

Exploring the Spatial Characteristics of Mortality Map: A Statistical Area Perspective

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Abstract : The analysis of geographic inequality heavily relies on the use of location-enabled statistical data and quantitative measures to present the spatial patterns of the selected phenomena and analyze their differences. To protect the privacy of individual instance and link to administrative units, point-based datasets are spatially aggregated to area-based statistical datasets, where only the overall status for the selected levels of spatial units is used for decision making. The partition of the spatial units thus has dominant influence on the outcomes of the analyzed results, well known as the Modifiable Areal Unit Problem (MAUP). A new spatial reference framework, the Taiwan Geographical Statistical Classification (TGSC), was recently introduced in Taiwan based on the spatial partition principles of homogeneous consideration of the number of population and households. Comparing to the outcomes of the traditional township units, TGSC provides additional levels of spatial units with finer granularity for presenting spatial phenomena and enables domain experts to select appropriate dissemination level for publishing statistical data. This paper compares the results of respectively using TGSC and township unit on the mortality data and examines the spatial characteristics of their outcomes. For the mortality data between the period of January 1st, 2008 and December 31st, 2010 of the Taitung County, the all-cause age-standardized death rate (ASDR) ranges from 571 to 1757 per 100,000 persons, whereas the 2nd dissemination area (TGSC) shows greater variation, ranged from 0 to 2222 per 100,000. The finer granularity of spatial units of TGSC clearly provides better outcomes for identifying and evaluating the geographic inequality and can be further analyzed with the statistical measures from other perspectives (e.g., population, area, environment.). The management and analysis of the statistical data referring to the TGSC in this research is strongly supported by the use of Geographic Information System (GIS) technology. An integrated workflow that consists of the tasks of the processing of death certificates, the geocoding of street address, the quality assurance of geocoded results, the automatic calculation of statistic measures, the standardized encoding of measures and the geo-visualization of statistical outcomes is developed. This paper also introduces a set of auxiliary measures from a geographic distribution perspective to further examine the hidden spatial characteristics of mortality data and justify the analyzed results. With the common statistical area framework like TGSC, the preliminary results demonstrate promising potential for developing a web-based statistical service that can effectively access domain statistical data and present the analyzed outcomes in meaningful ways to avoid wrong decision making.

Keywords : mortality map, spatial patterns, statistical area, variation

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