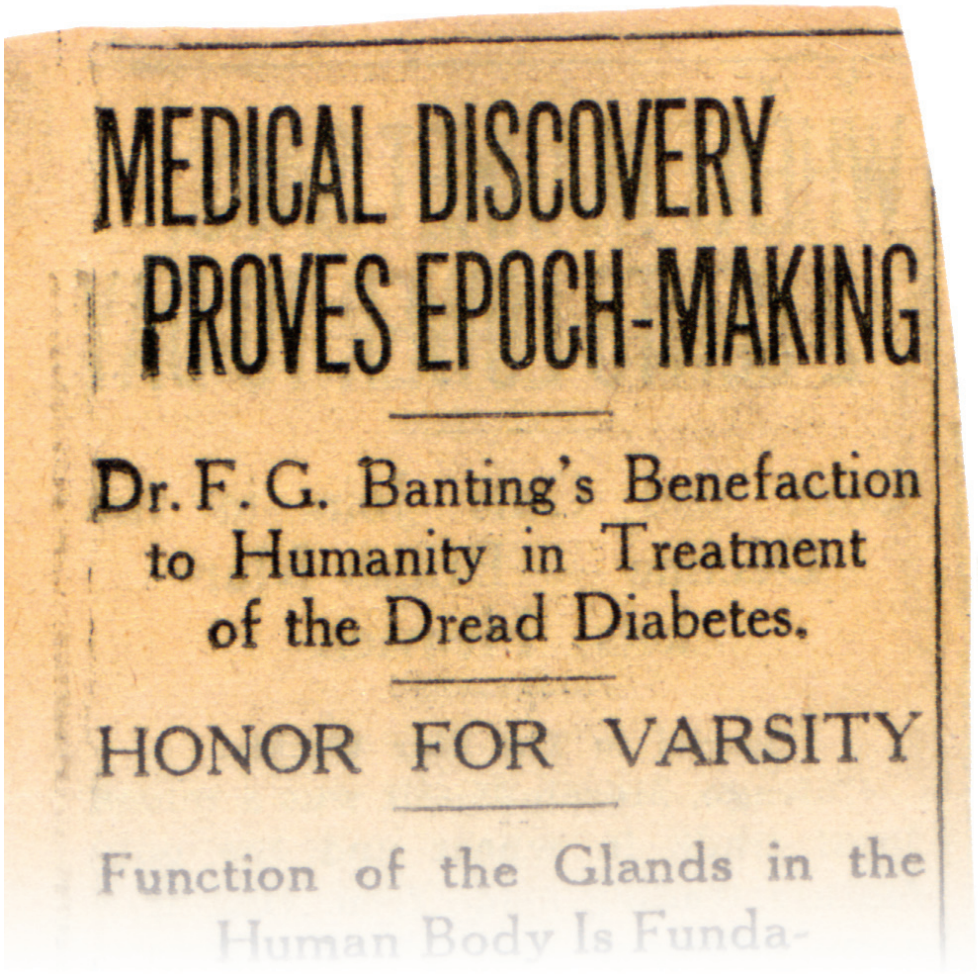
1.1

Medical Discovery Proves Epoch-Making



MEDICAL DISCOVERY
PROVES EPOCH-MAKING

Dr. F. G. Banting's Benefaction to Humanity in Treatment of the Dread Diabetes.

HONOR FOR VARSITY

Function of the Glands in the Human Body Is Funda-

Source: Toronto Star Weekly, March 26, 1922.

1.2

On the Trail of Discovery

Fourteen-year-old Leonard Thompson weighed only 65 pounds when he was admitted to Toronto General Hospital. He was pale and listless. His hair was falling out, and his abdomen was swollen. He complained bitterly about always being hungry. He was too weak to do anything for himself. In fact, all he did, day after day, was lie still in his bed.

Many years later, a former secretary at the hospital remembered seeing Leonard for the first time. "I've never seen a living creature as thin as he was," she said, "except pictures of victims of famine or concentration camps."

Leonard had diabetes. When he entered the hospital, he did not have long to live. "All of us knew he was doomed," said a former medical student at the hospital.

Diabetes is a disease that affects a person's ability to use the glucose (sugar) in the food that he or she eats. In a person without diabetes, the glucose that enters the bloodstream is taken into cells, where it is used to produce energy. In a person with diabetes, however, the glucose does not enter cells. Instead, it stays in the bloodstream. The result is that the person is always terribly hungry. He or she is also very tired and weak and may lose weight quickly.

1.3

Condition Unknown

Name Date

1. How would you describe Leonard's condition when he entered the hospital?

2. What disease did Leonard have?

3. What was wrong in Leonard's body?

4. How can you explain his terrible hunger?

5. How can you explain how tired and weak he was?

6. How can you explain how thin he was?

1.4

Condition Unknown—Possible Answers

1. How would you describe Leonard's condition when he entered the hospital?

Leonard appeared to be very sick. He was thin, his abdomen was swollen, his hair was falling out, and he had no energy. He complained about being hungry and was too weak to do anything but lie in bed.

2. What disease did Leonard have?

Leonard had diabetes.

3. What was wrong in Leonard's body?

The glucose in the food that Leonard ate could not enter his cells. Instead, it stayed in his bloodstream.

4. How can you explain his terrible hunger?

Despite high levels of glucose in his blood, Leonard's cells did not receive the glucose and could not use it as fuel to release energy. The result was constant hunger.

Leonard was also hungry because he was on a strict, 450 calorie per day diet. Before the discovery of insulin, most doctors tried to treat diabetes by putting patients on extremely strict diets, restricting their calorie intake to just under the level at which glucose would begin to appear in the urine. This strategy helped keep the blood glucose level under control, but it worsened many of the symptoms that the patients already were experiencing (for example, extreme hunger, tiredness, weakness, and weight loss).

5. How can you explain how tired and weak he was?

Leonard's cells were not receiving enough of the glucose they needed to provide energy for his body to function.

6. How can you explain how thin he was?

Students may have difficulty with this question. This is an opportunity to reinforce the importance of glucose as a source of energy for the body. Without glucose in the cells to provide energy, the body begins to use other molecules, such as protein and fat, to provide the energy it needs. Leonard's body was using protein from his muscles and fat to provide the energy that it should have been receiving from glucose. Leonard was not getting enough protein from food to rebuild his muscles, and so he became very thin.

1.5

Clue Cards

Autopsies on people who died of diabetes often showed a damaged pancreas.	If the pancreas is taken completely out of a dog's body, the dog develops diabetes.
The pancreas makes many different types of chemicals. Some of these chemicals travel from the pancreas through a small tube into the digestive tract.	Some chemicals made by the pancreas move straight from the pancreas into the bloodstream.
If the tube that carries chemicals from a dog's pancreas into its digestive tract is cut, then these chemicals can no longer move into the digestive tract. The dog cannot digest its food properly. However, the dog *does not* develop diabetes.	If the pancreas is cut completely out of a dog's abdomen but then grafted back under its skin, the dog cannot digest its food. However, the dog *does not* develop diabetes.

1.6

Looking for Clues

Name Date

1. Which organ of the body seems to be involved in diabetes?

2. What were the two most important pieces of evidence that show this organ is involved?

3. What does this organ normally do in the body?

4. Two experiments showed that the chemicals that move through a tube into the digestive tract are not important in diabetes. Which experiments are they?

5. Which type of chemical does seem to be important in diabetes? Why do you say this?

6. Remember from the story about Leonard that diabetes is a disease in which glucose does not move into a person's cells. What does this clue suggest about the importance of one or both of these chemicals?

7. What possible treatment for diabetes did these clues suggest?

8. How could this idea for a treatment be tested?

1.7

Looking for Clues—Possible Answers

1. Which organ of the body seems to be involved in diabetes?

The pancreas is involved in diabetes.

2. What were the two most important pieces of evidence that show this organ is involved?

Autopsies on the bodies of people who died from diabetes almost always showed some kind of damage to the pancreas.

When the pancreas was completely removed from a dog, the dog developed diabetes.

3. What does this organ normally do in the body?

The pancreas makes several different types of chemicals. Some of these chemicals travel from the pancreas through a small tube into the digestive tract, and others move from the pancreas directly into the bloodstream.

4. Two experiments showed that the chemicals that move through a tube into the digestive tract are not important in diabetes. Which experiments are they?

They are the experiment in which the tube leading from the pancreas to the digestive tract was cut and the experiment in which the pancreas was removed from the dog's abdomen and grafted under the skin. If the tube that carries chemicals from a dog's pancreas into its digestive tract was cut so that chemicals could no longer move into the digestive tract, the dog could not digest its food properly. However, the dog does not develop diabetes. This evidence indicates that these chemicals are not important in diabetes.

Likewise, if the pancreas is removed and then grafted under a dog's skin, the dog again has trouble digesting its food. It cannot digest its food properly because the grafted pancreas has no connection to the digestive system and the chemicals required for digestion cannot reach it. However, the dog does not develop diabetes. This suggests that the chemicals that move from the pancreas into the digestive tract are not involved in diabetes, because even though they are not getting into the dog's digestive tract, the dog does not develop diabetes.

The grafted pancreas does not reconnect itself to the digestive tract, but it does develop connections to the bloodstream. Thus, the chemicals that are normally produced by the pancreas and secreted

directly into the blood are still present in the dog's body, even after the pancreas has been removed from its normal location in the abdomen. These chemicals include the one chemical (insulin) that is important in diabetes. This is why even when the pancreas is moved as described, the dog remains diabetes free. You may wish to explain to students that further experiments showed that if the grafted pancreas was subsequently removed from under the skin (that is, if the grafted pancreas was later removed completely), the dog would then develop diabetes, just like when the pancreas is completely removed in the first place.

5. Which type of chemical does seem to be important in diabetes? Why do you say this?

The chemicals that are secreted from the pancreas directly into the bloodstream seem to be important in diabetes.

Students should be able to see that this is the only remaining answer, if the chemicals that move into the digestive tract are not involved. To help students see the full picture, you may want to explain to them that when either the tube is cut or the pancreas is moved from its normal location, the chemicals that the pancreas normally secretes into the bloodstream are still present in the dog's body. This is why the dog does not develop diabetes. The dog only developed diabetes if the pancreas was removed completely.

6. Remember from the story about Leonard that diabetes is a disease in which glucose does not move into a person's cells. What does this clue suggest about the importance of one or both of these chemicals?

It suggests that either all of these chemicals together, or perhaps only one of these chemicals, may help glucose get into a person's cells.

7. What possible treatment for diabetes did these clues suggest?

The clues suggested that if scientists could restore the missing substance to the bloodstream of a person with diabetes, perhaps glucose would be able to enter his or her cells.

8. How could this idea for a treatment be tested?

Scientists could try transplanting a healthy pancreas into a person with diabetes.

