat-producing hormone that even in insulin-resistant type 2s could help the body manufacture more fat.⁸

Dr. Bernstein concluded that the most effective use of insulin was in very small doses intended to keep blood sugar levels at a steady low.

Dr. Bernstein concluded that the most effective use of insulin was in very small doses intended to keep blood sugar levels at a steady low. He began recommending that his patients eat no more than 30 grams of carbohydrate per day—an amount substantially below what the ADA and other diabetes experts were advising.⁹ While Dr. Bernstein was able to get his patients to follow his low-carbohydrate/low-insulin program, trying to persuade his fellow medical professionals that high carbohydrate intake was hurting rather than helping patients became a long, lonely task. For years he stood at the sidelines of diabetes research.

Dr. Bernstein began bringing his insights to a larger public with the publication of *Diabetes: The Glucograft Method for Normalizing Blood Sugar* in 1981,¹⁰ followed

by five other books over the years since. In his last three books, published between 2005 and 2011, Dr. Bernstein firmly advocated low carbohydrate consumption and small insulin doses as the best way for patients with diabetes to achieve controlled, nearly normal blood sugar levels.

Good Calories v Bad Calories

With the 2007 publication of *Good Calories, Bad Calories*,¹¹ a book that became a bestseller, Gary Taubes, a science graduate with degrees from Harvard and Stanford Universities with a gift for clear writing, showed readers that the belief that simply counting calories was the key to successful weight loss and good health was wrong. It wasn't the calories people consumed, he said, but what form those calories came in, labeling highly refined carbohydrates, such as flour, sugars, and starches, as "bad calories." Mr. Taubes contended that the speed with which the body could convert processed carbohydrates into glucose made it highly likely that a diet high in those carbohydrates would eventually overwhelm the endocrine system's ability to metabolize high amounts of glucose. The result: diabetes and obesity.

Mr. Taubes also questioned the belief that diets high in fat and protein increased the risk of heart attack. He said it was the other way around; the conventional wisdom that high-carbohydrate diets were the best way to protect against cardiovascular disease was wrong. More fat and protein actually worked to people's advantage. Mr. Taubes' advocacy of higher fat/higher protein diets opened a robust public discussion of what people should really be eating to avoid disease. In 2011, his next bestseller, *Why We Get Fat and What to Do About It*,¹² went more deeply into the link between carbohydrate consumption and metabolic diseases.

These days the prevailing wisdom about eating fats is that some fats—like some carbohydrates—are bad for people, but many are not. *The New York Times* recently published a summary of current thought on fats and carbohydrates, "The Fats You Don't Need to Fear, and the Carbs That You Do"¹³ confirming that old assumptions about both forms of nourishment are now undergoing radical review. In the article, Mr. Taubes refutes the impression that all fats are bad and all carbs are good. "It's really important to distinguish between healthy fats and bad fats, healthy carbs and bad carbs," he said.

One of the pivotal studies that have led to a reconsideration of the role of fats in the diet was published in March 2015 in the *Annals of Internal Medicine*.¹⁴

Approaches to Carbohydrate Counting and Hypoglycemia Among Saudi Healthcare Providers

Three Saudi physicians explain their approaches to educating diabetes patients and the people around them about hypoglycemia and carbohydrate counting.

"Education about hypoglycemia depends on the type of patient as well as their educational level," says Saïid Khadar, MD, an endocrinologist at Dr. Sulaiman Al Habib Medical Complex-Olaya in Riyadh, Saudi Arabia. "We don't use visual aids. Instead, we talk to patients and their families about hypoglycemia symptoms and how to deal with them.

"The effectiveness of any advice we give patients is linked to their level of education," says Dr. Khadar. "More highly educated people can understand the more complex factors involved in controlling their diabetes, including carbohydrate counting. Less educated people require a less complex approach to helping them understand what they need to do."

Ashraf Shaaban, MD, an internist at GNP Healthcare in Jeddah, says an important task is how to treat diabetes patients who have experienced hypoglycemia for the first time. "I teach them how to recognize hypoglycemic symptoms and deal with them. If they are on a sulfonylurea or taking insulin, I make them aware that that puts them at greater risk of hypoglycemia."

Saudi doctors consider patient education to be the most important aspect of treating patients with hypoglycemia. "I give full instruction in my clinic," says Dr. Shaaban, "including a discussion of medications, symptoms, and ways to increase blood glucose levels in a short time, starting with glucose tabs all the way up to glucagon. Patients' families also participate in the educational sessions. I often use photographs of people experiencing hypoglycemia so that patients and their families become familiar with the signs of hypoglycemia. Many times a diabetes patient won't know that he is suffering from hypoglycemia, so his family's ability to see and deal with his symptoms becomes very important."

For Hamzah Arqan, MD, a consultant in internal medicine and endocrinology at International Medical Center in Jeddah, it is important to address every aspect of diabetes. The IMC has three full-time diabetes educators who can be made available at any time, as well as five

consider the ride



The fact is, even patients who achieve substantial HbA_{1c} reductions can experience too many ups and downs along the way

- Are patients reaching their HbA_{1c} goals?
- Are patients reporting all hypoglycaemic events?
- Could there still be spikes in fasting and prandial glucose?
- Are patients struggling with dosing regimens – and unable to take them as prescribed?

At Novo Nordisk, we are committed to supporting the medical community in addressing these challenges.

clinical dietitians on site. “We have a hotline and a voice message system so that patients can get advice right away. When we get new patients, we teach them about carbohydrate counting, meal portions, insulin calculations, and medications. When I prescribe a medication, I explain in detail how it works and discuss the risk and symptoms of hypoglycemia, how to monitor blood glucose levels, and what to do if a patient has those symptoms.”

