

# **An integrated geo-spatial approach of access to public healthcare services and socio-economic analyses**

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## **Introduction**

Access to health services requires a multidimensional analysis inside a holistic perspective. Such a multidimensional analysis responds to the needs of a more pluralist health geography framework and to the “cultural turn” that studies of health accessibility are experiencing nowadays (Hawthorne & Kwan 2012). This cultural turn needs to be reflected through a clear well-being conceptual framework, which should combine deprivation/satisfaction indicators with spatial accessibility measures. When considering healthcare accessibility as a multidimensional concept, taking into consideration the perceptions of patients can be a useful approach to understanding healthcare access inequalities (Comber et al., 2011). This PhD research will fill different gaps between qualitative and quantitative studies in order to present new mixed-method approaches to the scientific community and to support healthcare and urban planning. The main objective of this PhD are: (a) developing a spatial composite deprivation index related to health issues; (b) developing composite indices related to healthcare accessibility and healthcare satisfaction, and (c) developing a model of accessibility to healthcare services.

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## Methods

The study area is the capital city of Ecuador, Quito. Quito is located around 2800 meters above sea level and is home to more than 1.5 million inhabitants. A deprivation index was developed using indicators extracted from the 2010 Ecuadorian Population and Housing Census (Cabrera Barona et al., 2015). The criteria used to choose the different indicators follow a rights-based perspective (Ramírez, 2012, Mideros, 2012). Different deprivation scenarios were then created by applying the Ordered Weighted Averaging (OWA) method with linguistic quantifiers' integration (Malczewski 2006). The second stage of this research was the creation of two indices: a composite healthcare accessibility (CHCA) index and a composite healthcare satisfaction (CHCS) index. To calculate the CHCA index, three indicators were used: healthcare availability, healthcare acceptability, and general healthcare accessibility (Cavaleri 2013). To calculate the CHCS index, three indicators were used: the waiting time after the patient arrives at the healthcare service, the quality of the healthcare, and the healthcare service supply. The CHCA and CHCS indices were validated using factors of people's behaviour related to healthcare, namely predisposing, enabling, and need factors (Andersen 1995, Arcury et. al 2005), by applying three kinds of regressions: Linear Least Squares, Ordinal Logistic, and Random Forests regressions. The third stage of this research will be the creation of a gravity-based measure of accessibility to healthcare services (Crooks and Schuurman, 2012). The results of this measure of accessibility will be linked to the different scenarios of deprivation through multidimensional analyses.

## Preliminary Results

Results have indicated medium and high levels of deprivation only in specific zones of the study area while most of Quito shows low values of deprivation. The OWA deprivation scenarios represent various decision strategies that offer different options when dealing with socio-economic deprivation. The composite indices of healthcare accessibility and healthcare satisfaction identified healthcare inequalities in the study area. Regression results showed that some social factors influence accessibility and satisfaction related to healthcare. The use of perceptions in healthcare accessibility analyses impacted the calculated measures.

## Conclusions and Outlook

The developed indices have the potential to explain socio-economic deprivation and multidimensional healthcare accessibility. This research could also evaluate the influence of access to healthcare and socio-economic deprivation on specific health problems or illnesses. I consider important the incorporation of more detailed information of human transit between the household and healthcare services to improve the representation of the complex phenomenon of healthcare accessibility. The healthcare satisfaction index and healthcare accessibility index use information of health services supply. The health service supply was represented by the range of services, giving higher scores to specific health services such as specialized hospitals. However, the healthcare supply indicator may be represented by other indicators, such as the number of physicians in the health service. The next steps in my research will be: i) Developing an integral analyses of health-related inequalities by using indices of deprivation and healthcare accessibility and ii) Evaluating the scale effects of the different measures developed.

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