Mapping the Burden of Chronic Diseases in Delaware for Public Health Decision Making

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Abstract

Public health decision-makers need to consider geographic differences in rates of chronic disease risk factors and outcomes in order to focus intervention efforts on populations exhibiting the greatest burden of disease. Increasingly, public health agencies are using geographic information systems (GIS) to analyze area-based variations and identify geographic priority areas for health promoting interventions. The articles in this issue are descriptive studies presenting the geographic distribution of select chronic disease risk factors and outcomes among Delaware communities. These studies emerged from a collaboration between the Christiana Care Value Institute and the Jefferson College of Population Health. These studies show that the burden of chronic diseases is not distributed evenly among communities in Delaware. The results of these studies add to the evidence base about public health in Delaware, and should inform public health practitioners working to improve the health of Delaware communities.

Data is Important in Decision Making

Public health practitioners need to make decisions about the distribution of resources to focus on services that best utilize the skills and training of the public health workforce, are evidence-based, meet the health needs of populations, and ultimately reduce the burden of disease and increase the quality of life for members of populations. Ideally, public health practitioners should make programmatic, policy, and budgetary decisions by considering the best evidence available and the comparative effectiveness of interventions. A main process of evidence-based public health is to quantify the impact of public health issues by measuring the associated burden of disease among populations.[1] This process utilizes data from a variety of sources, including electronic medical records, birth and death records, demographic and health surveys, community input, expert opinion, and many others. Public health practitioners carefully analyze this data in order to highlight health issues that should be addressed, identify sub-populations disproportionately affected, monitor and evaluate intervention efforts, and generate hypotheses about the causes of negative health outcomes.

Place Affects Health

Studies have consistently found that characteristics about where individuals live predict their length and quality of life, even after controlling for genetics, demographics, and health behaviors. The distribution of health is not equal in every community. There are vast and

dramatic health disparities based on geography, at the state level and at smaller geographies such as counties, zip codes, and neighborhoods. These differences are due to historical, social, and cultural factors that have provided unequal opportunities for groups of the U.S. population. Segregation, employment inequality, and unequal access to adequate housing have produced vast differences in health behaviors such as physical activity, diet and other risk factors such as stress. Smoking, substance use, and health seeking behavior are very much influenced by the normative social environment- the people you encounter most, including family, friends, coworkers and neighbors. All of these factors have fostered the extensive differences in length and quality of life between geographic areas in the U.S.

Prioritizing Areas of Greatest Health Burden using GIS Mapping

Because of resource constraints, public health practitioners are constantly tasked with implementing programs and policies that are the most efficient. Prioritizing which interventions and activities to focus on is a major effort among local, state, and national public health organizations of all sectors. Due to shrinking budgets, it is very important that local health departments and other organizations tasked to improve the health of communities focus on efforts that could maximize the population health impact among communities and minimize resources expended.

Increasingly, public health agencies are using geographic information systems (GIS) to analyze geographical variation and identify geographic priority areas of focus for health promoting interventions. GIS mapping is used in a number of ways to strengthen the public's health, including disease surveillance, environmental risk analysis, health access and planning, and community health profiling.[2] Health mapping is a powerful way of efficiently transmitting information to the reader or viewer, and has been influential in health-related decision making. Maps can communicate geographic relationships that may not be possible with tabular data or other presentation formats.[3] When planning community-based health interventions, GIS mapping can help public health practitioners identify the populations that are experiencing the greatest burden of disease. An application of this approach is the Camden Coalition of Healthcare Providers in New Jersey's hotspotting process, which identifies geographic clusters of patients with poorly coordinated care, and implements programs to meet their health needs. In this case, the Camden Coalition's efforts reduced the utilization of healthcare services and cost of these patients' care by almost half.[4] A focused analysis of geographically linked data is important when deciding where evidence-based interventions would address the greatest public health needs.

Mapping the Burden of Chronic Diseases in Delaware

This collection of articles emerged from a collaboration between the Christiana Care Value Institute and the Jefferson College of Population Health (JCPH). Students in the GIS Mapping class at JCPH mapped and analyzed publically accessible data about risk factors and chronic diseases identified by the Christiana Care Value Institute. Students used innovative and rigorous methods to describe and analyze geographic relationships about chronic disease risk factors and outcomes experienced within and among Delaware communities.

The first paper in the *Data to Decision-Making Issue* identifies that asthma rates vary dramatically by neighborhood in Delaware, and that urban areas such as Wilmington have a greater burden of disease compared to rural areas. The second paper focuses on relationships

between smoking rates and tobacco-retail density among Delaware neighborhoods, and quantifies the high number of tobacco-retail outlets in close proximity to schools in Wilmington. The third article identifies the geographic distribution of the third greatest cause of death in Delaware, chronic lung diseases, with a particular focus on chronic obstructive pulmonary disease. The fourth article characterizes the food environment among Delaware communities, and explores relationships between SNAP-retail locations, food deserts, food insecurity, and obesity. The final article in the issue identifies and analyzes the differences in prevalence and mortality due to diabetes by geography and race.

These descriptive studies reinforce what is increasingly becoming apparent to public and population health practitioners; demographics and the social determinants of health matter for risk of disease. Where you live truly does impact your length and quality of life. Zip code is, by far, a better predictor of individual's long-term health outcomes than blood pressure, cholesterol level, or any ICD-10 code in the manual. Overall, these studies show that the burden of chronic diseases is not distributed evenly among communities in Delaware. The maps and analyses included in this edition are valuable for upstream hypothesis generation about the causes of health disparities, and serve as a "gateway" to consideration of other related data including demographic, socioeconomic, and health factors within the same geographic unit of interest. As all evidence-based decision-making should consider the breadth of knowledge about public health topics, no individual study or finding should solely initiate public health action. The results identified in these studies are just the beginning of further, more in-depth, inquiries to quantify the distribution and determinants of geographic health disparities in Delaware. The results of these studies add to the evidence base about public health in Delaware, and hopefully, will inform public health practitioners working to improve the health of Delaware communities.

References

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