Translating Genomics into Public Health Practice

Recent scientific discoveries have demonstrated that specific genetic traits may be risk factors for common diseases that affect public health. The translation of these genomic research discoveries into medical practice will provide new opportunities for health promotion and disease prevention.

Increasing the public's understanding of genomics is important in building confidence among health care consumers about the benefits of genomic information and technologies. The full benefits of genomics in population health will not be realized, however, without the development of a genomically literate public health workforce that is capable of interpreting and applying relevant genomic information. Centers for Disease Control and Prevention (CDC) activities related to integrating genomics into public health practice and programs include Genomic tools development, workforce development, building capacity for future genomic response, and evaluating genomic application in practice and prevention.

Evaluating Genomic Applications in Practice and Prevention (EGAPP)

The success of the Human Genome Project has led to the increasingly rapid translation of genomic information into clinical applications. Although most of the more than 1,000 genetic tests available for clinical testing are used to diagnose relatively rare single-gene disorders, a growing number have population-based applications and the potential for broad public health impact.

Issues raised about genetic testing include the need to develop evidence to establish efficacy and cost-effectiveness before tests can be commercialized, and the need to provide timely and reliable information that allows health-care providers and consumers to use the tests appropriately. Although expert panels such as the NIH-DOE Task Force on Genetic Testing and the HHS Secretary's Advisory Committee on Genetic Testing have made recommendations concerning the development and oversight of safe and effective genetic tests, a more coordinated approach is needed for translating genomic applications into clinical practice and health policy is needed.

In FY04, CDC launched a model project entitled Evaluation of Genomic Applications in Practice and Prevention (EGAPP). The EGAPP project aims to develop and evaluate a coordinated and systematic process for assessing genetic tests and other genomic applications in transition from research to clinical and public health practice. A CDC-wide and HHS interagency steering committee provided early guidance to EGAPP and will consider how to use the knowledge gained by the project to develop a sustainable evaluation process. An independent, non-federal, multidisciplinary EGAPP working group was established in 2005. The roles of this 13-member panel are to prioritize and select genomic applications for evaluation, establish methods and processes, oversee commissioned evidence reports, and develop conclusions and recommendations based on the evidence.

In its first year, the working group developed methods and criteria for topic selection and commissioned evidence reviews on the following four topics:

- Hereditary Nonpolyposis Colorectal Cancer (*HNPCC*), Screening
- Genomics Tests for Ovarian Cancer Detection and Management
- Cytochrome P450 Polymorphims (*CYP450*), Testing in Adults with Depression
- *UGT1A1* testing in colorectal cancer patients treated with Irinotecan

Other EGAPP activities include conducting a comprehensive evaluation of the project's processes and products, and continuing to engage stakeholders.

Cooperative Agreements with State Health Departments

In July 2003, CDC established cooperative agreements with state health departments in Michigan, Minnesota, Oregon, and Utah to assist them in developing and expanding their capacity to integrate genomic knowledge and tools into their chronic disease prevention programs. These health departments have since demonstrated that genomics can be successfully incorporated into their programs. Areas of progress include: establishing infrastructure, building partnerships, educating the public health workforce, assessing the integration of genomics into population-based surveillance, and applying family history as a screening tool to identify high-risk populations in order to more effectively target prevention messages. The progress made by these states can serve as a model for other local, state, and regional health departments as they begin to incorporate genomics into their public health programs.

Centers for Genomics and Public Health

In collaboration with the Association of Schools of Public Health, CDC established the first "Centers for Genomics and Public Health" in 2001. These centers, located in schools of public health at the University of Michigan, the University of North Carolina, and the University of Washington, each became hubs of expertise that built on and complemented existing university programs and created links with state and local health departments. These centers are recognized as national resources and contributors to the knowledge base of public health genomics. They serve local, state, and regional public health organizations by providing technical assistance, and developing and delivering training to the public health workforce.

In collaboration with CDC, these centers developed two Web-based training programs for public health professionals. The first is a 45-minute introductory presentation called *Genomics for Public Health Practitioners* that describes the application of genomics to public health, dispels myths about genomics, and identifies challenges in public health genomics. A more in-depth series, *Six Weeks to Genomics Awareness*, consists of six presentations designed to help public health professionals understand how genomic advances are relevant to public health. In 2005, two of the centers (Michigan and Washington) were awarded funding to continue their work in public health genomics.

For more information, please visit the CDC's National Office of Public Health Genomics website at www.cdc.gov/genomics.