A different approach would be to make an "extract" of the substances produced by the pancreas and inject that extract into a patient's body. If the extract contained the unknown chemical that helps glucose get into a person's cells, the symptoms of diabetes might be eliminated by the injection.

1.8

The First Test of a New Idea

In January 1922, Leonard Thompson became the first human known to be treated for diabetes by receiving regular injections of an extract made from the pancreas of a healthy cow.

Within 24 hours after the first injection, the level of glucose in Leonard's blood dropped. According to one of Leonard's doctors, Leonard quickly "became brighter, more active, looked better, and said he felt stronger."

Leonard lived for 13 more years, receiving daily injections of "pancreatic extract." He gained weight and his health got much better. The picture shows Leonard as a young man, after his release from the hospital. As long as he received regular injections of the extract, Leonard remained free from the most serious symptoms of diabetes. He died at age 27 from pneumonia.

Source: Thomas Fisher Rare Books Library.

1.9

Leonard and Testing New Ideas

Name Date

1. What hypothesis were the scientists testing when they injected the pancreas extract into Leonard Thompson?

2. What were the effects of the first injection on Leonard? What do you think was happening inside his body that brought about these changes?

3. Did injecting Leonard with the extract cure his diabetes? What evidence does the story offer for your answer?

4. The chemical in the extract that helped control Leonard's diabetes is called insulin. Does insulin cure diabetes? Can you offer any evidence for your answer?

1.10

Leonard and Testing New Ideas—Possible Answers

1. What hypothesis were the scientists testing when they injected the pancreas extract into Leonard Thompson?

   They were testing the hypothesis that the extract would help glucose get into Leonard's cells (that is, that it would help "control" the symptoms of diabetes).

2. What were the effects of the first injection on Leonard? What do you think was happening inside his body that brought about these changes?

   Leonard became "brighter" (more alert) and more active. He also looked better and said that he felt stronger. These changes happened because the glucose in Leonard's bloodstream began moving into his cells.

3. Did injecting Leonard with the extract cure his diabetes? What evidence does the story offer for your answer?

   No, injection with the extract did not cure Leonard's diabetes. The evidence for this is that he continued to receive daily injections of pancreatic extract for the rest of his life. He would not have had to receive these injections if the extract had cured his diabetes.

4. The chemical in the extract that helped control Leonard's diabetes is called insulin. Does insulin cure diabetes? Can you offer any evidence for your answer?

   No, insulin injections do not cure diabetes, even though they do help control the symptoms. This is why Leonard remained healthy only if he received regular injections. Students may also know that people with certain types of diabetes must still receive daily injections of insulin.

Today, bacteria that contain a cloned copy of the human gene for insulin make virtually all of the insulin used in the treatment of diabetes.

1.11

Lesson 1 Quiz

Name Date

Directions: Please indicate which response you believe is the correct one.

1. What disease did Leonard have?

_____a. liver failure

_____b. heart disease

_____c. diabetes

_____d. ulcers

2. Which organ of the body is directly involved in this disease?

_____a. liver

_____b. heart

_____c. pancreas

_____d. stomach

3. Diabetes is a disease that affects how the body uses glucose.

_____true _____false

4. People with diabetes that has not been treated

_____a. are often tired and weak.

_____b. are usually filled with energy and strength.

_____c. cannot digest their food properly.

_____d. have too much insulin in their bodies.

5. Insulin is

_____a. a sugar made by the liver.

_____b. a chemical made by the pancreas.

_____c. important for digestion of the sugar in food.

_____d. a protein that increases blood sugar levels.

1.12

Lesson 1 Quiz—Answer Key

1. What disease did Leonard have?

_____a. liver failure

_____b. heart disease

__X__c. diabetes

_____d. ulcers

2. Which organ of the body is directly involved in this disease?

_____a. liver

_____b. heart

__X__c. pancreas

_____d. stomach

3. Diabetes is a disease that affects how the body uses glucose.

__X__true _____ false

4. People with diabetes that has not been treated

__X__a. are often tired and weak.

_____b. are usually filled with energy and strength.

_____c. cannot digest their food properly.

_____d. have too much insulin in their bodies.

5. Insulin is

_____a. a sugar made by the liver.

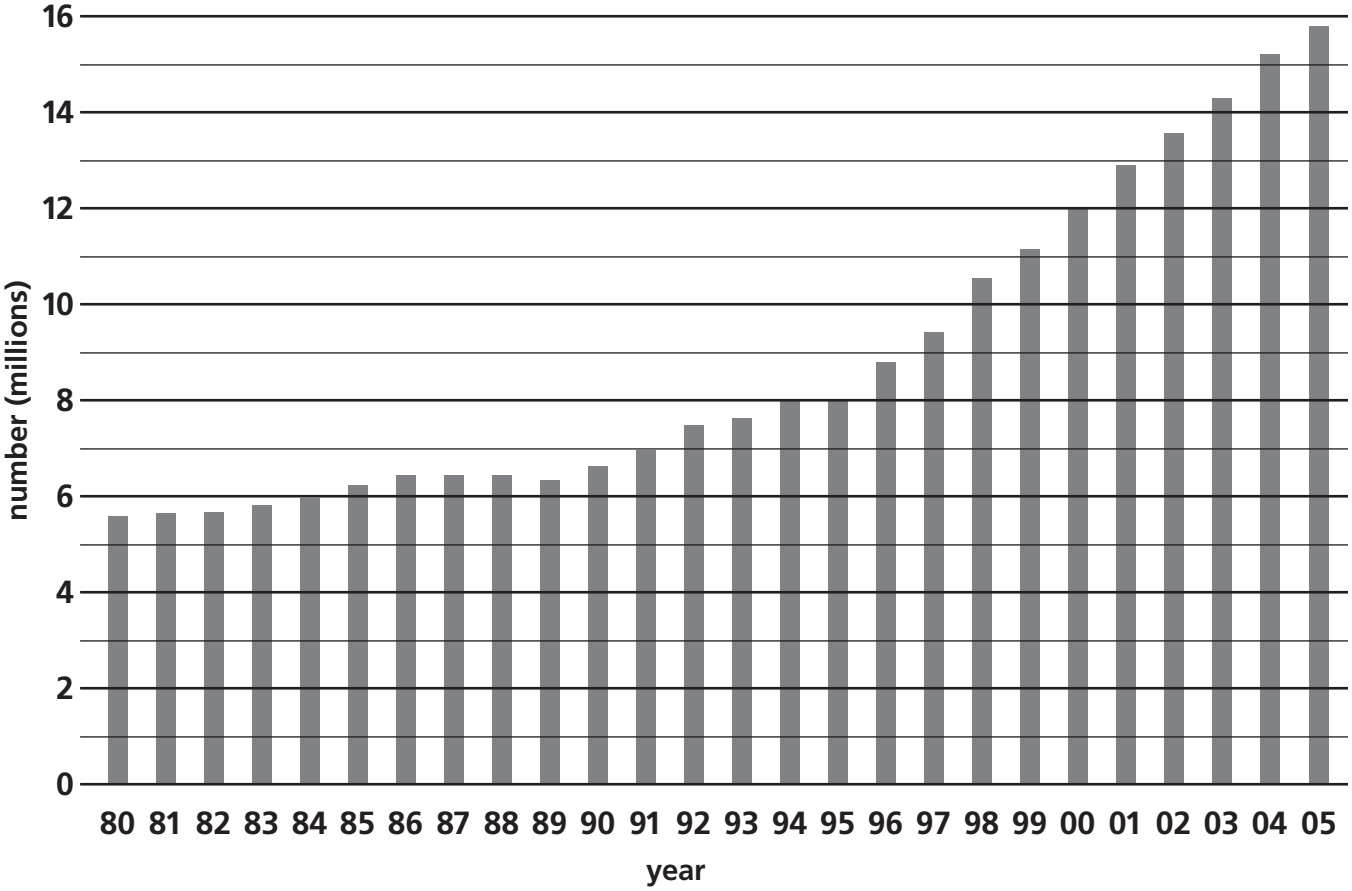
__X__b. a chemical made by the pancreas.

_____c. important for digestion of the sugar in food.

_____d. a protein that increases blood sugar levels.

2.1

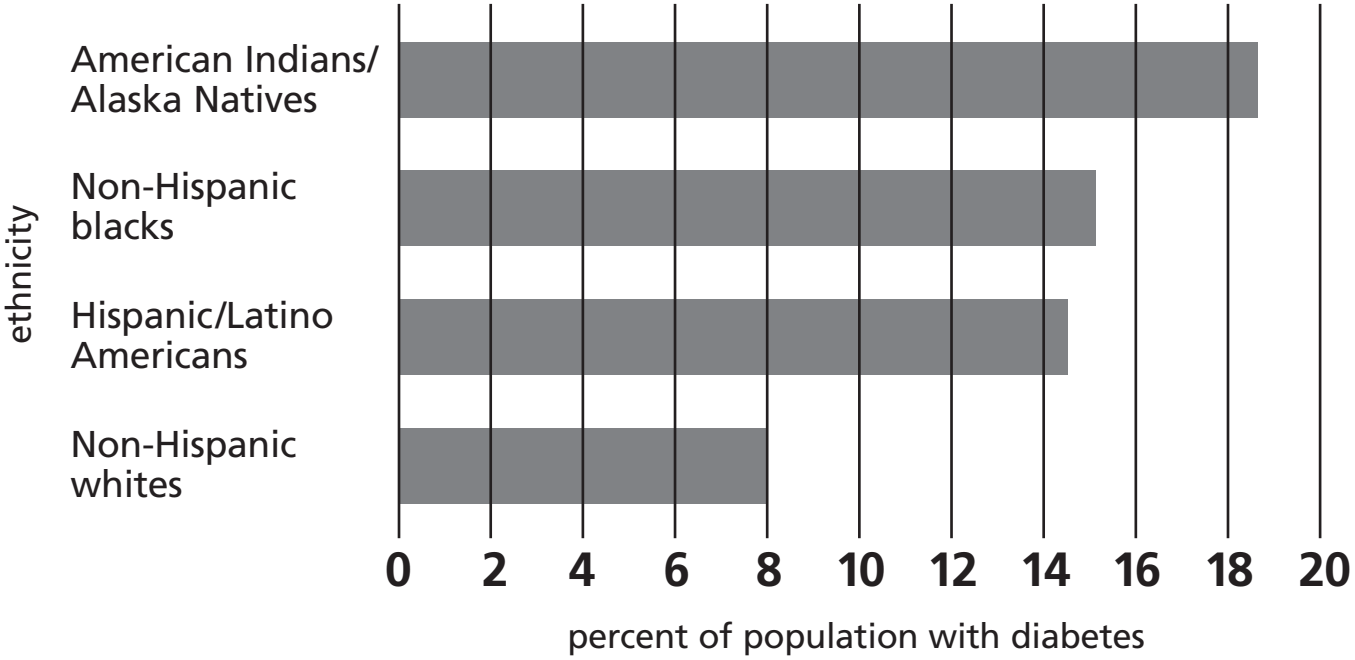
Incidence of Diabetes in the United States



Source: Centers for Disease Control and Prevention, National Center for Health Statistics, Division of Health Interview Statistics, data from the National Health Interview Survey.

