A Guide to Genetics and Health
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Read “Book 1: A Guide to Family Health History” to learn more about how to collect, organize, and share your family health history.
Why is genetics important to my family and me?

Genetics helps to explain:

• What makes you unique, or one of a kind
• Why family members look alike
• Why some diseases like diabetes or cancer run in families
• How learning your family health history can help you stay healthy
• Why you should bring your family health history to your healthcare provider

Taking time to learn about health and diseases that run in your family is worth it! It will help you understand your own health and make healthy choices.
What makes me unique?

Every person is unique. Part of what makes you unique is your genes. Genes are the instructions inside each of your cells. They control how you look and how your body works. Since everyone has slightly different genes, everyone has a different set of instructions. Genes are one reason why you are unique!
Tell me more about my genes

- A person has two copies of each gene, one from the mother and one from the father.
- Genes carry instructions that tell your cells how to work and grow.
- Cells are the building blocks of the body. Every part of your body is made up of billions of cells working together.
- Genes are arranged in structures called chromosomes. Humans have 23 pairs of chromosomes. Copies of the chromosomes are found in each cell.
- Chromosomes are made up of DNA. DNA is the special code in which the instructions in your genes are written.
Why do family members have things in common?

Children inherit pairs of genes from their parents. A child gets one set of genes from the father and one set from the mother. These *genes can match up in many ways* to make different combinations. This is why many family members look a lot alike and others don’t look like each other at all. Genes can also increase the risk in a family for getting certain health conditions.

Families also share habits, diet, and environment. These influence how healthy we are later in life.
You share a lot with your family—including what can make you sick.
Why do some diseases run in families?

Some diseases are caused when there is a change in the instructions in a gene. This is called a mutation. Every person has many mutations. Sometimes these changes have no effect or are even slightly helpful. But sometimes they can cause disease.

Most common diseases are caused by a combination of mutations, lifestyle choices, and your environment. Even people with similar genes may or may not get an illness if they make different choices or live in a different environment.

Common Disease: Type 2 Diabetes
Changes in your genes passed on by your parents may make you more likely to develop type 2 diabetes. If you are active and eat a healthy diet, you may be able to lower your risk.

Visit page 10 to learn about some
Thousands of diseases are caused by a specific change in the DNA of a single gene. Many of these diseases are rare. These conditions usually develop when an individual is born with a mutated gene.

If a rare disease runs in your family, be sure to write it down. Do not forget to learn about common conditions that affect your family’s health.

**Single Gene Disorder: Sickle Cell**

Sickle cell is caused by a mutation in a single gene passed from one or both parents.
How can knowing my family health history help me stay healthy?

Your family health history tells you which diseases run in your family. Health problems that develop at a younger age than usual can be a clue that your family has a higher risk. Though you cannot change your genes, you can change your behavior.

Knowing your family health history will help you:
- Identify risks due to shared genes.
- Understand better what lifestyle and environmental factors you share with your family.
- Understand how healthy lifestyle choices can reduce your risk of developing a disease.
- Talk to your family about your health.
- Tell your healthcare provider about the diseases that run in your family.

Remember
1. Share your family health history with your healthcare provider.
2. Ask if you can be screened for a disease that runs in your family.
Why should I take my family health history to my healthcare provider?

Your healthcare provider (doctor, nurse, or physician’s assistant) may use your family health history and current health to figure out your risk for developing a disease. Your provider can then help decide which screenings you get and which medicines you might take.

Based on your family health history, a healthcare provider may order a genetic test or refer you to a genetic counselor or geneticist. Genetic tests can show if you have a gene change that increases your risk for disease. They can also tell if you have a gene change that you might pass on to your children. Your healthcare provider can help you:

- Understand the results of your tests.
- Learn of any treatments for a disease found by the test.

All newborn babies born in the U.S. and many other countries are tested for certain genetic diseases that may make them sick. This is called newborn screening. If the screening test finds a problem, a healthcare provider will help you understand what can be done to help the baby.
In the rest of this booklet, we give you examples of some common diseases that affect our communities and families. For each disease, we include information under the following headings:

- What is the disease?
- Who is at risk?
- Hints for health
Heart disease

Heart disease is the main cause of death in America in both men and women. There are many types of heart disease. Two of the most common types are coronary artery disease (CAD) and high blood pressure (hypertension).

WHAT IS CORONARY ARTERY DISEASE (CAD)?

- In CAD the arteries that supply blood to the heart muscle can get hard and narrow. The arteries narrow, or get smaller, because plaque and cholesterol build up on the inner walls.
- CAD gets worse over time. As the arteries get smaller, less blood gets to the heart, and less oxygen gets to the heart muscle. Very low levels of oxygen can cause chest pain or a heart attack.
- CAD is the most common cause of heart attacks among Americans.

