

DOES IT RUN IN THE FAMILY?

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**DRAFT**

# A Guide for Understanding Genetics and Health



INSTITUTE FOR CULTURAL PARTNERSHIPS

# Contents

Why is genetics important to my family and me?	1
What makes me unique?	2
Tell me more about my genes	3
Why do family members have things in common?	4
Why do some diseases run in families?	6
How can family health history help me stay healthy?	8
Why should I bring my family health history to my health care provider?	9

Diseases That Run in the Family	10
Heart disease	11
<i>Coronary Artery Disease</i>	
<i>High Blood Pressure</i>	
Asthma	13
Diabetes	14
<i>Type 1</i>	
<i>Type 2</i>	
Cancer	16
<i>Breast</i>	
<i>Lung</i>	
<i>Prostate</i>	
Sickle Cell Anemia	19
Resources	21



# Why is genetics important to my family and me?



Genetics helps to explain:

- What makes you unique
- Why family members have traits in common
- 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 health care 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 in many ways. Part of what makes you unique is in your genes. **Genes are the instructions inside each of your cells.** These instructions influence 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. Skin cell



# Tell me more about my genes

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- A person has two copies of each gene, one from their mother and one from their 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 that the instructions in your genes are written in.

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3. Chromosomes



4. DNA





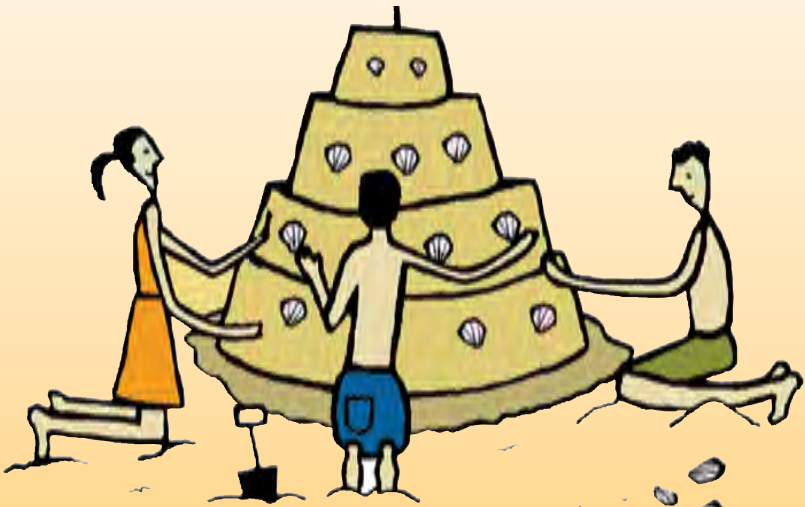
## Why do family members have things in common?

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Children inherit pairs of genes from their parents. A child gets one set of genes from his father and one set from his 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 determine similarities in appearance, but they may also lead to a risk in the family for developing certain health conditions.

**Families also share habits, diet, and environment.** These experiences might influence how healthy we are later on 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 develop an illness** if they make different choices or live in a different environment.

## **Common Disease: 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.

**Rare Disease:  
Sickle cell anemia**

Sickle cell anemia is caused by a mutation in a single gene passed from each parent.

Even if there is a rare disease that runs in your family, don't 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?

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Family health history gives you an idea of which diseases run in your family. Health problems that develop at an age that is younger than usual can be a clue that your family has higher risks. Though you can't change your genes, you can change your behavior.

## **Knowing your family health history will help you:**

- Identify risks due to shared genes
- Better understand 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
- Summarize your health information to give to your health care provider

## **Remember**

1. Share your family health history with your healthcare provider.
2. Ask if there is screening available for a disease 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 developing a disease. Your provider can then help decide what screenings you get and what 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. A specific test can show whether you are affected by or are at risk for a disease, and what mutations you might pass along 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 US and many other countries are tested for certain genetic diseases that may make the baby sick if not treated. This is called **newborn screening**. If the screening test finds a problem, a healthcare provider or specialist 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 provide you with examples of some common diseases that affect our communities and families. For each disease, we include information on:

