

Rural Health: A Literature Review for the National Health Committee

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Contents

1.	BACKGROUND	5
2.	INTRODUCTION	5
3.	METHODS AND SOURCES.....	6
4.	A FRAMEWORK FOR RURAL ACCESS	8
5.	FORMAT FOR THIS REPORT	9
6.	RURAL NEED	11
6.1	The rural condition: sociological writing.....	11
6.2	History.....	13
6.2.1	‘Pioneer’ New Zealand	13
6.2.2	Rural New Zealand since 1970: A changed rural/urban landscape	14
6.3	Demographics: rural New Zealand today	15
6.4	Rural health and disability needs	19
6.4.1	Health status data	19
6.4.2	Narrative on need.....	22
6.4.3	Other data.....	23
7.	RURAL SERVICE SUPPLY	25
7.1	Distribution of and distance to services	28
7.2	Primary care services in rural areas	29
7.3	Other aspects of health and disability service supply	31
7.4	Emergency services	32
7.5	Telehealth services.....	33
8.	REALISED ACCESS	38
8.1	Realised Access – primary care services	38
8.2	Realised Access – secondary care services.....	42
8.3	Realised Access – narratives.....	43
8.4	Realised Access – participation	47
9.	INFORMATION ON RURAL HEALTH IN NEW ZEALAND: GAPS AND OPTIONS	50
9.1	Currently available data collections.....	50
9.2	Earlier recommendations on data gathering for rural health policy	52
9.3	Measures of ‘rurality’: ensuring conceptual clarity	53
9.3.1	Demographic rurality	53
9.3.2	Health effects of rurality	54
9.3.3	Rurality measures for funding formulae	55

9.4	Towards a rural health indicator set	57
10.	SUMMARY	58
11.	CONCLUSION	61

1. BACKGROUND

This document is a broadly specified literature review of ‘rural health’. In June 2006 the National Health Committee (the Committee) tendered this review, providing guidance in a request for proposals document that it should “*outline the health status of people living in rural health communities and evidence of the influences on health status in rural areas, and [...] analyse the impact of rurality on access to health care and disability support services*”; also it should “*identify and discuss definitions of ‘rural’ drawing particularly from New Zealand material [and discuss] indicators of rurality relevant to access to health services*”.

The Health Services Research Centre was awarded the commission. The contract with the Committee further specified that the review should include “*descriptive (including quantitative) material on the health status of rural communities [and] their similarities and differences in health terms as may relate to rural subpopulations, for example including Māori, women and older people*” and also that “*a summary of mortality and morbidity for rural communities in New Zealand will be incorporated*”.

Finally, it was specified that the review should “*employ an analytical framework that distinguishes health status and factors influencing it*” and also, “*identify any other significant issues arising in the literature that would be relevant for the [Committee’s] project*”.

2. INTRODUCTION

This review has identified some detailed New Zealand material relating to certain aspects of rural health and independence, especially considerations of service coverage, sustainability and workforce (generally regarding primary care). There is also a volume of New Zealand material from the 1990s. This is rooted in the concerns of the time, most often discussing issues such as closure of rural hospitals, impacts of bureaucratic structures on service provision decisions, and echoes of larger changes in rural New Zealand in the immediate post-Muldoon era of New Zealand politics. Some of this material remains relevant, and is summarised.

Outside defined areas however, the volume of available material to inform the broad, yet New Zealand-focussed review question identified by the Committee has been found to be modest. For many health areas, the types of analysis the Committee had mentioned (that is, work focussing on the New Zealand rural/urban divide, preferably with accompanying subgroup analyses) is

either limited or non-existent. The single largest area of literature both in New Zealand and internationally concerns rural general practitioner recruitment and retention. In the course of the review, the Committee has advised that it is less interested in this topic than others such as population health, and service delivery innovations outside questions of rural recruitment.

An attempt has been made to avoid focussing too heavily on workforce issues, but in view of their prominence throughout the rural health literature, links with current measures of rurality, and the centrality of workforce resources to rural service ‘supply’ (a key component of the conceptual framework used to organise and present the material – see below), some discussion of workforce is contained in the document.

In the finish, any attempt to take broad perspectives on the current state of rural health in New Zealand suffers from paucity of current (especially quantitative) information. This becomes a defining point of difference between New Zealand and other countries in terms of ability to develop fully informed policy. Observations of sector commentators on this point are excerpted, and a discussion of implications is provided in Section 9: ‘Information on rural health in New Zealand: gaps and options’.

3. METHODS AND SOURCES

Despite the patchy availability of data in several areas, the breadth of the commission – from definitions of ‘rural’, to the health status of rural communities, impact of rurality on access to services and a desire for both qualitative and quantitative data – is considerable. At an early stage the Committee secretariat sought clarity on the conceptual framework which would be used to organise available material. A framework (outlined in the following section) was developed in close consultation with the Committee secretariat, and in tandem, the developing framework was used to modify and guide methods for data gathering and extraction.

The search steps were as follows. For academic material, searches were made of the CINAHL, PubMed and Proquest databases. With minor adjustments for terms lists in each database, the following PubMed search is typical of those conducted in the other databases:

("Rural Health"[MeSH Major Topic] AND (hasabstract[text]) AND (English[lang])) OR ("Rural Population"[MeSH Major Topic] AND (hasabstract[text]) AND (English[lang])) OR

("Hospitals, Rural"[MeSH Major Topic] AND (hasabstract[text]) AND (English[lang])) OR ("Rural Health Services"[MeSH Major Topic] AND (hasabstract[text]) AND (English[lang]))

These searches produced very large results lists (the PubMed search alone yielded 9,655 hits). Restrictions by country (to UK, Australia, New Zealand, Canada and Ireland), to publication within the last five years, to review articles only, and addition of terms such as 'health services accessibility' and 'disability' still yielded lists of several hundred articles.

Some of the search results were reviewed with secretariat officials, and a decision was taken to concentrate first on what New Zealand material might be available, using international material to broaden and provide context on particular issues. Further searches were undertaken, this time employing narrower search terms of 'rural' and 'Zealand'. All titles and/or abstracts were viewed for the resulting 227 articles. Forty one articles were selected as relevant, and of these approximately 32 articles were available as full text within the required timeframe.

In the search of official documents on rural health, approximately 15 documents were identified from the Ministry of Health website, 27 from the Ministry of Health library, a volume of approximately 25 items was provided by the secretariat, and the Health Services Research Centre held approximately five relevant items from earlier work.

Data extraction

A final list of approximately 108 documents was entered into an Excel database, assessed for relevance, and sorted for theme. Material was extracted for inclusion in this review according to (i) its relevance in populating the conceptual framework developed earlier; and (ii) further discussion with the secretariat about the Committees evolving interest in the topic. Forty eight of the 108 documents either concerned more detailed rural workforce information than was required for this review, reiterated material from other documents, or were otherwise deemed irrelevant. Remaining documents which were available within the review timeframe are summarised.

Second bibliography

In response to a draft document, the secretariat advised that the Committee was interested particularly in "service delivery innovations which remedy remoteness". In view of the project timeframe, it was agreed that a second bibliography would be produced on delivery innovations,

through a review of all titles over the past two years of the US, Canadian and Australian journals of rural health. This bibliography has been provided under separate cover.

4. A FRAMEWORK FOR RURAL ACCESS

The literature on health care access offers useful frameworks for considering questions of rural health and health care access. The analytical approach for this review follows the framework which Goddard and Smith have proposed for considering questions of equitable access to health care. Drawing from Aday and Andersen, Vladeck, Culyer, and Donabedian, Goddard and Smith set out that equitable (or inequitable) access to health care lies at the intersection of three components: population need, health care supply, and “*realised access*” (Goddard and Smith 2001). For each component, they set out a list of key considerations which should underlie any discussion of access:

Population need

- Whether to define need as a ‘level of illness’ or to restrict focus to population groups’ varying ‘capacity to benefit’ from health services
- The extent to which non-clinical factors such as social circumstances are reflected within a definition of need
- Which health status measures are to be employed, for example self-reported health status measures or clinical measures (or both)
- Whether linkages between needs are recognised. For example, to what degree are immediate clinical needs an outcome of poorly-met need over preceding years?

Health care supply

- The types and range of services ostensibly available to a population
- The level of quality of those services
- Charges or costs imposed directly on particular population groups
- The quality of information about available services which is provided

‘Realised access’

Attitudes toward felt health and independence needs, care-seeking behaviours and prior experiences of care mediate between the ‘potential access’ represented by available services and

‘realised access’ – actual use of available services by the population. Important considerations of this nature include:

- individuals or communities may face different costs or affordability in terms of travel costs and time away from home or off work
- different communities or individuals may make different assessments of the benefit of a particular service, especially in light of past service experiences; they may also interpret the advice of clinicians in different ways, or have differing propensities for substitute services (such as alternative therapies).

Aday and Andersen, and Goddard and Smith, stress that the most common form of data used in analyses of access – utilisation data – should properly be regarded as reflecting a population’s realised access, that is, the use made of available services given particular needs and a particular profile and quality of available services. They consider therefore that *prima facie* evidence of disparities in access “*can only be considered useful for policy if it is presented in conjunction with [that is, relative to] likely causes of inequity*” – *that is, those issues considered under the need and supply headings*” (Goddard and Smith 1998 p20).

5. FORMAT FOR THIS REPORT

Following the above framework, the results of this review are grouped under the headings ‘Rural Need’, ‘Rural Service Supply’ and ‘Realised Access by Rural Communities’. The quality and volume of available literature, especially New Zealand literature, varies for the three headings.

The ‘Rural Need’ section of this report contains:

- (i) Some discussion of the ‘rural condition’ – aspects of rural life which distinguish it from urban life. This is based on a brief summary of some of the sociological writing about rural life, and demographic and socio-economic data on rural New Zealand drawn largely from a series of rural/urban profiles prepared by Statistics New Zealand.
- (ii) A summary of the very restricted available material of rural health and disability needs, taken from an old (1989) appraisal of morbidity and mortality assessment, the New Zealand disability survey, some small community surveys, and some work on rural access to common community resources.

The 'Rural Service Supply' section includes:

- (i) A summary of government initiatives seeking to influence the supply of services in rural communities.
- (ii) Data on travel times to services for rural people.
- (iii) A summary of the most important current issues regarding the rural health workforce.
- (iv) Local data on mobile and telehealth services.

The 'Realised Access' section summarises material as follows:

- (i) Utilisation analyses from the NatMedCa study of patient presentations to primary care services in rural and non-rural areas.
- (ii) Narrative material on the service experiences of rural people, including Māori.
- (iii) A volume of New Zealand material on the importance of rural communities' role in rural service delivery and design. Though this aspect is not formally recognised by Goddard and Smith or Aday and Andersen, a substantial national and international literature identifies community participation in health service design and delivery as enabling of improvements in health service quality and health outcomes. In this literature, questions of community need, of quality and sustainability of service supply, and of realised access (for example accounts of service acceptability, cultural safety or ease of use) become almost indivisible from issues of community participation and empowerment.

This review then closes with a discussion of the challenges presented by very restricted data availability on many aspects of rural health, and discusses possible options for filling these information gaps.

6. RURAL NEED

6.1 The rural condition: sociological writing

Since concepts of rurality and ‘things rural’ broadly lie in intersections of national geography, demographics and history, it is perhaps not surprising that many commentators identified in the course of this review begin by asserting that there is no “*agreed definition of ‘rural’*” (Ricketts, Savitz et al. 1994; Litchfield 2002; London 2002; Janes 2006).

Discussion by sociologists of the ‘rural identity’ has been established at least since the 1960s. In a United States (US) context, Marx (1964) described some ideals of American rurality, for depicting rural places as “‘*garden’ where people are honest, religious, individualistic and hard workers who lead simple lives*” (Ricketts, Savitz et al. 1994). Writing in 1994, Ricketts et al note that Marx-style images of rural virtue pervade the modern US vernacular (for example, ‘small-town America’), and argue that powerful popular imagery of bygone days continues to attach to rural life – not least to “*help sell off-road vehicles to urban accountants*” (Ricketts, Savitz et al. 1994 p18).

However, images of rural life are not universally positive. Ricketts summarises Miller and Luloff’s typology of popular images of rural life as (Ricketts, Savitz et al. 1994 p19):

1. Positive images of rural life, typified by neighbourly and close-knit communities)
2. Negative descriptions of rural life as ‘monotonous’ or ‘narrow-minded’
3. Anti-urban sentiment, which characterises urban life as ‘too fast and dangerous’, ‘impersonal’ and ‘uncaring’, and contrasts rural life as avoiding such risks and anomie
4. Agrarian values, which see agriculture as worthy because it is ‘natural’, and ‘the best place for a family’;
5. Wilderness values, which value ‘open areas [as] good and healthy’ as well as wilderness as part of national heritage.