2.1

Estimated age-adjusted total prevalence of diabetes in people aged 20 years or older, by race and ethnicity, United States, 2005



Sources: For American Indians/Alaska Natives, the estimate of total prevalence was calculated using the estimate of diagnosed diabetes from the 2003 outpatient database of the Indian Health Service and the estimate of undiagnosed diabetes from the 1999–2002 National Health and Nutrition Examination Survey (NHANES). For the other groups, 1999–2002 NHANES estimates of total prevalence (both diagnosed and undiagnosed) were projected to year 2005.

2.2

Generating Questions about Type 2 Diabetes

Cause of Type 2 Diabetes
Who Develops Type 2 Diabetes
Symptoms of Type 2 Diabetes
Consequences of Type 2 Diabetes
Treatment of Type 2 Diabetes
Other Questions

2.3

Team Questions about Type 2 Diabetes

Question 1
Answer
Question 2
Answer
Question 3
Answer

2.4

Facts about Diabetes

Almost everyone knows someone who has diabetes. An estimated 20.8 million people in the United States—7 percent of the population—have diabetes, a serious, lifelong condition. Of those, 14.6 million have been diagnosed, and 6.2 million have not yet been diagnosed. In 2005, about 1.5 million people aged 20 or older were diagnosed with diabetes.

What Is Diabetes?

Diabetes is a disorder of metabolism—the way our bodies use digested food for growth and energy. Most of the food we eat is broken down into glucose, which is the form of sugar in the blood. Glucose is the main source of fuel for the body.

After digestion, glucose passes into the bloodstream, where it is used by cells for growth and energy. For glucose to get into cells, insulin must be present. Insulin is a hormone produced by the pancreas, a large gland behind the stomach (figure 1).

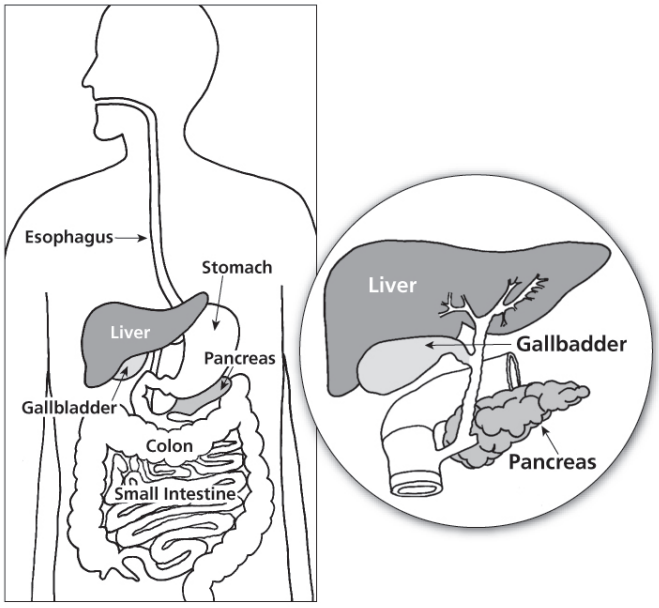
For most people, when we eat, the pancreas automatically produces the right amount of insulin to move glucose from the blood into our cells. In people with diabetes, however, the pancreas either produces too little or no insulin, or the cells do not respond appropriately to the insulin that is produced. Glucose builds up in the blood, overflows into the urine, and passes out of the body in the urine. As a result, the body loses its main source of fuel even though the blood contains large amounts of glucose.

What Are the Types of Diabetes?

The three main types of diabetes are

- type 1 diabetes,
- type 2 diabetes, and
- gestational diabetes.

Figure 1: Insulin is produced in the pancreas.



2.4

Type 1 Diabetes

Type 1 diabetes is an autoimmune disease. An autoimmune disease results when the body's system for fighting infection (the immune system) turns against a part of the body. In diabetes, the immune system attacks and destroys the insulin-producing cells in the pancreas. The pancreas then produces little or no insulin. A person who has type 1 diabetes must take insulin daily to live.

At present, scientists do not know exactly what causes the body's immune system to attack the beta cells, but they believe that autoimmune, genetic, and environmental factors, possibly viruses, are involved. Type 1 diabetes accounts for about 5–10 percent of diagnosed diabetes in the United States. It develops most often in children and young adults but can appear at any age.

Type 2 Diabetes

The most common form of diabetes is type 2 diabetes. About 90–95 percent of people with diabetes have type 2. This form of diabetes most often occurs in adults and in people who are obese, have a family history of diabetes, have a previous history of gestational diabetes, are physically inactive, and are of certain ethnicities. About 80 percent of people with type 2 diabetes are overweight. Type 2 diabetes is increasingly being diagnosed in children and adolescents.

When type 2 diabetes is diagnosed, the pancreas is usually producing enough insulin, but for unknown reasons the body cannot use the insulin effectively, a condition called insulin resistance. After several years, insulin production decreases. The result of this condition is the same as for type 1 diabetes—glucose builds up in the blood and the body cannot make efficient use of its main source of fuel.

The symptoms of type 2 diabetes develop gradually. Symptoms may include fatigue, frequent urination, increased thirst and hunger, weight loss, blurred vision, and slow healing of wounds or sores. It is also important to realize that some people have no symptoms.

Gestational Diabetes

Some women develop gestational diabetes late in pregnancy. Although this form of diabetes usually disappears after the birth of the baby, women who have had gestational diabetes have a 20–50 percent chance of developing type 2 diabetes within 5 to 10 years. Maintaining a reasonable body weight and being physically active may help prevent development of type 2 diabetes.

How Is Diabetes Diagnosed?

The fasting blood glucose test is the preferred test for diagnosing diabetes in children and adults,

except for pregnant women. It is most reliable when performed in the morning. However, a diagnosis of diabetes can be made based on certain test results, which are confirmed by retesting on a different day.

What Is Pre-diabetes?

People with pre-diabetes have blood glucose levels that are higher than normal, but not high enough for a diagnosis of diabetes. This condition raises the risk of developing type 2 diabetes, heart disease, and stroke.

What Are the Scope and Impact of Diabetes?

Diabetes is widely recognized as one of the leading causes of death and disability in the United States. In 2002, it was the sixth-leading cause of death. However, diabetes is likely to be underreported as the underlying cause of death on death certificates. About 65 percent of deaths among those with diabetes are attributed to heart disease and stroke.

Diabetes is associated with long-term complications that affect almost every part of the body. The disease often leads to blindness, heart and blood vessel disease, stroke, kidney failure, amputations, and nerve damage. Uncontrolled diabetes can complicate pregnancy, and birth defects are more common in babies born to women with diabetes.

In 2002, diabetes cost the United States $132 billion. Indirect costs, including disability payments, time lost from work, and premature death, totaled $40 billion; direct medical costs for diabetes care, including hospitalizations, medical care, and treatment supplies, totaled $92 billion.

Who Gets Diabetes?

Diabetes is not contagious. People cannot "catch" it from each other. However, certain factors can increase the risk of developing diabetes.

Type 1 diabetes occurs equally among males and females but is more common in whites than in non-whites. Data from the World Health Organization's Multinational Project for Childhood Diabetes indicate that type 1 diabetes is rare in most African, American Indian, and Asian populations.

Type 2 diabetes is more common in adults, especially in people who are overweight. It occurs more often in African Americans, American Indians, some Asian Americans, Native Hawaiians and other Pacific Islander Americans, and Hispanics/ Latinos. On average, non-Hispanic African Americans are 1.8 times as likely to have diabetes as non-Hispanic whites of the same age. Mexican Americans are 1.7 times as likely to have diabetes as non-Hispanic whites of similar age.

(Data are not available for estimating diabetes rates in other Hispanic/Latino groups.)

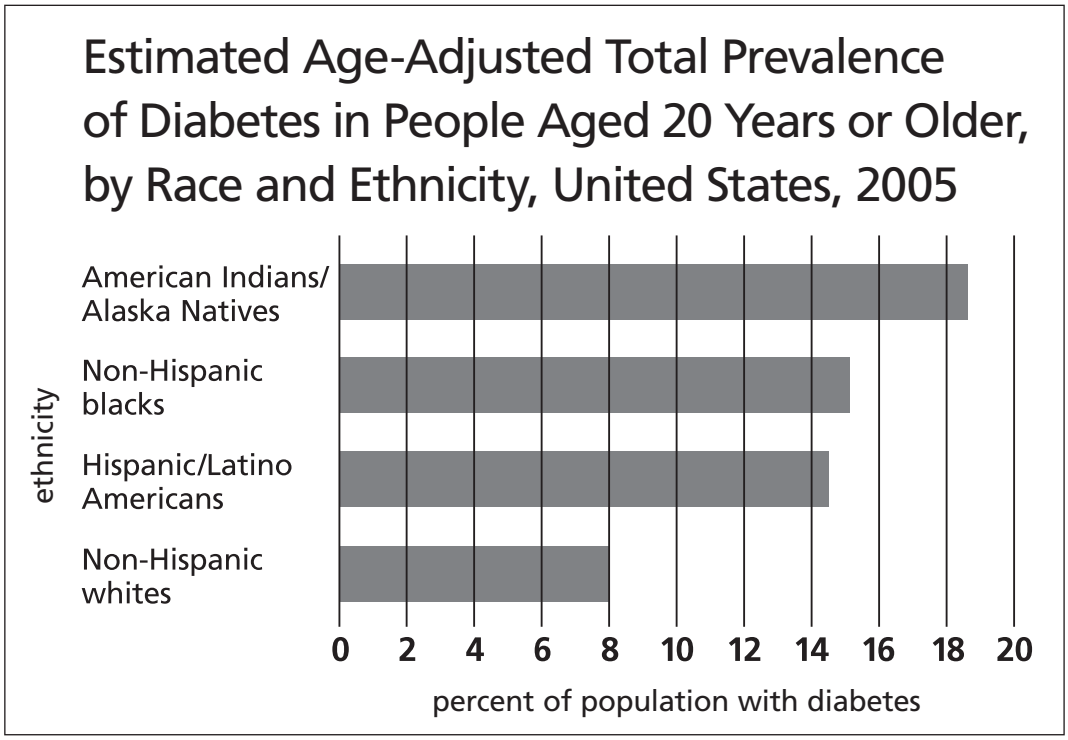
American Indians have one of the highest rates of diabetes in the world. On average, American Indians and Alaska Natives are 2.2 times as likely to have diabetes as non-Hispanic whites of similar age (figure 2). Although prevalence data for diabetes among Asian Americans and Pacific Islanders are limited, some groups, such as Native Hawaiians, Asians, and other Pacific Islanders residing in Hawaii (aged 20 or older) are more than twice as likely to have diabetes as white residents of Hawaii of similar age.

