CHAPTER ONE

Current Health Problems and Dietary Needs: An Abundance of Foods and Health Problems

Chances are you greet each day wondering "What should I eat?" rather than "What is there to eat?" Many of us take the abundance of food in the developed world for granted and we may need to remind ourselves that for millennia, people struggled to survive. Obtaining food was always the primary focus and, in the earliest times, not much separated humans from animals, other than our ability to use abstract thinking. Hunting, foraging, gathering, and eventually animal husbandry and agriculture turned the tide. The ancient Egyptians were the first to bake leavened bread and it quickly became the "staff of life."

The nineteenth and twentieth centuries brought us mechanized farming, fertilizers, pesticides, and bioengineering. Now there are vast monocultures in the United States, and food companies have invented new ways to use these commodities. Food additives and sweeteners pump up the calories and fat in convenience foods and extend their shelf life. Our stores are lined with foodstuffs meant to make our lives easier, and more often than not, these products appeal to palates accustomed to heavy combinations of fat, salt, and sugar. It's easy to grab a doughnut or a fast meal at a drive-through, and when dining out for special occasions, it's more about pleasure and experience than about sustenance.

We do pay a high price for all of this.

In the United States alone:

- Heart disease is the number one killer, among both men and women.
- About 1 in 3 adults has high blood pressure and 1 in 6 has high total cholesterol—both major risk factors for heart disease.
- Obesity affects close to one-third of the adult population, and childhood and adolescent obesity has nearly tripled since 1980.
- Diabetes is on the rise: As of 2008, 24 million people, or close to 8 percent of the U.S. population, were diagnosed with it. Another estimated 57 million people had pre-diabetes, a condition putting them at risk for developing the disease.
- The ascension of processed foods also corresponds to higher reporting of other food-related health problems in the United States:
  - More than 12 million Americans have food allergies.
  - More than 2 million people have celiac disease and must avoid gluten.[1]

Treatment of these diseases and disorders often includes drugs, but diet and exercise also play important roles. In the case of people with allergies and celiac disease, carefully avoiding certain foods is the only way to go.

A lot of other people are careful about their diets for more general health reasons, and may even adhere to ways of eating because of philosophy or religion. Veganism and keeping kosher are examples of those.

[1] www.cdc.gov; www.jama.ama-assn.org.

All of these health conditions and their attendant diets require altering the traditional ingredients and/or methods you use in baking. When you get an order, it is up to you to deliver what you say you will, not to make a judgment about the client's diet.

In the following pages, you will learn more about these health issues and dietary needs, starting with the one that requires the biggest change in how you bake: celiac disease and the gluten-free diet.

Celiac Disease

People often refer to **celiac disease** as an allergy to **gluten**, but it's actually an inherited autoimmune disease that can be managed with a gluten-free diet. When a person with celiac disease ingests the proteins in wheat, barley, and rye (commonly referred to as gluten), the intestinal villi become damaged or destroyed and can no longer absorb nutrients. The disease can be hard to diagnose because the symptoms are varied and some doctors may not think to test for it. Some people, especially children, have classic digestive symptoms, including abdominal pain, bloating, chronic diarrhea or constipation, vomiting, and weight loss. Others have secondary symptoms, such as unexplained fatigue or anemia, depression or anxiety, bone or joint pain, infertility, canker sores, or tingling or numbness in the extremities. Still others have no symptoms at all. Since celiac disease runs in families, a person might get tested for the disease after a relative is diagnosed, and be surprised to discover that he or she has it, too. Testing involves checking the blood for certain antibodies, then confirming a positive blood test result with an **endoscopy** in which biopsies are taken of the intestinal villi.

Some patients may have a positive blood test for celiac disease antibodies and/or a positive genetic test, but a biopsy of the intestinal villi will come back negative. Doctors sometimes refer to this as "**gluten sensitivity**." People who do not have positive blood test or biopsy results, but whose symptoms are relieved by the gluten-free diet, may be termed "gluten intolerant." Interestingly, people with a confirmed diagnosis of celiac disease are both gluten sensitive and gluten intolerant, but it is not the other way around.