Regarding the impacts of rural living on health, Coward and Davies observe Ford’s arguments for both human behaviour and human health outcomes as conditioned by interactions of fundamental biology or physical capability (seen as broadly similar across population groups) with environment (Coward, Davis et al. 2006 p1). In this way the physical and social fabric of

rural society is seen to have a special character, highly dissimilar from urban life and conferring special conditions, challenges and resilience on rural populations. Poverty rates in rural areas are reported as higher than in urban areas, and higher still among households headed by a woman alone (reported to be 46% of rural American households in 2006)(Coward, Davis et al. 2006 p3).

Rural people are said to marry earlier, to bear more children and hold more conservative values. Subtle interactions of social environment and biology are seen to affect social roles and longer term social outcomes. For example, social conservatism is argued to accelerate girls' progression from childhood to social maturity, through mutually reinforcing mechanisms of accelerated developmental timetables, and early adoption of adult behaviours. The result for these women is younger pregnancy than their urban counterparts, accompanied by "*attendant, usually negative, consequences*" in the form of reduced educational achievement, lower status within society and poorer lifetime health (Coward, Davis et al. 2006 p3).

New Zealand discourse on rural life reflects similar hardships for rural people, especially Māori. Sampling the health access experiences (see later) of rural Māori women in the Hawkes Bay, Rameka cites underemployment in the area, and the relative underprivilege of rural Māori compared with Pākehā farmers (Rameka 2006);

"Shearing is a common seasonal work for the rural people within the rohe (area) of Ngāti Pahāwera. There is minimal full time or even part time work rurally besides the 'norm', which is farming and labouring on Pākehā farms or working for the Pākehā who is leasing Māori farmland. People have to look outside the rohe for work and most times this is seasonal, where they have to live away from home for periods at a time. It becomes their way of life and they become accustomed to it. Very few urban people are made to live away from home and experience the hard adjustments that rural people have to do to make a living for their whanau."

and regarding financial support during the shearing off-season:

"Oh definitely my family was very supportive and independent, like I don't like to ask for money, the only time I will is off my Mum and then my in-laws but they're on a benefit too."

6.2 History

The nation's history though the last century and a half, and the radical social and demographic change it has precipitated – especially for Māori – provides the context for today's rural health and independence issues. The following summary of this history is drawn from Statistics New Zealand's report "New Zealand: An urban/rural profile" (Statistics New Zealand).

6.2.1 'Pioneer' New Zealand

European colonisation had by the late nineteenth century established a firmly rural settler identity, with almost 60 per cent of the population living in a rural area. Thriving commercial centres and ports, either developed by controversial figures such as Edward Gibbon Wakefield or spurred by simple economic boom, had sprung up around the country to support national and international trade of New Zealand's abundant natural resources. Whales and seals, followed by gold, then wool and (with the advent of refrigeration) meat and dairy products, have formed the backbone of New Zealand's economy as an agricultural, trading nation.

With rapidly increasing incomes and economic diversification in the national economy, 'urbanisation' commenced virtually immediately upon European settlement. The proportion of the population living in rural areas fell steadily from the 1880s to the 1980s, with this change peaking during New Zealand's industrial revolution in the early twentieth century and the return of soldiers from World War I. By 2002, 87.5 per cent of New Zealanders were reported to live in urban areas. Compared with 1886, urban areas have seen huge growth, from Dunedin's five-fold increase in both population and geographic area, to Auckland's 3000-fold increase in population and 78-fold increase in area.

Population growth over that time has ensured, however, that the absolute number of rural dwellers has remained remarkably constant. In 1916 the rural population was 501,258; by, 2001¹ it was 532,740. This belies the fluctuating economic and social fortunes that rural New Zealanders have faced. Standards of living steadily increased, especially for Europeans, and especially in the 30 or so years after the end of World War II, buoyed by commodity price booms, improvements in production, and government subsidy support to ensure the strength of the agricultural sector. During the 1950s and 1960s, rural economic strength had propelled New Zealanders' standard of living to among the highest in the world. In 1973, the first oil price

¹ The current urban/rural profile report presents demographic data from the 2001, not 2006, census.

shock occurred and, simultaneously, Britain (the main importer of New Zealand's agricultural produce) entered the European Economic Community and New Zealand exports became subject to draconian tariffs and quotas. This began to bring about a rapid decline in New Zealand's economic fortunes². A decade of comprehensive agricultural price supports for farming did not enable the sector to re-establish strong economic viability, and with the sudden end of this support in the 1980s, rapid change ensued in rural sectors. Wool and lamb production in particular fell markedly, and significant diversification has occurred continuously since then. The past 20 years have seen increases in dairy farming and an array of new activities including deer farming, new horticultural crops, forestry, aquaculture and a large wine industry now established from the north of the country to central and southern Otago.

The Māori experience of the nation's urbanisation and underlying economic development has been unique. Whereas over 40 per cent of the European population lived in urban areas at the beginning of the last century, only 15.6 per cent of Māori lived in these areas. Particularly from World War II, and peaking in the 1960s, Māori moved in large numbers to the towns; large scale confiscation and purchase of Māori land had ensured that there was insufficient land remaining under Māori ownership to sustain a rurally-based Māori population. In a short 40 years (against a lesser change over 100 years for non-Māori) the proportions of Māori living in rural versus urban areas almost completely reversed.

6.2.2 Rural New Zealand since 1970: A changed rural/urban landscape

Starting with the economic upheavals of the 1970s, economic and social change within New Zealand's rural communities was observed throughout the 1970s and 1980s. In the late seventies middle-sized landholdings began to be 'squeezed out' by an increase in the number of larger holdings, and a much more substantial increase in the number of small (under 10 hectare) holdings. Concomitantly, a reverse in the slow decline of rural populations was observed. A fall of 9.9 per cent in the total population between the censuses of 1976 and 1981 was followed by an increase of 4.6 per cent between 1981 and 1986 (Statistics New Zealand (undated)). The

² New Zealand's current account deficit in the year to July 2006 was a comparatively large 9.3 per cent of GDP. The current account has been in deficit since 1973, which has been cited as the worst of any developed country. (*We are living far beyond our means* (23 September 2006) Molesworth and Featherston (M&F Weekend update), Sugar Media, Wellington).

New Zealand Planning Council noted that depopulation had been replaced by subtler changes to the location and composition of the rural population. In 1983, Statistics New Zealand first noted that: *“Although it may have been tenable in the past to regard the rural population as homogeneous... [i]ncluded under the rural umbrella today are a diversity of groups – farmers and farm workers, forestry workers, 'alternative lifestyles' and craftspeople, among others ... it would be useful to divide the rural population into groups which reflect this diversity”* (Statistics New Zealand (undated)).

This diversity increased during the 1990s. Notwithstanding impressive productivity increases in New Zealand’s agricultural sector during the 1990s, booming urban house prices, changing tastes among home buyers and pragmatism on the part of farmers facing rapid economic change in their sector has seen much subdivision of rural areas into ‘lifestyle blocks’. The Real Estate Institute reported in 2003 that there were in the region of 90,000 – 110,000 ‘lifestyle farm units’ in New Zealand, which have brought booming property prices and even booming country school rolls to rural areas. The emergence of the ‘peri-urban’ area has been identified by Statistics New Zealand as the greatest single change to affect rural New Zealand in the last thirty years (Statistics New Zealand (undated) p15).

6.3 Demographics: rural New Zealand today

Historically, the urban/rural continuum has been expressed in terms of five area categories:

- Main urban areas (population greater than 30,000)
- Secondary urban areas (population 10,000 - 30,000)
- Minor urban areas (population 1,000 – 10,000)
- Rural centres (population 300 – 1,000)
- Other rural areas (population less than 300)

Observing that there is a ‘huge difference’ between smaller communities (urban or rural) whose primary employment and economic activities are locally based, and communities where a significant proportion of the population work in a nearby, Statistics New Zealand has sought to better interpret the urban-rural spectrum using a new categorisation system. All areas except the main urban areas have been re-categorised, based broadly³ on:

³ Stats NZ’s “New Zealand: An Urban/Rural Profile” report does not contain technical details on the index.

- (a) the proportion of the usually resident population whose workplace addresses are within a larger urban area – that is, the proportion of the population who commute;
- (b) the category of that urban area; a system of weights is used to reflect that a given proportion of the population commuting to a main urban area has a greater impact than that same proportion commuting to a secondary or minor urban area.

The result of this work is an urban/rural spectrum which expresses relative isolation as well as population size. There are three urban categories and four rural categories in the new system:

- Main urban area (this category is identical with the standard classification system)
- Satellite urban community
- Independent urban community
- Rural area with high urban influence
- Rural area with moderate urban influence
- Rural area with low urban influence
- Highly rural/remote area

The country's demography is extensively described in terms of these categories in the urban/rural profile report. Table One below compiles the major results reported in the profile document, including a selection of results from detailed downloadable tables available from the Statistics New Zealand website.

Table One: Selected data from *New Zealand: An urban/rural profile* (Statistics New Zealand).

	National average (urban and rural)	Urban Areas:			Rural Areas:			
		Main Urban Areas	Satellite Urban Areas	Independent Urban Areas	High urban influence	Moderate urban influence	Low urban influence	Highly rural/remote areas
<i>Percentage of total NZ land area</i>	-	1.9%	0.2%	0.6%	2.8%	8.0%	33.0%	53.1%
<i>Percentage of total NZ population</i>	-	71.3%	3.0%	11.7%	2.6%	3.6%	6.0%	2.0%
<i>Māori ethnicity</i>	14.7%	13.1%	19.1%	20.5%	10.9%	15.6%	19.1%	18.2%
<i>Projected population growth 2001-2021</i>	16%	20.0%	19.0%	- 4.0%	34%	21%	2%	-9%
<i>Births per 1000 people</i>	15.1	15.4	16.0	13.9	15.2	11.1	15.0	9.3
<i>Deaths per 1000 people</i>	7.5	7.3	9.2	10.8	4.6	4.1	6.0	3.9
<i>Teenage births per 1000 teenage women (15-19 yrs)</i>	29.0	27.0	39.5	44.6	18.7	18.7	32.2	19.8
<i>Working Age population</i>	65.3%	65.7%	60.9%	60.3%	67.5%	65.7%	64.7%	60.9%
<i>Unemployment rate</i>	7.5%	7.9%	8.2%	7.6%	4.5%	5.2%	5.5%	<i>Nth Isl.</i> 7.0% <i>Sth Isl.</i> 2.8%
<i>Labour force participation rate</i>	66.7%	66.4%	62.8%	61.4%	75.1%	72.6%	72.6%	74.0%
<i>Median personal income – North Isl.</i>	\$18,500	\$19,900	\$15,800	\$15,800	\$22,300	\$19,100	\$18,700	\$17,900
<i>Median personal income – South Isl.</i>	\$18,500	\$16,700	\$17,400	\$16,200	\$20,800	\$18,300	\$18,300	\$18,900
<i>Proportion of married people</i>	49.7%	47.7%	51.3%	51.2%	60.3%	59.7%	58.4%	57.7%

Approximately 14% of New Zealand's population is reported to reside in rural areas. The proportion of the population identifying as Māori is higher in smaller urban centres and more remote rural areas.

Population growth varies widely across the categories. Consistent with observations above about the growth of the peri-urban area in New Zealand, 'commuter belt' rural areas with high urban influence are projected to grow at a very fast rate. Despite their higher proportions of Māori, areas of low urban influence and highly remote areas are expected to see a decline in population; over time this may have the potential to make service delivery to these small populations even more difficult.

There is a lower death rate in rural areas than urban areas, which Statistics New Zealand interprets as 'probably' related to younger populations in these areas than in many urban areas.

While much of the literature summarised in this review depicts rural population groups as consistently more vulnerable than most urban groups, on some risk indicators – such as teenage births and median personal incomes – satellite and independent urban areas appear more vulnerable (although one rural category, areas with low urban influence, has a rate of teenage births similar to some urban rates).

On some indicators (for example labour force participation rates and median personal incomes), areas with high urban influence appear to have higher socio-economic status than any other area; this may reflect the advent of relatively affluent 'lifestylers' near the main centres.

A final important point is that close examination of some of the tables reveals that variation *within* profile categories is as important as variation *between* categories. For example, Table One separates unemployment in highly remote areas for the North and South Islands; at 2.8% in South Island areas and 7% in North Island areas, this differential is greater than unemployment rate differences between any two profile categories. Similarly, the differences in median personal income between the two islands are in many cases as marked as differences between categories. Also, the range in personal median incomes across the categories appears narrower, and the gradient flatter, for the South Island compared with the North Island. These examples underline the reality that the rural/urban profiles result from a particular cross-sectional analysis;

new analyses are likely required to inform any potential set of rural health policy priorities (this is discussed further in Section 9).

6.4 Rural health and disability needs

Serious difficulties were encountered during this review in identifying comprehensive national data on the health and independence of rural versus non-rural populations. This highlights serious gaps in the analytical base for health and disability planning for services to rural communities (discussed later), in particular the lack of recent comprehensive analysis of morbidity and mortality in New Zealand, stratified into rural versus urban population groups.