Dr. Arqan says his clinic sees about 120 patients daily over a five-day workweek. “About 80% of our patients have diabetes, and of that number, 90% have type 2 diabetes. Education is the cornerstone here. One thing we stress when we teach people how to use insulin is to remind them that because insulin can control blood sugar, it is a powerful tool for averting cardiovascular problems. We also teach them how to safely increase or decrease their doses. Insulin users who lack adequate knowledge run a greater risk of hypoglycemia and weight gain.”

IMC also offers a weekend program monthly, with a diabetes educator and dietitian participating on site. “Sometimes we have children with type 1 diabetes. We meet with their teachers and other people at their schools so that if a child has a hypoglycemic episode, they know how to respond”—such as giving a diabetic student a snack that will quickly raise blood glucose level.

“When you educate a patient, you are preventing future problems associated with diabetes.”

– Ashraf Shaaban, MD

Once his patients are following a routine for managing their diabetes, Dr. Shaaban has them return every three months for follow-up checks. “I always greet them with a warm salutation: ‘Hello! It is wonderful to see your face!’

When you’re dining out and you can’t measure, you can estimate!

If you are dining out or you’re unable to use measuring cups and spoons or a scale, you can use your hand to estimate portion sizes. (Note: Hand sizes vary. These estimates are based on the size of a small hand. They are intended to be guides only.)



■ Your fist equals about 1 cup



■ Your palm equals about 3 ounces



■ Your thumb equals about 1 ounce

For more meal planning tools, visit Cornerstones4Care.com.

Daily calorie goal

The table below shows how many servings from the different food groups you would eat for each daily calorie level. Each column lists the total grams of carbs, the recommended number of food servings from each food group, and how many grams of carbs are in these servings. To find out how much food is in a serving, check the lists at the end of this booklet.

- Current recommendation of total carbs for a healthy diet is 45% to 65% of total calorie needs
- 1200 calories per day is the minimum necessary to meet your nutrient needs

Talk with your diabetes care team about the calorie count that is right for you.

Calories	1200	1500	1800	2000	2200
Total carbs (grams/serving)	144	174	209	239	269
Servings					
Starches (15 grams)	5	6	8	10	11
Fruits (15 grams)	2	3	3	3	4
Milk & yogurt* (12 grams)	2	2	2	2	2
Vegetables, nonstarchy (5 grams)	3	3	4	4	4
Lean meat and meat substitutes	4 oz	6 oz	7 oz	8 oz	8 oz
Fats	5	6	7	7	8

Bold = foods that contain carbohydrates. *Fat-free.

Please come in!’ This puts patients at ease and makes it easier for them to discuss their diabetes with me.”

Dr. Shaaban often lectures before public audiences and fellow medical professionals. “I tell my medical peers to not look at the time they spend educating diabetic patients as lost time they could have spent better elsewhere. When you educate a patient, which is something that must be done, you are preventing future problems associated with diabetes.”

National Differences

The Saudi doctors note that even though they are as aware as any group of doctors in the world of hypoglycemia and its possible ill effects, they observe some differences between Saudi diabetes patients and European or American patients. “In my practice, probably 5% experience hypoglycemia,” says Dr. Khadar. “In Saudi Arabia as a whole, I’d estimate it is 10%. The reason why this figure is lower than what you would see in the United States or Europe is because we do not try to control our patients’ A1c levels as tightly as in other countries. A1c levels of 7.5% to 8% are acceptable here. Our patients don’t use as much insulin as elsewhere, and we often try to delay insulin use for as long as possible.”

Dr. Khadar says that Saudis seem to tolerate much lower blood sugar levels than Europeans or Americans. “I’m not sure why, because Saudis eat a lot of carbohydrates, especially rice. Our per-capita consumption of rice is among the highest in the world. Most of our diet is meat and rice, and a typical dinner is usually taken around 11 p.m.”

Dr. Khadar thinks that local culture can make it harder for patients to track and control carbohydrates. “We don’t have many places of entertainment here besides restaurants, and invitations to friends to do something together almost always means hosting them at a meal. For teenagers, restaurants are the only form of entertainment. Western and American-style fast-food restaurants offer meals that have many carbohydrates, so we always try to educate our diabetes patients about avoiding junk food.

“Still, we are getting greater public awareness of carbohydrates, slowly, through notices in the media—TV and radio—and some restaurants have taken our advice to offer dishes with fewer carbohydrates. One good development is diet centers, such as Cambridge Diet Center, that deliver meals to customers’ homes, with customized dishes, such as ones that follow Weight Watchers guidelines.”

As much as diabetics are becoming more aware of hypoglycemia, there are some who are unaware that they may

Sample meal plan 1500 calories, 174 carb grams

Visit Cornerstones4Care.com to find tools that make meal planning easy! The personalized meal planner lets you plan meals that include the foods you like best. The planner comes complete with recipes and a shopping list.