Sometimes a patient may undergo an endoscopy for a seemingly unrelated condition, such as **GERD** (**gastroesophageal reflux disease**), and learn from the doctor that his or her intestine is damaged. Celiac disease was once thought of as a rare disease, but that perception is starting to change due to higher public awareness.

Many people decide to stop eating gluten without consulting a doctor or without knowing for sure that they have celiac disease to see if it makes them feel better. Doctors who specialize in celiac disease caution people not to do this. Why? Unless a person has been eating a regular, gluten-containing diet for several months (i.e., consuming the equivalent of at least two to four slices of bread a day), the blood test may come back as a false negative. Undiagnosed celiac disease can cause serious, long-term complications. For now there is no cure for celiac disease, and avoiding gluten for life is the only way to keep it in remission. Additionally, the diet is more than a matter of just avoiding bread products. Gluten can be hidden in places you might not suspect: Malt vinegar, barley malt, soy sauce, beer, and prepared seasoning mixes are just a few examples. People must also be very careful about cross contamination, because even trace amounts of gluten can cause damage. This makes eating out difficult.

OTHER CONDITIONS REQUIRING A GLUTEN-FREE DIET

There is an itchy and painful skin rash form of celiac disease called **dermatitis herpetiformis** (DH). It is diagnosed with a biopsy of the skin adjacent to the affected area. Often a person with dermatitis herpetiformis may have no intestinal damage, but the condition is serious and requires adhering

to a gluten-free diet. Although there is a topical treatment for DH lesions called Dapsone (an antibacterial medication sometimes used to treat Hansen's disease), it is not considered safe for long-term use.

What does this mean for you as a baker? It means you will have to learn how to make products without gluten, which is hard to do, but not impossible. Yes, wheat, barley, and rye are off-limits, as well as most oats, unless they are specifically grown and processed separately from wheat, barley, and rye. However, you can use a combination of other flours and starches. By blending these together and changing your mixing methods, you can make pleasing gluten-free goods.

Diabetes

What exactly is **diabetes** and what role does insulin play? Insulin is a hormone made by the pancreas and it is needed to help move sugar from the blood into the cells. Diabetes is a condition in which the body either does not produce insulin or cannot properly use the insulin it produces. As a result, sugars build up in the blood and are not available for the body to use as energy.

Diabetes may seem complicated at first: There is more than one type and more than one way to treat it. There can be horrible consequences if the disease is not managed properly, including blindness, limb amputation, nerve and kidney damage, cardiovascular disease, and premature death. However, people can and do live healthy lives with diabetes through proper diet, exercise, careful monitoring, and sometimes the use of oral medication and/or insulin injections.

TYPE 1 DIABETES

Type 1 diabetes is also known as "**insulin-dependent diabetes mellitus**" or "juvenile-onset diabetes." It is estimated that between 5 and 10 percent of all diagnosed diabetes cases are type 1. This form of diabetes is considered an autoimmune disease because the body's immune system attacks the pancreas, rendering it unable to make insulin. It usually strikes children and young people and may be caused by a genetic tendency or a virus. Other, more rare causes of type 1 diabetes include injury or damage to the pancreas, or surgical removal of all or part of the pancreas. People with type 1 diabetes must monitor their blood glucose levels and give themselves daily insulin shots carefully timed with meals. Alternatively, type 1 patients can use an insulin pump, which acts like an artificial pancreas. Also known as "subcutaneous insulin infusion therapy," this type of pump makes monitoring blood sugar and delivering insulin more convenient. Insulin cannot be taken orally because stomach acid would destroy it before it could be absorbed in the bloodstream.