Reported New Zealand Health Survey data (most recently available for 2003) contains data from more than 12,000 respondents (Ministry of Health 2004c). The 'Portrait of Health' report of the survey however contains virtually no reference to rural populations, although it is understood that the Public Health Intelligence arm of the Ministry of Health plans to release a document shortly (personal communication – Liza Wilcox).

A few limited sources of either quantitative or qualitative information have been uncovered on health and independence in rural New Zealand, and these are précised here.

6.4.1 Health status data

Very brief life expectancy data were provided in a 2002 Ministry of Health report. In addition to echoing widely reported findings of poor longevity for Maori as compared with non-Maori, this data showed that whereas rural non-Maori had a slightly longer life expectancy at both birth and age 65 than urban non-Maori, rural Maori had a shorter life expectancy than urban Maori (Ministry of Health 2002b p33).

The most recent comprehensive comparison of rural and urban health status discovered in this review is a 1989 exercise by Edmondston, which reviewed mortality and hospital discharge data, and reported results from a prior community survey⁴ (Edmondson 1989). The mortality and hospital discharge analyses were not controlled for age or ethnicity. Also, geo-coding compatibility problems between numerator and denominator data required the exclusion of 14% of the population from analysis. In this work, Edmondston reported that mortality rates for rural

⁴ The survey had been undertaken by AGB McNair, but data from this had not previously been analysed.

and major urban areas were lower than those for secondary and minor urban areas. In the survey, rural residents were found to be no more likely to delay care, but less likely to report waiting to see if their condition improved. Rural people were more likely to report 'inconvenience' as a reason for delayed care seeking, and possibly slightly better self-perceived health status (though this result was non-significant).

A 2002 report (by the Public Health advisory subcommittee to the National Health Committee) into environmental health in New Zealand reported that rural communities were less likely to have safe drinking water supplies than urban communities (Public Health Advisory Committee (sub-committee of the National Health committee) 2002). Fourteen per cent of the population were being supplied with water that failed to comply with microbiological standards. The quality of the water supplied to a further thirteen per cent of the population was unknown. Dust, agricultural spray-drift, bird droppings and other risks were cited as widespread in areas relying on rooftop supply for potable water; other risks to rural health included faecal contamination due to poor sewage systems (reported as common in areas of substandard rural housing) and contamination of waterways by agricultural nutrients.

Wickens et al studied the allergic response of 293 predominantly rural children (a response rate of 60% on approximately 500 approached non-siblings) who were selected from seven schools around Dannevirke in the central Hawkes Bay (Wickens, Jane et al. 2002). Despite international evidence for less allergic disease in children exposed to farm animals, this study found an increased risk for allergic symptoms, but not skin prick test positivity, for farm residence in this group of rural New Zealand children. However, at least weekly consumption of yoghurt, consumption of unpasteurised milk, and proximity to cats, dogs or pigs was found to be protective against some allergic reactions for young children.

The largest source of current New Zealand data comparing rural and urban population need discovered in the course of this review is the "Living with Disability in New Zealand" report (Ministry of Health 2004a) (hereafter referred to as the NZ Disability Survey), which reports on 2001 surveys of households and residential facilities on the prevalence of disability and the characteristics of the disabled population.

Notable findings in the NZ Disability Survey (and in particular those on major prevalences of disability) are stratified for rural versus urban populations. Although the survey's design was

complex, so that statistical significance testing for differences between groups was not possible, a ‘noteworthy difference’ was defined broadly in the report as being at least 5–10 percentage points for any given prevalence.

Similarly with other New Zealanders, 13% of people lived in households in rural areas (areas with population less than 30,000). Similar proportions of both Māori and non-Māori with a disability lived in rural areas (15 per cent and 13 per cent respectively). However, 99 per cent of Pacific peoples lived in urban rather than rural areas, compared with 85 per cent of non-Pacific peoples.

Although the age-standardised rates of disability were similar for people living in rural and urban households (17,900 and 16,600 per 100,000, respectively), in the 75 and over age group urban women had a markedly higher rate of disability than rural women.

At health region level, regions of a more rural nature such as the Southern and Midland regions had a slightly higher age-standardised prevalence of disability than the Northern or Central regions.

Children with a disability living in rural areas were slightly less likely (31 per cent) than children in urban areas (39 per cent) to have had an assessment by a professional. Adults with a disability living in rural households were more likely than adults with a disability living in urban households to have no school qualifications (36 per cent compared with 30 per cent), which was similar to the pattern for adults without a disability (27 per cent and 20 per cent respectively).

Rural-dwelling adults with a disability were more likely (at 76 per cent) than urban-dwelling adults with a disability (64 per cent) to live in one-family households, but were also more likely (at 66 per cent) to have a partner or spouse than adults with a disability living in urban areas (52 per cent). Rural adults with a disability were less likely than urban adults with a disability to be living in dwellings where the usual residents paid rent (11 per cent, compared with 21 per cent).

Fourteen per cent of rural adults with a disability had not made trips over 80 km in the past 12 months, compared with a quarter of urban adults. A slightly lower proportion of rural children with a disability than their urban counterparts had not travelled long distances (7 per cent compared with 15 per cent). Rural adults with a disability were more likely to be drivers (82

per cent) than their urban counterparts (68 per cent). More than half (54 per cent) of the adults with a disability living in rural areas could not get to a bus stop or railway station easily, compared with 19 per cent of adults with a disability living in urban areas. Also, rural adults with a disability were slightly more likely than urban adults with a disability to report difficulties using public transport.

Multi-variate analyses for the factors contributing to various differences between rural and urban groups were not presented. Nonetheless, the fact that rural people with disabilities were less likely to have made a long (> 80 kms) trip than their urban counterparts (despite their relative geographic isolation), and apparently had a greater need to be a driver (that is, were more likely to hold a driver's licence), together suggest that distance may exacerbate the challenge of living with a disability for rural people.

6.4.2 Narrative on need

Some authors offer narrative on the link between rural conditions and health needs. In a discussion of access to health for Māori women in the Ngāti Pahāuwera rohe near Wairoa in the North Island, Rameka attributes 'hauora effects', including 'increased levels of stress among mokopuna and tamariki' to distance and social marginalisation of Ngāti Pahāuwera (Rameka 2006 p5). Noting Wairoa District Council's responsibility for 900 kilometres of road (of which only 20 per cent is sealed), Rameka draws the link between health and rural life thus:

“Within te ao Māori there is an inter linking of the tinana, hinengaro, wairua and whanau that encompass the various facets of life through a Māori world view. Within the contemporary context this can refer to how issues such as housing, accessibility to services, income levels and so forth can impact on hauora and wellbeing. A simple example is: housing for a number of our Pāhauwera whānau can be described as sub-standard – which will in turn have an adverse effect on hauora and wellbeing. This can be brought about by the stress associated with having sub-standard housing (e.g., no running water), the costs of maintenance and renovation for houses, and so on.”

Discussing the aetiology of barriers to health, Rameka observes:

“The importance of having access to shops and services cannot be overestimated. [...] Accessing services of any nature, whether health, social or economic, is rather costly. Having to pay for petrol and car maintenance, as well as having money to attend the

medical services and pay for prescriptions and other referral services, begins to add up for the whanau of Ngāti Pāhauwera.”

Litchfield collected qualitative data via telephone interviews with one or more key community informants who were not involved in health care delivery (Litchfield 2002). Her respondents are reported to have nominated the following health issues as affecting rural people: asthma, cancer, diabetes, ear infections, cardiac disease, arthritis, muscular problems, conditions of aging, mental illness, sexually transmitted diseases, substance abuse, and accidents (road and work-related). Litchfield reports that the respondents *“elaborated their references to prevalent diseases with statements about [...] determinants and whatever is required for prevention and control.”* (Litchfield 2002 p7). Family and community dynamics and poverty were cited most frequently by respondents as causing poor health. Direct and indirect quotes on the causes of ill-health were *“marriage breakdown”, “family breakdown”, “parenting worries”,* transient partnerships and household composition, *“all the major lifestyle/health problems”, “freely available alcohol and drugs”, “smoking”, “money worries”, “unemployment”, “stress”,* and teenage promiscuity.

Litchfield reports that other determinants of low health status were seen to be *“lack of skills”, “low self-esteem, ignorance, the inability to identify and articulate problems, and the indulgence in risky behaviour”, “lack of responsibility for personal health”* resulting in behaviours such as *“(the youth) driv[ing] under the influence of alcohol and other drugs”*.

6.4.3 Other data

Some data on the challenges posed by distance do not refer to health status or need for health services directly, but are suggestive of need, at least at the level of potential vulnerabilities for rural people. Citing US studies by Dies Roux and Yen into local epidemiologies of coronary heart disease and depression, Pearce, Witten and Bartie have recently measured some characteristics of neighbourhoods theorised as contributing to health and wellbeing (Pearce, Witten et al. 2006). Using New Zealand data, they have developed an index of ‘community resource accessibility’, by calculating the distance from the (population-weighted) centroid of each meshblock to the nearest marae, recreational facilities, shopping facilities, educational facilities and health facilities (this latter aspect is discussed in terms of health service supply in the next section). The calculations are performed using network analysis techniques to calculate

geographic distances and travel times.⁵ Each leg of each journey was adjusted to account for variations in speed limits, road surfaces, ‘sinuosity’, and topography (such as steep hills).

The findings include a “*strong urban-rural gradient*” in travel times to fresh food shops. Long travel times are noted for Fiordland and the south west of the South Island, with one meshblock being 244 minutes away from the nearest food shop. The work is a first step toward a closer investigation of the causal links between resource accessibility and health status, and the authors signal potential uses of the newly created index to identify ‘multiply disadvantaged’ communities, and in respect of defined health outcomes, to inform ‘locality-based health promotion strategies’. The context and outlook for this kind of development work in New Zealand is discussed in Section 9 of this report. Work by other authors using similar methods to analyse distance to health services is summarised in Section 7 ‘Rural Service Supply’.

⁵ ‘Network analysis’ algorithms are used in computer-based mapping software (often called ‘geographic information systems’ (GIS)) to calculate geographic distances and travel times based on the most direct route available in the roading network.

7. RURAL SERVICE SUPPLY

The features of rural New Zealand typically presented as conferring challenges for the delivery of health services are:

- *“large distances and obstructive geographical features that affect ease of access to health services*
- *small, isolated populations that lead to diseconomies of scale when planning and funding local health services*
- *high levels of deprivation that are a feature of some rural regions and some rural communities in otherwise more affluent regions which impact on the health status of the local population and their ability to access services*
- *[a] high concentration of Māori in some regions (eg, in the Far North and East Coast of the North Island) [which] present[s] both challenges and opportunities for the organisation and delivery of culturally appropriate health services and the reduction of health inequalities*
- *sharp seasonal fluctuations in population numbers experienced by some rural areas pose workforce difficulties when organising and funding health services on a population basis”.*

(Ministry of Health 2002a)

The most widely available material regarding the supply and management of services to rural people concerns rural general practitioners (GPs) and nurse practitioners, and focuses on the nature and demands of health practice in rural communities, and the challenges of recruitment and retention of rural practitioners. A modest amount of other material describes service supply using a variety of measures, including travel times. Reporting recently on a search using ‘rural hospitals’ and ‘New Zealand’, Williamson notes that only 11 peer-reviewed papers were revealed, dating back as far as 25 years (Williamson, Gormly et al. 2006). On this basis he judges the topic of rural hospitals (a ‘mainstream’ one by any definition) to be understudied in New Zealand.

Also, advice from the Committee secretariat has been that for the purposes of this report, workforce recruitment and retention are of lesser interest. Accordingly, this part of the report will précis:

- current rural health and disability funding policies intended to affect supply

- assessments of service supply and accessibility using several measures
- some basic metrics on practitioner supply from the NatMedCa survey of primary care, and also rural workforce surveys conducted in 2001, 2002 and 2005
- a few articles from local literature on delivery of specific services such as surgery, and safe and effective acute care for remote populations
- material available on ‘telehealth’ services, including a summary of the comprehensive Healthline evaluation.

In general, policy settings for the funding and supply of health and disability services for rural areas match broader national policies. However, a few well-identified exceptions, both historical and current, do alter conditions for the supply of services.

Historically, deprived areas in New Zealand, many of which were rural areas, were accorded ‘Special Medical Area’ (SMA) status by the government in 1941 (Ministry of Health 2004d p5; Hokianga Health Enterprise Trust 2006). In contrast with the traditional arrangement in which New Zealand GPs were privately funded by their patients, in SMAs salaried GPs operated from local base hospitals (such as Rawene Hospital in the Hokianga) and maintained a network of clinics to remote areas in conjunction with a district nurse located in each such area. Originally numbering 34, Special Medical Areas were reduced in 1967 and 1974 (Ministry of Health 2004d), and, along with other structural changes in the health sector, the designations are thought to have ceased to be part of national policy by 1993 (personal communication – Chrissie Williams)⁶. Also commenting on SMAs legacy, one Ministry of Health report has documented a personal communication that four special medical areas (note small case) “*continued to operate*” on the West Coast of the South Island in 2003 (Ministry of Health 2004d p5).