Food	Amount	Food Group	Carb Grams
Breakfast			
Bran flakes	1 cup	Starch	30
Milk, fat-free	1 cup	Milk	12
Banana	½	Fruit	15
Meal total			57
Lunch			
Sandwich of:			
Roast beef, lean	2 oz	Meat	0
Cheese (part skim)	1 oz	Meat	0
Whole-wheat bread	2 slices	Starch	30
Mayonnaise, reduced fat	1 Tbsp	Fat	0
Baby carrots and grape tomatoes with low-fat dressing	½ cup each	Vegetable	5
Apple, large (8 oz)	1	Fruit	30
Meal total			65
Supper			
Winter squash	1 cup	Starch	15
Whole-wheat bread roll with margarine, regular tub	1 small	Starch	15
Broccoli, steamed with lemon	½ cup	Vegetable	5
Salad: greens, cucumber, red pepper, and Italian dressing	1 cup	Vegetable	5
Broiled flounder with lemon	3 oz	Meat	0
Meal total			40
Evening snack			
Yogurt, plain, fat-free	½ cup (6 oz)	Milk	12
Meal total			12
Total			174

From Novo Nordisk brochure, “Carb Counting and Meal Planning”

be experiencing it. “Unawareness shows up especially in people with poorly controlled diabetes,” says Dr. Arqan. “Type 2 diabetics are more serious because they’re often not aware of hypoglycemic symptoms. The classical symptoms are headache, sweating, tremors, hunger, irritability, and anger. We’ve been called at times to the emergency department because a patient has lost consciousness or is having convulsions or seizures. At that point, when blood sugar is usually 30 mg/dL to 40 mg/dL, we give glucagon or an IV dose of glucose.” He says such episodes are rarely seen now, especially with new insulin analogs that allow better control of blood glucose levels.

Steps for Preventing Hypoglycemia

The specific steps for preventing hypoglycemia that Dr. Khadar recommends to patients are to diligently monitor their blood glucose levels before and after meals, and if they are using insulin, to also snack between meals. He notes that some patients try to keep their blood sugar levels high enough to avoid hypoglycemia altogether. “Getting people to monitor their blood sugar is probably more difficult here than in the United States or Europe. However, we find that pregnant women and children generally are very good at tracking their levels.”

Dr. Khadar encourages patients with diabetes to be prepared for hypoglycemia. “One of the best treatments for hypoglycemia is dates, which I advise them to keep close at hand in the home or car. Fruit juices or jam also works well. Glucose tablets are not as popular here as in other countries.”

Dr. Shaaban teaches patients that there are three degrees of hypoglycemia: mild, moderate, and severe. “In mild

hypoglycemia, a patient's first line of defense is his autonomic system, which shows up as shaking and sweating. Moderate hypoglycemia often shows as tiredness and aggressiveness. In severe cases, there is a lowered level of consciousness and severe mood swings. This is a situation where the family has to act, especially if the patient does not know he is undergoing a hypoglycemic episode."

Exercise

As exercise becomes more popular, Saudi doctors tell diabetes patients to be aware of how to incorporate it into their daily routines. "If they exercise or do long-distance walking a lot, they should understand that those activities can bring on hypoglycemia," says Dr. Khadar.

For Dr. Shaaban's physically active diabetes patients, "You have to teach them when to stop or not begin physical activity by first testing their blood sugar levels before exercise. You have to make it clear to athletic diabetics that they have a disease that they have to manage and that demands them to be careful."

Dr. Arqan has no problem with patients exercising a lot, or running, or playing football. "We advise them on how to adjust their insulin levels—usually to take a lower dose because the exercise itself will lower blood glucose levels—and what to do before exercise, such as having a snack in some cases, which creates a bigger margin for error by raising blood glucose levels."

Treatment

What doctors prescribe for hypoglycemia depends on the situation. "Usually any blood glucose reading below 70 mg/dL we consider to be a hypoglycemic episode," says Dr. Arqan. "What we say to do depends on the situation. For a patient who's aware, we give glucose tablets. Within 15 minutes, he will get better. Grape juice or other fruit juice is also recommended, as well as even simple sugar and water. Sometimes we'll recommend biscuits." He says his clinic staff educate patients about the glycemic index so that they have an idea of what carbohydrates are more quickly absorbed.

Dr. Khadar says that the duration of hypoglycemia symptoms once a patient has consumed fruit juice or something high in quickly absorbed carbohydrates is usually 5 to 10 minutes. For Dr. Shaaban, his advice for recovery from a hypoglycemic episode is to check blood glucose levels every 15 minutes after eating something that is intended to bring blood glucose levels back up. "One thing we worry about is overcorrecting by ingesting too many

carbohydrates, which can result in the opposite problem of hyperglycemia. With hyperglycemia, there are two problems with using insulin as a corrective: one is possibly creating insulin resistance, and the other is that hyperglycemia can stress the cardiovascular system.

"With children, we focus much more on the possibility of experiencing hypoglycemia, so we educate parents about symptoms and treatments, and teachers as well. Older people can also be more vulnerable to hypoglycemia, but fortunately most of them live with their families, so there's less worry about them not being able to have their hypoglycemia treated right away," says Dr. Khadar.

"Usually any blood glucose reading below 70 mg/dL we consider to be a hypoglycemic episode."

