

TRACING HEREDITARY DISEASES

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OVERVIEW

Being a health educator at an African American high school has piqued my interest in the disparities that exist within the health care industry. In an attempt to discover why these disparities exist and find a way to eliminate them led me to the United States Surgeon General's Family Health Initiative.

The overall looming question surrounding the disparities in health care is why are there so many illnesses and diseases that seem to affect African Americans more than any other ethnic group. I believe the Surgeon General's Family Health Initiative is the cornerstone to eliminating these disparities. African Americans are disproportionately affected by a large number of hereditary diseases. Inheriting specific genes can put one at risk for certain illnesses and diseases such as heart disease, diabetes, sickle cell anemia, and cancer just to name a few.

Dispelling the old saying, "...that what you don't know can't hurt you", into the realization that what you don't know can kill you makes the Family Health Initiative the perfect medium to take a closer look at the influence that heredity has on our health. Knowing your family health history can reveal critical information about your present and future health. It's a fact that many illnesses and diseases can be predicted, diagnosed, and even prevented by just studying one's immediate family medical health history. Possessing the information garnered from a family health survey coupled with the ability to make certain lifestyle changes can literally mean the difference between life and death. If a person knows that they are predisposed towards diabetes, they can be more careful about their diet, exercise regularly, and get tested periodically.

Tracing hereditary diseases is a health unit designed for the eleventh and twelfth graders in Health II. The health unit is divided into five lessons, with each lesson lasting for a week. The first lesson is an introduction to epidemiology, genealogy and genetics. It covers basic information about common inherited diseases causes, symptoms and preventive strategies. The second lesson examines the influence of family medical history as a risk factor for inherited diseases. It will entail creating a family health history questionnaire and conducting a survey of immediate family members, i.e., grandparents, parents, siblings, uncles and aunts. The third lesson involves interpreting and analyzing the data collected from the survey and creating a family health tree or pedigree and/or genogram. The fourth lesson will consist of selecting an illness or disease of likely probability of contraction and researching information for a term paper. The fifth lesson is the actual writing of the research paper and oral presentation in class.

Rationale

African Americans suffer disproportionately from hereditary diseases more than any other ethnic group in the United States. Having an educational objective to make health a priority and increasing students' life spans, learning the importance of how heredity affects one's health seems only natural. Especially when one teaches health education at an urban African American high school.

Surgeon General Richard H. Carmona says that "knowing your family history can save our life." What you don't know about your family health history empowers one to predict and perhaps head off diseases prevalent in families even before they appear.

It is my desire that by educating students to their personal family health history they will be able to take the necessary preventative measures to avoid contracting certain diseases that are prevalent in their families. Tracing hereditary diseases will be a health curriculum designed to teach students how to evaluate personal family medical history information in assessing their potential risk factor for illnesses and diseases.

A major objective of the Pittsburgh Board of Education is to close the achievement or learning gap that exists between black and white students. Recognizing this as a worthwhile endeavor I would like to expand by closing the longevity gap that exists between blacks and whites by increasing African Americans life expectancy. This to me would be the ultimate accomplishment in truly impacting the lives of our student population.

Objectives

African Americans lead in fourteen of the sixteen leading causes of death in America many of which are hereditary. Heredity influences sixteen percent of our ability to cope with diseases. Lifestyle influences eighty-four percent of our ability to cope with diseases. Since African Americans have the shortest life expectancy of any ethnic group, it seems only logical that by better understanding the impact of hereditary diseases we could greatly improve their health while increasing their longevity.

The objective of this health curriculum is to help students to understand the basics of epidemiology and genealogy through a brief introduction of genetics and health. A second objective is to guide students in developing a personal family health history by conducting a survey in questionnaire form of immediate family members. After completing the survey students will be asked to evaluate their personal risk potential of family hereditary disease. The final objective will consist of students researching information for a research paper about a hereditary disease and develop a plan of prevention.

Strategies

In order to assist the students to accomplish the desired objectives the instructor will employ teaching techniques of overhead projection of notes and lectures of key terms and definitions.

