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Geographical access to community pharmacies in New Zealand

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ABSTRACT

Geographic access to community pharmacies is an important aspect of access to appropriate medicines. This study aimed to explore changes in the number and location of pharmacies in New Zealand and determine whether some populations have poor geographical access to pharmacies. Pharmacy numbers in New Zealand have been declining since the mid-1980s, and, adjusted for population growth, there are now only half the number there was in 1965. While the urbanisation of pharmacies has been matched by loss of population in rural areas, the loss of pharmacies from smaller rural towns leaves many people with poor access to pharmacy services.

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1. Introduction

Access to community pharmacies is an important aspect of access to medicines. Community pharmacies sell and supply both prescription and non-prescription medicines, provide advice and counselling about these medicines, and also increasingly provide other professional services such as medication review, smoking cessation, immunisation and other public health services (Eades et al., 2011; Eickhoff et al., 2012; Goad et al., 2013; Hatah et al., 2014; Tremblay et al., 2013). Lack of geographical access to a pharmacy reduces people's abilities to obtain medicines and the professional advice they may need to use them appropriately. In spite of this there is little research on community pharmacy numbers and location, and their implications for access to medicines and pharmacy services. Both numbers of pharmacists (World Health Organisation, 2012) and numbers of pharmacies vary widely in otherwise quite similar countries. In New Zealand there is 0.22 pharmacy per 1000 people, while in European countries numbers per 1000 people vary from around 0.05 in Denmark to 0.78 in Greece (Kanavos et al., 2011).

In countries with areas of low population density (e.g., New Zealand, Australia, Norway, Finland and Canada) access to pharmacies in rural and remote areas can be problematic (Law et al., 2011; Norris, 1997; Sunderland et al., 2006). Governments have used a range of strategies to address this. Some strategies aim to ensure that pharmacies are spread as widely as possible.

These include licensing, which means that the government or a licensing authority decides how many pharmacies, there should be and where they should be located. As well as providing direct control over pharmacy location, restricting pharmacy numbers in this way makes it more attractive for pharmacists to buy pharmacies in rural areas that might otherwise be neglected in favour of urban opportunities (Norris, 1997). In New Zealand, licensing was used briefly from 1938 until 1954 (Norris, 1997). In Norway it was used until 1996, and Iceland until 2001 (Norris, 1997; Anell, 2005). Many European countries have national or health service criteria for restricting the numbers of pharmacies allowed. For example, in Italy one pharmacy per 5000 people is allowed in small towns (< 12,500 people) whereas one per 4000 people is allowed in larger towns (Mossialos et al., 2004). Other options for attempting to ensure reasonable access to pharmacies in rural areas are public ownership of pharmacies (as was the case in Sweden until 2009 (Nylander, 2009)) or extra subsidies to improve the viability of pharmacies in rural areas. For example, in the United Kingdom (UK) ninety pharmacies in rural areas are defined as “essential small pharmacies” and therefore receive extra payments (Pharmaceutical Services Negotiating Committee, 2010). In Germany, although there is no extra subsidy, pharmacists who are prepared to own a pharmacy in a designated rural area may be exempted from the usual one-pharmacy ownership limit (Mossialos and Mrazek, 2003).

Studies which have looked at pharmacy location have, unsurprisingly, found different results in different countries. There is no agreed definition of poor geographical access, and geographical distance is a very coarse measure which does not take account of the existence or quality of roads, availability of public transport or travel times. Studies in Illinois and Ontario have found little

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problem with geographical access to pharmacies. In Illinois, only 0.1% of elderly people had to travel more than 20 miles to a pharmacy (Lin, 2004) and in Ontario, which has a high number of pharmacies per capita, 90% of Ontario residents lived within 5 km drive of a pharmacy (Law et al., 2011). Others have found that a combination of geographical and financial barriers causes difficulties with access. Casey estimated that in Minnesota, North Dakota and South Dakota 98,000 people (about 1.6% of the population) lived more than 20 miles from a pharmacy, and that counties more than 20 miles from a pharmacy had a significantly higher percentage of the population below the poverty level (Casey et al., 2002). In Nova Scotia, Law et al. (2013) found that 46.7% of rural residents lived more than 5 km from a pharmacy. However they did not provide data on longer travelling distances (Law et al., 2013). In Western Australia where there are many very remote areas, Kaiser found that pharmacies were not optimally distributed. He found that adding five more pharmacies would reduce the average distance to a pharmacy by 33% (Kaiser, 2000).