How Is Diabetes Managed?

Before the discovery of insulin in 1921, everyone with type 1 diabetes died within a few years after diagnosis. Although insulin is not considered a cure, its discovery was the first major breakthrough in diabetes treatment.

Today, healthy eating, physical activity, and taking insulin are the basic therapies for type 1 diabetes. The amount of insulin must be balanced with food intake and daily activities. Blood glucose levels must be closely monitored through frequent blood glucose checking (figure 3).

Figure 2: Prevalence data. Estimated age-adjusted total prevalence of diabetes in people aged 20 years or older.



2.4

Healthy eating, physical activity, and blood glucose testing are the basic management tools for type 2 diabetes. In addition, many people with type 2 diabetes require oral medication, insulin, or both to control their blood glucose levels.

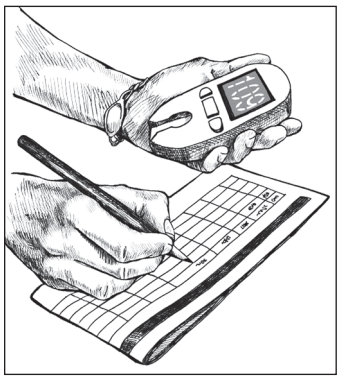


Figure 3: Keeping track of glucose levels. *Source: National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health.*

People with diabetes must take responsibility for their day-to-day care. Much of the daily care involves keeping blood glucose levels from going too low or too high. When blood glucose levels drop too low—a condition known as hypoglycemia—a person can become nervous, shaky, and confused. Judgment can be impaired, and if blood glucose falls too low, fainting can occur. The goal of diabetes management is to keep levels of blood glucose, blood pressure, and cholesterol as close to the normal range as safely possible.

How Can People Lower Their Risk of Diabetes?

People can do a lot to lower their risk. Some ways to do that include the following:

- Reach and maintain a reasonable body weight.
- Make wise food choices most of the time.
- Be physically active every day.
- Take prescribed medicines.

Doing these things can reduce the risk of developing type 2 diabetes. Keeping blood pressure and cholesterol on target also helps people stay healthy.

Adapted with permission from National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health.

2.5

Scoring Rubric for Focus on Diabetes Poster

Task	Excellent (3)	Satisfactory (2)	Needs Improvement (1)
Answer to the team question	The poster provides a clear and accurate answer to the team's question about type 2 diabetes.	The poster provides a satisfactory answer to the team's question about type 2 diabetes, but leaves out some important information that should be included.	The poster does not provide a satisfactory or accurate answer to the team's question. It does not indicate why the team was not able to find an accurate answer.
Additional information about type 2 diabetes	The poster accurately includes other related and important information about type 2 diabetes that students have learned so far.	The poster includes other information about diabetes that is mostly accurate.	The poster does not include any additional and related information about type 2 diabetes, or it includes information that is not accurate.
Appearance of poster	The poster's appearance is neat and inviting to the reader. The poster presents the information in a manner that is easy for the reader to understand.	The poster's appearance is fairly neat and presents the information in a manner that is satisfactory.	The poster's appearance is not neat and is difficult for the reader to follow and understand.
Evidence of teamwork	It is clear that the team members worked together to create the poster. The poster displays the work of each member of the team.	It is clear that more than one team member contributed to the poster, but there is no evidence of each team member's work.	There is little evidence to indicate that more than one person worked on the poster.

2.6

Lesson 2 Quiz

Name Date

Directions: Please indicate which response you believe is the correct one.

1. There is only one type of diabetes.

_____ true _____ false

2. What do we know about the number of people in the United States who have been diagnosed with diabetes?

_____ a. It is increasing.

_____ b. It is decreasing.

_____ c. It is not changing.

_____ d. No one knows whether this number is changing or not.

3. Treatment for diabetes might include which of the following?

_____ a. receiving regular injections of insulin

_____ b. eating a healthy diet

_____ c. getting regular physical exercise

_____ d. all of these

4. Which of the following is true about insulin?

_____ a. A person's liver produces it.

_____ b. It causes the amount of glucose in a person's blood to rise.

_____ c. It helps glucose move into a person's cells.

_____ d. It is found in the food that we eat.

5. Scientists have not yet discovered a cure for diabetes.

_____ true _____ false

2.7

Lesson 2 Quiz—Answer Key

1. There is only one type of diabetes.

_____ true __X__ false

2. What do we know about the number of people in the United States who have been diagnosed with diabetes?

__X__ a. It is increasing.

_____ b. It is decreasing.

_____ c. It is not changing.

_____ d. No one knows whether this number is changing or not.

3. Treatment for diabetes might include which of the following?

_____ a. receiving regular injections of insulin

_____ b. eating a healthy diet

_____ c. getting regular physical exercise

__X__ d. all of these

4. Which of the following is true about insulin?

_____ a. A person's liver produces it.

_____ b. It causes the amount of glucose in a person's blood to rise.

__X__ c. It helps glucose move into a person's cells.

_____ d. It is found in the food that we eat.

5. Scientists have not yet discovered a cure for diabetes.

__X__ true _____ false

3.1

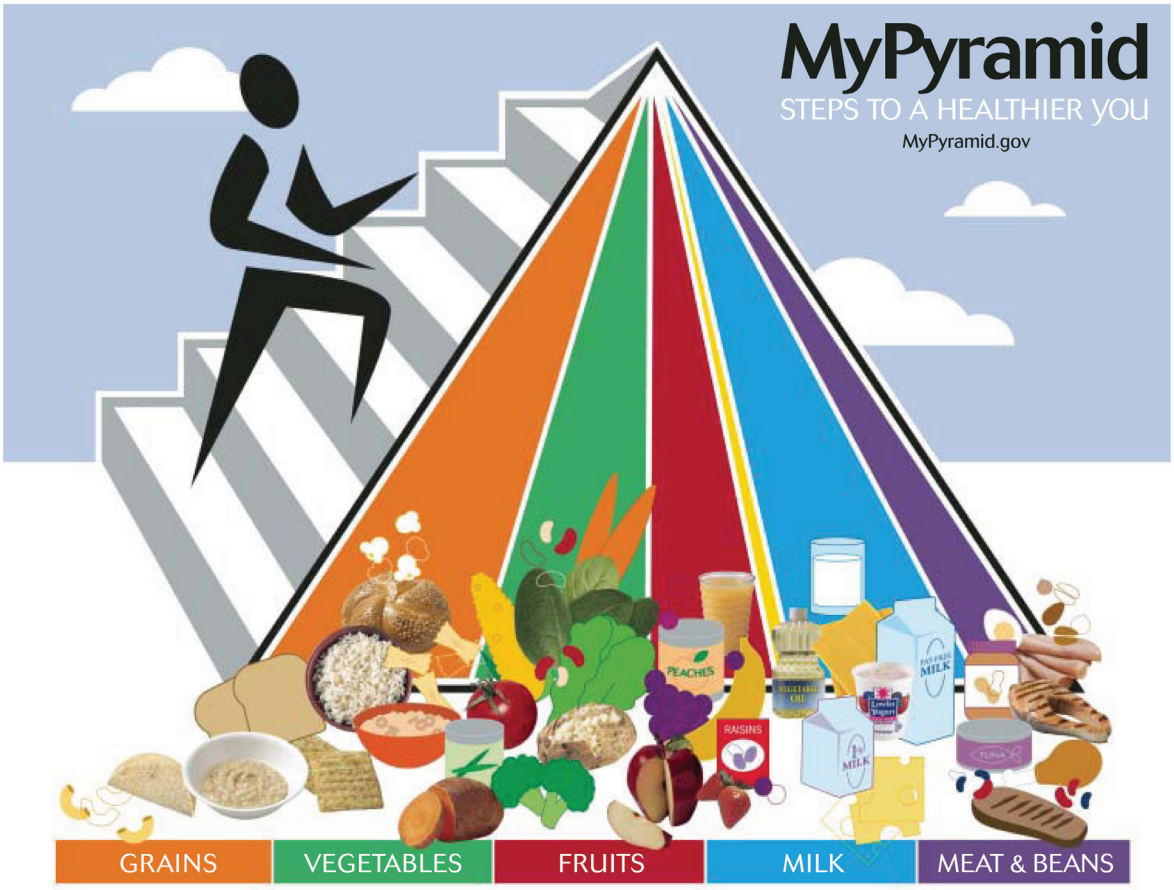
Risk Factors for Type 2 Diabetes

- Family background
- Ethnic background
- Age

- Diet
- Weight
- Exercise habits

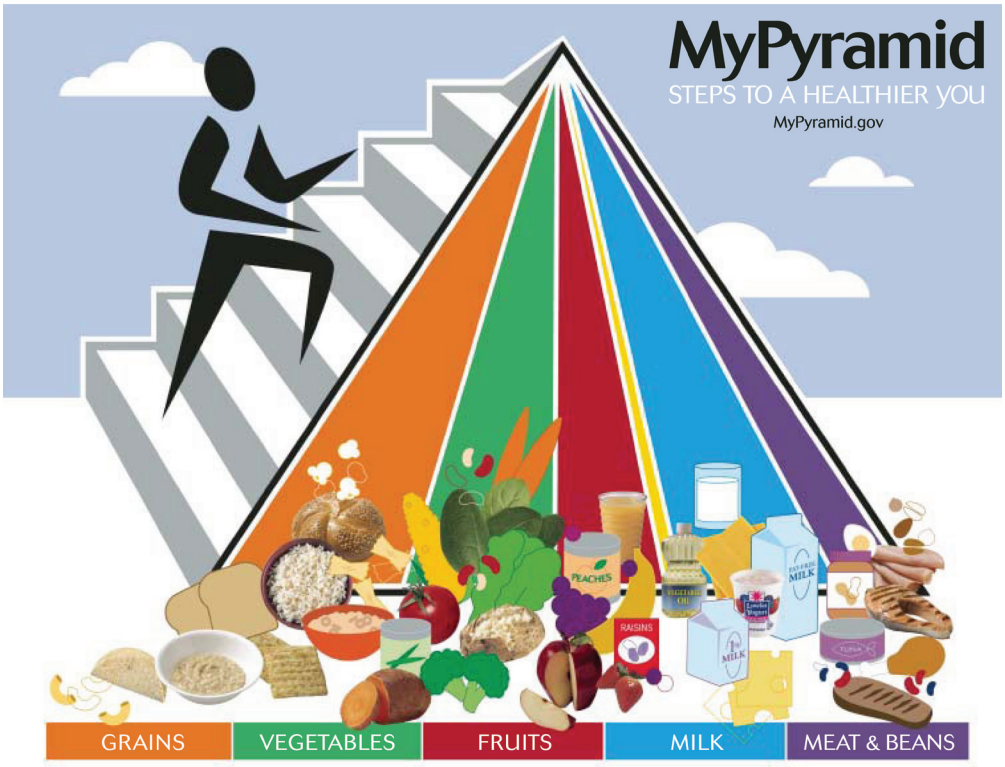
3.2

MyPyramid



3.3

MyPyramid Food Guidance System



- MyPyramid has six colored bands representing the five food groups and oils (the narrow yellow band). Eat foods from all six groups every day for good health.
- The different widths of the bands show the relative amounts of each food group you should eat every day. For instance, eat more vegetables than meat and beans.
- The wider base for each band represents foods with little or no fats or sugars added, and the narrower tip represents foods with more fats or sugars added. Eat more foods that belong at the base of each band (for example, plain broccoli). Eat fewer foods that belong at its tip (for example, broccoli that is fried and has cheese sauce added).
- You are the person climbing the steps of the pyramid. Get at least 30 minutes of moderate to vigorous exercise on most days of the week for good health.
- Remember the following slogans to help you eat more healthfully: "Make half your grains whole. Vary your veggies. Focus on fruits. Get your calcium-rich foods. Go lean with protein."