— Hamzah Arqan, MD

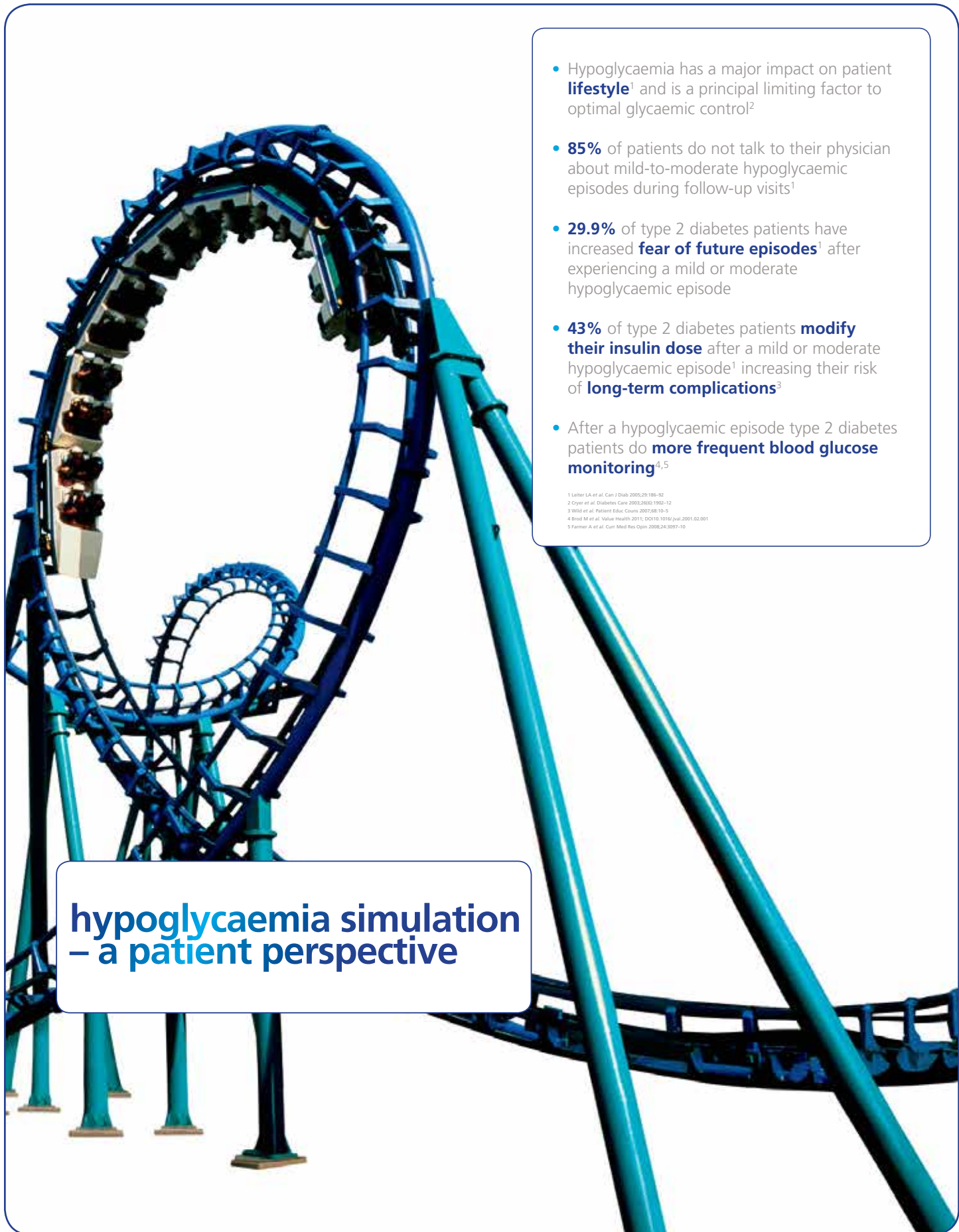
Glucagon

Glucagon is one tool the doctors insist that diabetes patients have on hand. "Glucagon, especially for those with type 1 and children, is something we prescribe for diabetics and their families to have on hand," says Dr. Khadar. Dr. Arqan prescribes two glucagon kits for every one of his type 1 patients: "One for home and the other for work. We teach patients how and when to use it, including their family members. We also give glucagon kits to type 2s whom we know to be at risk for hypoglycemia." The kits are replaced each year to prevent the use of expired glucagon.

Carbohydrate Counting

"The patients most in need of instruction in carbohydrate counting are type 1s, young people, and type 2s who use insulin," says Dr. Shaaban. "The need to count carbohydrates comes from eating too much rice and bread, a habit I'm trying to get them to change. The instruction I give is to start with a salad, then move on to chicken or meat. By this time they feel full, so that when they come to the rice serving, they don't eat as much of it. Also, I suggest substituting brown rice for white rice. Brown rice is easy to find at stores here and most patients eventually become used to it—although some become distressed at the dietary limitations imposed by the method."

"Regarding carbohydrate counting, we have brochures that describe it and how to do it for our patients," says



hypoglycaemia simulation – a patient perspective

- Hypoglycaemia has a major impact on patient **lifestyle**¹ and is a principal limiting factor to optimal glycaemic control²
- **85%** of patients do not talk to their physician about mild-to-moderate hypoglycaemic episodes during follow-up visits¹
- **29.9%** of type 2 diabetes patients have increased **fear of future episodes**¹ after experiencing a mild or moderate hypoglycaemic episode
- **43%** of type 2 diabetes patients **modify their insulin dose** after a mild or moderate hypoglycaemic episode¹ increasing their risk of **long-term complications**³
- After a hypoglycaemic episode type 2 diabetes patients do **more frequent blood glucose monitoring**^{4,5}

1 Lutter LA et al. Can J Diab 2005;29:186-92
2 Cryer et al. Diabetes Care 2002;25(6):1020-12
3 Wild et al. Patient Educ Couns 2007;68:10-5
4 Brod M et al. Value Health 2011; DOI:10.1016/j.jval.2011.02.001
5 Farmer A et al. Curr Med Res Opin 2008;24:3097-10

Dr. Arqan. We've found that the best ages for teaching carbohydrate counting are from 8 to 30 years. Younger people are more flexible and open to learning new information. One difficulty we've noticed about keeping patients counting carbohydrates is when they are traveling, or eating outside the home or country."