Since 2001, the Labour government has introduced several funding initiatives to improve the sustainability of rural services, as well as a revised subsidy scheme to assist with patients’ travel

⁶ The legacy of Special Medical Areas has remained in some areas of the country. For example, whereas a National Government in 1991 announced the removal of SMAs’ exemption from prescription charges, Hokianga’s health services reincorporated into a health trust in 1993 and gained a pharmaceuticals budget holding contract which allowed the trust to continue not to charge patients prescription charges. As a Primary Health Organisation since in 2004, Hokianga health service funding contracts now have a ‘zero co-payments’ provision to continue Hokianga patients’ exemption from pharmaceutical and other charges.

costs. Initiatives include a 'Rural Adjuster' to the Population Based Funding Formula (PBFF) paid to DHBs to compensate for the higher cost of delivering hospital and community health care services to rural communities; the amount of the adjuster was reported to be \$80m in 2003/4 (Ministry of Health 2004b p46). An additional \$8.4 million goes to PHOs to support rural primary health care workforce retention (personal communication – Ministry of Health).

A Rural Bonus comprising \$4.23 million is paid directly to rural GPs, and an additional \$2 million was announced in December 2006 for rural midwives (O'Connor 2006 (4 December)). The Rural Bonus to GPs has historically been allocated on the basis of a Rural Ranking Scale (RRS) which assigned a score for various combinations of travel time to the nearest hospital, GP-call rostering, trauma-call commitments, travel time to nearest GP colleague, travel time to most distant practice boundary, and peripheral clinic duties (London 2004; Janes 2006).⁷ The RRS is under review by the Ministry of Health and may in future involve the use of some different criteria (personal communication – Ministry of Health).⁸

In 2006 the government announced a programme to identify and recruit 15 GPs for placement in rural practices, additional funding for 30 rural GP trainee placements accounting for an additional \$2 million, and \$5 million of funding for a mobile surgical bus (see below) (O'Connor 2006 (4 December)).

In addition, a Primary Response in Medical Emergencies service (The 'PRIME' scheme – described below) is funded by the Accident Compensation Corporation⁹ for rural emergency service support (personal communication – Ministry of Health). Finally, a National Travel Assistance Scheme for long-distance or frequent attendance to specialist health or disability support seeks to eliminate inconsistencies among several regional policies originally set up by regional health authorities in the 1990s (Ministry of Health 2005b). Financial assistance is available based on distance and frequency of travel, Community Service Card status and the age of the traveller (lower distance thresholds apply for people under 18).

⁷ The RRS was developed in the 1990s by the NZ Rural General Practice Network, and subsequently adopted by the Health Funding Authority (and then Ministry of Health) for allocating supplementary funding to rural general practices to reflect the increased costs of practice in more isolated areas.

⁸ See also discussion in Section 9.3 'Measures of rurality: ensuring conceptual clarity'.

⁹ Some additional funding is provided by the Ministry of Health (personal communication – Ministry of Health)

7.1 Distribution of and distance to services

Pearce et al's work on community resource accessibility (discussed in the previous section) included calculation of travel times to GP and other health services (Pearce, Witten et al. 2006). These results are not reported in detail, however some conclusions can be reached from travel time quintiles reported for each community resource category. If the highest quintiles of travel times in this work are taken as likely to include rural and remote areas, it is notable that the travel times for the highest quintile of journeys to accident and emergency services (average 27.57 mins), Plunket services (15.22 mins), and also journeys from the nearest ambulance service (30.57 mins) are longer than times to reach any other community resource, save for coastal beaches. The average travel time for the highest quintile of pharmacy journey times (9.08 minutes) is longer than for any other facility save beaches, leisure centres and secondary schools.

Brabyn and Barnett used three methods to assess access to GP services in New Zealand (Brabyn and Barnett 2004). The first was population to GP ratio. The second was a 'least cost path analysis' (LCPA, in practice a population-weighted average travel time via road) from each meshblock to the nearest meshblock containing a GP surgery, calculated using network analysis techniques. The third method was an 'allocation' model which revised the travel time analysis using a simulation to 'allocate' residents to the nearest GP surgery, subject to a capacity constraint of 1400 patients per GP. In this simulation, remaining unallocated residents were modelled as travelling to the next nearest GP surgery where the capacity constraint had not been breached. Results for the LCPA and allocation models were reported at the territorial authority (TA) level, and against a benchmark of 30 minutes; areas with population average travel times to a GP above 30 minutes were deemed to have poor access. Also, the LCPA and allocation results were correlated with New Zealand Deprivation Index (NZDep) values.

70,833 people lived more than 30 minutes from a GP according to the LCPA method, and 128,034 according to the allocation method. Substantial variations existed in accessibility between different regions, although the areas identified as having poor access depend in part on the method used to calculate accessibility; there was only a weak correlation between GP per capita values and the LCPA and allocation models. For example, although the Waikato District had the highest ratio of population per GP (at 2343), it was mid-ranked (33rd out of 73 TAs) in number of people travelling more than 30 minutes to a GP (using either the LCPA or allocation

methods). Poor access was more strongly correlated with lower (that is 'wealthier') 2001 NZDep scores (that is, from one to three) than with higher (that is 'poorer') scores; this was interpreted to indicate that wealthier people generally had higher travel times to GPs. It was suggested also that people in remote areas may suffer a 'double burden' of both social deprivation and poor geographic access. Improvements to the 'spatial information base' for primary care were recommended. (This is discussed in Section 9.)

Save for Pearce's published work (which collected data for, but it appears has not yet published, distances / travel times to hospital), the only hospital distance analyses located in the course of this review were those of Moore, conducted in the former Midland region in 1993 (Moore 1993). While well over ten years old, the results are still likely, however, to be representative because hospital locations have not changed (though service configuration in some cases may have), and since the New Zealand Automobile Association reports current private car operating costs per kilometre to be 55.4c (Automobile Association), relatively close to the 53.1c figure applied in cost estimates provided by Moore. The work gives tabular presentations of travel times and costs for trips to 'hospital towns' across the region for both public and private transport. Across a large volume of data, stark differences between communities are seen, reflecting the reality that the inpatient services are inevitably centralised to the larger towns. Variations between communities of a magnitude of eight times, and costs in excess of \$50 (in 1993) for a one-way trip are common. (Findings relating to utilisation of hospital services are presented in the following section on realised access).

7.2 Primary care services in rural areas

Discussion of primary care supply to rural areas, in both the New Zealand and international literatures, concerns itself most predominantly with challenges of workforce recruitment, deployment and retention, especially regarding rural GPs.

In the NatMedCa survey, Raymont et al found that of all subgroups of GPs, rural GPs recorded the highest number of days worked per week, the highest volume of patients per week and per day, the highest proportion of after-hours work, the most demanding rosters, and the highest number of weekends on call (Raymont, Lay-Yee et al. 2005).

Two primary care workforce surveys conducted by London between 1999 and 2002 (London 2002; London 2003), have recently been followed by a 2005 survey conducted by Goodyear-

Smith (Goodyear-Smith, Janes et al. 2006). Time series comparisons are difficult because apparently different methodologies have been used to recruit respondent practices for the surveys, with resulting differences in response rates, and volumes of missing data. For example, in 2002, London identified that there were 216 rural general practices, and that 477 rural GPs¹⁰ provided 396 FTEs; for 2005, Goodyear-Smith identified 171 rural practices and 358 rural GPs.

Rural GPs are more likely to come from the United Kingdom or other English speaking countries than GPs in other areas; the 2002 survey found that more than 50% of recruits to rural general practice were from the United Kingdom or other English-speaking countries, and the 2005 survey reports that 57% of GPs trained outside New Zealand.

The London surveys give population:GP ratios for rural practices¹¹ based on census populations within so-called 'Shared Roster Areas' (SRAs). Measured against Brabyn's 'reasonable' benchmark ratio of 1,400:1 (head of population : one GP FTE), the ratio reached 1,800:1 or more in 56% of SRAs, and 2000:1¹² or more in 32% of SRAs. For 2005, Goodyear-Smith uses PHO enrolled populations which do not allow for precise estimates. However, three instances are cited where single GPs are providing services to populations between 6,000 and 10,000.

Forty eight of 460 practitioner respondents in London's 2002 survey worked 1 in 1 or 1 in 2 rosters, 127 worked 1 in 3 or 1 in 4 rosters, and the remaining 285 worked less onerous rosters. London predicted in 2003 that as a result of the government's (then planned) Reasonable Roster initiative, the number of practices facing onerous rosters should decline. However, on her smaller denominator of total rural GPs, Goodyear-Smith identifies 39 working 1 in 1 or 1 in 2 rosters (Monday to Thursday), and 80 working 1 in 3 or 1 in 4 rosters.

¹⁰ To match national policy definitions, practices were defined as rural if their score on a 'Rurality Ranking Scale' (RRS) was greater than 35 points.

¹¹ Defined as practices scoring 35 points or more on the Rural Ranking Scale.

¹² A population : GP FTE ratio of 2000:1 has been proposed as an 'alert' level by a Rural Expert Advisory Group to the Minister of Health (Ministry of Health (2002) Report of the Rural Expert Advisory Group to the Minister of Health: Implementing the Primary Health Care Strategy in Rural New Zealand, Wellington.)

Against a continued flow of qualitative data¹³ and anecdote regarding the demands on rural GPs, it is worth noting that both the number of onerous rosters, and SRA-level patient:GP ratios vary widely between rural areas. As Raymont et al note, while workloads of rural GPs are undoubtedly higher on average “*the distribution of GPs is a more important workforce issue than absolute numbers*” (Raymont, Lay-Yee et al. 2005). London’s report for 2002 reports noted that “less challenging, more desirable locations” were enjoying a rise in the number of practising GPs whereas other others (“particularly within the North Island”) were seeing reductions (London 2003 p6).

London has recently remarked that perhaps the greatest challenge in terms of securing an adequate supply of general practitioners in rural areas lies in creating career pathways for rural practitioners, and points to the high levels of professional development and community visibility enjoyed by rural health practitioners in Australia. Indeed, the Rural General Practice Network has applied this year to the New Zealand Medical Council for registration of vocational scope of practice called ‘rural hospital medicine’ for general medical officers and general practitioners working in rural hospitals (Nixon and New Zealand Rural General Practice Network 2006), and the planned training is to be offered at the University of Otago next year (University of Otago).

7.3 Other aspects of health and disability service supply

Arising from concerns about a deterioration in access to secondary and tertiary care for rural communities resulting from rural hospital closures in the 1990s, a mobile surgical bus has been built by a private consortium, and has provided a mobile surgical service for “*low risk procedures to low risk patients*” throughout the country since 2004 (Bax, Shedda et al. 2006). A total of 1901 surgical procedures have been performed in that time, across a range of eight or so surgical specialties ranging from dental surgery to gynaecology. Benefits cited for the service include less time off school and work for patients; improved surgical access for rural Māori and rural Pacific people (33% of patients treated are of Māori or Pacific ethnicity); upskilling of

¹³ Janes has recently reported on the impacts of on-call work on GPs and their families. He reports that while rural GPs find their roles challenging and rewarding, negative aspects of demanding on-call rosters included stress from being immediately available for extended periods, sleep deprivation, and reduced ability to plan and attend family events. The income received for this work was reported to be “minimal (if any)”. Demanding rosters were reported to be a major barrier to recruiting both permanent staff and locums, and a main reason for practitioners to contemplate leaving rural practice.

local GPs and nurses; and improved training through ‘telepresence’ facilities (this aspect of the service is described briefly in the section below on telehealth).

Both solutions to and challenges of acute clinical service delivery to rural populations have been documented in New Zealand, especially as regards thrombolytic drug therapy to reduce risk and disability from events such as heart attacks and ischaemic strokes. This therapy is widely recognised as best clinical practice, but delivering this care within recommended time limits is challenging in the rural setting. In a comparative cohorts study, the ECGs of patients presenting with acute myocardial infarction to Coromandel GPs were faxed to the Waikato Coronary Care unit in Hamilton and GPs then provided drug treatment as advised by a cardiologist (Nunn, Lennane et al. 2001). Times to treatment for these patients were compared with those from a historical cohort whose treatment times had also been assessed. A median time-saving of 135 minutes was observed. It was concluded that community-based thrombolysis by GPs was logistically and clinically feasible, although the association documented in the literature between thrombolysis and ventricular fibrillation was thought to highlight a need for defibrillation facilities and training at primary care level.

However, an evaluation of a ‘Christchurch Hospital Stroke Thrombolysis Service’ notes that although intravenous thrombolytic therapy is associated with a substantial reduction in the likelihood of death or disability for patients presenting with acute stroke, the infrastructure requirements – most especially rapid access to computer tomography (CT) imaging and interpretation for definitive diagnosis – mean that the introduction of such services may not be feasible in many areas (Fink 2005).

