USING GEOPROCESSMENT TO ENSURE HEALTHCARE ACCESS AT A BRAZILIAN HEALTHCARE PLAN

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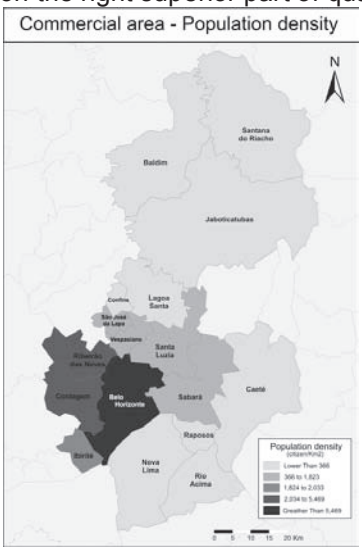
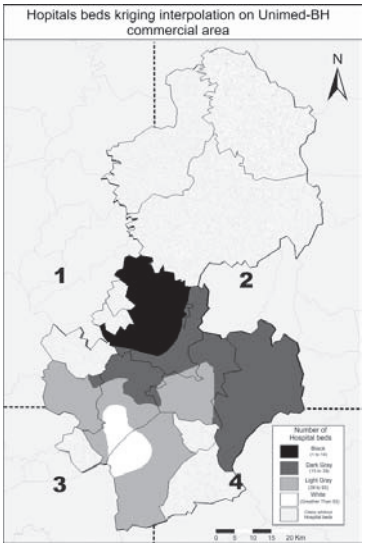
Objective: To identify health services access gaps using georeferencing analysis at a Brazilian health plan covering 17 cities in the metropolitan region of Belo Horizonte, Minas Gerais state.

Methods: For the geoprocessment analysis, a database was built on Mapinfo ® Professional v9.0 (Pitney Bowes©), containing the following information: hospital name; hospital classification (daycare clinic, emergency service, general hospital, etc.); address; city; state; postal code; telephone number, number of beds available for the health plan, city population and city area. City population data was obtained from IBGE (Brazilian Institute of Geography and Statistics) estimates, based on year 2000 population census. City area was obtained from IBGE's international chart of the world (CIM). The database structuring was based on geo-relational models (dual architecture), in which there is the separation between textual information and graphic information. After the database building, data was georeferred by matching the information to an external database (Streetbase standard v2.0 by ProMaps Soluções de Mapeamento LTDA, Campinas, Brazil) containing geographic coordinates. Lastly, georeferred data were interpolated using kriging method (Materon, 1971) at the software ArcMap v9.3 - Geostatistical Analyst Extension® (ESRI, New York, USA) for building a Grid Surface Thematic Mapping (GSTM). This graphic method allows observing the density of determined georeferred data, such as the number of hospital beds in a determined area, according to a chosen gradual pattern.

Results: The database georeferral was able to match 100% of all health plan network, with an expected distance err of 10 to 15 meters. The demographic density analysis revealed the highest density at Belo Horizonte city, with 5,469 inhabitants per square kilometer, and the lowest at Santana do Riacho (65 kilometers far from Belo Horizonte), with 6 inhabitants per square kilometer (Figure 1). Hospital bed density (Figure 2) revealed 9 cities without hospital beds within its limits, most located at quadrant 1 and 2. Quadrant 3 area concentrated the majority of hospital beds. The average nearest neighbor distance analysis show that the hospitals are dispersed. Kriging interpolation method asserts that the hospital beds are concentrated on the right superior part of quadrant 3





Conclusion: In conclusion, the data show bed concentration despite hospital dispersed arrangement and revel problems in the health services provision and coverage in the metropolitan geographic region. These methods and studies based on geoprocessment are relevant for planning and managing health services for quality improvement.

Reference: Contact author