TYPE 2 DIABETES

Most of the time when you hear about an "epidemic" of diabetes in the United States, it is about **type 2 diabetes** and its links to poor diets, lack of physical activity, and obesity. Type 2 is also called "insulin-resistant diabetes." This means that the insulin the body produces doesn't work as well as it should at moving sugar from the blood into the cells, or it has stopped working altogether. The disease usually develops in middle age, but an alarming number of cases are being reported among young people, along with an increase in child obesity, which may be a contributing factor. Genetics plays a role, and other risk factors include high blood pressure, high blood triglyceride levels, and high-fat diets. People who routinely drink large quantities of alcohol may develop cirrhosis of the liver, which can lead to insulin resistance. And women who have had gestational diabetes while pregnant are at a greater risk for developing type 2 diabetes. Type 2 patients can sometimes take oral medication to lower their blood sugar, but may eventually need insulin injections. Others can manage their condition through diet, exercise, and weight loss.

GESTATIONAL DIABETES

The onset of diabetes during pregnancy can cause dangerous complications for both the mother and child, including high blood pressure and protein in the urine—a condition

called "preeclampsia." The only treatment for serious preeclampsia is the delivery of the baby, and so doctors must carefully consider how far the pregnancy can go without risking the life of the mother or harming the baby with an early delivery. Therefore, pregnant women are routinely tested for **gestational diabetes** during the second trimester. It is diagnosed in much the same way as other types of diabetes, through a blood test measuring the amount of glucose in the bloodstream after fasting and/or after consuming a controlled amount of glucose. This form of diabetes usually goes away once gestation is over. But as mentioned above, women who have had gestational diabetes have a greater risk of developing type 2 diabetes later in life.

PRE-DIABETES

You can't tell whether someone has diabetes by looking at them, so doctors may order a blood glucose test if there is any reason to suspect it. A person may be diagnosed as being **pre-diabetic** if the test results are higher than normal, but not high enough to be deemed diabetic. People with this condition can often stave off the disease by controlling their weight through diet and exercise.

DIABETIC DIETARY NEEDS

Is there a singular "diabetes diet"? Not exactly. Each patient is different. Since many people with type 2 diabetes need to lose weight, foods that are higher in fiber and lower in calories, sugar, and fat are often in order. If a person's weight is under control, then along with eating sensibly and healthfully, it's mostly about counting carbohydrates (with 1 serving of carbohydrate being equal to 15 grams). In fact, glucose control is the guiding principle for all people with diabetes.

Alternative Sweeteners

Another thing to consider when baking for customers with diabetes is the use of alternative sweeteners. Some of these are metabolized more slowly in the body than regular sugar, which may be helpful to people trying to maintain a steady blood sugar level. If you look at it from the point of view of the glycemic index (GI), some of these sweeteners have what GI reference books would term "insignificant carbohydrates." These sweeteners include lactitol, aspartame (NutraSweet®), sucralose (Splenda®), and stevia. Low-GI sweeteners include agave, fructose, lactose, and xylitol. Mid-GI sweeteners include raw honey and table sugar. High-GI sweeteners include commercially blended honey, glucose, and maltose. See Chapter 2 for more details on sweeteners.

CO-INCIDENCE OF DIABETES AND CELIAC DISEASE

Celiac disease and type 1 diabetes share some genetic links. At least one study suggests that 8 to 10 percent of people diagnosed with type 1 diabetes will also develop celiac disease, usually within ten years of their initial diabetes diagnosis. This dual diagnosis carries an additional dietary burden. Gluten-free flours and their resultant baked products, as well as gluten-free pasta and cereals, tend to be higher in carbohydrates than their traditional wheat counterparts. Consider this example: A typical slice of wheat toast contains 15 grams of carbohydrate and equals what is considered 1 serving of carbohydrate, whereas a slice of gluten-free bread may contain 18 to 20 grams of carbohydrate. This difference makes it a lot more challenging to control glucose levels. Such customers have an even greater need than most to know exactly how much carbohydrate is in a baked good and what sweeteners are used.

Weight Loss

There is really only one way for people to lose weight: They must take in fewer calories than they expend. This book will not endorse any particular weight-loss plan. Health professionals who treat obesity are starting to agree that "non-dieting" may be the best way to go: encouraging their patients to focus on healthful, low-calorie eating and exercise, rather

than restricting any particular category of foods. Take, for example, the current set of Dietary Guidelines for Americans issued by the United States Department of Agriculture, on its Web site www.mypyramid.gov.

