



The effect of spatial barriers on realised accessibility to health services after a natural disaster



Jayden MacRae^{a,*}, Simon Kingham^b, Ed Griffin^b

^a Department of Geography, University of Canterbury, Private Bag 4800, Christchurch 8020, New Zealand

^b GeoHealth Laboratory, Department of Geography, University of Canterbury, Private Bag 4800, Christchurch 8020, New Zealand

ARTICLE INFO

Article history:

Received 12 September 2014

Received in revised form

16 June 2015

Accepted 16 June 2015

Available online 1 July 2015

Keywords:

Utilization

Spatial analysis

Health services accessibility

Disasters

ABSTRACT

The closure of the Manawatu Gorge in New Zealand in August 2011 caused a change in the travel time for patients living in the east of the MidCentral Health District to their health services located in Palmerston North. This presented an opportunity to study the effect a change in spatial access had on a population before and after such an event. We used a retrospective cohort design with routinely collected data from general practice and hospital services. Realised accessibility was calculated for 101,456 patients over 3.5 years. General practice utilization appeared to be the only service affected negatively during the gorge closure (rate ratio 1.106). Outpatient attendances had an increase in use by those with increased travel time (rate ratio 0.922). There was evidence of other unidentified factors that impacted the use of services across both intervention and control groups between the gorge open and closed periods. These results were more conservative than those produced by a traditional uncontrolled travel time category analysis which suggested a correlation in non-urgent ED attendance and general practice and boundary effects in all ED attendances and hospital admissions.

© 2015 Elsevier Ltd. All rights reserved.

1. Introduction

This study used a rare event to investigate the impact an increase in travel time had on the realised accessibility of health services. On 19th August 2011 an opportunity arose that allowed us to observe the utilization of health services in a group of people who had their travel time to those services suddenly increased. We were able to make observations of the use of those services across two distinct time periods; both before and after the change in travel time; and we were able to make the same observations within a group of people who had no change in travel time across either period. A section of New Zealand's State Highway 3 (SH3) that runs through the Manawatu Gorge is a major thoroughfare providing access to thousands of people to their local hospital and health services. This road was the site of a slip of a substantial scale (see Fig. 1) and it was immediately closed and it remained so for more than a year, re-opening to one lane on the 29th August 2012, and to two-way traffic on the 19th September 2012. The economic impact to the region of the closure has been estimated to have been \$62,000 per day of closure (Forbes, 2011).

Having significant travel time or distance to a health service is a

barrier to service use (Brabyn and Barnett, 2004). Such spatial barriers to health care have been studied for decades (Cromley and Shannon, 1986; Guagliardo, 2004; Joseph and Bantock, 1982), with the literature consistently identifying that the further people are from health services, the less likely they will be to use them (Hiscock et al., 2008; Nemet and Bailey, 2000) with concomitantly negative impacts on their health (Jones et al., 1999). Travel time and distance are often considered causal influences on access.

Despite the current evidence some commentators are skeptical of the causal nature of the relationship between health service use and travel time and distance. This stems partly from the difficulty in drawing comparisons between populations that have inherently different characteristics and an absence of evidence that demographic controls are valid for the type of analysis undertaken in these studies (Astell-Burt et al., 2011). The difference in attitude in health seeking behavior for people living in rural and urban settings has been cited as a confounding factor in the correlation (Fuller et al., 2000), while the way that stigma may manifest in different size and density of populations of people may also confound the relationship between travel distance and health service access (Astell-Burt et al., 2011; Hoyt et al., 1997).

The Manawatu Gorge is located in the catchment of the Mid-Central District Health Board (DHB), one of the country's twenty administrative health boards. Each board has a defined and exclusive geographic catchment (Fig. 2) for providing health care to residents. The district spans 8850 km² and stretches from the west

* Corresponding author.

E-mail addresses: jayden.macrae@gmail.com (J. MacRae), simon.kingham@canterbury.ac.nz (S. Kingham), egriffin@linz.govt.nz (E. Griffin).



Fig. 1. Aerial Photo of the Manawatu Gorge Slip (reproduced with permission of the New Zealand Transport Agency).

coast to the east coast of the North Island. It has both the Ruahine and Tararua mountain ranges running through it dividing the resident population into western and eastern areas.

Almost all General Practices are part of larger networks called Primary Health Organizations (PHOs), which are responsible for providing primary care to their enrolled patient populations. MidCentral has a single PHO. General practices in New Zealand operate on a mixed model of public funding and patient co-payment. Patients nominate a general practice as their enrolled practice but they may seek care in any general practice in New Zealand regardless of whether it is their enrolled practice. It is usually cheaper however for patients to attend their nominated practice because of the way funding is structured from PHOs. This acts as an incentive to promote continuity of care. There are no restrictions however on how often a patient may change their nominated practice or where their nominated practice may be. In some cases, patients choose to nominate a practice that is located outside of the DHB in which they reside.

