

DOES IT RUN IN THE FAMILY?

2

# A Guide for Understanding Genetics and Health



THE GENOMEDICAL CONNECTION

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# Why is genetics important to my family and me?



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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

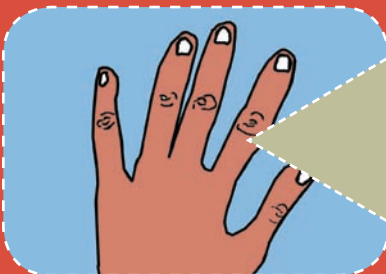
Taking time to learn about health and diseases that run in your family is worth it! It will help you understand your own health and make healthy choices.

# 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!**

1. Hand



2. Cell



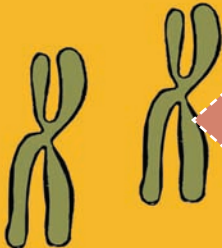
# Tell me more about my genes

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- 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.

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3. Chromosomes



4. DNA





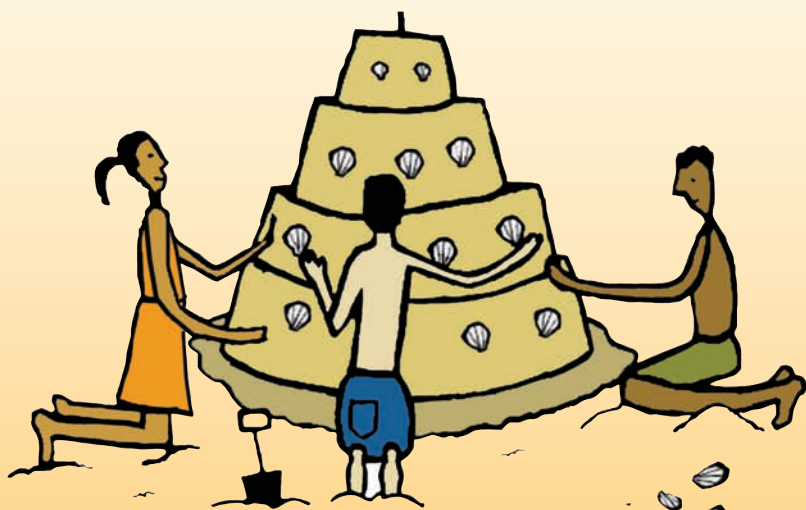
## Why do family members have things in common?

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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 do not 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?

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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 different places.

## **Common Disease: Colon Cancer**

Changes in your genes passed on by your parents may make you more likely to get colon cancer. You can lower your risk by being active and not smoking.

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 diseases are often found when a person is born.

**Single Gene Disorder:  
Sickle Cell Anemia (SCA)**

SCA is a disease that affects the red blood cells. It is caused by a mutation in a single gene passed from each parent.

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

diseases that run in families.

# 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 lower your risk for getting 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 doctor.
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?

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Your healthcare provider (doctor, nurse, or physician's assistant) may use your family health history and current health to figure out your risk for getting 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 send 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.

# Diseases that run in the family

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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

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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 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 narrow, 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 getting heart disease.
- CAD is caused by a combination of genes, lifestyle choices, and environment.
- For some people, a healthier diet and more activity can change the cholesterol level and lower their risk.
- Since your genes cannot be changed, some people need medicine to lower their risk of having a heart attack.

## **Hints for health**

- Eat healthy meals.
- Exercise at least 30 minutes, five (5) times per week. Obesity increases your risk.
- Take your prescribed medications to control high cholesterol, high blood pressure, and diabetes.
- If you smoke, talk with your doctor about quitting.
- Share your family history of heart disease with your doctor.

For more information, visit [www.nhlbi.nih.gov/health/dci](http://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).

# Heart disease continued

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## WHAT IS HIGH BLOOD PRESSURE (HBP)?

- Blood pressure is a measure of how hard your heart is working to push blood through your arteries, the 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.
- HBP 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?