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



# Heart Disease

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Heart diseases are the main cause of death in America in both men and women. Two of the most common diseases that involve the heart 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 because of buildup of plaque or cholesterol on the inner walls.
- CAD gets worse over time. As the heart gets less blood, less oxygen is delivered to the heart muscle. When the heart gets very little oxygen, you can develop 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. More than half of all people who die from heart disease each year are women.
- CAD is caused by a combination of genetic background, lifestyle choices, and your environment.
- For some people, a healthier diet and increased activity can change cholesterol level and lower risk.
- Since your genetic background cannot be changed, some people need additional medical assistance such as medication, 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 medications to control high cholesterol, high blood pressure, and diabetes
- If you smoke, talk with your healthcare provider about quitting

For more information: call 301-592-8573 or visit [http://www.nhlbi.nih.gov/health/dci/Diseases/Cad/CAD\\_WhatIs.html](http://www.nhlbi.nih.gov/health/dci/Diseases/Cad/CAD_WhatIs.html)

# Heart Disease continued

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## WHAT IS HIGH BLOOD PRESSURE?

- Blood pressure is a measure of how hard your heart is working to push the blood through your arteries.
- There are two numbers in a blood pressure reading. A normal reading is about 120/80 (read as “120 over 80”). The first number measures the force your heart uses to pump the blood. The second number measures 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?

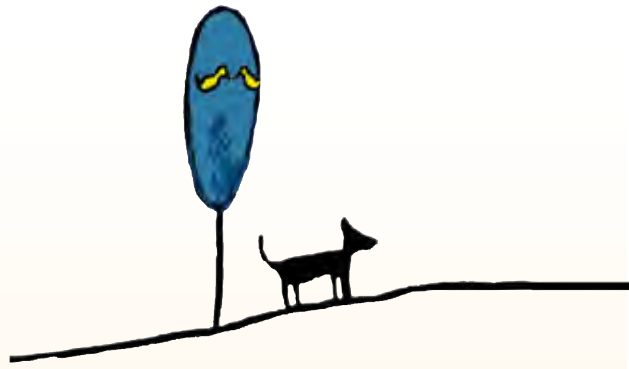
- Approximately 1 in 3 adults have high blood pressure. Many do not even know it because there are no clear symptoms.
- A family history of high blood pressure increases your risk for developing it at a younger age.
- As a group, African Americans tend to develop high blood pressure earlier and have more complications than other people.
- Greater risk comes with 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 go to [http://www.nhlbi.nih.gov/health/dci/Diseases/Hbp/HBP\\_WhatIs.html](http://www.nhlbi.nih.gov/health/dci/Diseases/Hbp/HBP_WhatIs.html) or contact the Capital Region American Heart Association office at 717.795.9514.*

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, over time, causes repeated episodes of breathlessness, wheezing, coughing, and chest tightness. The episodes can range from mild to life threatening.
- Asthma episodes are caused by many triggers, including dust mites, animal dander, mold, pollen, cold air, exercise, stress, viral colds, allergies, tobacco smoke, and air pollutants.
- Genes control some of an individual's response to these asthma triggers.

## Who's at risk?

- Asthma affects approximately 1 in 10 children and 1 in 12 adults.
- Asthma affects many children, including Hispanics/Latinos and African Americans, and 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
- Correctly use medication



For more information: call 301-592-8573 or visit [http://www.nhlbi.nih.gov/health/dci/Diseases/Asthma/Asthma\\_WhatIs.html](http://www.nhlbi.nih.gov/health/dci/Diseases/Asthma/Asthma_WhatIs.html).

# Diabetes (Sugar Disease)

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Diabetes is a serious, chronic disease in which blood sugar levels are above normal. Unfortunately, many people learn about their diabetes after complications develop. According to the American Diabetes Association,  $\frac{1}{3}$  of those affected are unaware that they have the disease.

Symptoms occur when the body fails to change sugar, starches, and other food into energy. This happens when the body cannot produce or properly use a hormone called insulin. Serious complications from diabetes can include blindness, kidney failure, and death. Diabetes can be detected early and treatment can prevent or delay these serious health problems. A combination of genetics and environmental factors, such as diet and exercise, play an important role in developing the disease.

## **WHAT IS TYPE-1 DIABETES?**

- Type-1 diabetes usually develops in young children or young adults.
- People with Type-1 diabetes stop producing their own insulin.

## **WHAT IS TYPE-2 DIABETES?**

- Type-2 diabetes usually develops in people over thirty years of age, though in recent years more young people are developing it due to poor diet.
- Scientists are learning more about the specific genes involved in this type of diabetes.