Public hospital services are supplied at no direct cost to New

Zealand citizens and other qualifying individuals. Some specialist outpatient and elective surgical services are supplied privately. Such private services offer reduced waiting times for consultations or surgery and offer a higher level of non-health related commodities, such as private rooms and improved meal options.

The district's main hospital service and the majority of general practice services are located in the west. People that live in the east have three routes by which they can access western services; SH3 through the Manawatu Gorge; the Pahiatua Track; and the Saddle Road. The SH3 Manawatu Gorge road is the easiest drive of all three. It is relatively flat and of moderate sinuosity. By comparison both the Pahiatua Track and Saddle road traverse the mountain ranges to the south and north of the gorge respectively and they are consequently both more sinuous than the gorge route.

Each of the alternative routes to access the western services from the east take longer to drive than the SH3 road. The result of the SH3 road closure through the Manawatu Gorge was that those people living in the east of the district experienced an increase in travel time to hospital services for over a year. Patients that used general practice services in the west but lived in the east also experienced an increase in travel time during this period. Better access to health services leads to better management of health conditions (Teach et al., 2006). Access to health services is expressed in the literature in terms of potential and realised access (Gulliford, 2002; Higgs, 2004). Potential access is a function of enabling resources and the ability of populations to use them if they wish to (Graves, 2009). Realised access is a function of demand of a population that uses available health resources. Achieving universal equity of health service provision requires a reduction of barriers to access of health services, that can come in many forms including financial charges (Andrulis, 1998), financial debt (Beck, 1974), opportunity costs (McIntyre et al., 2006), cultural differences (Ellison-Loschmann and Pearce, 2006; Jansen et al., 2011), language difficulties (Timmins, 2002), bad health (Comber et al., 2011; Webb et al., 2013) low health literacy (Berkman et al., 2011) and transport and travel time difficulties (Brabyn and Barnett, 2004; Brabyn and Skelly, 2001).

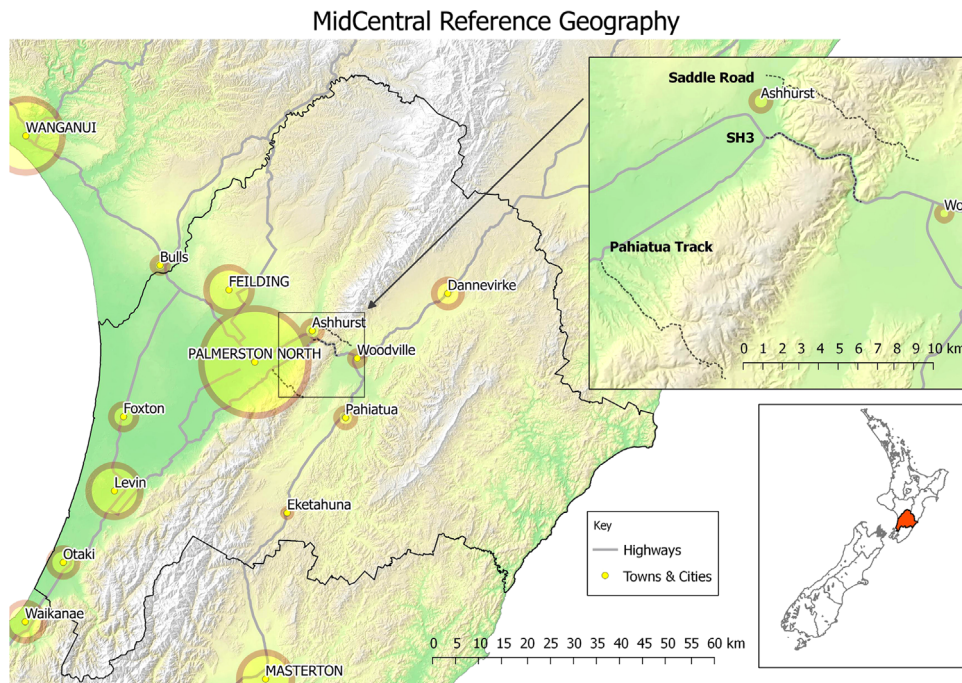


Fig. 2. Figure MidCentral Reference Geography (town and city population sizes shown as yellow shaded areas with Palmerston North population of 83,800). (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

Download English Version:

<https://daneshyari.com/en/article/7457763>

Download Persian Version:

<https://daneshyari.com/article/7457763>

[Daneshyari.com](https://daneshyari.com)