7.4 Emergency services

The ACC-funded PRIME scheme is a network of approximately 196 rural GPs and 70 rural nurses (as at 2003) who are specially trained to provide clinically appropriate management of trauma and medical emergencies in rural locations when an ambulance crew is more than 20 minutes away (in the North Island) or 40 minutes away (in the South Island) (Hore, Coster et al. 2003). The scheme has operated since 1999 (1998 in Southland). PRIME registration of a nurse or GP requires attendance at a five-day course in emergency and trauma medicine, and two-day refresher courses at least every two years, which follow recommended emergency care protocols developed by the Royal Australasian College of Surgeons’ Trauma Committee.

PRIME providers are required to have access to a prescribed medical kit, and a reliable telecommunications device such as a pager, mobile phone or ambulance radio. A local roster system ensures 24-hour, 365-day availability of a provider and is activated, usually by pager, by the nearest regional communications centre on receipt of a 111 call, when the centre has been advised that the nearest ambulance is more than the set travel time limits from the location of the emergency.

Hore, Coster and Bills conducted a survey of 290 (of an approached 536) rural or semi-rural GPs, both PRIME providers and others, on their attitudes to the scheme, the emergency equipment routinely carried, and the quality of communications.

PRIME GP responses were that the training and equipment provided by the scheme was seen as excellent. Also, whereas 22% of non-PRIME GPs had no emergency medical training save for skills learned in practice, this was the case for only 2% of PRIME GPs. Substantially more comprehensive emergency equipment was carried by PRIME GPs than non-PRIME GPs. For example, 82.3% of PRIME GPs routinely carried a chest drain compared with 19.5% of non-PRIME GPs, and 93.7% of PRIME GPs carried a laryngoscope compared with 60.2% of non-PRIME GPs. Also, 45.6% of PRIME GPs carried a defibrillator compared with 22% of non-PRIME GPs (this underlines the challenge involved in meeting Nunn's recommendation for defibrillation equipment and training to manage potential fibrillation in rural patients treated with thrombolytic drugs outside hospital). Despite the differences in equipment carried, the PRIME group was only slightly more confident regarding the adequacy of their equipment for emergency situations.

Respondents' most important criticism was that triage information from the scene of the emergency, transmitted via call centres, was often poor. Also, although communication with ambulances was generally considered good, there was concern that in some areas the PRIME service was being used to 'prop up' under-resourced ambulance services.

7.5 Telehealth services

So-called 'telehealth' services are often cited as offering a solution to problems of remoteness associated with service delivery to rural populations. Telehealth (sometimes also termed

telemedicine) refers to the use of modern telecommunications technology to connect patients with clinicians and/or to connect clinicians, for example rural GPs, with clinical colleagues such as hospital specialists. The Ministry of Health considers that “*advances such as telemedicine increasingly make specialist expertise and continuing education more accessible to the rural workforce both in hospital and primary care settings*” and that “*Telemedicine can link specialist services, the health care team and the rural patient to provide enhanced quality services close to where the patient lives*” (Ministry of Health 2002a).

Developments in New Zealand have followed those in other jurisdictions. As early as 1997, 558 of 2336 respondent rural (non-federal) hospitals in a US survey reported that they were actively using telemedicine, and a further 530 had plans to do so (U.S. Department of Health and Human Services 1997). Surveys in New Zealand have found a small but growing number of pilots or other projects in telehealth since 2000. A 2000 survey found 12 projects underway around the country (Kerr and Norris 2004). In common with other jurisdictions, teleradiology (the practice of transmitting clinical imaging results such as X-rays or CT scans for remote interpretation by distant radiologists) was the most common telehealth application, followed by telepsychiatry (in the form of patient consultations with a remote consultant psychiatrist). In the 2003 survey 22 projects were identified, and most of these were genuine clinical applications of telecommunications technologies¹⁴. Again teleradiology was the most common application (considered to be a result of the national shortage of radiologists)¹⁵. Some telepsychiatry services continued, however problems in logistical support (e.g. maintenance of video-conferencing facilities, poor administrative support for teleclinics) contributed to what appeared to be decreased use of such services after 2000. Although a broader range of communications technologies was in evidence in 2003 – including mobile phones and broadband internet (compared with a predominance of ISDN (phone line) based systems in 2000), only around half of the initiatives from 2000 were still in operation. It was concluded that the pilot status of

¹⁴ Some rural telehealth projects, while evidently useful, have the appearance of being more administrative applications than the use of telecommunications technologies in real-time clinical care, for example the use of electronic medical records or electronic communication of lab results. See for example, *PrISM - Primary integration systems management - overcoming isolation through innovation*, NZ Health Innovation Awards 2006, <http://www.healthinnovationawards.co.nz/06profilewinner6.html>

¹⁵ There has been recent news coverage of the practice of Hawkes Bay District Health Board to have radiological images read in Beirut, the United Kingdom, United States and other countries such as India (*Hospital sends x-rays to Beirut*, NZ Herald, 1 September 2006, Fairfax Publishing Ltd, Auckland).

telehealth projects had not developed into mainstream delivery as had earlier been hoped. Viability of the New Zealand telehealth movement was seen to depend on the availability and goodwill of local clinical champions who contributed time and energy to the projects. Many projects were concentrated in the Auckland region, not more remote parts of the country. Finally, it was proposed that a national framework should be developed to “*coordinate and encourage [telehealth] activities and realize their benefits*” (Kerr and Norris 2004 p62).

More moderate progress than had been hoped for is evident also from a review of early predictions for telehealth by commentators such as the WAVE e-health strategy group. The WAVE report predicted “*remote monitoring of home care patients, development of remote virtual reality surgery, and distance diagnosis using visual imagery*” (WAVE Advisory Board 2001 p56). National experience to date has seen strong development in only the third of these areas. However, the mobile surgical bus has provided early experience in ‘remote virtual reality surgery’ (Bax, Shedda et al. 2006). As well as providing mobile surgical services directly, the surgical bus is contracted by the Ministry of Health to provide 50 ‘telepresence’ sessions each year. In these sessions specialist surgeons based at a large hospital are ‘virtually’ present during surgical procedures carried out in the bus. The remote specialist and the bus’s surgical team are connected by a broadband video and audio link. The specialist uses a joy stick control to manipulate multiple cameras within the bus to observe surgery, and two large plasma screens in the bus display the attending specialist to the surgical team. In a pilot of the technology, Christchurch surgeons performed a laparoscopic nephrectomy in the bus, under the supervision of a renal expert observing from Brisbane.

The most widespread application of telehealth, and certainly the best documented, has been in the ‘Healthline’ service, a free, 24 hour a day telephone health advice service. This service commenced operation as a pilot in four areas in 2000, and since July 2004 has been a national service, accessed via a free-calling 0800 number.

An evaluation of the pilot was conducted in 2002. The four regions, Northland, Gisborne / East Coast, Canterbury and West Coast were recorded as having substantially differing availability of primary care services (for example a reported population to GP FTE ratio of 1500:1 for the West

Coast¹⁶, versus 13,500:1 for Gisborne / East Coast (Kalafatelis, Fryer et al. 2002 p47).

Although early sections of the report contemplate that this might result in more use of Healthline in an area such as Gisborne than on the West Coast, this is not evident from call-rate-per-capita figures provided. The rates vary to a degree but not by a very great order of magnitude. The rates were 52.2 calls per 1,000 population in Canterbury, 46.6 calls per 1,000 population in Gisborne / East Coast; 42.1 calls per 1,000 population in West Coast, and the 41.9 calls per 1,000 population in Northland.

The evaluators noted that demographic information was not collected for 10-15% of Healthline callers. However it was noted also that the service had a “*comparable record in this regard to that of providers of some other telephone based social services, and their performance in this area is generally much better than other providers and/or services.*” (Kalafatelis, Fryer et al. 2002 p91), and several demographic analyses are presented. An important result is that the proportion of calls received from callers self-identifying as Māori in the four areas was in most cases almost identical with the proportion of Māori in the population, although a difference for Northland (26% Māori callers versus 30% Māori population) may have been an exception (Kalafatelis, Fryer et al. 2002 p108). A disproportionately high number of callers were female, many calling on behalf of pre-school aged children, but a disproportionately low number were older people. In the context of variable rates of use by different population groups, it was noted that the 0800 number was only accessible from landlines, yet between nine and ten per cent of households in the pilot regions, (except six per cent for Canterbury) did not have access to a telephone (Kalafatelis, Fryer et al. 2002 p47).

Accounting for the variations over time in the utilisation of the Healthline service, peaks and troughs in call volumes are reported to have mirrored marketing and promotional activity during the pilot period. Comparing somewhat lower call rates for Healthline than published data for a similar UK service ‘NHS Direct’, it is noted that the “*NHS Direct service received more promotional activity than the Healthline service and [...] General Practitioners were more supportive because the introduction of the service would not potentially impact their remuneration base.*” (Kalafatelis, Fryer et al. 2002 p97) Despite this, results from a time series

¹⁶ Note the large difference between this figure and the figure shortly to be released by the Institute of Rural Health in its report of the 2005 rural workforce survey.

survey of providers' attitudes to Healthline conducted as part of the evaluation were that (i) the proportion of surveyed providers agreeing with a statement that "[Healthline] provides a valuable additional resource for people seeking medical and health advice" improved from 52% to 66% over a four-month period in 2001; (ii) the proportion agreeing that Healthline was "*a medically safe option for people needing advice*" improved from 55% to 67% over the same period, and ; (iii) the proportion reporting that they displayed information about the Healthline service in their premises improved from 31% to 39% (Kalafatelis, Fryer et al. 2002 p102).

Most of the symptomatic calls to the Healthline service resulted in a 'self-care' triage outcome (at least¹⁷ 43%) (Kalafatelis, Fryer et al. 2002 p117), and it is observed that Healthline nurses frequently advised a less urgent or a lower-impact course of action than patients had planned prior to their contact with Healthline (Kalafatelis, Fryer et al. 2002 p121), which was thought likely to decrease demand in the pilot areas for General Practitioner after-hours services, and to a lesser extent, hospital emergency departments, pharmacists and chemists (Kalafatelis, Fryer et al. 2002 p147).

Large sections of the evaluation also examined the clinical safety of the service. Broadly, there were some discordant findings between nurse safety reviewers (from the School of Health Sciences, Massey University) and general practitioner reviewers (from the Department of General Practice, Wellington School of Medicine and Health Sciences). The overall conclusion was that the Healthline service had "*operated at least as safely to date as similar overseas telephone triage services, and further, that the Healthline service [had] the potential to provide a valuable and safe service*". (Kalafatelis, Fryer et al. 2002 p148)

Concluding that the service had broadly delivered the required outcomes for callers, the evaluators hazarded that since usage was responsive to promotion, and since a third of respondents in a random survey of population awareness of the services in the four areas were not aware of Healthline, there was likely to be considerable latent or untapped demand (Kalafatelis, Fryer et al. 2002 p116).

¹⁷ Two apparently conflicting figures were reported for the proportion of callers advised to self-care; 50% was reported on p35 of the Healthline evaluation report, but 43% was reported on p117.

8. REALISED ACCESS

Following Aday and Andersen's definition of 'realised access', this section summarises both (quantitative) utilisation data and some narrative data on rural people's actual use of services. The international literature on utilisation of services for rural and non-rural communities is very broad. Goddard, for example, is able to draw on large-scale national United Kingdom databases to make geographical comparisons on the utilisation of hospital care, long-term care beds, travel costs, reasons for GP visits, and threshold effects in 'distance decay' of health services utilisation (Goddard and Smith 1998). A comprehensive rural health indicator set developed in Australia (discussed in the following section on reducing gaps in the New Zealand knowledge base) employs dozens of utilisation indicators.

Similarly with the situation for national needs data, there are few analyses of population utilisation for New Zealand health and disability services stratified into rural versus urban subgroups¹⁸. The data summarised below comprise a single community survey by Panelli and the Rural Women's Institute, information about primary care utilisation from the NatMedCa study, and results from a recent study of hospitalisation rates in rural Otago¹⁹.

8.1 Realised Access – primary care services

The NatMedCa study collected information on patient contacts for both rural²⁰ and urban²¹ practices (Ministry of Health). Summary level data were collected for 8686 contacts at rural

¹⁸ For example, the most comprehensive published data on secondary services utilisation is found in a 2005 publication by the Ministry of Health of national minimum data set discharge extracts for the 2001/2002 year (Ministry of Health (2005) Selected Morbidity Data For Publicly Funded Hospitals 2001/02, New Zealand Health Information Service 2005, Ministry of Health, Wellington). This publication stratifies by age, gender, ethnicity and ICD (International Classification of Diseases) code, but does not contain geographical analyses.

¹⁹ In fact a reference to a historical analysis of hospitalisation rates stratified for rural versus urban populations is referred to in Report 4 of the NatMedCa series (Ministry of Health (2004), A Comparison of Primary Health Care Provided by Rural and Non-Rural General Practices: The National Primary Medical Care Survey (NatMedCa): 2001/02 Report 4. Wellington: Ministry of Health. p97). However there is a referencing error in the report, and although the authors have been contacted for clarification, no resolution to the query has been possible at time of writing.

