A Web-based Geographic Information System (GIS) for Visualizing Cancer Disparity with Socioeconomic and Demographic Variables

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OBJECTIVES
This project aims to develop a highly-interactive and user-friendly Web-based mapping application to visualize mortality and hospitalization data for 19 cancer sites in each Subregional Areas (SRAs) of San Diego County during 2010 to 2013. The application allows cancer researchers to synchronously explore 23 different types of cancer mortality rates on the left side and 96 socioeconomic and demographic factors on the right side, and help them to explore interrelationships between cancer outcomes and socioeconomic factors by computing and visualizing spatial and statistical correlations.

FINDINGS
The correlation analysis is performed after this button click

CONCLUSIONS
Different from existing web mapping tools for public health data, our tool can provide a side-by-side visual comparison between health data and socioeconomic data to facilitate hypothesis testing for various health disparities and epidemiology research questions.

Disclaimer
The results of correlation analysis should not be considered as causal. For example, the correlation (Pearson’s r = 0.6 ) is computed between the age adjusted death rate from liver cancer in each SRA region and the density of Hispanic population in each SRA region. It means that mortality rate of liver cancer is likely to be high in the region where Hispanic population density is high, but it does not necessarily mean that being Hispanic or residing in an area that is predominantly Hispanic causes increases risk of death from liver cancer. Other factors that correlate with the racial composition of a particular area could also be confounding the observed relationship between Hispanic race and liver cancer mortality, such as limited access to health care or poor health behaviors like drinking alcohol, both of which are known to increase the risk of death from liver cancer. Our exploratory analysis is a data mining tool that can be used for hypothesis testing and to construct more complex, realistic models of cancer mortality risk, but this visualization alone should not be interpreted as a valid tool for prediction of cancer outcomes.

REFERENCES

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http://vision.sdsu.edu/health/