3.4

Brian's Diary

Name of student: *Brian*

Age: *16*

It is only a 10-minute walk from my house to the school, but it was cold this morning, so it felt longer. I did not have breakfast before I left the house, so I bought two 50-cent doughnuts from the swim team's fund-raiser table in the school cafeteria. I was hungry again between third and fourth periods, so I bought a soda and a candy bar from a vending machine. That held me over through lunch, so I had only a bottle of lemonade and a bag of chips while my friends ate their bag lunches.

After sitting in class all afternoon, I was ready to get outside again, so I walked the 10-minute route back home from school instead of taking the afternoon shuttle bus. Later, I spent an hour skateboarding in the neighborhood with my friends before catching a ride with my older brother to a local pizza parlor, where we each ate half of a meat lover's pizza and three or four bread sticks. Of course, I had another soda before we headed back home in my brother's car.

3.5

Sample MyPyramid Worksheet

Team Evaluation: Food

Lifestyle Elements	Goal	Tally the MyPyramid Equivalents	Evaluate the Total (Check the Line That Applies)
Grains	5–9 equivalents	/// //	___ Did not meet goal _X_ Met goal ___ Exceeded goal
Vegetables	2–3½ equivalents		_X_ Did not meet goal ___ Met goal ___ Exceeded goal
Fruits	1½–2 equivalents		_X_ Did not meet goal ___ Met goal ___ Exceeded goal
Dairy	3 equivalents	/	_X_ Did not meet goal ___ Met goal ___ Exceeded goal
Meat and beans	5–6½ equivalents	///	_X_ Did not meet goal ___ Met goal ___ Exceeded goal

On this day, Brian (*student's name*) ate a poor (*good, fair, poor*) balance of foods from the different food groups.

Team Evaluation: Physical Activity

Physical activity	30 minutes of moderate to vigorous activity	20 minutes	_X_ Did not meet goal ___ Met goal ___ Exceeded goal

On this day, Brian (*student's name*) achieved a fair (*good, fair, poor*) balance between eating and exercise.

3.6

Valerie's Diary

Name of student: *Valerie*

Age: *13*

This morning, I had my usual cup of oatmeal with 1 cup of milk before getting dressed. I had an orange while I made the 20-minute trek to school. I walked quickly with my heavy backpack. I was already hungry an hour before lunch, so I munched on some walnuts (1 ounce) that I had in a bag in my backpack while I sat in class.

For lunch, the cafeteria was serving chili (meatless). I mixed in four to five crumbled saltine crackers into my bowl to give it some texture.

I have PE at the end of the day. Today, we warmed up with 10 minutes of laps and then played volleyball. On the way back from school I walked slowly, chatting with my friends along the way. My backpack seemed even heavier than it was in the morning; that could be because I now had it filled with textbooks for next week's exams. It must weigh 10 pounds.

I did some homework before dinner. My mom cooked my favorite meal, which included 3 ounces of grilled chicken breast and a cup of steamed cabbage. I also had a baked sweet potato with butter. In the evening, I watched some television with my little sister. Before bed, I snacked on a cup of blueberries.

3.7

Lenore's Diary

Name of student: *Lenore*

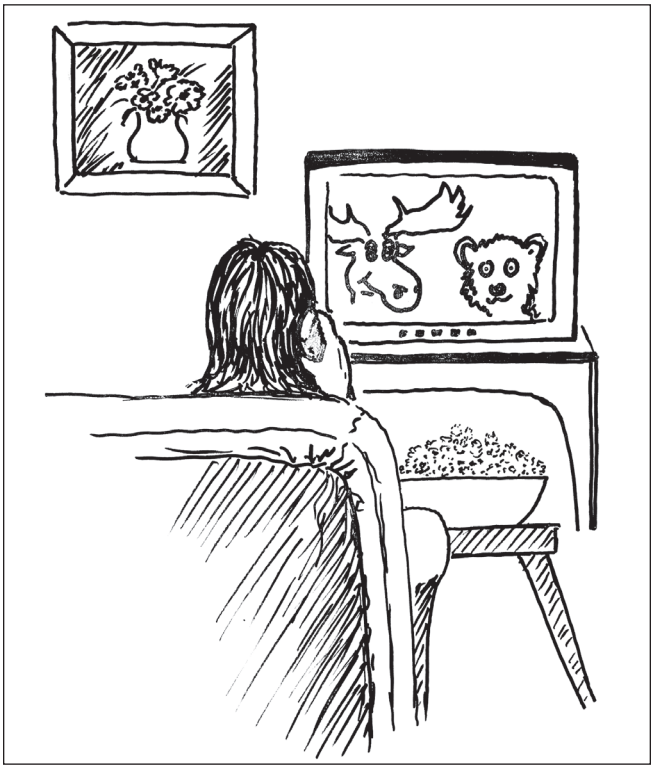
Age: *11*

Today, when I went down to the kitchen, my dad had set out 2 $^{1}/_{2}$ cups of cereal for my breakfast. He wanted to finish off the box because none of us kids really like it and do not eat it. We are always asking for cereals with more sugar! I added a cup of milk. Since our toaster is not working, I dipped my piece of whole wheat bread in the leftover milk at the bottom of the bowl until it got nice and soggy.

Dad packed my lunch because I was running late to catch the bus for my ride to school. I discovered he had made me a sandwich on whole wheat with tuna and mayonnaise. He also included one sliced apple with 1 tablespoon of peanut butter to spread on it. There was also a container of six or seven carrot sticks with light ranch dressing for dipping.

After a few more hours of sitting in class, I took the bus home again. No one was home, so I made myself a snack of 4 cups of popcorn. I watched some afternoon TV shows and talked on the phone with some of my friends. We like to watch the same show while we are on the phone so we can talk about it!

When my parents got home, they had me do some homework. My mom then took me to my soccer coach's house. We were having a big team dinner to get ready for our game tomorrow. I had 1 $^{1}/_{2}$ cups of spaghetti with meat sauce as well as two slices of garlic bread and a garden salad with French dressing.



3.8

Jeremy's Diary

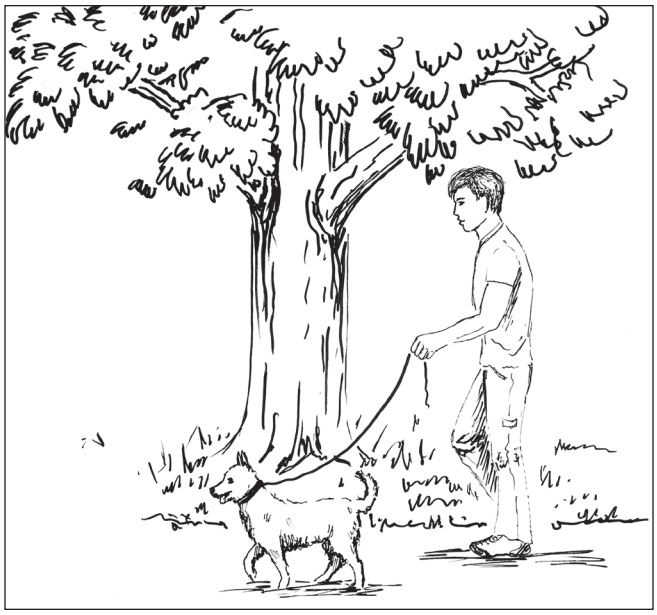
Name of student: *Jeremy*

Age: *12*

I was running late for school this morning because I took the dog for a quick, 10-minute walk before school. I was only able to chug down a glass of orange juice before I had to leave for the 10-minute walk to school.

Since I had not had time for a real breakfast, I bought an egg sandwich from the cafeteria before my first period. I had forgotten to pack lunch, so I called my mom to see if she could bring me something. I have PE just before lunch, where we did 20 minutes of exercise before watching a movie. I was very hungry by the time my mom arrived. She brought me a turkey sandwich and lots of veggies. I also grabbed a carton of milk, some baked chips, and an apple from the cafeteria to round out the meal.

After school, I made the 10-minute walk home. I grabbed a low-fat yogurt with blueberries as a snack. I then made the 5-minute bike ride to my friend's house.



His mom had set out a garden salad and a plate with cucumbers, radishes, and bell peppers for us to munch on while she finished making dinner. The meal was tacos on whole-wheat tortillas with lettuce, tomato, salsa, and light cheese. I only ate one taco, but it was great.

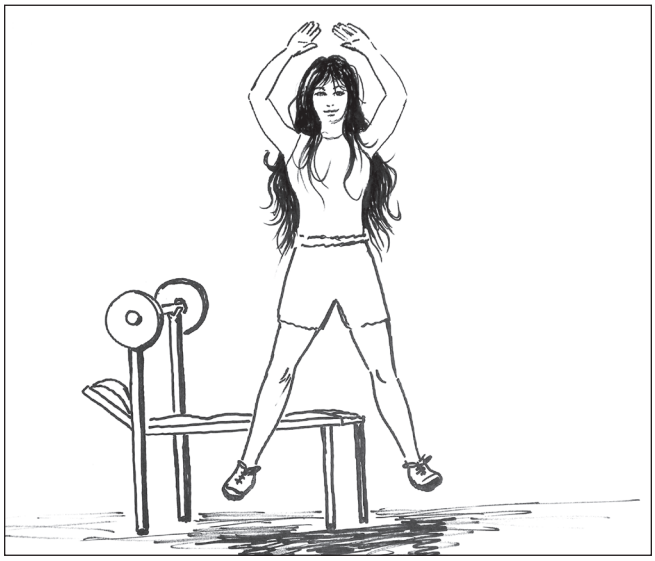
3.9

Jody's Diary

Name of student: *Jody*

Age: *13*

I grabbed a cup of milk this morning before I got in the car with my mom and my little brother for the ride to school. It is a long drive, so I usually grab something to eat in the car. This morning I had a banana and a granola bar. Mom gave me money before I got out of the car, so I ate in the cafeteria for lunch. They were serving turkey with gravy and mashed potatoes. I also had a garden salad and 1/2 cup of slushy canned fruit.