²⁰ Rural Ranking Scores were not available for all potentially rural practices, so a supplementary survey was used to apply the RRS questionnaire directly to respondent practices in "*country areas with a resident population less than 30,000*" (op. cit. p5).

practices and 31,991 contacts at urban practices. Detailed data on patient visits was collected for a subset of these contacts; 1957 rural visits and 7315 urban visits. The few references to rural Māori in NatMedCa study reporting are summarised at the end of this sub-section.

The study found that the profile of patients visiting GPs in rural areas was broadly similar to that of urban patients, in terms of numbers new to the practice, numbers of previous visits, and the general severity of presenting conditions. However, some important differences emerged.

Contributing GPs recorded up to four reasons for each patient visit, the length of patient consultations, and numbers of drug and non-drug treatments provided²². Reasons for a GP visit (RfVs) were reported as number of RfVs per 100 consultations. Across both rural/urban and age spectra, RfV numbers ranged from 110 per 100 consultations to 168 per 100 consultations. Older age groups and female patients had higher RfV scores. Across almost all age groups and both genders, rural patients had fewer RfVs than urban patients. Rural boys aged one to four had the lowest RfV score of any population group. Rural practices record a slightly lower relative frequency of 'preventive' RfVs (as a proportion of all RfVs) than urban practices at 4.6% of all reasons, compared with 6.1% for urban practices. Rural practices were associated with a slightly lower rate of non-specific symptoms as a percentage of visits and RfVs. Ear nose and throat non-specific symptoms were slightly less frequent at rural practices.

In terms of health problem presenting in general practice, males aged over 65 in rural areas presented with cardiovascular problems at a markedly lower rate than the same group of males in urban areas. Males aged 25 to 64 in rural areas had markedly lower rates of attendance for mental health problems than those in urban areas, particularly males aged 25 to 44. Respiratory problems also presented less frequently at rural practices than at urban practices among males aged under 25 (36 versus 41 presentations per 100 visits), but more frequently among males aged over 65 (26 versus 18 presentations per 100 visits). Finally, males aged under 25 at rural practices were associated with a considerably lower rate of nervous system /sensory organ

²¹ The report refers to 'non-rural' and 'urban' practices, practitioners and patients interchangeably. In this review, the term 'urban' is used.

²² In general, data were entered by GPs into practice management systems as free text, and READ codes and Pharmacode/ATC codes were assigned automatically.

problems, and males aged over 65 at rural practices were associated with a notably lower rate of digestive problems.

An area in which rural people presented relatively more often was for injury or poisoning; this accounted for a larger proportion of visits and total reported problems among rural patients (both male and female) than urban patients.

Patients of rural practices received fewer tests and investigations than urban patients. For women, cervical smear rates were considerably lower for patients of rural practices; rural women aged 25 to 44 received an average of four smears per 100 visits compared with eight per 100 visits for urban women. Rural women aged 45 to 64 received one smear per 100 visits compared with five for similar women at urban practices. In the 65-plus age group, rural practices ordered a similar rate of imaging investigations for both men and women. Striking differences appeared in diagnostic referrals for management of cardiovascular problems: rural practices referred at a rate 60% below urban practices. For haematology problems, a pathology test was only ordered in 34.8% of presentations of a haematological problem at rural practices, compared to 60.2% at urban practices.

Rural patients received fewer prescriptions than urban patients for some medication groups. Rural males aged 65 or over received only 34 cardiovascular prescriptions per 100 visits compared with 50 for urban males of a similar age. Both new and existing urinary system problems²³ were treated with anti-infective agents substantially less often among rural patients (at 53.3% of all presenting cases, and 69.3% of new cases) than among urban patients (72.5% and 84.3%, respectively), and new non-organic psychoses were treated by prescription much more often in rural patients (78% of all cases and 88.9% of new cases) than in urban patients (61.6% and 51.2%, respectively). Upper respiratory tract diseases²⁴ (other than chronic obstructive disease and acute infections) were managed by prescription far more often in management of rural patients (72.7% all cases, 58% new cases) than of urban patients (58.7% and 0.1 %, respectively). This finding was similar for treatment of other respiratory symptoms²⁵ (40% and 37% for rural patients, versus 22.4% and 14.2% for urban).

²³ This finding related to READ code K1 'Other urinary tract infections'

²⁴ READ code H1

²⁵ READ code I7

Cross-sectional findings such as these are insufficient to draw conclusions about underlying disease prevalence (hence their presentation here under the heading ‘realised access’), care seeking behaviour, or clinical management patterns. However, interpretation of some kind of rural effect may be less problematic for health problems more likely to be serious or life-threatening. The authors identify that the *“higher rate of injuries among patients of rural practices is likely to be due either to, the more physically hazardous nature of rural life, or the relative lack of other places to obtain care (that is accident and medical clinics or hospital-based emergency departments).”* (Ministry of Health p96). Also, the authors consider it likely that because of the lack of other available services, GPs in rural settings may be providing follow-up care for conditions usually managed by hospital specialists in urban areas; they cite high rates of follow-up of patients with haematological disorders.

Although it is noted that apparently lower prescribing rates among rural practices *“may relate to the higher number of visits to rural practices at which only a single problem was presented to the GP”*, this caveat does not appear to account for the differences in proportions of rural and urban health problems managed with drugs. Some of these findings are very striking. Although the limitations mentioned above prevent any firm conclusions, further investigation may be warranted where apparently conflicting findings are present – for example the findings of lower mental health reason-for-visit counts in rural males, yet much higher proportions of psychosis apparently requiring management by prescription.

Māori use of primary care services

Ethnicity data collected in the study appears adequate. For both summary contacts data and detailed visit data, ethnicity was collected using the recognised Census 2001 question. Rule preferences in coding gave priority first to Māori and then to Pacific Island preferences. Summary data was collected for 2874 rural Māori patients, and 3510 urban Māori patients. Detailed visit data was collected for 646 rural Māori patients, and 801 urban Māori patients.

However, reporting from the study by Crengle et al restricts discussion of rural versus urban results to the amount of summary data collected in the study (Crengle, Lay-Yee et al 2005). Dividing urban contacts into small town and city contacts, Crengle remarks that a greater proportion (849/6384; 13.3%) of Māori patient contacts recorded in the study occurred in small town practices than for the non-Māori patient contacts (2599/33,805; 7.7%). A smaller

proportion of Māori contacts (2379/6384; 37.3%) occurred in city practices than for non-Māori contacts (16,795/33,805; 49.7%). Lastly, Crengle reports that similar proportions of contacts occurred in rural practices for Māori (1582/6384; 24.8%) as did for non-Māori (8266/33,805; 24.5%).

8.2 Realised Access – secondary care services

In an evaluation of surgical intervention rates using 1995 – 2000 data, Raymont found that excluding private discharges, population utilisation rates in larger centres (for example Auckland and Wellington) were 10-18% lower than the national average discharge rate, and the six areas with a rate more than 15% above the national average contained large rural catchments (these were West Coast (47% above the national average), Eastern Bay of Plenty (34% above), Otago (30% above), Taranaki (19% above), Tairāwhiti (19% above) and Wanganui (17% above) (Raymont 2002). Inclusion of private discharges (in an analysis of 1995²⁶ discharges), showed variation in rates similar to that of public-only discharges for some surgical specialties and a reduction in variation for other specialties²⁷. It was concluded that access to elective surgery for populations in smaller centres (which can be assumed to include the rural populations in surrounding areas) may be better than access for populations in larger city centres.

Contemporaneous research by McLeod noted debate among surgeons as to whether equality of access to elective surgery across the country was an achievable policy goal, since a minimum level of surgery was required in smaller hospitals to retain surgeons; in these cases, levels of hospitalisation, and therefore access to surgery, would be higher in provincial areas than in larger centres (McLeod, Morgan et al. 2004).

In a small study published this year, Williamson et al have sought to test whether comparatively ready availability of local hospital services in Oamaru, Balclutha and Dunstan in rural Otago results in higher levels of hospitalisation, on the basis that an ‘easier’ avenue of care might be “abused” by patients and referrers (Williamson, Gormly et al. 2006). Age- and gender-standardised hospital discharge rates are calculated for the rural Otago population, using

²⁶ The most recent year for which data was available as at 2003

²⁷ This may suggest substitution between publicly and privately funded surgery in those areas where private surgery is available, as opposed to supplementary ‘gap insurance’ where privately-funded surgery in those areas would be only those procedures not publicly funded anywhere in New Zealand.

National Minimum Data Set discharge data, and these are then compared with published national figures from the Ministry of Health. Different methods are used in the calculation of rural hospital discharge rates from those used to calculate discharge rates (of rural Otago residents)²⁸ from Dunedin Hospital; the two rates are then added to produce a total discharge rate. It is concluded that hospitalisation rates for the national and rural Otago populations are very similar, save for a substantially higher rural Otago rate for patients >75 (the latter appears to be of the order of 18% higher than the former, though only a histogram of results is provided). This seems not inconsistent with Raymont's finding of higher levels of surgical access for Otago populations than for populations in other main centres. The authors remark that it is "unlikely" that Otago clinicians would operate different standards (from peers in other centres) for this group; it should be noted that this is not borne out by most literature in clinical judgment and utilisation review (Meehl 1954; Wennberg and Gittlesohn 1973; McPherson 1981; McPherson K, Wennberg JE et al. 1982; Kirwan 1983; Kirwan 1986; Wigton, Patil et al. 1986; Ham 1988; Wright, Coyte et al. 1995; MacCormick 2002; Hurst 2003).

8.3 Realised Access – narratives

Supporting narrative from Panelli et al summarising survey respondents' experiences of access included (for GP services):

"The cost is extremely high for GP visits and pharmacy. If I didn't have VISA I doubt we could afford visits for children and contraceptive pills for myself."

"Weekend doctors share on-call with neighbour (sic) town. One doctor covers morning, one night sometimes. You can't afford the added cost of travelling to the other town."

"I am concerned about the amount of working hours lost in transporting others and myself. All day is lost for a quarter hour appointment."

"Lack of doctors able to take on new patients due to overloading. Lack of access to female doctors."

(Panelli, Gallagher et al. 2006)

²⁸ There is some discussion of use of rural Otago hospitals by non-Otago populations as a confounder for the rural hospital part of the calculation, but the Dunedin Hospital component appears to relate solely to rural Otago residents. Also, the analysis did not include hospitalization or transfer of the rural Otago population to hospitals outside Otago.

Regarding Accident and & Emergency services;

“They’re only there one day a week and we’re a long way from help if it’s required in an emergency, i.e. an asthma attack, convulsions, etc. We are a fair distance from emergency attention.”

“I would hate there to be a nasty accident on our farm. I am very glad that I am not intending on having any more babies.”

“We take our children to A&E rather than call an ambulance—it takes too long to get to us.”

Regarding early post-surgical discharge;

“Adult was sent home with a catheter that started to bleed, was taken to local hospital (60 min away) and nurse didn’t know what to do.”

Regarding ongoing specialist spinal care;

“Also [we face] costs of accommodation for the [carers] that travel and stay with ‘John’²⁹. Last year [he] went twice to [hospital] for operations. We did 24 h care in the hospital with him. We paid the motel bills (over \$1000) and are still waiting for someone to reimburse us. ACC says it is [the] Hospital [who has] to pay, and the hospital says it’s ACC. We keep getting caught in this political system where no one wants to pay.”

Compelling portraits of the effects of ‘distance deprivation’ and other vulnerabilities on realised access for Māori are offered by Rameka (Rameka 2006). The account of ‘Marama’, a Māori woman whose son spent many weeks in intensive care at Hastings Hospital, tells how she and the rest of her whanau were forced to live separate lives, she and her youngest child based at the hospital and the other five members of the whanau (partner ‘Tane’ and four other children) commuting between the hospital and home near Wairoa, two hours away.

²⁹ The son of a survey respondent, who became tetraplegic and ventilator dependent after an accident.

“One life was with Tane at home caring for their children - managing the family unit with their daily living like the food, the monthly bills such as the power and phone as well as the mortgage

[...]

The second life involved the daily living costs within the hospital such as the payment of lodgings at the Whānau Whare (hospital accommodation). Mārama had to supply their own food or buy from the hospital cafeteria, which wasn't cheap and doesn't cater for long-term residential whanau in terms of a discount. Yet discounted meals, if not free, are made available for some hospital staff. The hospital was to become Mārama's and Kani's second home.”

Some quotes from Marama demonstrate the burden imposed by attempts to access care:

“Tane was spending most of our money on petrol, and then I said, “Fill up our cupboards, like for the kids lunches”, so we were just living on like gee!!, like sometimes he would leave me on the Sunday and then come back and I would only have \$20.00 to last me until Thursday and that's the pits. You imagine living on \$20.00, there was three of us (Mārama, Kani and Manu, Mārama's youngest daughter) and you're spending like so much a day on food and those café are so expensive.”

Reflecting on the seasonal nature of the family's shearing work, and a long stand-down period before the couple were eligible for an unemployment benefit, Marama observes:

“Within that period we've like two-three months and we haven't had anything and we've been living off Tane's bankbook for the last two months and its like gee!”

