National Office of Public Health Genomics

Translating Gene Discoveries into Population Health Benefits

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).

Taking into account all factors that determine disease, it can be said that 100% of human disease results from the interactions between genetics and environment.

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.

Worldwide collaboration in research and practice is needed to better understand and use scientific discoveries to improve the public's health.

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.

96% of Americans believe that family history is important to health. Yet, only about 30% have tried to collect and organize their family history information.

State Genomics Programs
Integrating genomics into chronic disease prevention programs in state health departments

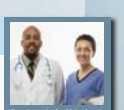
Since 2003, NOPHG has supported genomics programs in four state health departments (Michigan, Minnesota, Oregon, and Utah) to integrate genomics knowledge (e.g., genetic risk factors) and tools (e.g., family history assessments) into chronic disease prevention programs and core public health functions.

In a 2005 survey in Oregon using BRFSS, 84% of adults had a healthcare provider ask them about their family history of disease. In a 2005 survey in Utah, 74% of adults had a health care provider discuss their risk for certain diseases based on their family history.

Public Health Investigations
Integrating genomics into public health investigations and surveys

In 2006, NOPHG established funding for innovative CDC projects, focusing on infectious disease, chronic disease, birth defects, pharmacogenomics, and environmental exposures, to integrate genomics into their research and programs.

NOPHG and the National Center for Influenza and Respiratory Diseases at CDC developed the Influenza Public Health Genomics Initiative to investigate the role of population genetic variation in the epidemiology of influenza morbidity and mortality.



Every year in the United States, an average of 5% to 20% of the population gets the flu. Genetic factors may play a role in determining whether infected persons develop severe complications leading to hospitalization or death.

Evaluation of Genomic Applications in Practice and Prevention (EGAPP)
Developing methods for evaluating genetic tests in transition from research to practice

The EGAPP initiative was launched by NOPHG to establish and test a systematic, evidence-based process for evaluating genetic tests and other applications of genomic technology that are in transition from research to clinical and public health practice.

More than 1,200 genetic tests are available, but more evidence is needed on whether these tests are useful and safe for the public.

Centers for Genomics and Public Health
Establishing regional hubs of expertise in genomics and public health in the United States

Since 2005, NOPHG has funded Centers for Genomics and Public Health within schools of public health at the Universities of Michigan and Washington to provide expertise in translating genomic information into usable public health knowledge, to provide technical assistance to state and community public health agencies, and to integrate genomics into programs and practice.

The integration of genomics into public health practice requires a workforce capable of interpreting and applying relevant genomic information in the practice setting.

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.

2018

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

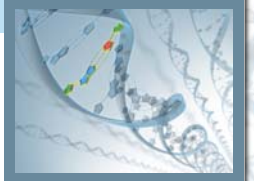
We will strengthen efforts to engage and educate health providers and consumers about genomics, genetics, and family history to assist them in decision-making about health and health care.

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

2008

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.



1997:
Strategic Plan of Genetics and Public Health
New CDC Office of Genetics and Disease Prevention

1998:
1st National Conference on Genetics and Public Health
Human Genome Epidemiology Network (Hugenet™)

1999:
1st Extramural Grants: Prevention Research

2001:
1st Centers for Genomics and Public Health
ACCE Project
Genomic Competencies for the Public Health Workforce

2002:
NHANES III Collaborative Genomics Project
Family History Public Health Initiative

2003:
Four State Health Departments Funded to Build Genomics Capacity

2004:
Evaluation of Genomic Applications in Practice and Prevention (EGAPP) Model Project

2005:
Family Healthware™

2006:
Office Renamed National Office of Public Health Genomics
Intramural Seed Funding: Genomics Projects
Influenza Public Health Genomics Initiative

2007:
2nd Round Intramural Seed Funding: Genomics Projects
External Peer Review

2008:
Extramural Translation Research