I was hungry again before PE, so I snacked on a string cheese between classes. In PE, we did 30 minutes of exercise.

After school, my brother and I took the bus home. We each had a 20-ounce soda and a bag of chips. Later, we snacked on some licorice. Mom called and said she would be late getting home from work, so I made a hamburger and pasta dinner. We ate that with a piece of whole wheat bread with butter for our dinner. We spent the evening watching TV and playing video games because neither of us had any homework.

3.10

Jessica's Diary

Name of student: *Jessica*

Age: *12*

Mom stayed home from work today, so she made everyone a big breakfast. I had two scrambled eggs, four small sausage links, and three big pancakes with syrup.

She drove me to school, and I spent the morning sitting in classes. I do not have PE this semester, so I never seem to get much exercise.

For lunch, my dad stopped in for a surprise visit. He brought me my favorite—a double hamburger with cheese, large French fries, and a soda.

After my last class, Mom drove me home. I got ready to meet my friends for a movie. It was an early showing, so I skipped dinner and grabbed a bag of popcorn (about 4 cups) and a soda (20 ounces) after riding the bus to the theater. After the show, my dad picked us up, dropped my friends off at their houses, and drove me home.

3.11

MyPyramid Worksheet

Team Evaluation: Food

Lifestyle Elements	Goal	Tally the MyPyramid Equivalents	Evaluate the Total (Check the Line That Applies)
Grains	5–9 equivalents		___ Did not meet goal ___ Met goal ___ Exceeded goal
Vegetables	2–3½ equivalents		___ Did not meet goal ___ Met goal ___ Exceeded goal
Fruits	1½–2 equivalents		___ Did not meet goal ___ Met goal ___ Exceeded goal
Dairy	3 equivalents		___ Did not meet goal ___ Met goal ___ Exceeded goal
Meat and beans	5–6½ equivalents		___ Did not meet goal ___ Met goal ___ Exceeded goal

On this day, _____ (*student's name*) ate a _____ (*good, fair, poor*) balance of foods from the different food groups.

Team Evaluation: Physical Activity

Physical activity	30 minutes of moderate to vigorous activity	____ minutes	___ Did not meet goal ___ Met goal ___ Exceeded goal

On this day, _____ (*student's name*) achieved a _____ (*good, fair, poor*) balance between eating and exercise.

3.12

MyPyramid Equivalents

Food

Type of Food	MyPyramid Equivalent
Apple (sliced or whole)	1 fruit
Baked sweet potato	1 vegetable
Banana	1 fruit
Blueberries (1 cup)	1 fruit
Bread sticks (3–4)	2 grain
Butter	None
Candy bar	None
Canned fruit (1/2 cup)	1/2 fruit
Carrot sticks (6–7 sticks)	1/2 vegetable
Cereal (2 1/2 cups)	2 1/2 grain
Chili (meatless,1 bowl)	2 1/2 meat and beans
Chips	None
Cucumbers, radishes, bell peppers	1 vegetable
Double hamburger with cheese	2 grain, 1 dairy, 4 meat and beans
Doughnut	None
Egg sandwich	2 grain, 1 meat and beans
French dressing	None
French fries (large)	None
Garden salad	1 vegetable
Garlic bread (2 slices)	2 grain
Granola bar	1 grain
Grilled chicken breast (3 ounces)	3 meat and beans
Hamburger and pasta dish	1 grain, 2 meat and beans, 1/2 vegetable
Lemonade	None
Licorice	None

3.12

Food (continued)

Type of Food	MyPyramid Equivalent
Light ranch dressing	None
Low-fat yogurt with blueberries	1 dairy, ½ fruit
Mashed potatoes	None
Meat lover's pizza (½ large pizza)	3 grain, 3 meat and beans, 1 dairy
Milk (1 cup or carton)	1 dairy
Oatmeal (1 cup)	2 grain
Orange	1 fruit
Orange juice (1 glass or cup)	1 fruit
Pancakes (3 pancakes)	3 grain
Peanut butter (1 tablespoon)	None
Popcorn (4 cups)	None
Saltine crackers (4–5 crackers)	1 grain
Sandwich on whole wheat, tuna, and mayo	2 grain, 2 meat and beans
Sandwich—turkey with lots of veggies	4 grain, 1 meat and beans, ½ vegetables
Sausage links (4 small)	2 meat and beans
Scrambled eggs (2 eggs)	2 meat and beans
Soda (20 ounces)	None
Spaghetti with meat sauce (1½ cups)	3 grain, 1 meat and beans, 1 vegetable
Steamed cabbage (1 cup)	1 vegetable
String cheese	1 dairy
Syrup	None
Taco on whole wheat tortilla, with lettuce, tomato, salsa, light cheese	2 grain, ½ vegetable, 1 dairy
Turkey with gravy	2 meat and beans
Walnuts (1 ounce)	1 meat and beans
Whole wheat bread (1 slice)	1 grain

3.12

Activity

Type of Activity	MyPyramid Equivalent
Homework	None
PE class—20 minutes of exercise	20 minutes
PE class—30 minutes of exercise	30 minutes
PE class—volleyball with 10 minutes of laps to warm up	30 minutes
Play video games	None
Ride bike to friend's house (5 minutes)	5 minutes
Ride the bus	None
Ride in a car	None
Sit in class	None
Skateboard	None
Talk on the telephone	None
Walk to school (10 minutes)	10 minutes
Walk home from school (10 minutes)	10 minutes
Walk to school (20 minutes)—quickly with heavy backpack	30 minutes
Walk home from school (25 minutes)—slowly with heavy backpack	35 minutes
Walk the dog (10 minutes)	10 minutes
Watch a movie	None
Watch TV	None

3.13

Details about the MyPyramid Guidelines for Middle School Students

The amount of grains, vegetables, fruits, and meats and beans you need to eat depends on age, sex, and level of physical activity.

Grains: In general, 1 slice of bread; 1 cup of ready-to-eat cereal; or 1/2 cup of cooked rice, cooked pasta, or cooked cereal can be considered as a 1-ounce equivalent from the grains group.

	Ages	Daily Equivalents
Girls	9–13 years old	5-ounce equivalents
	14–18 years old	6-ounce equivalents
Boys	9–13 years old	6-ounce equivalents
	14–18 years old	7-ounce equivalents

Vegetables: In general, 1 cup of raw or cooked vegetables or vegetable juice, or 2 cups of raw leafy greens can be considered as 1 cup from the vegetable group.

	Ages	Daily Equivalents
Girls	9–13 years old	2 cups
	14–18 years old	2 1/2 cups
Boys	9–13 years old	2 1/2 cups
	14–18 years old	3 cups

Fruits: In general, 1 cup of fruit or 100 percent fruit juice, or 1/2 cup of dried fruit can be considered as 1 cup from the fruit group.

	Ages	Daily Equivalents
Girls	9–13 years old	1 1/2 cups
	14–18 years old	1 1/2 cups
Boys	9–13 years old	1 1/2 cups
	14–18 years old	2 cups

Meat and beans: In general, 1 ounce of meat, poultry, or fish; 1/4 cup cooked dry beans; 1 egg; 1 tablespoon of peanut butter; or 1/2 ounce of nuts or seeds can be considered as a 1-ounce equivalent from the meat and beans group.

	Ages	Daily Equivalents
Girls	9–13 years old	5-ounce equivalents
	14–18 years old	5-ounce equivalents
Boys	9–13 years old	5-ounce equivalents
	14–18 years old	6-ounce equivalents

3.13

Dairy: In general, 1 cup of milk or yogurt, $1\frac{1}{2}$ ounces of natural cheese, or 2 ounces of processed cheese can be considered as 1 cup from the milk group.

	Ages	Daily Equivalents
Girls	9–13 years old	3 cups
	14–18 years old	3 cups
Boys	9–13 years old	3 cups
	14–18 years old	3 cups

Oils: Most Americans consume enough oil in the foods they eat, such as nuts, fish, cooking oil, and salad dressings. A person's allowance for oils depends on age, sex, and level of physical activity. Daily allowances for teens are shown in the chart.

	Ages	Daily Equivalents
Girls	9–13 years old	5 teaspoons
	14–18 years old	5 teaspoons
Boys	9–13 years old	6 teaspoons
	14–18 years old	6 teaspoons

Discretionary calories: The discretionary calories allowance is based on estimated calorie needs by age and sex. Physical activity increases calorie needs, so those who are more physically active need more total calories and have a larger discretionary calorie allowance. The discretionary calorie allowance is part of the total estimated calorie needs, not in addition to the total calorie needs. The chart gives a general guide for teens.

These calories are the "extras" that can be used on luxuries like solid fats and added sugars or on more food from any food group. They are your "discretionary calories." You can use your discretionary calorie allowance to

- Eat more foods from any food group than the food guide recommends.

		Not Physically Active		Physically Active	
	Age Group	Calorie Budget	Discretionary Calories	Calorie Budget	Discretionary Calories
Girls	9–13 years old	1,600	130	1,600–2,200	130–290
	14–18 years old	1,800	195	2,000–2,400	265–360
Boys	9–13 years old	1,800	195	1,800–2,600	195–410
	14–18 years old	2,200	290	2,400–3,200	360–650

- Eat higher-calorie forms of foods—those that contain solid fats or added sugars. Examples are whole milk, cheese, sausage, biscuits, sweetened cereal, and sweetened yogurt.
- Add fats or sweeteners to foods. Examples are sauces, salad dressings, sugar, syrup, and butter.
- Eat or drink items that are mostly fats or caloric sweeteners, such as candy and soda.

Physical activity: "Physical activity" simply means moving the body in ways that use energy. Walking, gardening, briskly pushing a baby stroller, climbing the stairs, playing soccer, or dancing are all good examples of being active. For health benefits, physical activity should be moderate or vigorous and add up to at least 30 minutes a day.