The students will also spend time in the library gathering information about a family hereditary disease for their research papers.

Students will use a questionnaire to conduct a survey of immediate family members in order to identify potential risks of hereditary illnesses and diseases.

Classroom Activities

Lesson 1 – Introduction to Epidemiology, Genealogy, and Genetics

This lesson will introduce the students to the sciences of epidemiology, genealogy and genetics. Its main focus will be to define specific vocabulary terminology that will assist in explaining the connection between heredity and diseases.

Monday – A sample of the vocabulary includes:

- Epidemiology
- Genealogy

- Genetics

Tuesday – Part of the lesson will involve a discussion of how heredity influences disease?

Another part will identify basic genetic disorders.

Wednesday –

- Single gene
- Multifactorial
- Chromosomal
- Mitochondrial

Thursday & Friday – Identify Common Genetic Diseases

The class will define and discuss the following genetic diseases and disorders:

Common Genetic Diseases

Heart Disease

- Coronary arteriosclerosis
- High blood pressure
- Hyperlipidemia

Diabetes

Cancer

- breast and ovarian cancer
- colon cancer
- malignant melanoma
- prostate cancer

Neurological Illnesses and Disorders

- Alzheimer's
- Amyotrophic Lateral Sclerosis (ALS)
- Gaucher Disease
- Huntington's Disease (HD)
- Multiple Sclerosis (MS)
- Neurofibromatosis (NFI)
- Parkinson's Disease
- Tay – Sachs Disease
- Tourette Syndrome

Mental Illnesses and Disorders

- Alcoholism

- Anxiety Disorders
- Attention Deficit Disorders (AD/HD)
- Eating Disorders
- Manic Depression (Bipolar Disorder)
- Schizophrenia

Other Genetic Diseases

- Cleft Lip and Cleft Palate
- Clubfoot
- Cystic Fibrosis
- Duchenne Muscular Dystrophy
- Galactosemia
- Hemophilia
- Hurler's Syndrome
- Marfan Syndrome
- Phenylketonuria (PKU)
- Sickle Cell Disease (Sickle Cell Anemia)
- Thalassemia

Other Medical Conditions With Genetic Links

- Allergies
- Arthritis
- Asthma
- Baldness
- Migraine Headaches
- Obesity
- Periodontal Disease (Gum Disease)
- Speech Disorders

Lesson 2 Family History As A Risk For Disease

Lesson 2 will explain how diseases are inherited and passed down through generations. It will explore how inherited genetic tendencies are important predictors for predicting health and diseases. It will show how knowing what kind of medical conditions run in families makes preventing or controlling them easier. Students will develop a family medical questionnaire and conduct a survey of immediate family members.

Monday – Class discussion on the influence of heredity on health.

Tuesday & Wednesday – Develop a family medical questionnaire

PERSONAL MEDICAL HISTORY INFORMATION

Name: _____

Relationship to you: _____

Date Born: _____

Date of Death: _____

Cause of Death: _____

Marriage (s): Name: _____

Where: _____

Date: _____

Illness (es):

What medication do you take?

Do you have any known allergies? _____

To what?

Have you ever been hospitalized? _____

Where?

Reason?

Have you ever had surgery? _____

When? _____

Reason:

Have you ever had emotional problems requiring medical care?

Have you had any serious injury or illness within the last year?

Occupation:

Education:

Military Service:

Accomplishments:

Special Memories:

Others:

Lesson 3. Creating A Family Health Tree

Objectives: 1) develop a family medical tree (pedigree)

2) interview immediate family members

Creating a personal family medical tree is paramount in gathering information and predicting the potential risk for developing an inherited illness or disease. This lesson will take students through the steps of developing a family tree model and use it to collect health histories for immediate family members.