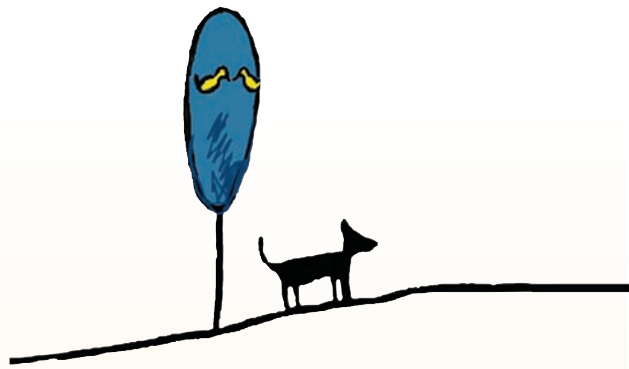
- About one (1) in three (3) adults has HBP. Many do not even know it because there are no clear symptoms.
- A family history of HBP increases your risk for getting it at a younger age.
- Risk increases with age, being overweight, or having a family history of HBP.

## Hints for health

- Eat less salt.
- Maintain a healthy weight.
- Manage your stress.
- Exercise at least 30 minutes, five (5) times per week.
- Limit the alcohol you drink.
- Have your blood pressure taken regularly.
- Share your family history of HBP with your doctor.

For more information, visit [www.nhlbi.nih.gov/health/dci](http://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).

Heart disease symptoms may not appear until the damage is already done. Talk to your family about heart disease today.



# Asthma

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## 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 episodes are caused by triggers. These can be things like dust mites, animal dander, mold, pollen, cold air, exercise, stress, viral colds, allergies, tobacco smoke, and air pollutants.
- Some people have genes that control their response to these asthma triggers.

## Who is at risk?

- Asthma affects about one (1) in 10 children and one (1) in 12 adults.
- Asthma 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 develop it.

## Hints for health

- Avoid exposure to triggers.
- Use medication correctly.
- Share your family health history of asthma with your doctor.



For more information, visit [www.nhlbi.nih.gov/health/dci](http://www.nhlbi.nih.gov/health/dci) and click on “Asthma” or call the American Lung Association at 800-548-8252.

# Diabetes (sugar disease)

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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 (1) out of three (3) 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 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 play 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 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 about one (1) in 14 people in the United States.
- Five (5) to 10 percent of Americans with diabetes have type 1 diabetes.
- Children or siblings of people with diabetes are more likely to get diabetes.
- Obese people are more likely to get type 2 diabetes.
- Women who had a baby that weighed more than 9 pounds or who had gestational diabetes are at risk.

### Hints for health

- Eat more fruits and vegetables, less sugar and fat.
- Exercise at least 30 minutes, five (5) times per week.
- Lose weight if necessary.
- Share your family health history of diabetes with your doctor.

For more information, visit [www.ndep.nih.gov](http://www.ndep.nih.gov) or call 800-860-8747.

# Cancer

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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 can be treated if found early.

## Who is at risk?

- In 2005, 371 people in Guilford County developed breast cancer.
- One (1) out of eight (8) American women will develop breast cancer in her lifetime.
- Among Hispanic/Latina women, breast cancer is the most common type of cancer.
- Breast cancer risk is higher if a woman has close blood relatives who have had this disease. Both your mother's and father's family history of breast cancer is important.

## Hints for health

- Women should do monthly breast self-exams.
- Women should get annual mammograms.
- Ask your doctor if genetic testing is right for you.
- Eat a healthy diet.
- Exercise at least 30 minutes, five (5) times per week.
- Limit the alcohol you drink.
- Share your family history of breast cancer with your doctor.

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).

Breast Cancer Support Group, 3rd Tuesday of the month 7-8:30 PM, second floor conference room Moses Cone Regional Cancer Center.  
Contact Laura Herring 336-913-3922

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## WHAT IS COLON CANCER?

