

GIS-based accessibility analysis- a mixed method approach to determine public primary health care demand in South Africa

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Abstract

The spatial realities and dynamics of a changing population with changing health care needs require regular and logical methods to evaluate and assist in primary health care (PHC) planning. Geographical access is an important aspect in the planning process. GIS-based accessibility analysis is a logical method which can be applied to test the degree to which equitable access is obtained. The GIS analysis is however based on the assumption of rational choice, i.e. a person will always go to their closest facility. Inputs to the analysis are supply (capacity of facilities) and demand (people seeking the service) estimates. In South Africa PHC is a dual system made up of private and public health care facilities. Private PHC is expensive and only affordable to affluent citizens or people with medical insurance, and does not form a part of this investigation. Two challenges with respect to GIS-based accessibility analysis for public PHC services within a South African context that emerge are: (a) how accurate is a rational choice based model compared to people's actual decisions; and (b) what method is the best in determining demand in the absence of accurate databases indicating public versus private health care usage? In this study GIS analysis is applied to determine three distinct demand scenarios based on a combination of three variables: (a) household income category, (b) age, and (c) average facility visits. GIS is used to determine catchment areas for each facility, allocating demand to its closest facility limiting access based on facility capacity and access via a road network. The catchment area analysis results from each of the three demand scenarios are compared with actual usage rates in the form of headcounts and mapped origins of users at each facility. Preliminary results indicate that the catchment areas of the facilities for the three scenarios appear to follow the same spatial pattern. Correlation coefficient results indicate that the modelled demand for all three scenarios have a moderate positive correlation with the facility headcounts with scenarios two and three having a slightly higher correlation.