Rameka also provides accounts of Marama's experience of hospital staff's attitude to remote rural Māori.

“Well I've seen it you know when you're in the children's ward, well my son was under 16, and you don't go up to the other wards until you're 16 and over and I have seen many, like they'll run and do this person and they won't go and do this person and you can guarantee because there are three of us in there, they'll be running to a Pākehā and not a Māori. That's only some reasons but I have seen it happen.”

These negative experiences contrasted dramatically with positive experiences of local primary care services:

“Even though the women had faced these experiences by those government agencies, generally they supported and were supported by their own local Hauora Service, including support and assistance to gain access to specialists when funding is unavailable through WINZ or the HBDHB.”

and

“They seemed to also have good relationships with their own local GPs in Wairoa, who were very proactive in making sure that the women and their whanau received cost-effective subsidised prescriptions”

and

“[b]y and large, the women are satisfied customers with their respective local primary medical services.”

Rameka identifies large differences in the quality of communication provided by local rural health services with Māori, and urban hospitals a long distance away:

“In the hospitals they give you a pamphlet and say here go and read this or they say that’s for you that pamphlet. But here (Pāhauwera Hauora Service) they sit down and talk to you for hours. When I say I’ve got to go now they say hang on here we’ll just do this and oh okay two hours later I’m walking out of here which is cool. You know Hine and Mana [community health workers at Pāhauwera Hauora Service], they’re really good aye, but they are there for me which is the main thing”.

Rameka’s findings resonate with those expected³⁰ from a project led by Dr Peter Jensen which is researching Māori consumers’ use and experience of health and disability, and also the Accident Compensation Corporation. Early indications are that findings relating to rural Māori will focus on transport problems, affordability, lack of choice, and ways in which distance exacerbates other barriers Māori face (personal communication – P. Jansen).

³⁰ The work is funded by a grant from the Joint Research Portfolio (Māori Knowledge Output Expenses fund) provided jointly by the Health Research Council (HRC) and the Foundation for Research Science and Technology (FRST). The final report will be provided to HRC/FRST in October, and will be in the public domain shortly.

8.4 Realised Access – participation

A large body of international literature identifies the involvement of communities, at the level of community leaders and stakeholders, service users, community members, or through broadly conceived community development, as strongly supportive of improved service quality, acceptability and/or population health outcomes. A considerable amount of this discussion centres on the importance of rural communities' own role in the design and delivery of services. In this literature, questions of community need, of optimal quality and sustainability of service supply, and of realised access (for example user acceptability, cultural safety or ease of use) become a function of the quality of community participation in both design and implementation phases of service delivery.

In the New Zealand context, Eyre and Gauld used an adaptation of Rifkin's 'Pentagram' framework to assess the quality of community participation in health service development in a community health trust³¹ in Lawrence, South Otago (Eyre and Gauld 2003). Rifkin's framework defines participation in a health service delivery context as "*a social process whereby specific groups with shared needs living in a defined geographic area actively pursue identification of their needs, take decisions, and establish mechanisms to meet those needs*" (Eyre and Gauld 2003 p190). Under the Pentagram framework, developed out of over 100 case studies, quality of participation is measured in terms of five dimensions: needs assessment, leadership, resource mobilisation, management and organisation.

Eyre and Gauld gathered interview data from seven participants to assess the Lawrence health trust's performance in each dimension, and then compared these ratings with performance ratings provided by the interviewees themselves. The broad finding was that the Lawrence trust had functioned very well in most Pentagram dimensions, although there was some room for improvement. Noting that the framework used did not focus on those who did not participate in the trust, some distrust of "*marginalised voices with their own agenda*" by one trustee, and noting also academic criticism of the co-option of community involvement by government agencies, the authors suggested that assessment of privation must first answer questions such as "*Why is community participation being encouraged?*" and "*Who stands to gain by the*

³¹ Community health trusts were vehicles for locating ownership of small healthcare facilities – historically owned by the government – within local communities. Such trusts were part of New Zealand health policy during the sector reforms of the 1990s.

community being involved?’” They proposed that answers to these questions would be best assessed by the addition of three further dimension to Rifkin’s original Pentagon: “‘*sustainability of participation*’, ‘*equity in participation*’ and ‘*the dynamic socio-political context*’” (referring to societal change and health sector restructuring as examples of context) (Eyre and Gauld 2003 p195).

Another analysis by Barnett and Barnett sought to assess the experience of nine community health trusts in Southland and Otago (including the Lawrence trust studied by Eyre and Gauld), and to consider implications for the future development of rural health services. Bluntly describing health trusts as an option made available to small communities by the government “*for removing rural services from the balance sheet of CHEs*”³² so as to ensure these services “*did not compromise [CHEs] ‘bottom line’*” (Barnett and Barnett 2001 p230), Barnett and Barnett nonetheless identified that “*all the communities involved in this study had sought new ways of addressing health needs. This was not easy and involved community debate, intelligent and realistic appraisal of options [...]*” (Barnett and Barnett 2001 p233). The authors proposed a series of ‘critical success’ factors: local leadership and capability, local commitment, involvement of local health professionals, ‘learning from each other’ and operational efficiency.

Barnett and Barnett cited examples of health trust successes: services being “*directly accountable to their local communities*” and development by one trust of a ‘support group’ which provides training for local people in “*health and business matters, to ensure a supply of well-informed [trust] directors for the future*”. Caveats were advanced, however, that surgical services were no longer supplied by any of the trusts, that some areas lacked maternity services, and that in general the range of available services varied widely across the nine trusts studied, creating access inequities between communities. In summary, the local control provided by trusts was judged a “*two-edged sword since [communities also] now have all the responsibility*”. Nonetheless, the model was considered to be successful because of a strong sense of community ownership of health services and because there was generally a wider range of services (save the exceptions mentioned above) being provided in each trust area.

³² During the 1990s reforms, public hospitals and related services were incorporated as quasi-commercial, government-owned institutions called Crown Health Enterprises (CHEs).

Despite an overall tone of guarded optimism in these authors' writings, Barnett and Barnett have observed elsewhere that the quality and scale of services retained and/or developed by the communities studied reflected the ability of rural communities to mobilise and take part effectively in the politics of provision decisions (Barnett and Barnett 2003). Successful communities were those able to engage in 'legitimising activities' such as legislative lobbying to defend local services against any planned rationalisation. Effective provider organisations themselves were seen not rational suppliers of services in a central controlled healthcare 'market', but as "*profoundly community-based political savvy organisation[s]*". This extended to the success of new services. Strong communities were able to secure "*contractual advantages*" or "*more comprehensive services*" than other communities. The Lawrence community trust was reported to have successfully engineered a law change to allow more flexible staffing arrangements, which radically improved the financial viability of the trust. This was reportedly achieved with the help of a [government-appointed] Crown Health Enterprise board member, who was a prominent local farmer and also the chair of the Lawrence trust. Barnett and Barnett interpreted these events as examples of 'insider' knowledge at work; this resonates with Eyre and Gauld's concerns regarding the risk that participation can be narrowly defined participants, and offer no voice to more marginalised groups.

Conversely, if effective participation in service delivery requires effective participation in the health sector's political economy, then participation such as membership of a District Health Board (DHB) is important. Indeed effective community representation is a goal of the DHB system of health administration, evidenced perhaps by the reporting undertaken by the Ministry of Health on the representation of rural communities on boards. The Ministry has reported that in the last DHB elections, held in 2004, 'balanced' geographical representation was largely maintained. It is reported that "*if the 76 constituencies of the 2001 elections are used as a comparison, around 70 per cent of rural communities saw an increase or no change in representation*" (Ministry of Health 2005a p163).

9. INFORMATION ON RURAL HEALTH IN NEW ZEALAND: GAPS AND OPTIONS

A large body of literature, covering all aspects of rural health, is available to inform policy in Australia, the United States and other countries. The single largest challenge in the preparation of this review on rural health in a New Zealand context has been the dearth of New Zealand material.

The paucity of analyses on rural health is somewhat surprising given the New Zealand context of

- a relatively robust and comprehensive health data infrastructure available through the National Health Index, National Minimum Data Set and other collections held by the New Zealand Health Information Service
- wide experience throughout the sector in the application of this data for a range of policy and planning purposes
- new data collections being developed; for example the electronic immunisation register, and performance indicators for Primary Health Organisation service delivery and elective surgical service delivery.

Below, options for filling these data gaps are canvassed, and conceptual considerations arising are discussed.

9.1 Currently available data collections

Currently available datasets could be analysed to understand differentials in either health status or service access for rural as opposed to urban residents. Analyses for urban-rural differentials in mortality and hospital utilisation would be straightforward. Advice could be sought from NZHIS on the contents and quality of such other collections as may be analysable on a rural versus urban criterion, and sector stakeholders could be consulted on whether useful combinations of existing data could be formed to elucidate important rural health questions.

It is understood that the Public Health Intelligence arm of the Ministry of Health plans to release analyses from the New Zealand Health Survey (NZHS) regarding urban / rural differentials (personal communication – Liza Wilcox). At present it is not known how well represented rural people were in that survey. However, because the primary sampling unit of the NZHS was the

meshblock, and because meshblocks vary widely in the number of dwellings they contain, the NZHS is likely to have interviewed fewer rural respondents than urban respondents³³, which may impose limits on the specificity and precision of estimates. It is notable that even for Māori, who constituted over a third of the 12,969 respondents to the survey, a typical relative sampling error for, say, a reported quantity for Māori women, stratified into four age bands, is likely to amount to plus or minus 15% (Ministry of Health 2004c p7). Also, the National Health Committee secretariat suggests that other data quality issues³⁴ are recognised as placing limits on the feasible precision of estimates, especially for any estimates cross-tabulating urban/rural with other variables (personal communication – Liza Wilcox). Finally, the degree to which *rural* members of over-sampled populations, for example Māori, were represented in the survey is also not clear at this point. Although a good volume of data was gathered for Māori, cost-efficiency in data collection was achieved by ‘clustering’ the over-sampling of Māori respondents within meshblocks containing a very high (>70%³⁵) proportion of Māori. This may well be appropriate, but depending on whether useful estimates for rural subpopulations are feasible from the NZHS data, it may be useful to clarify with the PHI Directorate whether anything is known about the number of Māori living in more ethnically diverse, rural meshblocks (which were not over-sampled) and therefore how representative the rural Māori respondents to the survey are of rural Māori more generally.

Depending on the quality of information available from the planned urban/rural stratified analysis, the Committee may form some view as to the priority it would attach to a strengthened rural component to future runs of the survey. This would likely require a larger sample of rural respondents, in turn requiring an alteration to the sampling strategies employed in the survey.

³³ The procedure for sampling non-Māori; (1) listed all meshblocks; (2) created a cumulative count of dwellings within each meshblock – effectively creating a conceptual array of all dwellings in New Zealand grouped by meshblock; (3) used a ‘step’ procedure to select an initial dwelling at random, then step down the array, selecting every ‘ n^{th} ’ dwelling. ‘ n ’ was calculated so that the number of dwellings chosen would equal the desired sample size as the end of the array was reached. Since urban meshblocks outnumber rural meshblocks, and since urban meshblocks contain as many as 500 dwellings, compared with as few as three dwellings for rural meshblocks, urban dwellings were very much better represented in the NZHS than rural dwellings.

³⁴ Specifically, geo-coding errors which can misallocate addresses between census area units.

³⁵ This was the threshold for over-sampling for Māori in the final survey design.

9.2 Earlier recommendations on data gathering for rural health policy

Janes, Brabyn and London have all stressed a need for geographically referenced data on the location of services (Brabyn and Barnett 2004; London 2004; Janes 2006). These recommendations have related primarily to general practice services, but the principle rationale for them, that provider-to-population ratios are not sufficient to plan and deliver equitable access to services, applies equally to other services; for example community-based mental health or disability support services. In reply to a comment from Atmore, Brabyn argued for improvements in the national ‘spatial information base’:

An important theme [...] is that computer technology is now available for providing much more sophisticated models of geographical access than population per GP, and that there are a range of models and statistics that can be used. Given that sophisticated spatial analysis tools are available for calculating accessibility, it is ironic that data collection, which is relatively simple, is the problem. [...] It is also hoped that a geographically referenced database of all health services is maintained. This will enable travel time information to be routinely calculated and help provide informed debate on the accessibility of health services in New Zealand.

(Atmore, Brabyn et al. 2004 p1064)

Recently, Janes has called for the completion of a New Zealand Atlas of Rural Health, initiated in 2002 in conjunction with the Annual Rural Workforce Survey (Janes 2006). The atlas sought to provide all data necessary to calculate various measures of rural health service accessibility, and commenced by surveying rural practices to identify Shared Roster Areas³⁶. The atlas initiative also documented the location and frequency of peripheral GP clinics offered in rural areas, the location of rural general practices and rural pharmacies, and average travel times to secondary and tertiary care.