Who is at risk?

- About 13 million Americans have CAD.
- Everyone has some risk for developing heart disease.
- For some people, a healthier diet and increased activity can change cholesterol level and lower risk. Other people need more help, such as medicine, to lower their risk of having a heart attack.

Hints for health

- Eat healthy, nutritious meals.
- Get active and exercise regularly. Obesity increases your risk.
- Take your prescribed medications to control high cholesterol, high blood pressure, and diabetes.
- If you smoke, talk with your healthcare provider about quitting.

For more information, visit www.nhlbi.nih.gov/health/dci and click on 'Coronary Artery Disease' or call the American Heart Association at 800-AHA-USA-1 (800-242-8721).
WHAT IS HIGH BLOOD PRESSURE?
• Blood pressure is a measure of how hard your heart is working to push the blood through your arteries, the blood vessels leaving your heart.

• There are two numbers in a blood pressure reading. A normal reading is about 120/80 (read as “120 over 80”). The first number is the force your heart uses to pump the blood. The second number is the pressure between heartbeats.

• High blood pressure means that your heart is working too hard. Over time, high blood pressure can cause kidney failure, heart attacks, strokes, and other health problems.

Who is at risk?
• Approximately one in three adults has high blood pressure. Many do not even know it because there are no clear symptoms.

• A family history of high blood pressure increases your risk for developing it at a younger age.

• Greater risk comes with increasing age, being overweight, or having a family history of hypertension.

Hints for health
• Decrease the amount of salt you eat.
• Maintain a healthy weight.
• Manage your stress.
• Get active and exercise regularly.
• Limit the alcohol you drink.
• Get screening regularly.

For more information, visit www.nhlbi.nih.gov/health/dci and click on "High Blood Pressure" or call the American Heart Association at 800-AHA-USA-1 (800-242-8721).
Asthma

What is Asthma?
• Asthma is a lung disease that causes repeated episodes of breathlessness, wheezing, coughing, and chest tightness. The episodes can range from mild to life threatening.
• Asthma attacks are caused by many triggers, including dust, animal fur, mold, pollen, cold air, exercise, stress, viral colds, allergies, tobacco smoke, and air pollution. Genes control some of a person’s response to these asthma triggers.

Who is at risk?
• Asthma affects about one in 10 children and one in 12 adults. It is the main reason children end up in the emergency room and miss days of school.
• If you have parents, siblings, or children with asthma or allergies, you are more likely to get it.

Hints for health
• Avoid exposure to triggers.
• Use medication correctly.

For more information, visit www.nhlbi.nih.gov/health/dci and click on Asthma or call the American Lung Association at 800-548-8252.
Diabetes (sugar disease)

Diabetes is a serious, chronic disease in which blood sugar levels are above normal. Many people learn about their diabetes after problems develop. According to the American Diabetes Association, one out of three people who have type 2 diabetes do not know that they have the disease.

Symptoms occur when the body fails to change sugar and other food into energy. This happens when the body cannot make or use a hormone called insulin. Serious problems from diabetes can include blindness, kidney failure, and death. Diabetes can be detected early and treatment can prevent or delay these serious health problems. Both genetic and environmental factors such as diet and exercise plays an important role in getting the disease.

WHAT IS TYPE 1 DIABETES?
- Type 1 diabetes usually develops in young children or young adults.
- People with type 1 diabetes stop making their own insulin.

WHAT IS TYPE 2 DIABETES?
- Type 2 diabetes usually develops in people over 30 years of age. In recent years, more young people are getting it due to poor diet.
- Scientists are learning more about the specific genes involved in this type of diabetes.
Who is at risk?

• Diabetes affects approximately one in 14 people in the United States.

• Five to 10 percent of Americans who are diagnosed with diabetes have type 1 diabetes.

• Children or siblings of individuals with diabetes are more likely to develop it themselves.

• Obese people have a greater risk for type 2 diabetes.

• Women who had a baby that weighed more than 9 pounds or who had gestational diabetes while pregnant are at risk.

Hints for health

• Eat more fruits and vegetables, less sugar and fat.

• Get active and exercise regularly.

• Lose weight if necessary.

For more information, visit www.ndep.nih.gov or call 800-860-8747.
There are many types of cancer. Cancer is caused by the growth and spread of abnormal cells. Though your risk of getting cancer increases as you get older, genetic and environmental factors also cause people to be at a higher risk for certain types of cancer.

**What is Breast Cancer?**

- Breast cancer is a type of cancer that forms in the tissues of the breast, usually the ducts.
- Breast cancer is one of the most common cancers among women. Although it is rare, men can also get breast cancer.
- Most breast cancer is treatable if found early.

