Geospatial Modeling of Asthma Population in Relation to Air Pollution

A Decision Support for Health Administration

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Abstract

Recent observations indicate that asthma is growing every year in the United States, especially in urban areas, which are not well understood. The study aims to investigate the spatio-temporal behavior of asthma and health-related air pollution. The association between asthma and environmental exposure to pollutants such as PM2.5 and other air pollutants is increasing every year in the United States. Rob, 2003 found that there is a 2% increase in annual PM2.5 levels over Mississippi State in the study region. G.M. Foody, 2006 has pointed out that the long-term focus on disease surveillance is essential for planning and health care needs to a cluster of diseased population. It is also important to understand the temporal and spatial correlation between asthma and air pollution. Mohammad A. Rob, 2003 has conducted geographical information systems (GIS) research to find the appropriate relationship between asthma and air pollution. Al-Hamdan, 2009 has estimated daily PM2.5 levels combining both Moderate Resolution Imaging Spectroradiometer (MODIS) data and Environmental Protection Agency (EPA) ground data.

Methods

1. Identify seasonal patterns in pollution and hospital admissions.
2. Establish a quantitative relationship between PM2.5 and asthma-related hospitalizations.
3. Find the underserved and over-served clusters of diseased population.
4. Use remotely sensed data (MODIS/Aqua) for the ground-based ground monitor, and estimate the accurate levels of PM2.5 pollutant over study region.

Conclusions

At any point of a year between 2003-2011, zip code regions of Jackson urban area have at least 500 to 700 asthma related hospital admissions, and this is the highest rate when compared to rest of data. Taking into account spatio-temporal patterns, it is important to understand the relationship between asthma and air pollution. This GIS-based project would be useful to make health risk assessment and provide information support to the administrators and decision makers for establishing satellite satellite in the future.

Acknowledgements

Authors sincerely thank and acknowledge the support of Dr. Lei Zhang, Director of Health Data and Research, Mississippi State Department of Health.

References

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