Apps and Teaching Aids

When it comes to technology that helps manage diabetes, Dr. Shaaban points to smartphones. "They have caught on in Saudi Arabia, so there are apps I can recommend for patients, such as ones that can suggest foods that are low on the glycemic index, display the caloric content of foods, demonstrate how to read food labels, store blood glucose readings, and then pass them on to their endocrinologist. "I do not recommend apps for patients who are not comfortable with phone technology."

Dr. Arqan gives his patients free glucometers to use. "They can download their data to us for analysis. Working in this kind of environment is healthier for both patients and physicians."

"The idea of free distribution of blood glucose meters is starting to catch on in Saudi Arabia," says Dr. Khadar. "The government has begun distribution of free blood glucose meters and test strips in certain hospitals, such as National Guard. The majority of private-sector companies also provide those tools."

Carbohydrate Counting and Hypoglycemic Control

Novo Nordisk recently asked three American dietitians to respond to questions about carbohydrate counting and how to teach it. The dietitians, who are also certified diabetes educators, are:

Amy Hess-Fischl, MS, RD, LDN, BC-ADM, CDE, program coordinator for the Teen and Adolescent Diabetes Transition Program at the University of Chicago's Kovler Diabetes Center. She is also a nutrition specialist and certified insulin pump trainer

Dori Khakpour, RDN, CD, CDE, research dietitian at the Endocrine and Diabetes Care Center at the University of Washington in Seattle

Marion J. Franz, MS, RD, CDE, nutrition health consultant at Nutrition Concepts by Franz, Minneapolis, MN

What are meal planning methods that people with diabetes can use to help manage their diabetes? Why use them?

Ms. Hess-Fischl: Carbohydrate counting is one type of meal planning and is appropriate for diabetes patients who are adjusting their insulin according to the amount of carbs they are eating. For type 1s, carb counting usually is going to be the meal planner of choice. For the 90% of diabetes patients who are type 2s, the other meal planning method is to make small changes in foods they're consuming and see how much of an impact that can have on overall blood glucose control.

Ms. Khakpour: Because carbohydrates have the biggest impact on blood sugar and on the volume of insulin needed to cover them, carb counting can give flexibility to individuals to adjust their mealtime insulin dose to the amount of food they're eating.

If carbohydrate counters don't feel like eating very much because the weather is exceptionally hot, or they don't have access to food, they know to decrease the amount of insulin that they're taking. If there's a special occasion and they want to eat more food than usual, then they know to take more insulin to avoid having really high blood sugar levels.

Diabetics may feel that they have to eat the same thing at each meal to get the same blood sugar results. But endocrinologists know that food accounts for only 50% of the contribution to blood sugar. Factors besides food that influence blood sugar levels include stress, medications, and lack of hydration. It makes a big difference to patients when you tell them that.

You can tell a patient to take the same amount of insulin at each meal and eat about the same amount of food. But that doesn't translate into the kind of food patients are eating—volume isn't equal to carbohydrates isn't equal to blood sugars. With a little bit of effort, most diabetes patients can learn carb counting. Snacks also need to be factored in. (See Sidebar, "Low-Carb Snack Suggestions.")

Ms. Franz: There isn't necessarily one meal planning method that's better than another. At the Academy of Nutrition and Dietetics, we found that several different types of nutrition therapy are effective. For some people, a very simplified meal structure works, with healthy food choices. For others, carbohydrate counting works. For people with type 1 diabetes, they're matching insulin and carbohydrate ratios. The skill of the professional is selecting an approach that the person with diabetes will be able to understand and use.

People who can't understand carbohydrate counting need a schedule of what they should be eating and at what

Low-Carb Snack Suggestions (5 g carbs or less)

- 1 oz. nuts (almonds, peanuts, pistachios, walnuts)
- 1 oz. seeds (sunflower, pumpkin)
- 1 oz. low-fat cheese (any soft or hard) with 5-6 baby carrots
- 1 oz. lean cold cuts (turkey, 98% fat-free ham) rolled up in a leaf of lettuce (optional: add mustard or a pickle)
- 1 hard boiled egg with light mayonnaise
- 1 cup raw vegetables (baby carrots, celery, peppers, cucumber) with 1/3 cup cottage cheese, low-fat ranch or sour cream dip
- 1 cup low-fat cottage cheese with 3-4 strawberries
- Tuna, egg or chicken salad with light mayonnaise (instead of bread use a leaf of lettuce)
- 1 cup salad (mixed greens and raw vegetables) with oil and vinegar
- 3-4 celery sticks with 1 Tbsp natural peanut butter or cream cheese
- 1 serving sugar-free Jell-O with lite whipped cream
- 1 Dannon Light'n Fit Carb Control smoothie
- 1 Dannon Light'n Fit Carb Control yogurt
- 1 sugar-free ice pop
- 1 cup ricotta cheese with cinnamon, vanilla extract, 4-5 nuts, Splenda
- 3-4 pickles or 5-6 olives with 1 oz. low-fat cheese

Source: Dori Khakpour, RDN, CD, CDE

times. If they are on insulin therapy, they have to be consistent. You ask people with diabetes what they normally have at a meal and then come up with a schedule based on foods they feel they can eat consistently.