Moderate physical activities include the following:

- Walking briskly (about 3 1/2 miles per hour)
- Hiking
- Gardening and yard work
- Dancing
- Golf (walking and carrying clubs)

- Bicycling (less than 10 miles per hour)
- Weight training (general light workout)

Vigorous physical activities include the following:

- Running or jogging (5 miles per hour)

- Bicycling (more than 10 miles per hour)
- Swimming (freestyle laps)
- Aerobics
- Walking very fast (4 1/2 miles per hour)
- Heavy yard work, such as chopping wood
- Weight lifting (vigorous effort)
- Basketball (competitive)

3.13

At a minimum, do *moderately* intense activity for 30 minutes most days, or preferably every day. This is in addition to your usual daily activities. Increasing the intensity or the amount of time you engage in an activity can have additional health benefits and may be needed to control body weight.

About 60 minutes a day of moderate physical activity can help prevent weight gain. To lose weight, exercise for at least 60–90 minutes a day. At the same time, calorie needs should not be exceeded. Children and teenagers should be physically active for at least 60 minutes every day, or most days.

While 30 minutes a day of moderately intense activities provides health benefits, being active for longer or doing more vigorous activities can provide even greater health benefits. They also use up more calories per hour. No matter what activity you choose, even exercising for just 10–15 minutes two to three times a day can be a very healthful choice. Even 10-minute bouts of activity count toward your total.

Adapted from MyPyramid.gov.

3.14

Guidelines for Student Letters

Directions: Write a polite, informative letter to your assigned student. Be sure to do each of the following.

1. Briefly evaluate the strengths and weaknesses of his or her food and activity choices.

2. Offer at least three specific recommendations for how he or she could improve his or her lifestyle choices to bring about a better balance in diet and activity patterns.

3. Provide at least two reasons for doing so.

3.15

Sample Letter

Dear Brian,

We enjoyed analyzing the diet and exercise diary that you sent us. We hope our comments are helpful to you.

You did a great job meeting the MyPyramid recommendations for the grains food group. However, you might want to consider making some changes to meet the recommended amounts for the other four food groups. Also, be sure not to exceed the recommended amounts.

It is terrific that you spent 20 minutes walking to school and back. However, MyPyramid recommends that you get at least 30 minutes of moderate to vigorous exercise on most days.

To bring your eating and activity habits into better balance, we recommend that you continue to eat 5 ounces of grains every day. In addition, you should

- eat more vegetables, fruits, milk, and meat and beans every day;
- reduce the amount of fat- and sugar-containing foods (for instance, doughuts, soda, and candy bars) that you eat; and
- get a little more exercise every day (for instance, you might want to ride your bike for a half hour every day or join a sports team at your school).

Keeping a better balance in the foods you eat and how much exercise you get each day will help you control your weight. It will also help you lower your risk for developing dangerous diseases like type 2 diabetes.

Sincerely,
Team members' names

3.16

Lesson 3 Quiz

Name Date

Directions: Please indicate which response you believe is the correct one.

1. If your mother or father has type 2 diabetes, then you can be sure that you will develop it, too.

_____ true _____ false

2. The MyPyramid food guide system emphasizes the importance of balancing what we eat with

_____ a. how much soda we drink.

_____ b. how much exercise we get.

_____ c. our age.

_____ d. our risk of developing type 2 diabetes.

3. Most teenagers probably do which of the following?

_____ a. eat too many foods that have a lot of sugar and fat

_____ b. eat more than the recommended amounts of fruits and vegetables each day

_____ c. get more than the recommended amount of daily exercise

_____ d. all of the above

4. How does the expression, "Health is life in balance" best relate to type 2 diabetes?

_____ a. It doesn't relate.

_____ b. The number of people with type 1 diabetes is balanced with the number of people with type 2 diabetes.

_____ c. People with diabetes need to balance the different kinds of exercise they get.

_____ d. A person may be able to avoid developing type 2 diabetes by keeping his or her diet and exercise in good balance.

5. Making good eating and exercise choices today can help improve a person's health in the future.

_____ true _____ false

3.17

Lesson 3 Quiz—Answer Key

1. If your mother or father has type 2 diabetes, then you can be sure that you will develop it, too.

_____ true __X__ false

2. The MyPyramid food guide system emphasizes the importance of balancing what we eat with

_____ a. how much soda we drink.

__X__ b. how much exercise we get.

_____ c. our age.

_____ d. our risk of developing type 2 diabetes.

3. Most teenagers probably do which of the following?

__X__ a. eat too many foods that have a lot of sugar and fat

_____ b. eat more than the recommended amounts of fruits and vegetables each day

_____ c. get more than the recommended amount of daily exercise

_____ d. all of the above

4. How does the expression, "Health is life in balance" best relate to type 2 diabetes?

_____ a. It doesn't relate.

_____ b. The number of people with type 1 diabetes is balanced with the number of people with type 2 diabetes.

_____ c. People with diabetes need to balance the different kinds of exercise they get.

__X__ d. A person may be able to avoid developing type 2 diabetes by keeping his or her diet and exercise in good balance.

5. Making good eating and exercise choices today can help improve a person's health in the future.

__X__ true _____ false

4.1

Diabetes Health Care Team Members

A **diabetes educator** may also be a nurse, dietitian, pharmacist, doctor, exercise physiologist, podiatrist, or a social worker. Diabetes educators specialize in the care and education of people with diabetes. A diabetes educator can help patients understand what diabetes is, understand the benefits of managing their diabetes properly, give themselves shots, and measure their blood glucose levels. The diabetes educator may also help teach patients' families about diabetes and about how to help patients manage their disease. These health professionals obtain additional training in the diagnosis, treatment, and management of diabetes. This allows them to take a test to become a certified diabetes educator.

An **exercise physiologist** is a person who helps patients develop and stick with an exercise plan. This person also works with the patients' medical doctor to help the patients' exercise safely. Developing and sticking with an exercise plan is important because regular exercise can help lower a person's blood glucose level, help a person's body better use insulin, and reduce stress.

An **ophthalmologist** is a medical doctor who specializes in detecting and treating eye diseases, including those caused by diabetes. It is important that patients with diabetes see this doctor at least once a year because diabetes can affect the blood vessels in the eyes, causing vision loss and even blindness. Fortunately, many of these problems can be safely treated when they are detected early enough. Ophthalmologists make sure that people with diabetes understand how important it is that they get their eyes checked regularly.

A **pharmacist** is a person with extensive education and experience in the preparation and dispensing of medications. This person can help patients understand how to take their medications. The pharmacist can also work with the patients' physician to solve any problems with the patients' medications. Pharmacists can answer questions that the patients' may have about diabetes products like glucose measuring devices and about procedures such as blood glucose testing.

4.1

A **physician** is a medical doctor who is responsible for the overall medical management of patients. This includes helping patients make lifestyle choices that may prevent diabetes and diagnosing the type of diabetes patients have. This also includes ordering blood work to check glucose levels, prescribing the medication patients need, and making referrals to other health providers.

A **podiatrist** is a specialist trained to treat foot problems, such as those that sometimes develop in patients with diabetes. This person helps patients understand how to care for their feet and advises patients about appropriate shoes to wear. This person also examines patients' feet regularly to detect any problems and provides treatment for calluses, sores, or ulcers that the patients may develop. The information and treatment that a podiatrist gives is important because amputations related to diabetes are preventable if patients receive proper care.

A **registered dietitian** is a person trained to help patients develop a healthy diet or alter their current diet to lose weight or maintain a healthy weight. A dietitian can help patients learn what foods affect their blood glucose levels, how to read food labels, and how to plan healthful meals.

A **registered nurse** is a person with a nursing degree who can help patients in a variety of ways. A registered nurse can help people with diabetes learn to take care of themselves (diabetes self-care). Specifically, a nurse may help patients learn how to follow a diet, take medicines, and manage days when they do not feel well.

A **social worker** is a person trained to help patients get the care they need, such as home health care, food, and medical assistance. The social worker can also help patients deal with the emotional stress of having diabetes. Social workers provide family support, and they can help patients deal with any issues that may arise related to their job.

A **traditional healer** is a person who specializes in traditional Native American medicine who can complement the diabetes team in the management of diabetes.

4.2

Case Summary—Josie

Josie is a 12-year-old Native American girl whose mother took her to the doctor because she has continued to gain weight even though she is not getting any taller. Josie attends the local middle school and lives at home with her mother, father, and two younger brothers. Her father works for the tribal roads department, and her mother works as a secretary at the local Indian Health Service clinic. Her father has type 2 diabetes. Her parents get home by about 6:00 p.m. every weekday evening. From the time she gets home from school until the time her parents get home, Josie usually watches TV with her brothers. Josie does not play any sports.

Josie did not want to see the doctor, but her mother insisted. Josie agreed to let the nurse measure her weight and height, but she refused to let the nurse draw blood for a blood test. The nurse noted on Josie's chart that her weight is approximately 35 percent above normal for her height. Josie explained that she feels like she gains weight no matter what she eats and that she does not think the doctor can do anything about it. When the nurse asked Josie about her eating habits, she explained that she never eats breakfast, she rarely eats meat, and she eats only a few fruits and vegetables each week.

The doctor explained to Josie that he would like to do some tests to determine if Josie has diabetes. He suggested that Josie talk with a health professional at the Diabetes Health Care Clinic about her weight and about diabetes. Her physician hopes that after she talks with the health professional, Josie will make another appointment and will agree to undergo a thorough examination and appropriate testing to determine her actual medical condition.

4.3

Case Summary—Richard

Richard is a 45-year-old Native American male construction worker who went to the doctor because of recent back pain. He admitted to the doctor that he has not had a physical or seen a doctor for several years. He has not been feeling well for the past six months. He complained of being tired, having increased thirst at times, and having blurry vision.

Richard is 100 pounds overweight. His mother and brother have type 2 diabetes. His mother and brother both take oral medications to treat their diabetes. Richard does not want to take any medication if he does not have to. He also does not like to exercise. When he gets home from work, he likes to watch TV. His favorite foods include pizza, nachos, hot dogs, potato chips, and soda. His wife mostly prepares fried foods, and they like to eat out whenever they can. He admitted that he loves food and loves to eat.

The doctor received the results of Richard's blood work. It showed that his blood sugar was elevated. The doctor told Richard that he has type 2 diabetes. He will need to take oral medication and test his blood sugar regularly. The doctor explained that he will need to make some lifestyle changes and requested that he see a health professional at the Diabetes Health Care Clinic to help manage his disease.

4.4

Case Summary—Sarah

Sarah is a 55-year-old Native American female with type 2 diabetes who works as a secretary. She has had diabetes for 15 years and complained of her feet burning all the time. Her vision is poor and she has noticed a change in the last year. Her kidney function is declining, and she was told that if she does not get her blood sugars under control she may lose her eyesight and kidney function.

Sarah lives alone most of the time. She takes care of her grandchildren, and they will stay with her over the weekend. She admitted that she does not check her blood sugar and in fact does not know where her machine is. She also admitted that she eats whatever she wants, and she likes to eat what her grandchildren are eating—foods such as potato chips, soda, cookies, and other junk food. Sarah likes to walk but because her feet hurt all the time, she seldom walks anymore.

