Michigan

The Burden of Sudden Cardiac Death (SCD)

Public Health Issue

Sudden cardiac death (SCD) is defined as an unexpected sudden death due to a cardiac cause and occurring within one hour of the onset of symptoms in an individual who had been in his/her usual state of health, without any known life-threatening condition. SCD can be especially devastating when it occurs in children, youth, or young adults in the prime of life who were previously thought to have been in good health. The Michigan Department of Community Health (MDCH) Genomics Program has identified sudden cardiac or unexplained death of the young (under age 30) as a potentially preventable condition, due to the heritable nature of certain cardiac disorders. Specific causes of SCD in younger adults and children are more likely to have genetic determinants than similar conditions in older persons. These include etiologies such as inherited arrhythmias, hypertrophic cardiomyopathy, undetected congenital heart defects, and early atherosclerotic heart disease.

Program Example

In an effort to learn more about the burden of SCD of the young in Michigan, the MDCH Genomics Program, in collaboration with MDCH Cardiovascular Health Section and Michigan State University, initiated a pilot mortality review system in early summer 2007. The goal of this project is to reduce the burden of SCD of the young in Michigan by identifying health care system changes and family-based interventions for increasing awareness and prevention among individuals at increased risk. The mortality review system utilizes multiple avenues to gather information; mortality data are obtained from MDCH Division for Vital Records and Health Statistics. The SCD case definition includes decedents who were Michigan residents, aged 1-29 years, who died outside of the hospital or in an emergency department, and had specific cardiac or ill-defined causes of death recorded as the underlying cause of death on their death certificate.

For select cases who died between October 2006 and March 2007, medical records for the day of death and for the year prior to death were requested from providers and health care facilities. Selected decedents' next-of-kin were contacted and asked to participate in an interview regarding the events surrounding the death. Four anonymized case summaries were prepared and an advisory panel of 13 members, with varied genetics, cardiac, and medical expertise, was convened in October 2007 to review the cases and provide feedback on the etiologic nature of the deaths, implications for family members, and the mortality review process.

Implications and Impact

In 2006, a total of 83 deaths met the SCD case definition, translating to an estimated mortality rate of 2.1 per 100,000 for individuals 1-29 years of age. Black men were disproportionately affected. Almost one-third of the total cases died of cardiomyopathy. About half of the total cases died in an emergency department, while the other half died elsewhere. The SCD advisory panel found several implications for immediate family members of three out of the four cases that were reviewed during the panel meeting. Recommendations made by the advisory panel will be used to modify the case definition, improve the review process, and guide ongoing efforts to develop evidence-based public health recommendations for preventing SCD of the young in Michigan. This project is expected to increase knowledge of factors that contribute to SCD and feasibility of using mortality data to identify family, public, and provider needs regarding SCD.

Michigan

Michigan Department of Community Health: Health Homes University

Public Health Issue
In 2006-2007, the MDCH Genomics Program partnered for the first time with the MDCH Division of Environmental Health to integrate genomics and family history principles into a project called Health Homes University (HHU). This projects aims to positively affect the knowledge, attitudes, and behaviors of families to reduce asthma triggers and potential injury sources within their homes, to reduce emergency-care events related to asthma and injury, and to reduce school absenteeism. To date, more than 200 families have enrolled in the program. Family history is an important known risk factor for asthma. A family history of asthma has also been associated with asthma severity.

Program Example
The MDCH Genomics Program integrated questions into the HHU baseline survey and interviews given to families participating in the project, which inquired about the number of family members in the household and those who had asthma, severity of asthma, and knowledge of asthma triggers. Family history information from 162 families showed that 65% of probands (affected child) had at least one first-degree relative who had ever been diagnosed with asthma. When expanded to include second-degree relatives, this number rose to 77%.

The results from the baseline interview showed a significant trend of an increasing number of affected first-degree relatives associated with increasing days reported with asthma symptoms (e.g., shortness of breath, wheezing). Children with one or more first-degree relatives ever diagnosed with asthma had more days with symptoms on average than children without a first-degree family history.

Implications and Impact
By identifying households with multiple family members with asthma and educating these family members about asthma triggers in the home, the number of persons with asthma and/or the frequency and severity of asthma are expected to decline in these households.

Minnesota

Minnesota Department of Health: Genomics in Public Health

Public Health Issue
The integration of genomics into public health requires an educated and skilled workforce capable of interpreting and applying relevant genomic and family history information to research and practice settings and policy development.

Program Example
The Minnesota genomics program collaborated with the University of Minnesota's School of Public Health to organize three new courses and a roundtable session on public health genomics as part of the 6th annual Summer Public Health Institute from May 21 to June 8, 2007. Courses on "Genomics in Public Health," and "Application of Genomics to Public Health Part 1, and Part 2" provided an overview of basic human genetics and genomics, and a survey of the opportunities and challenges for using these disciplines in public health research and practice. The roundtable session focused on "Genes and the Environment: The Emerging Role of Genomics in Public Health." Muin Khoury, MD, PhD, director of the National Office of Public Health Genomics at the Centers for Disease Control presented on gene-environment interactions and the emerging role of genomics in public health during this session. More information about the Summer Public Health Institute is available at http://cpheo.sph.umn.edu/cpheo/institute/home.html, and more information about the roundtable session is available at: http://www.sph.umn.edu/cpheo/events/roundtable/Roundtable_060807.html.

Implications and Impact
The Public Health Institute courses were nationally advertised and over 300 participants attended from 28 states and five countries. Total enrollment for the genomics courses was 27, and included participants from Illinois, Michigan, Minnesota, North Dakota and Oregon. An additional 100 public health practitioners, health care providers, faculty, students, and other professionals attended the roundtable and there were over 325 "hits" recorded on the roundtable website. Participant evaluations of the courses and roundtable were overwhelmingly positive.