

Beyond the Genome and Pharmacogenetics: Precision Medicine

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Is Precision Medicine for You?

Do you wish to foresee your individual health future? The decision to investigate what health challenges. Each individual may experience is not for the weak of heart (no pun intended). Most healthcare practitioners embrace the need for interprofessional linkages with fellow professionals (physicians, pharmacists, nurses, nurse practitioners, physician assistants and many others) as they work to provide personalized care for patient/customers.

Precision medicine today, sometimes called personalized medicine is an approach for protecting individual health and treating disease that takes into account a person's genes, behaviors and environment. It revolves around the idea that a condition like cancer or heart disease in one individual isn't necessarily the same as in another individual. Interventions are tailored to individuals or groups, rather than using a one-size-fits-all approach in which everyone receives the same care or medicines. But what does this mean and how can precision medicine and precision medicines or using "targeted therapies" protect individual health?

This approach to providing superior healthcare and quality of life is about knowing the unique disease risks and treatments that will work best for each individual. This is tailored prevention and tailored treatment healthcare.

What Caused This New Approach for Individual Healthcare?

In 2011 the National Academy of Sciences, with financial support from the United States National Institutes of Health (NIH), commissioned the National Research Council (established in 1916 by the National Academy of Sciences) to establish a knowledge network for biomedical research and a new taxonomy of disease. US distinguished scholars from the National Academy of Sciences, The National Academy of Engineering (established in 1964) and the Institute of Medicine (established 1970) were invited to become part of this landmark committee. The report created by this committee established the framework for development of the precision medicine approach and was formally acknowledged as a United States FDA Center for Drug Evaluation and Research Initiative in 2015.

The Steps to a Successful Precision Medicine Approach for an Individual

Know yourself. Get genetic testing. Genetic testing that teaches what mutations have occurred to special genes in your genome. Please do not fear the Grim Reaper! Know before you must deal with a health challenge. Knowing what possible mutations to an individual genome have occurred due to life style and environment can teach physicians and pharmacists to approach many health challenges today in cancer, arthritis, Alzheimer's disease among others. Research that understands how genetic variations contribute to health is just one aspect of precision medicine. While the genome of each individual is set for life, the expressions of our genes fluctuate over time in response to the environment. Each individual's genome contains about 6 billion letters of DNA code. Contained within that code are the instructions for building all of the proteins that make the cells, tissues and organs function for each individual. Many serious health conditions are linked to a single letter of code within the 6 billions letters of code! Others are linked to combinations of more-subtle variations spread through the genome. Additional approaches to precision medicine involve measuring levels of proteins, RNAs, or metabolomics. These assessments can help inform medical choices by healthcare professionals for individuals.

Today for less than the cost of a one-time MRI scan, any individual is able to obtain a specific individual genome sequence, a resource can insure a medical decision about any individual over the course of their lifetime. Sequencing one human genome generates a lot information---about 200 gigabytes of raw data...but computational power today shares and analyzes this data on a large scale. The more genomic information doctors understand about everybody else, the more equipped they are to offer individualized care to any individual.

The International Initiative

Who has led the knowledge ascent about definition of genome to precision medicine? USA? Europe? It is about lessons from the North. Iceland. Why? With the tiny population of around 320,000 people of as 2014 plus the most detailed national medical and genetic data base of any country in the world. The population is involved with any healthcare assessment at the request of the Iceland healthcare commitment. They are involved! At the last American Society for Human Genetics Annual Meeting there were 8000 attendees with numerous vendors and activities that went from before dawn to after dusk every day. See you Next Year?

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