Session

Data Mining Implications: Community Mobility and GIS/GPS Applications/Disabilities

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2015 APHA Annual Meeting & Expo (Oct. 31 - Nov. 4, 2015)

Abstract

GIS and area deprivation: An approach to neighborhood level population health management

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Background: It has been shown that neighborhood-level characteristics can often influence health outcomes. This suggests that primary care providers should also be cognizant of a patient's neighborhood environment in order to provide the best treatment, inclusive of preventive care. However this can be a challenge with respect to the ease of access, interpretation, operationalization, and generalizability of this neighborhood data.

Objective/Purpose: To determine the relationship between an area deprivation index and selected health outcomes at the regional (Hudson Valley, NY) and local (e.g., county) levels and to propose a simple method of disseminating this data along with potential resources interactively.

Methods: Using a geographic information science (GIS) framework, we examined the Area Deprivation Index (ADI), developed by Singh and updated by Kind, which is freely accessible and available for the entire United States. The measure represents the socioeconomic deprivation of these areas using 17 census markers. Regional (Hudson Valley, NY), and local (e.g., county-wide) analyses were performed by correlating ADI values with selected hospitalization rates (cardiovascular disease, substance abuse, and asthma). This multi-scale look was done in order to examine local variation in correlations as well as to better reflect primary care and county social services availability. Spatial data was then transformed into easily accessible Google Earth files to provide interactive ability.

Results: Regional ADI value rankings concealed some important local variation in the ADI/health relationships.

Discussion/Conclusions: Presenting neighborhood-level characteristics may help providers understand the relative deprivation and risk experienced by the patient based on potential influences of the social and built environments, otherwise referred to as the broader determinants of health. Incorporating this information with health data, utilization, and costs available from claims databases will provide even richer datasets for analytics, public health surveillance, allocation of community resources, and overall population health management.

Provision of health care to the public

Abstract

Using Spatio-Temporal Data Mining to Study Community Mobility of Individuals with Disabilities

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Introduction: Community mobility and participation are important to the health and well-being of individuals with disabilities. Recently, there has been an interest in understanding how Global Positioning Systems (GPS) can be used to monitor mobility and participation of these individuals. **Methods:** In our study, we attempted to measure community mobility and participation of 5 individuals with psychiatric disabilities over a two-week period, using the mobile application AccuTracking on GPS-enabled cellular phones. Location data were collected at one-minute intervals and sent to AccuTracking's secure online database. Once data were gathered, we examined the feasibility of using ST-DBSCAN, a relatively new data mining density-based clustering algorithm which enables the detection of spatio-temporal clusters from GPS data in the presence of noise, to calculate a number of variables of interest from the data. **Results:** After settling on appropriate values of ST-DBSCAN parameters (spatial distance, temporal distance and minimum number of points per cluster), we were able to use ST-DBSCAN output to create the following variables: 1) number of destinations each individual had over the course of the study and on each day; 2) the amount of time each individual spent at each of these destinations; 3) the amount of time each individual spent in transit (i.e., not at a destination); and 4) the total distance each individual traveled over the course of the study. We were able to detect differences on each of these variables across individuals, as well as within-individual variability on different days. **Implications:** Despite certain limitations, ST-DBSCAN seems to be an appropriate tool for identifying destinations of individuals with disabilities, and to help with the calculation of other variables of interest, including time spent at destinations and in transit, and the total distance traveled.

Communication and informatics Other professions or practice related to public health Public health or related research Social and behavioral sciences

Abstract

Social Media Use and Community Participation among Individuals with Psychiatric Disabilities

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Introduction: Little research exists on social media (e.g., Facebook, Twitter, etc.) use among individuals with disabilities. Furthermore, whether and how online social media use is associated with these individuals' community participation – which numerous studies have shown to be related to positive health outcomes – has not been studied. **Methods:** 149 Individuals with psychiatric disabilities receiving services at ten community mental health centers throughout the continental USA have completed questionnaires on their community participation and social media use. Specifically, they were asked which social media sites they used; the duration, frequency and importance of, and reasons for, social media use; and the number of contacts they had on social media. Independent samples t-tests were carried out to examine whether individuals who use social media at least weekly have higher community participation than those without social media accounts or those who use them less frequently. **Results:** With data collection ongoing until May 2015, preliminary results show that 46 of the 149 individuals (30.9%) have at least one social media account, and 43 or 46 (93.5%) use it at least weekly, mostly for social and recreational purposes. Most individuals who use social media consider it important. Furthermore, individuals who use social media at least weekly reported significantly greater community participation than those who used social media less frequently or not at all. **Implications:** Greater use of social media seems to be positively associated with community participation. Future research will examine how social media use relates to other health outcomes, and will explore the possible role of social media in intervention research.

Communication and informatics Planning of health education strategies, interventions, and programs Public health or related research Social and behavioral sciences