A healthy diet is one that:

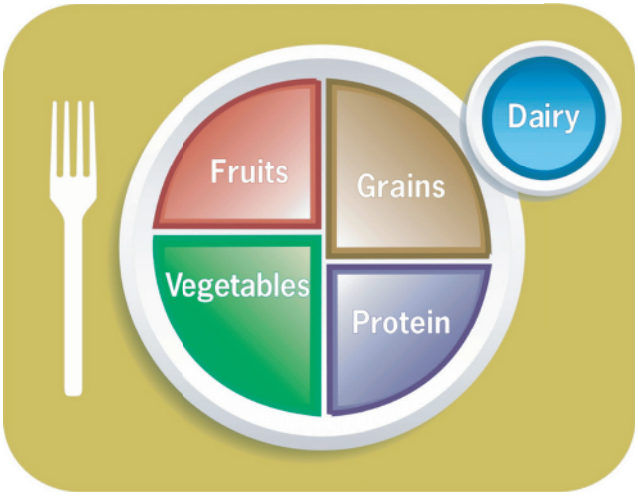
- Emphasizes fruits, vegetables, whole grains, and fat-free or low-fat milk and milk products;
- Includes lean meats, poultry, fish, beans, eggs, and nuts; and
- Is low in saturated fats, trans fats, cholesterol, salt (sodium), and added sugars.

MyPlate is an interactive guide that allows individuals to plug in their vital statistics and calculate a plan for healthy eating. Using it, the USDA says people can:

- Make smart choices from every food group.
- Find balance between food and physical activity.
- Get the most nutrition out of calories.
- Stay within daily calorie needs.

Of course, there are still a lot of people who adhere to diets that go beyond caloric restrictions and focus on "macronutrient composition."[2]

Ways to use alternative fats and other lower calorie products in baking will be outlined in later chapters.



MyPlate

High Cholesterol

A normal, healthy **cholesterol** level in an adult is one that is lower than 200 mg/dL of blood. The Centers for Disease Control and Prevention says one in every six adults in the United States has high total cholesterol of 240 mg/dL or higher and that the average adult American's cholesterol level is hovering near the high-risk mark. Doing nothing about it means a person's chance of getting heart disease

Good vs. Bad Cholesterol and Triglycerides

According to the American Heart Association, cholesterol is used by our bodies to produce cell membranes and certain hormones, and performs other necessary functions. Cholesterol is not dissolved in the blood but is carried by the lipoproteins LDL and HDL. LDL (low-density lipoprotein) is considered a "bad" cholesterol because it can slowly build up on the walls of the arteries that carry blood to the heart and brain. It forms plaque, which narrows the arteries and can lead to blood clots, which in turn can cause heart attack or stroke.

High levels of HDL (high-density lipoprotein), on the other hand, appear to protect against heart attack. HDL may carry cholesterol away from the arteries and back to the liver, and may remove excess cholesterol from arterial plaque.

Triglyceride is a form of fat made by the body, and excess levels of it in the blood often accompany high-LDL and low-HDL cholesterol levels. Many people with heart disease and diabetes also have high triglyceride levels.[3]

[2] *Nutrition, An Applied Approach*, 461.
[3] American Heart Association, www.heart.org.

is twice that of someone with healthy, optimal blood cholesterol level. To counteract high cholesterol, some people use cholesterol-lowering drugs along with changing their diets. Doctors usually recommend eating foods that are either lower in cholesterol, or that have a lowering effect on the person's cholesterol. Low-cholesterol foods include *some* egg substitutes (there are substitutes that contain high levels of fat), canola or olive oil, walnuts and almonds, and fish with omega-3 fatty acids, such as mackerel, salmon, herring, and sardines. Oatmeal, oat bran, and other high-fiber foods that contain soluble fiber may help reduce the bad kind of cholesterol known as "LDL."