### Who's at risk?

- Diabetes affects approximately 1 in 14 people in the United States.
- 5-10% of Americans who are diagnosed with diabetes have type-1 diabetes.
- African-Americans are two-times more likely to have diabetes than their white counterparts.
- Type-2 diabetes is more common in African Americans, Native Americans, Pacific Islanders, and Latino populations.
- 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 sweets, and fats
- Get active and exercise regularly
- Lose weight if needed

For more information: visit <http://www.diabetes.org/about-diabetes.jsp>.

# Cancers

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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, there are also genetic and environmental factors that cause people to be at a higher risk for certain types of cancer. Some of the most common cancers are breast cancer, lung cancer, and prostate 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 females. Although it is rare, men can also get breast cancer.
- Most breast cancer is treatable if found early.

## Who is at Risk?

- 1 out of 8 American women will develop breast cancer in their lifetime.
- African-American women have the highest death rate from breast cancer among women of all ethnic and racial backgrounds in the United States.
- Breast cancer risk is higher among women whose close blood relatives have had this disease. Both your mother and father's 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 done
- Genetic testing in high-risk families
- Eat a healthy, balanced diet
- Get active and exercise regularly
- Limit the alcohol you drink

For more information: visit [www.komen.org](http://www.komen.org).

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## 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% of lung cancer cases in the US are smoking related.

## Hints for Health

- Do not smoke
- Avoid second-hand smoke
- Find out about testing for radon and asbestos in your home and at work

For more information: visit <http://www.lungusa.org/>



# Cancers continued

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## WHAT IS PROSTATE CANCER?

- Prostate cancer is a disease in which cancer develops in the male reproductive system, specifically, in a small gland near the bladder called the prostate.
- Scientists do not yet know what causes prostate cancer but there are certain tests that doctors can use to determine whether a man might have prostate cancer.

## Who is at risk?

- Men of all ages can develop prostate cancer. More than 8 of 10 cases of all prostate cancer happen to 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 a brother with prostate cancer more than doubles a man's risk of developing this disease. The risk increases with the number of relatives with it, especially if the relatives were young (less than 50) when they got it.

## Hints for Health

- Regular screenings
- Follow a healthy diet
- Exercise regularly
- After age 50 men should have their prostate checked

For more information visit:

<http://www.nci.nih.gov/cancerinfo/types/prostate>

<http://www.cancer.org>

Or call your local chapter of the American Cancer Society at 888.227.5445.

# Sickle Cell Anemia

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## WHAT IS SICKLE CELL ANEMIA?

- Sickle cell anemia is one type of sickle cell disease. It is a genetic, inherited condition that causes red blood cells to change shape and become stiff. This change slows blood flow and causes people to feel tired, weak, and short of breath. Blockages in tiny blood vessels can cause painful crises and strokes. People are also at higher risk of getting infections.
- Sickle cell anemia is the direct result of a change or mutation in the gene for hemoglobin (Hgb)
- It is the most common inherited blood disease in the United States.

## Who's at risk?

- A person must have two copies of the hemoglobin gene mutation to have sickle cell anemia (Hgb S)
- If a person has one normal copy of the hemoglobin gene and one copy with the sickle cell mutation, he/she is called a carrier. Carriers of the mutation usually do not have related health problems, but can pass along the mutation to their children.
- In the US, most cases of sickle cell disease occur among people of African ancestry (1 in 400 African American births) but people of Mediterranean, Middle Eastern, or Indian background are also at higher risk.
- It is thought that more than 2 million Americans are carriers for sickle cell disease and over 70,000 have the disorder.
- If both parents are carriers, each pregnancy has a 1 in 4 chance of being affected by sickle cell disease.

# Sickle Cell Anemia continued

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## Hints for Health

- Members of higher risk populations may want to be tested for the hemoglobin S gene.
- In some states, newborn screening will detect sickle cell anemia
- While there is no cure for sickle cell disease, babies are often given antibiotics to help prevent serious infections.

For more information: contact the Sickle Cell Disease Association of America at 800.421.8453 or visit: <http://www.sicklecelldisease.org/>



# Resources

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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 health care 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**

<http://geneticalliance.org>

## **National Library of Medicine**

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

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