**Who is at risk?**

- One out of eight American women will develop breast cancer in their lifetime.
- Among Hispanic/Latina women, breast cancer is the most common type of cancer.
- Breast cancer risk is higher among women whose close blood relatives have had this disease. Both your mothers and fathers family history of breast cancer is important.

**Hints for health**

- Women should do monthly breast self-exams.
- After age 40, women should get annual mammograms.
- Ask about genetic testing for high-risk families.
- Eat a healthy, balanced diet.
- Get active and exercise regularly.
- Limit the alcohol you drink.

For more information, visit [www.cancer.gov/cancertopics](http://www.cancer.gov/cancertopics) and click on Breast Cancer or call 800-4-CANCER (800-422-6237).
What is Lung Cancer?
• Lung cancer is the uncontrolled growth of abnormal cells in one or both of the lungs.

Who is at risk?
• Lung cancer is the leading cause of cancer death for both men and women.
• More than 150,000 people died in the United States from lung cancer in 2005.
• Nearly 87 percent of lung cancer cases in the United States are smoking-related.

Hints for health
• Do not smoke.
• Avoid secondhand smoke.
• Find out about testing for radon and asbestos in your home and at work.

For more information, visit www.cancer.gov/cancertopics and click on "Lung Cancer" or call 800-4-CANCER (800-422-6237).
What is Colon and Rectal Cancer?
- Colon and Rectal cancers (CRC) affect the lower part of the large intestine (colon). The rectum is the last 6 inches of the colon.
- Most cases of CRC begin as small growths called polyps. Most polyps are benign (not cancer).
- A colonoscopy is a screening exam that looks for polyps. If a polyp is detected, it can be removed and tested for cancer cells.
- Most CRC is treatable if detected early.

Who is at risk?
- CRC is the 3rd most common cancer in men and women. About 1 in 18 people in the US will develop CRC in their lifetime.
- Most CRC is diagnosed in people over the age of 50 years.
- Risk for CRC is highest among people with close blood relatives with this condition.

Hints for health
- After age 50, men and women should get a colonoscopy.
- If you have an increased risk for CRC, talk to your doctor about early screening and/or testing.
- Eat a healthy, balanced diet.
- Get active and exercise regularly.
- Limit the alcohol you drink.

For more information: American Cancer Society, (800) ACS-2345, www.cancer.org
Mental Illness

What is mental illness?
- Mental illness is the top cause of disability among people ages 15-44. Many conditions fall into this category, including Attention Deficit/Hyperactivity Disorder (ADHD), depression, anxiety disorders, and schizophrenia. They affect people of all ages, races, religions, and incomes. The cause of mental illness is not known. However, like other diseases, they can run in families. Stress, drugs, and alcohol can also play a part in getting a mental illness.
- Mental illness is a medical condition that changes the way a person thinks and feels. A person’s mood and how they relate to others and act on a daily basis are also affected.
- Mental illness lowers a person's ability to cope with the usual demands of life.
- Mental illness can be treated.

Who is at risk?
- Four (4) of the 10 top causes of disability are mental disorders.
- One (1) in five (5) families may be affected with a mental illness.
- Mental illness often occurs during the teen years and young adulthood. Everyone is a risk.
- Genes can play a part in getting mental illness. However other factors also play a role. These include: stress, emotional upset, and contact with toxins, bacteria or viruses, as well as other medical conditions.
The “Does It Run In the Family?” toolkit includes two pieces that can help you summarize your health information for your provider—the family health portrait and healthcare provider card. You may also hear your healthcare provider call a Family Health Portrait a “pedigree.”

Each family and individual is unique and may have genetic diseases other than the major diseases listed here. For more information visit:

Disease InfoSearch www.geneticalliance.org

Mental Illness continued

Hints for Health:
• Keep your stress level low. Getting enough sleep and exercise can help.
• Reach out to others. Talk to friends and family about what is bothering you.
• Get help. A counselor can help you talk out issues that concern you. Medicine can make it easier to handle daily routines.
• Share your family health history with your doctor.

For more information on mental illness: National Alliance on Mental Illness (NAMI) www.nami.org
The “Does It Run In the Family?” toolkit includes two pieces that can help you summarize your health information for your provider—the family health portrait and healthcare provider card. You may also hear your healthcare provider call a *Family Health Portrait* a “pedigree.”

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For more information visit:

**Disease InfoSearch**  
www geneticalliance org

**National Library of Medicine**  
www nlm nih gov/services/genetics_resources html

**University of Iowa Libraries**  
http://guides lib.uiowa edu/siouxland
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