High Blood Pressure

High blood pressure can also dramatically increase a person's risk for getting heart disease. One approach for reducing it is through diet. A diet researched and developed by the National Institutes of Health called DASH (Dietary Approaches to Stop Hypertension) contains large daily servings of fruits and vegetables, whole grains, low-fat or nonfat dairy products, and small servings of meat. It calls for a sodium intake that is lower than the average intake of most Americans.

DASH Diet Eating Plan

Type of Food	Number of Servings for a 2,000 Calorie Diet
Grains and grain products (include at least 3 whole-grain foods each day)	7–8
Fruits	4–5
Vegetables	4–5
Low-fat or nonfat dairy foods	2–3
Lean meats, fish, and poultry	2 or fewer
Nuts, seeds, and legumes	4–5 per week
Fats and sweets	Limited
Suggested sodium level	1,500 mg per day

Heart Disease

Heart disease, also known as "cardiovascular disease," is an umbrella term for various conditions that affect the heart and/or blood vessels. It refers to not only to congenital heart defects and arrhythmias, but also to coronary artery disease: one of the biggest public health concerns in the United States. According to the Centers for Disease Control

Blood Pressure: What the Numbers Mean

Blood pressure readings occur in a set of two numbers and are measured in millimeters of mercury (mmHg). A normal, healthy blood pressure reading is, for example, 110 over 70 (110mmHg/70mmHg). The top number is the heart's systolic blood pressure, measuring the maximum pressure exerted when the heart contracts. The bottom number is the diastolic pressure, measuring the minimum pressure in the arteries when the heart is at rest. A person has mild to high blood pressure when he or she has consistent readings where the top systolic number ranges from 140 to 159 and the lower diastolic number ranges from 90 to 99. Moderate to severely high blood pressure readings range from 160 or higher systolic and 100 or higher diastolic.

Pre-hypertension is diagnosed when patients have top blood pressure numbers of 120 to 139 and bottom numbers reading 80 to 89.[4]

[4] U.S. National Library of Medicine, National Institutes of Health, www.nlm.nih/gov.

and Prevention, heart disease was the cause of more than one-quarter of the deaths in the United States in 2006, and many of those deaths could have been prevented. Coronary artery disease, where blocked blood vessels can lead to heart attack or stroke, can be managed through diet, exercise, and other healthy lifestyle choices. Treatment includes lowering cholesterol and blood pressure through medication and diet. Therefore, doctors often recommend patients follow the DASH diet mentioned above, which includes reducing salt intake; lowering consumption of unhealthy fats and cholesterol; eating more vegetables, fruits, and whole grains; and keeping weight in check through portion control.

Vegetarianism and Veganism

While vegetarianism and veganism are not health conditions that require specific dietary restrictions, many people with heart disease, hypertension, and high cholesterol turn to vegetarianism to help address their health problems. When done in a carefully considered way, vegetarian diets have been shown to be healthy and effective. There are also philosophical reasons people choose vegetarianism, including ethical, religious, environmental, and economic concerns.

Vegetarians do not consume animal flesh, or products made from it, such as lard and gelatin. Many vegetarians will consume animal products such as eggs, butter, cheese, and honey. Vegans, however, eschew all of that, either on philosophical grounds or for health reasons. They get their proteins exclusively from nuts, beans, and grains, and fill out their diet with fruits and vegetables. There are a lot of ingredients a vegan will not consume that may not be obvious at first glance. Take, for example, cane sugar. During the final purification process, the sugar is filtered through charcoal, which may be of animal origin. More than half of the sugar refineries use bone char as an activated charcoal source. You will learn more about vegan baking substitutes in later chapters.

Summary

There are many factors to consider when accommodating special diets. It is important to have working knowledge of why people need special diets, and what those diets entail. If you understand what a customer's needs are, you are better equipped to fulfill them. You don't have to be a registered dietician to do a good job for your customers, but *you must deliver what you say you will*. If, for example, you are baking for vegetarians, you must never use a meat product (such as gelatin) and pass it off as acceptable. Your word is your bond, and people are putting their health and well-being in your hands. Why they make certain food choices is their business, and your business is to accommodate those needs if you can. If you cannot, then you must be honest about it.