

Consortium on Law and Values in Health, Environment & the Life Sciences
Award Report for the 2016-17 Academic Year

“Bridging the Gap Between Health Geography and Evidence-based Public Health Policy by
Facilitating Knowledge of Spatial Methods with Dynamic Geovisualization”

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PhD program

Project Summary

Population responsiveness to public health policy and community intervention strategies is substantially dependent on geographically-constrained social, economic, and environmental determinants of health. Because these contexts vary from place to place, space needs to be considered a vital part of investigations of health, and yet there is a clear lack of real-world examples that show how ever-improving geographic information systems (GIS) have influenced public health policy. It has been suggested that the absence of GIS-informed public health policy is due to a lack of confidence in geospatial methods (Cockings et al., 2004). Many public health researchers are not well-trained to engage in “spatial thinking” and geographic studies of health can oftentimes be characterized as having nontransparent methods. The aim of the present project was to demonstrate transparency in geospatial methods by shedding light on a concept that threatens the integrity of research relying on spatially aggregated data for analysis. By facilitating understanding of the risks tied to using spatially aggregated units and encouraging appropriate strategies for geographically meaningful aggregation, we are able to motivate GIS applications in public health research.

In specific, this project set out to create an educational resource in the form of a dynamic geovisualization (map animation) and informational webpage that could be shared with public health researchers to promote appropriate use of GIS in public health. Animations are known to facilitate learning when the concept intended to be conveyed is a dynamic process such as the MAUP. This map animation serves as an educational resource--facilitating knowledge of MAUP and furthering transparency of geospatial methods. This animation also demonstrates how investigators might frame their work to acknowledge the presence and severity of the MAUP within their own data.

Results

During the past year, I developed and refined a dynamic geovisualization demonstrating the influence of the Modifiable Areal Unit Problem (MAUP) in a public health dataset. The animation shows how the MAUP affects the correlation between median household income and respiratory health in the Minneapolis metropolitan area. It was imperative that the units chosen would help portray the severity of the concept of MAUP, and by careful selection, I was able to find a series of units that outputted dramatically different correlation coefficients. By adding a graph within the animation, I was able to show the reverse of the relationship among the two variables. In addition to the geovisualization, I developed and launched an online informational resource that describes MAUP effects and how to address these within your own data. The website is still under construction as I am intending to expand it beyond MAUP effects and cover other issues central to spatial analysis of public health data.

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Furthermore, this project was presented at the GeoMed Conference in Porto Portugal last August. The initial geovisualization was well-received and the audience provided generous feedback in terms of how to make improvements. Three more versions of the animation were developed in the time following, and the final product was derived from audience feedback and consultation with an expert in visualization. I have intentions to present the new, improved version of the animation at the next GeoMed conference in 2019 and/or at the International Medical Geography Symposium (IMGS) in 2019. For these I intend on submitting travel grants to COGS and the CLA this year. Furthermore, because I plan to expand the aims of the project, I am in the process of developing a proposal for the Interdisciplinary Doctoral Fellowship (IDF) program this Fall. It is expected that, within the next year, a final manuscript will be submitted for publication.

The web resource: www.studyspatialhealth.com

Future project plans

Because this project is a part of my dissertation—which I intend to complete by Spring 2020—I am expanding the aims to include two other approaches of representation. In addition to the dynamic geovisualization, I plan to develop an interactive space/time visualization and an interactive tool—both of which will be hosted on the informational web resource along with the animation. It is my intention that these three educational tools will be tested for their effectivity in collaboration with the center for cognitive sciences under the support of an IDF.