Personalized Genomic Medicine
What is personalized genomic medicine (PGM)?

- Personalized genomic medicine is a way to improve your health using your family history, medical history, genetic information, and lifestyle
- The four Ps of personalized genomic medicine are:
  - Personalized: risks are uniquely yours
  - Predictive: predicts the chances of developing certain disorders
  - Preventive: based on genetic test results and specific lifestyle behaviors, offers healthy solutions to decrease disease risk
  - Participatory: requires your involvement

What is genetic information?

Information about your genome (your DNA), which includes:
- Family health history
- Diseases and risks of health problems that run in your family
- Family stories

Are there any diseases that run in your family?
What is a genetic test?

Genetic tests look at changes in your DNA that cause disease or put you at increased risk to develop disease.

What is the human genome?

• The human genome contains all of a person's genetic information
• It is made of DNA
• It is a series of 3 billion base pairs, the building blocks of DNA
• Base pairs consist of letters (A, C, G, T) that are the code to make 20,000 to 30,000 genes
• Genes are the instructions for our bodies

What can personalized genomic medicine do for me?

• It may help diagnose a disease you already have
• It may help your doctor decide which medicine and how much of that medicine will work best for you (pharmacogenomics)
• It may tell you if you are at risk to develop a disease in the future

What kind of diseases can personalized genomic medicine tell me about?

• Diseases that run in your family
• Rare diseases
• Common diseases such as diabetes, which are caused by both DNA changes and your environment
What can personalized genomic medicine not tell me?

- We do not fully understand all diseases at this time
- We do not fully understand all genes or all of their changes at this time
- It cannot tell you when you will develop disease
- It may or may not be able to tell you how severe the disease will be

Why haven’t I heard of personalized genomic medicine until now?

- Scientists and doctors are using recent research discoveries to improve medical care
- Recently, new DNA tests make studying your DNA easier, faster, and cheaper than in the past
- The new tests can give detailed information about:
  - Specific genes (targeted sequence capture)
  - All of the genes that make proteins in a person (whole exome sequencing)
  - All of the DNA in your genome (whole genome sequencing)

The Iowa Institute of Human Genetics and personalized genomic medicine.

- The Iowa Institute of Human Genetics (IIHG) was approved by the state of Iowa Board of Regents in August 2012
- The mission of the IIHG is to bring PGM to the state of Iowa
- PGM tests offered by the IIHG include but are not limited to:
  - Targeted disease panels for a group of diseases
  - Pharmacogenomic testing (determines medicine and dosage based on genes)
  - Whole exome sequencing (screens many genes at once)
- Education for all Iowans on genetics and PGM
How do I learn more about personalized genomic medicine?

- You can talk to your doctor about PGM
- You can contact a genetic counselor
  - Visit the National Society of Genetic Counselors (NSGC) online directory to find a genetic counselor (www.nsgc.org)
Did You Know?

- Humans and dogs both have about 20,000 genes.

Genetic testing is recommended for 10% of all drugs to get the best treatment.
Helpful Websites

Iowa Institute of Human Genetics (IIHG)
Information for patients, health care providers, researchers, and students regarding human genetics and personalized genomic medicine
>> www.medicine.uiowa.edu/humangenetics

National Human Genome Research Institute (NHGRI)
Information for patients, health care providers, researchers, and students regarding human genetic disease and human genetic disease research
>> www.genome.gov

Genetics Home Reference
Information about how genes affect your health: what genes are, how they work, and how they can cause illnesses

National Society of Genetic Counselors (NSGC)
Information about genetic counseling, genetic testing, and finding a genetic counselor in your area
>> www.nsgc.org

Genes in Life
Information about genetics and how it affects you and your family, why you should talk to your health care provider about genetics, how to get involved in genetics research, and more
>> genesinlife.org

Ask for our other booklets about genetic counseling, genetic testing, exome sequencing, and pharmacogenomics.
Contact Information

Iowa Institute of Human Genetics

University of Iowa
285 Newton Road, 5296 CBRB
Iowa City, IA, 52242
Phone: (319) 335-3688
Fax: (319) 335-3484
Email: iihg@uiowa.edu
www.medicine.uiowa.edu/humangenetics

Follow us on Twitter
@IIHG_Genetics