In geographical areas without community pharmacies a range of strategies have been employed to provide some pharmacy services. Some governments allow doctors in these areas to dispense their own prescriptions (e.g., in Iceland (Almarsdóttir et al., 2000), the UK (Morton-Jones and Pringle, 1993), Canada, the Netherlands (Mossialos and Mrazek, 2003) and Australia (Sunderland et al., 2006)). However this solution is not ideal because there are often also shortages of doctors in rural areas (Rourke, 2010), doctors may not want to or be able to stock a wide range of medicines, and patients miss out on pharmacists' expertise in dispensing, non-prescription medicines and advice about minor ailments (Sunderland et al., 2006). An Australian study found higher rates of local dispensing (i.e., less need to travel) and higher patient satisfaction in towns with a pharmacy compared to those with a dispensing doctor (Sunderland et al., 2006). In the UK, dispensing doctors, of which there are more than 5000 (Select Committee on Health, 2003) have been found to have higher prescribing costs than non-dispensing doctors (Morton-Jones and Pringle, 1993). Some countries allow depots, such as shops or health centres, where pharmacists deliver medicines regularly for staff to give to patients. In some cases pharmacists visit these depots regularly (Almarsdóttir et al., 2000). Other strategies include telepharmacy, where services are delivered at a distance by Information and Communications Technology (ICT). This is used in some US states and has been piloted in Australia (Kimber and Peterson, 2006). Other options include automated dispensing machines, and mobile pharmacists (Sunderland et al., 2006).

The implications of poor access to community pharmacy have seldom been studied. In New Zealand Hiscock et al. found that those in rural areas who lived further from pharmacies were less likely to have visited a pharmacy in the past year (Hiscock et al., 2008). In an Icelandic study some participants had to travel 65–100 km over a mountain road to obtain prescriptions if they were not available in their local pharmacy or outlet, and some reported having to share the last package of medicines with other pharmacy customers if they both needed them (Almarsdóttir et al., 2000). In Western Australia one Aboriginal town was 848 km from the nearest pharmacy (Kaiser, 2000). Driving long distances is difficult for those with disabilities, or those who lack access to a reliable car and sufficient money for fuel. The impact of such poor access has, to our knowledge, not been investigated.

In New Zealand pharmacy numbers have declined substantially in the last 20 years, and this has been the subject of concern. The economic viability of rural pharmacies and attracting and retaining staff in rural areas are separate but intertwined issues (Capstick et al., 2008; Pharmacy Guild of New Zealand, 2012; Stewart, 2012). There is currently no government control over the location or numbers of pharmacies (since the end of the licensing

system in 1954) and no extra funding is provided to support community pharmacies in rural areas. Although doctors sometimes dispense small amounts of medicines to individual patients when patients are unable to get to a pharmacy (under Medical Practitioners Supply Orders) it is rare for doctors to do any other dispensing (Ministry of Health, personal communication, 14 Dec. 2012). The main response to under-served areas has been a depot system which operates in many rural areas throughout the country. There are currently nearly 70 depots, and these are concentrated in Te Tairāwhiti, Northland, Southland and Canterbury. These are licensed by the Ministry of Health (Carr et al., 2010) but do not provide anything like a full range of pharmacy services (Davis, 2012). Pharmacies dispense medicines for individual patients and then send these by courier or bus to a shop or clinic which has been approved to act as depot. Where the depot is a shop no health professional expertise is available. Where the depot is a clinic no staff with pharmacy training are available. For access to a limited range of pharmacy-only medicines, retail licences can be issued to shops that are more than 10 km from a pharmacy (under Section 51(2) of the Medicines Act).

This paper aims to explore how pharmacy numbers and locations have changed in New Zealand over the last several decades (since pharmacy licensing was removed in 1954), and whether recent changes (in the last 20 years) have led to changes in the number of people with poor access to pharmacy services.

2. Methods

Pharmacy names and locations were collected from 1955 to 2010, in five yearly intervals. From 1955 to 1995 pharmacy names and addresses were legally required to be published in the New Zealand Gazette, the official government journal. Lists were photocopied and scanned from the relevant Gazettes. The list for 2000 was obtained from the web archive of the Gazette. By 2005 pharmacy ownership laws had changed, and pharmacies were then registered with MedSafe (a division of the Ministry of Health). MedSafe provided us with electronic lists of registered pharmacies for 2005 and 2010.

The data for each year underwent substantial cleaning and checking. Duplications were removed, pharmacies that did not have a street address or number were identified and any other anomalies were identified. Where any details appeared incorrect or were missing, steps were taken to correct or add the data at this time. Google Maps/Street View/and Google Search were used, along with historical and current copies of the Directory of Retail Pharmacies published by the Pharmacy Guild, NZ Post's Postcode Finder, and a business list (<http://nz.vicdir.com/dir-s24221-pharmacies.htm>). Missing or incomplete addresses were located using UBD (Universal Business Directories) Business Directories, Wises Guides, old telephone books and local knowledge of former pharmacy owners and pharmacists.

All the data was then combined into a single file, unique addresses were identified and any duplicates removed. Geocoding was done by a company called Geosmart Limited. Where complete addresses were unable to be provided Geosmart was able to approximate locations using a centroid location based on the street in which the pharmacy was located. ArcMap10 (esri) was used at the School of Surveying, University of Otago, to map the pharmacies and to draw 5 km and 25 km circles around each pharmacy. These distances were chosen to represent a reasonable distance one might expect to travel to a pharmacy in a city (5 km) and in a rural area (25 km) (Table 1).

The geocoded addresses were used to locate each pharmacy within a meshblock for the years 1995, 2000, 2005 and 2010. A meshblock is the smallest geographic unit for which statistical

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