Sarah wants to make changes to improve her blood sugar level but she does not know where to start. She knows she needs to take her medication regularly. Her doctor referred her to a health professional at the Diabetes Health Care Clinic to help her manage her diabetes.

4.5

Case Summary—Chad

Chad is a quiet, overweight. 11-year-old Native American boy who has been diagnosed with type 2 diabetes. Chad is supposed to check his blood sugar before each meal and bedtime and write the results in a logbook. He should start on medication and work on improving his diet and increasing his physical activity. He should return to his physician in one month for a follow-up visit. His physician is also concerned about his blood pressure.

Chad has a strong family history of diabetes. Both of his parents have type 2 diabetes. He does not want to test his blood sugar because he hates needles and is afraid of blood. At this time, both parents' diabetes is not well controlled.

Chad likes to eat sugary cereals for breakfast. He eats lunch at school and snacks on popcorn, chips, sandwiches, and ice cream after school. He only drinks diet soda because that is all that his parents buy. He likes sports but is afraid to participate because kids tease him about his weight. Chad's teachers report that he is doing poorly in school and has trouble staying awake in class.

Chad has been referred to a health professional to help him manage his diabetes.

4.6

Case Summary—Art

Art is a 68-year-old Native American male with type 2 diabetes. He has had diabetes for over 30 years and knows how the disease can affect a person's life. His diabetes is well controlled, and he suffers from no complications. Art takes his health very seriously. He checks his blood sugar daily, eats a healthy diet, and walks five miles every day.

Art is worried about his 12-year-old grandson John, who recently has gained some weight and complains of being tired all the time. John loves to play video games and eat junk food. He doesn't enjoy playing basketball with his cousins. He also loves to read and play on the computer.

When John gets home from school, he plays video games and snacks on chips and soda. He skips breakfast and eats lunch at school. At school, John was weighed and had his height measured. He is overweight for his height and age. He participates in gym class five days a week. John has two brothers who are overweight, but who are very active physically. John's mother tries to prepare healthful dinners, but she does not get home from work until 6:00 pm, and they eat dinner late. John has expressed some interest in cooking.

Art thinks that John's weight gain, family history of diabetes, and complaint that he is tired all the time means that John might have type 2 diabetes.

4.7

Case Analysis Form

Part I: Patient Profile

Directions: Use the information available in the case summary to complete the patient profile. If certain information is not available, write "unknown" in the space provided.

Name of patient _____ **Age** _____ **Occupation** _____

Reason for seeing doctor _____

Current medical status (including symptoms) _____

Uncontrollable risk factors for diabetes _____

Controllable risk factors for diabetes _____

Special challenges for the patient _____

Part II: Team Evaluation of Patient's Medical Situation

Directions: Think about the information provided in the case summary and then answer the following questions. If a specific question does not apply to the case you are analyzing, write "does not apply" in the space provided.

1. Does this person already have diabetes or is he or she at risk of developing it? Explain.

2. Does the patient seem to understand what diabetes is and what type of diabetes he or she has or might be at risk of developing? Explain.

3. Does the patient seem to understand how the treatment doctors have recommended relates to his or her diabetes? Explain.

4. What is this person doing that might help improve his or her medical situation? Explain.

5. What is this person doing that can harm his or her medical situation? Explain.

6. What is likely to happen to this person's medical condition if he or she begins to make better lifestyle choices? Explain.

7. What is likely to happen to this person's medical condition if he or she continues to make or begins to make bad lifestyle choices? Explain.

Part III: Team Recommendations

1. What do you recommend that the diabetes health care team explain to the patient about his or her specific medical condition (for example, about diabetes, about his or her symptoms, or about his or her treatment)?

2. What do you recommend that the diabetes health care team explain to the patient about his or her lifestyle in relation to diabetes, now and in the future?

3. What specific suggestions do you recommend that the diabetes health care team offer the patient about how to manage his or her medical condition, how to avoid developing diabetes, or both?

4.8

Lesson 4 Quiz

Name Date

Directions: Please indicate which response you believe is the correct one.

1. What is a risk factor for a disease?

_____a. something that affects how likely you are to get the disease
_____b. something that prevents you from getting the disease
_____c. something that doctors use to treat you for a disease
_____d. something you cannot ever control

2. An example of a controllable risk factor for type 2 diabetes is

_____a. a person's family background.
_____b. a person's weight.
_____c. a person's sex.
_____d. a person's age.

3. An example of an uncontrollable risk factor for type 2 diabetes is

_____a. how much soda a person drinks.
_____b. how much exercise a person gets.
_____c. a person's family background.
_____d. whether or not he or she has diabetes.

4. A symptom of diabetes might be which of the following?

_____a. feeling very energetic and well rested
_____b. pain in a person's chest
_____c. often being very thirsty
_____d. all of these

5. Which of the following health professionals might be part of a diabetes care team?

_____a. physician
_____b. diabetes educator
_____c. pharmacist
_____d. all of these

4.9

Lesson 4 Quiz—Answer Key

1. What is a risk factor for a disease?

__X__ a. something that affects how likely you are to get the disease

_____ b. something that prevents you from getting the disease

_____ c. something that doctors use to treat you for a disease

_____ d. something you cannot ever control

2. An example of a controllable risk factor for type 2 diabetes is

_____ a. a person's family background.

__X__ b. a person's weight.

_____ c. a person's sex.

_____ d. a person's age.

3. An example of an uncontrollable risk factor for type 2 diabetes is

_____ a. how much soda a person drinks.

_____ b. how much exercise a person gets.

__X__ c. a person's family background.

_____ d. whether or not he or she has diabetes.

4. A symptom of diabetes might be which of the following?

_____ a. feeling very energetic and well rested

_____ b. pain in a person's chest

__X__ c. often being very thirsty

_____ d. all of these

5. Which of the following health professionals might be part of a diabetes care team?

_____ a. physician

_____ b. diabetes educator

_____ c. pharmacist

__X__ d. all of these

5.1

Commendation Letter

Dear Diabetes Health Professionals,

I want to thank and commend you for the excellent work you did with the patients I referred to the Diabetes Health Care Clinic. They all learned a great deal about diabetes. They also appreciated the many useful suggestions you made about what they can do every day to improve their health. The information and suggestions that you provided will help them make choices that are more healthful for themselves and their families in the future.

I have one more favor to ask of you. One of the patients, Art, is very concerned about the increasing number of people on the reservation who are overweight and who have diabetes. He has scheduled a meeting with tribal leaders to discuss what the community can do to help people live lives that are more healthful. Art is not sure that he will be able to present the problem clearly. He is also not sure what the community can do to encourage people to adopt healthful patterns of eating and exercising. Because you are the experts, Art would like your help.

I would like to request that you put together a presentation that Art could show at his meeting with tribal leaders. Please develop an outline of the contents for Art's talk and provide the basic information and ideas that will form the body of the talk.

Thank you for your help with Art's talk and for all that you do to promote healthful living in our community.

Sincerely,
Deana Rides at the Wind, MD

5.2

Guidelines for Diabetes Presentation

Directions: Develop questions that your presentation should answer.

5.3

Scoring Rubric for Presentation to Tribal Leaders

Task	Excellent (3)	Satisfactory (2)	Needs Improvement (1)
Relevance of the presentation	The presentation is relevant and addresses the concern Art has for his grandson and the tribe.	The presentation is somewhat relevant and satisfactorily addresses the concern Art has for his grandson and other members of the tribe.	The presentation is not very relevant and does not satisfactorily address Art's concern for his grandson and the tribe.
Accuracy of the presentation	The presentation accurately describes the risks and challenges for the tribe with respect to type 2 diabetes.	The presentation fairly accurately describes the risk and challenges for the tribe with respect to type 2 diabetes.	The presentation does not describe the risk and challenges for the tribe with respect to type 2 diabetes.
Effectiveness of the presentation	The presentation is effective in suggesting ways the tribe can help reduce the risk for type 2 diabetes within the tribe. The presentation keeps the sustained interest of the audience.	The presentation is somewhat effective in suggesting a few ways the tribe can reduce the risk of developing type 2 diabetes within the tribe. The presentation is satisfactory in keeping the interest of the audience.	The presentation does not effectively suggest ways the tribe might help reduce the risk of tribe members developing type 2 diabetes. The presentation does not keep the interest of the audience.
Evidence of teamwork	It is clear that the team members worked together to develop the presentation. The presentation includes the work of each member of the team.	It is clear that more that one team member contributed to the presentation, but there is no evidence of each team member's work.	There is little evidence to indicate that more than one person worked on the presentation.

5.4

Lesson 5 Quiz

Name Date

Directions: Please indicate which response you believe is the correct one.

1. Diabetes is diagnosed in all families and in people of all ethnic backgrounds at about the same rate.

_____ true _____ false

2. It is important to help people learn about diabetes because

_____ a. the incidence of diabetes is increasing in the United States.

_____ b. diabetes can lead to serious consequences like blindness and amputations.

_____ c. knowledge about diabetes can help people make healthy choices about how they live.

_____ d. all of these.

3. Imagine that you want to help a person reduce his or her risk of developing diabetes. Which of the following would you suggest he or she do?

_____ a. eat as many sweets as he or she wants

_____ b. never exercise

_____ c. balance how much and what they eat with how much exercise they get

_____ d. become obese

4. Communities can help people reduce their risk of developing type 2 diabetes by helping educate people about the disease.

_____ true _____ false

5. If you want to avoid developing type 2 diabetes, what can you do?

_____ a. get regular exercise

_____ b. maintain a healthy weight

_____ c. eat a well-balanced diet

_____ d. all of these

5.5

Lesson 5 Quiz—Answer Key

1. Diabetes is diagnosed in all families and in people of all ethnic backgrounds at about the same rate.

_____ true __X__ false

2. It is important to help people learn about diabetes because

_____ a. the incidence of diabetes is increasing in the United States.

_____ b. diabetes can lead to serious consequences like blindness and amputations.

_____ c. knowledge about diabetes can help people make healthy choices about how they live.

__X__ d. all of these.

3. Imagine that you want to help a person reduce his or her risk of developing diabetes. Which of the following would you suggest he or she do?

_____ a. eat as many sweets as he or she wants

_____ b. never exercise

__X__ c. balance how much and what they eat with how much exercise they get

_____ d. become obese

4. Communities can help people reduce their risk of developing type 2 diabetes by helping educate people about the disease.

__X__ true _____ false

5. If you want to avoid developing type 2 diabetes, what can you do?

_____ a. get regular exercise

_____ b. maintain a healthy weight

_____ c. eat a well-balanced diet

__X__ d. all of these