How do you teach someone carbohydrate counting?

Ms. Khakpour: Usually it takes at least three visits at least a month apart with a dietitian or food expert to understand the workings of carbohydrate counting. This is the reason diabetes patients need someone to instruct them on how to identify what carbohydrates are and how different carbohydrates can behave differently. We use the

glycemic index to teach patients which foods break down faster and which ones break down more slowly, and how to time insulin doses in carbohydrate counting.

Should carbohydrate counting be taught to all people with diabetes?

Ms. Hess-Fischl: For patients who have difficulty counting or reading, carbohydrate counting is not going to be appropriate. They're not going to be able to master it. Looking at a nutrition facts food label can add more confusion because there's a difference between carbohydrate choices and carbohydrate servings. Also, if patients don't know how to add or how to read food labels, that's going to be the problem. We have to break down carbohydrate choices into serving sizes.

Ms. Khakpour: The answer is no because it can be too much to manage for some patients. It's ideal if everybody knows what a carbohydrate is and how it should be matched to insulin, but not everyone should be taught carb counting because they can get themselves tangled up if they don't understand all the different steps. The steps include learning what carbohydrates are, the relationship between carbohydrates and insulin, how to time insulin injections, and finally, how to put those pieces together. Then they come back to their specialists to have them look at the results of their blood sugar readings and see if any adaptations are needed.

"It's essential that diabetes patients understand the impact of portion size."
— Amy Hess-Fischl, MS, RD, CDE

What are the most important steps someone must take to be successful with meal planning?

Ms. Hess-Fischl: Knowing what carbohydrates are is the most important thing. Also, patients need to understand that small changes can make a difference. It's essential that people understand the impact of portion size. Cutting portion size by one-third can reduce A1c by one to one-and-a-half points. There are many different tools you can use to get the point across, including food models, photographs, and measuring cups.

We want to make sure that decisions are mutually agreed upon. If you say to a patient, "You're eating a lot. You're having a lot of sugary drinks. What would you like to

work on?” The patient might say, “I want to do both.” The patient should be the one making the decisions; otherwise you’re never going to have a positive outcome.

I’ve presented at nutrition conferences where there were many dietitians from the Middle East who essentially take the same approach regarding carbohydrate counting. They focus first on type 1s. But a lot of them also use it with type 2s. My point when I spoke to them is you don’t always have to use carb counting with type 2s. You can do something simple and suggest small changes in what they’re eating that will have the same impact.

Ms. Khakpour: Over the years I’ve heard physicians tell patients, “Take your insulin at breakfast and dinner.” But people have different meal times. It’s better to be more specific and say, “Take your insulin at 8 in the morning and 8 at night.” Being very specific about time allows for more accuracy when using insulin. When they get their volume and timing right, I’ve seen patients use 30% to 40% less insulin. They’re no longer chasing blood sugars in a circle.

Ms. Franz: I see the need for carbohydrate counting among people with type 2 diabetes. It’s a positive method that gives them guidelines on what they can eat rather than what not to eat. Probably the best advice I can give type 1 patients is to be consistent in what they eat.

For people with type 2 diabetes, if you look at what leads to their improved numbers, there are all sorts of different nutrition interventions they can use. Basically, these interventions work by helping people reduce their total intake of food. It’s easy to say to patients, “Just eat less.” But most people need a little help. The message is that what improves blood glucose levels is not so much what people eat but how much. Carbohydrate counting helps people know how much to eat. There are no good foods or bad foods—it’s how much you eat of anything.

What are some of the pitfalls someone may encounter with meal planning with diabetes?

Ms. Khakpour: One pitfall is when patients get really stuck on numbers and don’t pay attention to the value of the food itself. For example, a turkey sandwich with two slices of bread equals 30 grams of carbohydrate. But a hamburger, which also has two slices of bread, has a higher fat content. The fat content of the hamburger versus the lean turkey sandwich can give quite different blood sugar readings at different times.

I have specialized in helping patients understand the nuances of different kinds of foods and not just grams

of carbohydrates. They have to learn how fat and fiber interact with blood sugar levels, or that being dehydrated, or not feeling well, or taking different kinds of medications can interfere with how food is digested. When you eat also has an effect, especially during Ramadan when people don’t eat during the day but just at night.

Ms. Franz: For people with type 1 diabetes, if they don’t understand carbohydrate counting, what’s important is consistency in what they eat and having a professional adjust their insulin. If they can understand carbohydrate counting, they can do this themselves. For type 2s, with so many different methods available, most often the message is simply to try to eat less.

“When you eat has an effect, especially during Ramadan.”

– Dori Khakpour, RDN, CD, CDE

Because most endocrinologists may only have 20 to 30 minutes with a patient, how can they get patients started on and excited about meal planning?

Ms. Hess-Fischl: When we think about carbohydrate counting, we want to make sure our expectations for endocrinologists are realistic. Having them give accurate information about what carbohydrates are may be enough. It could be just as simple as telling patients, “If I’m going to advise you to take insulin at all of your meals, you need to make sure that you’re having carbohydrate in all of them.” Then have patients return in two weeks to have their blood glucose level checked.

Patients should feel comfortable. We help them by finding what’s going to be best for them. There are many ways to manage diabetes. There’s no wrong way, there’s no right way; it’s what is best for that individual patient.

