Application of real-time GIS for community health resource inventory in the era of big data for a resilient and smart substance abuse management system

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ABSTRACT

As the world changes more rapidly, the demand for up to-date information for resource management, environment monitoring, planning are increasing exponentially. The healthcare sector has generated a vast quantity of data in the past decade (Chen et al., 2012, Demirkhan, 2013), with rapid widespread population growth changes in which health services are made accessible to a majority of the population. With practical tools, both professionals and the general public can quickly have access to data and make treatment decisions based on available data and services offered. Ease of access to data results in a faster rate at which an epidemic can be cured and prevented from spreading, thanks to spatial intelligent gadgets associated with dashboards that aid in monitoring services provided in the community.

In an attempt to make the community healthier, offer greater access, efficient care, and increase the availability of health resources, we configured a Health Resource Inventory that can be used by health and human services for an inventory of alternative medicine, drug drop off, drug treatment, health and human services, homeless services, hospitals and clinics, and mental health services in the community. The app is configured to work both on the web, and mobile devices can also be used as a remedy for substance use and mental health resource inventory. This inventory of health resources uses Web AppBuilder by ArcGIS, which provides a foundation for location-based application accessibility. This application can be used by the general public to locate health and human services in a designated area (Esri, 2018). A second health resource inventory devoted for substance abuse care App include the locations of substance abuse treatment facilities, drug drop-off locators, mental health facilities, and homeless/emergency shelter services.

METHODS

The university of North Dakota college of Arts and Science (North Dakota Atlas Project) and the Department of Geography and Geographic Information Science.

RESULTS

This health inventory allows the health department and community to have real-time access to health-related facilities and allows patients to quickly and efficiently pick the facilities that meet their health needs. The results show the potential impact of spatial accessibility to the identified resources (e.g., substance use treatment facilities, prescription drug-drop offs, mental health facilities and homelessness service) and how would they affect an individual’s willingness to access these readily available resources within specific demographic areas. The tool is also tailored to allow the general public and the department of human services to crowdsource information for resource managers and the general public on the location of health-related facilities. The local government can also use this information for a quick count of available services in the community. This reliable means of data transfer results in smart management and service, and can help solve the problem of regional development inequality. By integrating data sharing and visualization for the general public, a service-oriented government that promotes stability and harmony can be built (Nam & Pardo, 2011, De Jong et al., 2015).

CONCLUSIONS

Substance use disorders have increasingly become a significant public health burden and a safety issue throughout the United States. Although the potential relationship between spatial accessibility of resource utilization is relatively new, the introduction of Geographic Information Systems (GIS) has now given researchers a broader range of spatial tools to assist in the analysis of individual health and behavior in their proximal environments.

The environmental framework of substance use disorder is beyond complex, and requires a multilevel and ecological perspective, and access to substance use disorder services is a multidimensional issue in itself. We show the significance of information technology in facilitating and shaping decision making in urban centers, and how the use of an integrated system can increase accessibility of information to better show how their cities work, allowing stakeholders to efficiently micro-manage the urban system with real-time information.

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