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Editorial

Geographic Information System (GIS) in Public Health

Remote sensing and geographic information system (GIS) are a potential enabling technology used in public health. With the precise geographic location of the incident these technologies are potentially useful for infectious disease surveillance and control of vector borne diseases. GIS is a computer system for capturing and displaying data related to positions on earth's surface. Since many different kinds of data are shown on a map one can analyze their patterns and relationships.

GIS is another important tool that helps in mapping the spread of diseases. GIS is a set of procedures both manual as well as computer based that will allow the user to load, store, get back, manipulate, analyse and provide the corresponding output. During the past 20 years or so has seen a great development in storage and manipulation of large data (Big data), leading to the development of computerized version of GIS. Now the scenario has become such that, where spatial based data are used, GIS has become an inevitable part. The main advantage of GIS is that it has the ability to process large amount of data at a greater speed and also at a much lower cost. Though initially GIS was used to store or archive the data, it has the ability to perform some of the most complex spatial analysis which makes it or distinguishes it from the other computerized systems. In this way GIS also has an important role in planning of development as well as decision making. It is striking to note that GIS has not been extensively used in the study of infectious diseases, even though we have sufficient data.

Hippocrates in the 5th Century BC observed the relationships between human health and the environment. A popular example of early medical geography is of John Snow, the father of modern epidemiology, who demonstrated the water-borne origin of cholera by plotting cholera related deaths in London during the most severe 1854 epidemic on maps. In addition to disease cases, he also plotted the city's water pumps, and drew concentric circles to determine that the area with the highest concentration of cases were within close proximity to the Broad street pump. Removing the pump led to end to new cases in the area, proving that drinking water from this pump was an important causative agent in the epidemic. These early mapping techniques proved extremely useful for elucidating the geospatial correlates of disease incidence and spread. Today applications of GIS, in combination with global positioning systems (GPS) and remote sensing, have been successfully employed in the monitoring and control of onchocerciasis in Guatemala, trypanosomiasis in Africa and malaria in Israel and Mexico. In a most recent study in Baltimore county, Maryland, GIS and epidemiologic methods were combined to identify and locate environmental risk factors associated with Lyme disease. Ecologic data such as watershed, land use, soil type, geology and forest distribution were collected at the residences of Lyme disease patients and compared with data collected at a randomly selected set of addresses. A risk model was generated combining both GIS and logistic regression analysis to locate areas where Lyme disease is most likely to occur.

GIS holds distinct promise as a tool in the fight against emerging infectious diseases and other public health problems. It requires expense, training, maintenance and support. There is a need to integrate teaching on GIS into curriculum in public health and establish formal links with the research communities working with GIS. There are many similarities in the field requirements for using GIS between forestry, ecology, archeology and epidemiology that could provide benefits by the sharing of experiences and pooling of resources. GIS is another tool to promote public health where

there is an amalgamation of epidemiologic science and geographic information science. Hence there is a need for the public health professionals to become geographically literate.

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