Ms. Khakpour: I’ve found that getting patients excited about carb counting is easier when I share with them one tiny, eye-opening piece of information: 15 grams of any carbohydrate will give you 50 points of blood sugar. It doesn’t matter which carbohydrate; it’s going to give you 50 points of blood sugar, although metabolized at different rates. Once diabetics track the grams of carbohydrate of what they’re eating, they begin to realize that, “When I’m eating these crackers versus when I’m eating that bread, I’m ending up with a different blood sugar reading because I’m eating more grams of carbohydrate.” That first step can be enlightening and gets patients involved.

Ms. Franz: What are some of the pitfalls? One is that sometimes it's hard to determine carbohydrate content. In the US, most of our food has labels that list nutritional values. But in other parts of the world, that information may not be readily available—that's certainly a pitfall. Because endocrinologists have only a short time with patients, it's best if they just generally explain carbohydrates and foods that affect blood glucose levels, and how carbohydrate counting can help patients control their blood glucose levels.

What print/online meal planning resources are useful and available for people with diabetes? What phone apps are useful?

Ms. Hess-Fischl: Useful phone apps include Calorie King, My Fitness Pal, and GoMeals. For children with diabetes, there is Lenny the Lion. All of these apps are carbohydrate-based resources patients can use.

In the US, we have a large continuous glucose monitoring (CGM) population. Those who use the Dexcom G5 CGM can send data directly to their smartphones.

Novo Nordisk has a variety of educational brochures available on portion awareness, carb counting, food exchange lists, and meal planning. (See sample pages from brochure, "Carb Counting and Meal Planning.")

Ms. Khakpour: If physicians don't have diabetes educators available in every major hospital, they should consider doing online teaching modules. Patients can come into the office after seeing their physician and view online modules to learn how to do carb counting.

Arab-Language Diet Apps Need Improvement

An October 2015 study by Arab researchers into the effectiveness of Arabic language weight control apps says that further development is needed.¹⁵

A summary of their findings says that: "Weight-loss apps are widely available to the Arab population; however, these weight-loss apps lack localized content and adherence to evidence-informed practices.

"Industry standards are needed for the development of Arabic weight-loss apps which present content that adheres to the evidence-informed practices, while effectively assisting the public with an approach that is tailored to the Arab population."

Diabetes experts worldwide consider weight control to be a crucial component of effective diabetes management.

New Novo Nordisk Drug Tresiba® Available Soon

A new basal insulin from Novo Nordisk could show up fairly soon among the basal insulins that Middle Eastern endocrinologists can prescribe. Tresiba®, an insulin degludec, is a long-acting diabetes drug suitable for use by type 1 and type 2 diabetics.

Injected once daily, Tresiba® is compatible for use with oral diabetes medications and bolus insulins, or can be taken alone. After testing the drug in 40 countries, Novo Nordisk says that one major feature of Tresiba® is its long duration—up to 42 hours. Although Novo Nordisk advises diabetic patients to try to inject themselves with basal insulin at the same time every day, the insulin's long duration allows users to vary the times they inject depending on what is most convenient for them.

Tresiba® recently received approval from the US Food and Drug Administration to enter the US market in early 2016. The medication is sold in 30 countries, including Japan. European Union approval is expected soon. Those approvals to sell Tresiba® in major global markets could open the way for it to be sold in Middle Eastern countries.

The most notable side effect observed from tests of Tresiba® was hypoglycemia.

References

1. Glycemic Index. org. *History of the Glycemic Index*. <http://www.glycemic-index.org/>.
2. National Institute of Diabetes and Digestive and Kidney Diseases. What I need to know about carbohydrate counting and diabetes. December 2013. <http://www.niddk.nih.gov/health-information/health-topics/Diabetes/carbohydrate-counting-diabetes/Pages/index.aspx>
3. EBSCO Publishing. Low Glycemic Index Diets. *Is the Glycemic Index Even the Right Measurement?* July 2012. <http://therapy.epnet.com/nat/GetContent.asp?siteid=EBSCO&chunkid=38396>
4. Teicholz N. The questionable link between saturated fat and heart disease. *The Wall Street Journal*. May 6, 2014. <http://www.wsj.com/articles/SB10001424052702303678404579533760760481486>
5. Antinoro L. Brigham and Women's Hospital. The Importance of the Glycemic Index. March 2012. http://www.brighamandwomens.org/Patients_Visitors/pcs/nutrition/services/healthweightforwomen/special_topics/intelihealth1002.aspx?subID=submenu10
6. Bernstein R. Dr. Bernstein's Diabetes Solution. *My Life with Diabetes: 69 Years and Counting*. 2007. <http://www.diabetes-book.com/bernstein-life-with-diabetes/>
7. Jacob A. What is the recommended daily intake of carbs for a diabetic male? *SFGate*. <http://healthyeating.sfgate.com/recommended-daily-intake-carbs-diabetic-male-1816.html>
8. Bernstein R. Dr. Bernstein's Diabetic Solution. *The Basic Food Groups: The Insulin/Fat Connection*. 2007. <http://www.diabetes-book.com/insulin-fat-connection/>
9. Spritzler F. Diabetes Self-Management. Carbohydrate restriction: an option for diabetes management. June 12, 2014. <http://www.diabetesselfmanagement.com/nutrition-exercise/meal-planning/carbohydrate-restriction/>
10. Turkington RW. Diabetes: the Glucogra-F method for normalizing blood sugar. *JAMA*. 1981;246:1965.
11. Taubes, G. *Good Calories, Bad Calories*. Anchor Books. September 2008. <http://knopfdoubleday.com/book/176680/good-calories-bad-calories/>
12. Taubes, G. *Why We Get Fat and What to Do About It*. Anchor Books. December 2010. <http://knopfdoubleday.com/book/176683why-we-get-fat/>
13. Brody J. The fats you don't need to fear, and the carbs that you do. *New York Times*. October 19, 2015. <http://well.blogs.nytimes.com/2015/10/19/the-fats-you-dont-need-to-fear-and-the-carbs-that-you-do/>
14. Chowdhury R, Warnakula S, Kunutsor S, et al. Association of dietary, circulating, and supplement fatty acids with coronary risk: a systematic review and meta-analysis. *Ann Intern Med*. 2014;160:398-406.
15. Alnasser AA, Amalraj RE, Sathiaseelan A, et al. Do Arabic weight-loss apps adhere to evidence-informed practices? *Translational Beh Med*. 2015; October 13:1-7. <http://link.springer.com/article/10.1007/s13142-015-0347-7#/?page=1>

