



# National Office of Public Health Genomics

## Translating Gene Discoveries into Population Health Benefits

[www.cdc.gov/genomics](http://www.cdc.gov/genomics)



### Our Mission and Goals for Public Health Genomics

**Mission:** to integrate genomics into public health research, policy, and programs.  
**Goals:** to improve public health interventions by conducting population-based genomic research, assessing the role of family history in disease risk and prevention, and evaluating genetic tests.

**Public health genomics** is an emerging science that assesses the impact of genes and their interaction with behavior, diet, and the environment on population health. The field of public health genomics is concerned with the effective and responsible translation of genome-based knowledge and technologies into clinical and public health practice.

CDC envisions that advances in this science will lead to new and better ways to improve health and prevent diseases for individuals and populations.

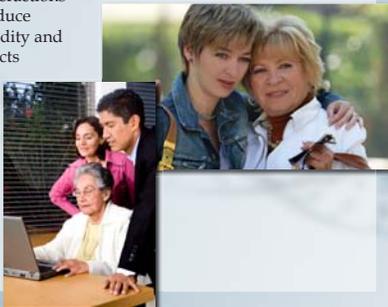
Ways that genomics is used to help prevent disease and promote health include:

**Infants**  
Newborn screening prevents morbidity and disability in thousands of children annually

**Children**  
Genomics may explain why some healthy children die from influenza infection

**Adolescents**  
Understanding gene-drug interactions could help reduce asthma morbidity and drug side effects

**Adults and Older Adults**  
Promoting colorectal cancer screening for persons with a family history of the disease could prevent more cases



### Our Major Public Health Genomics Initiatives

#### NHANES III Collaborative Genomics Project

Measuring population variation in selected genes of public health significance  
In 2002, NOPHG formed a multidisciplinary working group with members from across CDC to develop a proposal to measure the prevalence of selected genetic variants of public health interest in a representative sample of the U.S. population and to examine the associations between the selected genetic variants and disease outcomes with data from the 3rd National Health and Nutrition Examination Survey (NHANES III).



#### Public Health Investigations

Integrating genomics into public health investigations and surveys  
Public health investigations are essential for identifying the causes of disease and environmental health problems. Genomics and environmental health data can be used to identify genetic variants and their interactions with environmental factors that increase the risk of disease.



#### Human Genome Epidemiology Network (HuGENet™)

Developing a knowledge base on genomics and population health  
NOPHG established HuGENet™, a voluntary, international collaboration, in 1998 to help translate genetic research findings into opportunities for preventive medicine and public health by advancing the synthesis, interpretation, and dissemination of population-based data on human genetic variation in health and disease.



#### Family History Public Health Initiative

Developing and evaluating family history tools for disease prevention and health promotion  
NOPHG started the Family History Public Health Initiative in 2002 to increase awareness of family history as an important risk factor for common chronic diseases such as cancer, heart disease, and diabetes, and to promote its use in programs aimed at reducing the burden of these diseases in the U.S. population.



#### State Genomics Programs

Integrating genomics into chronic disease prevention programs in state health departments  
Since 2003, NOPHG has supported genomics programs in four state health departments (Michigan, Minnesota, Oregon, and Utah) to integrate genomics knowledge (e.g., genetic risk factors) and tools (e.g., family history assessments) into chronic disease prevention programs and core public health functions.



#### Evaluation of Genomic Applications in Practice and Prevention (EGAPP)

Developing methods for evaluating genetic tests in transition from research to practice  
EGAPP is a national effort to evaluate the validity, utility, and implementation of genetic tests in clinical practice. The program is designed to provide information to clinicians and patients about the benefits and risks of genetic testing.



#### Centers for Genomics and Public Health

Establishing regional hubs of expertise in genomics and public health in the United States  
The Centers for Genomics and Public Health are regional hubs of expertise in genomics and public health. They provide a platform for collaboration and information exchange between researchers, clinicians, and public health practitioners.



### Future Directions: Our Vision for the Next Decade

Our vision for public health genomics at CDC in the next 10 years is to accelerate the evaluation of new research findings and applications in genomics that can be used to improve health and prevent disease in the U.S. population.

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We will enhance collaborations with other CDC programs to integrate this knowledge appropriately into their goals and plans.

We will strengthen efforts to engage and educate health providers and consumers about genomics, genetics, and family history to assist them in decision-making about health and health care.

We will also expand national and international partnerships to further integrate genomics into policy, research, and programs.

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#### Genomics Translation Research

Accelerating the translation of gene discoveries into population health benefits  
In 2007, NOPHG began developing its portfolio for translation research to advance knowledge about the validity, utility, utilization and population health impact of genomic applications and family history for improving health and preventing disease in well-defined populations or practice settings. The objective is to address key questions along the translation continuum: T1 Research - From Gene Discovery to Health Application; T2 Research - From Health Application to Evidence-based Guideline; T3 Research - From Guideline to Health Practice; T4 Research - From Practice to Health Impact.

