Chapter XVII

Mapping Accessibility to General Practitioners

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Accessibility to general practitioners (GPs) is an important health issue that has financial, cultural and geographical dimensions. This chapter concentrates on a Geographical Information System method for assessing geographical accessibility using network analysis but begins with an overall review of health accessibility literature, followed by a more detailed review of GIS solutions to assessing geographical accessibility. A procedure based on ArcInfo software is described and demonstrated using cost path analysis to determine the minimum travel time and distance to the closest GP via a road network. This analysis is applied to approximately 36,000 census centroids in New Zealand and this enables travel time and distance to be linked to the population distribution. Statistics can be generated on what is the average time spent traveling or the average distance traveled if everybody visited a GP once. These statistics can be generated for different management areas and enables comparisons to be made between regions. This accessibility model is intended for decision support for health planners assessing the distribution of GP services. It can also be easily adapted for other services such as access to hospitals and cancer screening centers.
INTRODUCTION

Accessibility to general practitioners (GPs) is a major contentious issue in many countries (Perry & Gesler, 2000). Poor access to primary health services, such as GPs, can result in people with simple health problems not being advised by GPs and subsequently developing more complex problems with considerable discomfort that can be expensive to treat (Haynes et al., 1999). Health planners and policy developers require information on accessibility to GPs so that procedures and policies can be developed to address inequity. An important consideration for such decision making is where people are living, and their travel distance and time to the closest GP.

Geographical access models developed using network analysis functions in a GIS have enormous potential for informing policy development and grounding debate on how to achieve social equity of primary healthcare access. However, accessibility to health services is a complex subject and it is important that this is well understood before developing such models. There are many political and cultural considerations of accessibility that GIS cannot easily model. GIS can model geographical accessibility and this complements other considerations.

This chapter begins with a general discussion on the meaning of accessibility and the many facets to this term. The discussion then narrows to geographical accessibility and the GIS capabilities available to model this. An example of a GIS method for estimating the geographical accessibility of GPs is then comprehensively described and demonstrated. This example uses least cost analysis to determine the minimum travel time and distance to the closest GP via a road network. This analysis was applied to approximately 36,000 census enumeration district (meshblock) centroids in New Zealand, and this enabled travel time and distance to be linked to the population distribution. Statistics were generated on what is the average time spent traveling or the average distance traveled if everybody visited a GP once. These statistics can be generated for different management areas and enables comparisons to be made between regions.

A difficulty with calculating travel times is determining the travel speeds for different roads. Road layers often contain information that describes the road characteristics, and additional information on the bendiness of the roads can be obtained from calculating the sinuosity of the roads. A process for calculating sinuosity and estimating road travel speeds is described.

This chapter finishes with a discussion on the application of this accessibility model. This process can be easily adapted for other services such as access to hospitals and cancer screening centers.
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