KIKAKU AMERICA INTERNATIONAL

2001 Jefferson Davis Highway, Suite 1104
Arlington, VA 22202
Email: info@pharmaamerica.com
Phone: 202-246-2525

Editorial Director: **Peter Sonnenreich**

Editor-in-Chief: **Bassem Wolley, PharmD**

Beirut, Lebanon

Email: Bassem@pharmaamerica.com

Phone: 961-71-011454

Managing Editor: **Janice Zoeller**

Senior Writer: **Patrick Totty**

Art Director: **Ryan Harpster**

Copy Editor: **Jacolyn Connolly**

GULF/CD/0216/0101

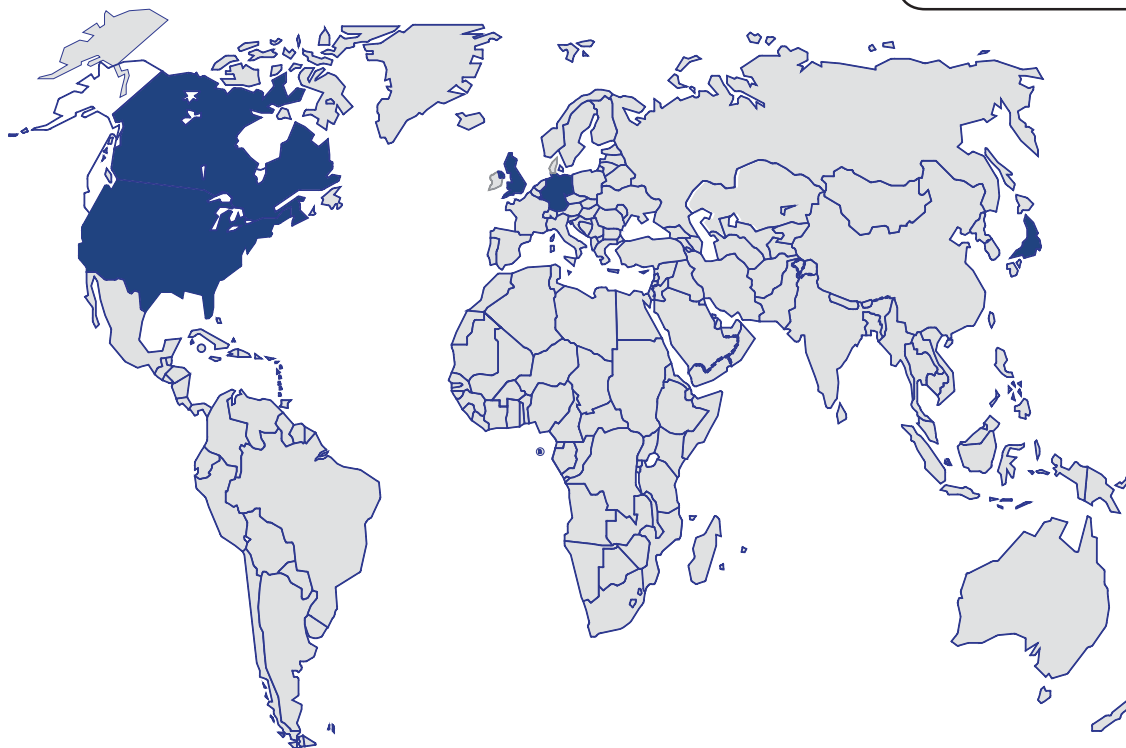
© 2016 Novo Nordisk Saudi Arabia

GAPP2™: (Global Attitudes of Patients and Physicians)

a global survey looking into insulin and type 2 diabetes

4,695 respondents

3,042 insulin analogue patients
1,653 healthcare professionals



Dosing irregularities are common in people with type 2 diabetes taking basal analogue insulin¹

In the last 30 days,
22% of patients missed,
24% mistimed by more than two hours and
14% reduced a basal insulin dose¹

People with type 2 diabetes taking basal analogue insulin do suffer with **self-treated hypoglycaemic events**²

In the last 30 days,
36% of patients using basal analogue insulin experienced self-treated hypoglycaemia²

1. Brod et al. Poster presented at the European Association for the Study of Diabetes (EASD) October 2012: GAPP2™. Global survey finds one in eight patients intentionally reduce their basal insulin doses to avoid hypoglycaemia

2. Tahrani et al. Presented at the European Association for the Study of Diabetes (EASD) October 2012: GAPP2™. Global survey finds three quarters of patients experience hypoglycaemia on insulin analogues causing dose irregularities and increased blood glucose monitoring

**Have you recently
discussed hypoglycaemia
with your type 2 basal
insulin diabetes patients?**