Step 1. Construct a skeleton of a Medical Family Tree

Step 2 Survey immediate family members

Step 3 Record information on model

Step 4. Interpret and analyze information

Step 5. Select potential hereditary disease

FAMILY TREE SUMMARY

| | |
|---|---|
| <p>Grandfather:</p> <p>_____</p> <p>Date Born: _____</p> <p>Death Date: _____</p> <p>Illness: _____</p> | <p>Grandfather:</p> <p>_____</p> <p>Date Born: _____</p> <p>Death Date: _____</p> <p>Illness: _____</p> |
| <p>Grandmother:</p> <p>_____</p> <p>Date Born: _____</p> <p>Death Date: _____</p> <p>Illness: _____</p> | <p>Grandmother:</p> <p>_____</p> <p>Date Born: _____</p> <p>Death Date: _____</p> <p>Illness: _____</p> |
| <p>Father: _____</p> <p>Date Born: _____</p> <p>Death Date: _____</p> <p>Illness: _____</p> | <p>Mother:</p> <p>_____</p> <p>Date Born: _____</p> <p>Death Date: _____</p> <p style="text-align: center;">Illness:</p> <p style="text-align: center;">_____</p> |
| <p>Father's Sibling</p> | <p>Mother's Sibling</p> |

| | |
|--|--|
| Name: _____ Name: _____ Date Born: _____ Date Born: _____ Death Date: _____ Death Date: _____ Illness: _____ Illness: _____ | Name: _____ Name: _____ Date Born: _____ Date Born: _____ Death Date: _____ Death Date: _____ Illness: _____ Illness: _____ |
| Compiled By: Your name: _____ Date Born: _____ Illness: _____ | Your Siblings Name: _____ Name: _____ Date Born: _____ Date Born: _____ Illness: _____ Illness: _____ |

Lesson 4. Researching Hereditary Disease

In this lesson the student will spend one week with teacher assistance in the library researching information of a hereditary disease.

Research Outline

- I. Introduction
 - a. Identification of disease
 - b. Rationale for selection
- II. Definition of the disease
- III. Signs and Symptoms of the disease
- IV. Causes of the disease
- V. Treatment of the disease

- VI. Preventive strategies of the disease
- VII. Personal action plan of prevention
- VIII. Conclusion

Lesson 5. Writing Research Paper

Lesson 5 is independent homework in writing the research paper. The paper must be type written and double spaced.

Annotated Bibliography

Daus, Carol. *Past Imperfect: How tracing your family medical history can save our life.* Santa Monica Pres LLC. (1999).

In *Past Imperfect* Carol Daus gives a step by step account of tracing family medical history and list resources to assist in gathering valuable information.

Gormley's, Myra V. *Family Diseases: are you at risk?* Genealogy Publishing Co., Inc. (1989).

Gormley's *Family Diseases* provides risk assessment and other information used to fight birth defects and genetic diseases.

Krause, Carol. *How Healthy Is Your Family Tree?*

A complete guide to tracing your family's medical and behavioral history.
Simon and Schuster. (1995).

Krause identifies potential risks and how to chart behavioral patterns and construct a genogram.

Packwood, Paula V. *Your Family Health History.* Paula V. Packwood, (1990).

Packwood's *Family Health History* tells how to retrieve and document your family's health history.

Shawker, Thomas H. *Unlocking Your Genetic History: A step by step guide to discovering your family's medical and genetic heritage.* Rutledge Hill Press (2004)

Dr. Shawker's *Unlocking Your Genetic History* shows how to discover genetic predispositions, confirm ancestral connections, and understand DNA breakthroughs.

Appendices – Standards

Content Standards for the Pittsburgh Public Schools

Reading, Writing, Speaking and Listening

1. All students use effective research and information management skills, including locating primary and secondary sources of information with traditional and emerging library technologies.

Wellness and Fitness

3. All students demonstrate their knowledge of the benefits associated with physical fitness and good personal health habits, including health promotion and disease prevention.

Science and Technology

6. All students develop and apply skills of observation, data collection, analysis, pattern recognition, prediction and scientific reasoning in designing and conducting experiments and solving technological problems.

9. All students demonstrate basic computer literacy, including word processing, software applications, and the ability to access the global information infrastructure using current technology.