The colon is an organ in the body that absorbs water and nutrients from food. It also stores waste. Colon cancer is a cancer that grows within this organ. It can start as a small growth, or polyp. Polyps can sometimes grow over many years. Sometimes they turn into cancer, and sometimes they do not. If you remove a polyp then you keep it from turning into cancer. A colonoscopy is an exam that looks for polyps.

### Who is at risk?

- About 145,000 people get colon cancer every year.
- In 2005, 207 people in Guilford County were diagnosed with colon cancer.
- About 25 percent of people who get colon cancer have it running in their family.
- About 75 percent of people who get colon cancer get it by chance (sporadic).

### Hints for health

- Do not smoke.
- Do not have more than four (4) drinks per week.
- Exercise at least 30 minutes, five (5) times per week.
- Do not become overweight.
- Share your family health history of colon cancer and polyps with your doctor.

General Cancer Support Group, a support group for people with any kind of cancer. 2nd Tuesday of the month, 6:30-8:00 PM. Second floor conference room, Moses Cone Regional Cancer Center. Terry Moore-Painter – 336-832-0364.

For more information visit [www.cancer.gov/cancertopics](http://www.cancer.gov/cancertopics) and click on “colon and rectal cancer” or call 800-4-CANCER (800-433-6237)

# Cancer continued

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## **WHAT IS PROSTATE CANCER?**

- Prostate cancer develops in the male reproductive system. The prostate is a small gland near the bladder.
- Scientists do not yet know what causes prostate cancer.
- Doctors have a test to find out whether a man might have prostate cancer.

## **Who is at risk?**

- 370 men in Guilford County were diagnosed with prostate cancer in 2005.
- Men of all ages can develop prostate cancer. However, more than eight (8) out of 10 cases occur in men over the age of 65.
- Prostate cancer is the most common type of cancer diagnosed in Hispanic/Latino and African American men.
- Having a father or brother with prostate cancer more than doubles a man's risk for getting prostate cancer. The risk goes up with the number of relatives who have it, especially if the relatives were less than 50 years old when they got it.

## **Hints for health**

- Get regular screenings.
- Follow a healthy diet.
- Exercise at least 30 minutes, five (5) times per week.
- Have your prostate checked by your doctor.
- Share your family history of prostate cancer with your doctor.

Prostate Cancer Support Group, 3rd Monday of the month, second floor conference room, Moses Cone Regional Cancer Center.  
Bob Hamilton 336-832-7950.

# Mental Illness

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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.

## WHAT IS 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 at 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.

# Mental Illness continued

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## 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:

### **Mental Health Association in Greensboro**

330 S. Greene, Suite B12  
Greensboro, NC 27401  
336-373-1402  
[www.mhag.org](http://www.mhag.org)

### **National Alliance on Mental Illness (NAMI) [www.nami.org](http://www.nami.org)**

**NAMI Guilford County**  
P.O. Box 10557  
Greensboro, NC 27404  
HELPLINE (336) 370-4264  
[www.naminc.org](http://www.naminc.org)



# Resources

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The “Does It Run In the Family?” toolkit includes two pieces that can help you gather 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:

**The Genomedical Connection**

[www.genomedical.com](http://www.genomedical.com)

**National Library of Medicine**

[www.nlm.nih.gov/services/genetics\\_resources.html](http://www.nlm.nih.gov/services/genetics_resources.html)

**Disease InfoSearch**

[www.geneticalliance.org](http://www.geneticalliance.org)



[WWW.GENOMEDICAL.COM](http://WWW.GENOMEDICAL.COM)

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[info@genomical.com](mailto:info@genomical.com)

The mission of The Genomical Connection is to create a model that supports proactive healthcare in Guilford County through the use of genomic medicine. Genomic medicine is intended to promote health and prevent disease by using family health history and genetic information to assess a patient's disease risk and to manage health based on risk.



**Genetic Alliance**

[WWW.GENETICALLIANCE.ORG](http://WWW.GENETICALLIANCE.ORG)

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