A Ministry of Health Rural Expert Advisory Group considered how best to implement the New Zealand Primary Health Care Strategy in rural areas (Ministry of Health 2002b). The Group recommended that additional information-gathering and research be undertaken on:

- *service delivery issues for rural Māori and rural communities that comprise Māori and non-Māori populations*
- *workforce issues of the wider primary health care team*

³⁶ See the discussion of workforce survey results in Section 7.2

- *scopes of practice and competencies of the rural primary health care workforce*
- *the use of geographical information systems to assist with rural health needs assessment*

The last of these recommendations resonates with the commentary of Brabyn and Janes, and the current contribution of Pearce (see below).

A further recommendation was that a ‘rural index’ be developed, which would:

- *identify localities where there are geographical access issues*
- *assess the health status of rural and remote areas*
- *assess the degree of remoteness of the communities served by individual PHOs (this may, in the future, be used as a basis for allocating the rural primary health care premium to PHOs).*

9.3 Measures of ‘rurality’: ensuring conceptual clarity

For all that it is easy to conceive of potentially useful data (the Expert Advisory Group listed various applications of an ‘index’ in quite rapid succession) it is prudent to be clear about the terms and purposes of quantitatively derived ‘rurality’ definitions, since it is relatively easy to become confused by the alternate, yet linked, concepts involved in an expanded analytical base.

Rurality in terms of demographics, health effects, and potential funding formulae are, at least at first consideration, probably best conceptualised as distinct concepts.

9.3.1 Demographic rurality

Considered demographic categories of rurality have been arrived at by Statistics New Zealand in its recent Rural-Urban Profile work. The profiles apply a construct that interplay with an urban area, specifically in terms of the proportion of commuters and the size of that urban area, alters the character of a rural area. This is intuitively understandable, yet the rural/urban categories are not necessarily proxy determinants of health; for example, a known determinant of health – income – varies greatly *within* categories. For this reason, it seems important to consider, rather than assume, the relevance of the rural profile categories to health, and test for this through analysis (see below).

9.3.2 *Health effects of rurality*

‘Rurality’ in health terms would appear to relate principally to the health effects of rural living, and resulting need for services. The current analytical base for understanding such effects is underdeveloped. Descriptive cross-sectional analyses such those reported from the New Zealand Disability Survey, the NatMedCa survey of primary care, such analyses as may become available from the NZ Health Survey, and any summary analyses of mortality or hospital discharge data which might be undertaken, all provide useful ‘snapshots’ of rural health status on some stratified basis (with ‘rural’ howsoever defined). Such analyses are however insufficient to establish causation because of the number of potential confounders. Conversely, analyses of potential community risk through poor access to services suffer from poor knowledge as to the effects of particular access ‘deficits’. For example, Brabyn and Barnett report that there are significant regional variations in geographical accessibility to health services in New Zealand, but the communities considered most burdened with poor access change depending upon the method (either population/GP ratio, least cost route analysis, or ‘allocation model’) used to calculate accessibility.

For greater insights into rural health effects, disciplined modelling work, using geo-spatial techniques which incorporate considerations of geography as well as other demographic and health-related factors, is required to identify patterns of location and health outcome. While the atlas work appears to have ceased, and despite its almost sole orientation to the imperatives of GP service provision, concepts of rural or remote health are essentially geographically contained, and the principle that geographic information is required for understanding seems sound. Service supply trends between the 2002 and 2005 workforce reports cannot easily be seen because the ‘Shared Roster Area’ basis of the earlier report series has been dropped in the less geographically oriented 2005 report.

Some study of patterns of geography and health outcomes is underway by Pearce. Potentially methodologically related work by Blakely et al on neighbourhood health effects is also being undertaken, although Blakely’s emphasis is on urban neighbourhood effects in socio-economically deprived communities – by definition, a different focus from considerations of rural or remoteness effects.

In terms of using such work to inform policy, important questions of analytical framework arise. Pearce’s focus on first constructing an index of ‘community resource accessibility’ to maraes,

recreational facilities, shopping facilities, educational facilities and health facilities – and positing health outcome effects for various index scores – is but one way to analyse for the health effects of location. Were data available on other potential modifiers of health status or independence – for example, data on accessibility and availability of services relevant to particular health conditions or disabilities, such as that originally proposed for the atlas which Janes and London have referred to – these might be equally valuable contributors to our understanding of the links between rural living and health.

9.3.3 *Rurality measures for funding formulae*

Finally, measures of ‘rurality’ are sometimes made in the context of funding formulae for rural services where the costs of service provision are atypical against urban benchmarks.

In many instances population demographics and health needs are strongly related to costs. The population-based funding formula (PBFF) used to fund DHBs allocates resources based on gender, age, sex, ethnicity and NZDep2001 (Ministry of Health 2004b). This occurs because all of these factors affect the cost of providing services and, crucially, because DHB costing data exists to link these need groups with costs for many services, allowing the generation of ‘cost weights’ attaching to different population groups. The cost weights for each type of individual are then applied to census data on each DHB catchment population to allocate available funding between DHBs.

In some instances, however, costs are driven by other factors. The PBFF contains a ‘rural adjuster’ which is used to distribute most of the additional funds provided under the government’s various rural funding initiatives (described earlier). The funds are provided for “*unavoidable differences in costs DHBs face in providing services to rural populations*” (Ministry of Health 2004b p45). The adjuster distributes funds based on the “*best estimates of current cost*” across DHBs (Ministry of Health 2004b pvii). In other cases, for example on mental health, data on costs is insufficiently robust to link costs of service provision to need groups. Accordingly, the 2003 PBFF population weightings for mental health used the Mental Health Blueprint targets.

The complexity of information required for algorithms such as the rural adjuster depends crucially on how simple or complex the particular policy goal is. For example, a single policy aimed at retaining access to a reasonable level of GP locum cover across different rural areas

would require simple estimates (e.g. required locum remuneration for differing roster situations) whereas the personal health PBFF requires much more complex cost data.

The clear imperative, though, is to distinguish clearly between concepts of demography, health need (for example the health effects of rurality) and provider costs. The Ministry of Health is engaged in a review of the Rural Ranking Scale (RRS) described earlier. Although commentators acknowledge deficits or anomalies in current scale, some controversy appears to have attached to the review. Some of this debate appears to relate to confusion between the concepts of demographic rurality, rural health need, and rurality components in funding formulae. Reaction has centred on a view perceived to be held by the Ministry of Health, that demographic definitions of rurality (specifically the Statistics New Zealand rural/urban profiles) are somehow directly related to definitions of rural general practice and the costs faced by rural practitioners (Janes 2006; Steele 2006 p13). Clarification on this point – for example, on the current policy goals for the Rural Bonus and (if its purpose is to defray higher costs of rural practice) the way that any such definition will be linked to costs – might resolve some of this misunderstanding.

Yet here too the development of more sophisticated understandings of the drivers of rural health status (for example the true role of distance, the impact of health services, the power of rural/urban categories as proxy health determinants) would usefully inform evolution of tools such as the RRS. For all this, the current RRS also has a modest analytical base, so that the present review is an opportunity for incremental improvement, based in a reflective stance and clear purpose.

Finally, in advancing that the current analytical base for understanding rural health is poorly developed, it is important to acknowledge that the realities of rural health experience and delivery on the ground are complex and nuanced in ways that ‘global’ quantitative analyses cannot represent (personal communication – Anne Duncan). Local, contextual, sometimes informal, yet always relevant local information-gathering and solution-finding must always occur within rural communities themselves, in conjunction with the service providers and other agencies which serve them.

9.4 Towards a rural health indicator set

Although New Zealand's existing health data infrastructure provides a strong initial base for the study of rural health, it is instructive to review the long Australian experience of policy-making for, and provision of, remote and rural health services, and the information needs which have emerged for these policies.

The Australian Institute of Health and Welfare recently published a rural health information and indicator framework (Australian Institute of Health and Welfare (AIHW) 2003). The framework is ambitious, seeking to identify "*all the types of information that are important to develop an understanding of, and to monitor, the health of rural, regional and remote populations*". The Institute has undertaken a process to:

- develop a formal understanding of the types of information that are important for understanding rural health
- review the usefulness of available data collections towards this understanding, so laying the foundations for an ability to report in a systematic way on rural health issues
- assist in identifying gaps in the data that prevent effective reporting of rural health issues.

The framework is comprehensive, with 114 proposed indicators covering 18 dimensions, and grouped within three overall tiers adopted from the federal government's National Health Performance Framework; 'Health Status', 'Determinants of Health' and 'Health System Performance'. Example indicators from the 'Health System Performance' tier include 'reduced access to service because of discrimination', 'reduced access to service because of cost', 'rate of dental consultation by reason', 'road distance to primary care, ED [Emergency Department], chemist, hospital and aged care', 'access to disability services', and 'prevalence of depressive, anxiety and substance-abuse disorders'.

Some of the indicators are ambitious in terms of scope and feasibility given available data, and 39 of the indicators have not been developed in detail, for these reasons. Nonetheless, the framework represents the kind of approach taken by a sophisticated view of the rural health policy problem.

10. SUMMARY

This brief review has attempted to document the nature of rural communities, their health and independence status, aspects of services supplied to them and their use of services, according to accepted access frameworks from authors such as Goddard and Smith, and Aday and Andersen.

Both positive and negative images and ideals of the rural life – and its links with health and wellbeing – are well documented in a large body of sociological literature, as well as in studies of rural life in New Zealand. However, in contrast with long-standing images of rural people and living, the demography, economy and social conditions have undergone radical changes over the past 100 years, including the wholesale urbanisation of Māori in a scant 40 years (but with significant Māori populations remaining in remote regions of the North Island) and, more recently, very rapid growth in so-called ‘peri-urban’ areas. Fourteen per cent of the New Zealand population now lives in rural areas. The changing shape of rural New Zealand is seen in Statistics New Zealand’s recent rural/urban profiles publications, yet important demographic, socio-economic and other differences are still visible within each profile category.

Little data on the health need or morbidity of rural populations, and any differentials from that of urban populations, is available. Early work (1989) from Edmondston identified that mortality rates for rural and major urban areas were lower than those for secondary and minor urban communities, that rural residents were no more likely to delay care, but more likely to report inconvenience as a reason for delayed care seeking. The literature documents increased health risks for rural populations from poor water quality, and one study documents increased allergic symptoms for rural children exposed to farm conditions. The New Zealand Disability Survey does analyse for rural/urban differentials, and finds similar age-standardised prevalences of disability. Differences between the urban and rural disabled population in terms of access to transport and ease of travel may suggest that rural living imposes additional challenges for people with disabilities. Narrative accounts of health and disability need describe low income, access to services (mediated by access to a vehicle), as well as other needs and vulnerabilities.

In terms of the supply and delivery of health and disability services, obstructive geography and diseconomies of scale in small-scale, distributed provision are seen as challenges for effective delivery. Successive governments since the 1940s have adopted special funding policies for rural health. While rural health policies sit within the larger context of current health strategy

and sector structures, half a dozen important funding initiatives are highly valued by the sector and the communities for whom access is improved. Analyses of supply sufficiency require careful consideration since different measures of access can depict relative isolation differently. For example, 'least cost path analyses' which focus on travel time and costs identify different regions as disadvantaged from areas identified by analysing provider-to-population ratios. Nonetheless, the variation around rural New Zealand in supply of key practitioners such as GPs is striking, and some authors contend that influencing the distribution of practitioners is as important as increasing the number of them. The model of care supplied is different in rural and urban areas, as seen for example in the differing services provided to primary care patients, and in innovative delivery of acute treatment in early onset acute myocardial infarction. Another innovative solution of relevance to rural areas is the national Healthline free-calling health advice service. A comprehensive evaluation has demonstrated the value of the Healthline service – not least because the proportion of Māori callers matched the population proportion of Māori in three of four pilot areas, including Gisborne / East Coast. While Healthline has established itself as a permanent feature of the New Zealand health system, other telehealth services, which had been expected to offer promise, have not developed at a rapid pace. The number of projects appears to be growing, but challenges include demanding requirements in terms of skills, infrastructure and the energy required of clinical champions to support telehealth ventures.

Some differences between urban and rural populations in patterns of primary care use are evident. Rural males have been reported to have lower attendance rates for both cardiovascular problems and mental health problems, and males over 65 recorded as having a lower rate of presentation for digestive problems. Injuries or poisoning presentation rates were higher for rural people. Much lower cervical smear rates and also cardiovascular referral (to hospital) rates were seen for rural populations than urban populations. Rather higher proportions of depression presentations in rural males were seen to be managed by prescription. Available studies on hospitalisation rates are not comprehensive (focussing either on a subset of services or a subset of regions), however the work which is available, and one study of the attitudes of surgeons to equitable surgical access across the country, has suggested that smaller centres and rural populations may be better served than urban populations. At the same time, in some narrative accounts of acceptability and accessibility of care, rural people have been highly critical of both the availability and quality of services.

Some authors cite community participation in health and disability service design and delivery as a central determinant of overall service accessibility and quality. Analyses of effective participation concluded that success rests crucially on the ability of rural communities to mobilise politically, which not all communities appear empowered to do, and authors cited some evidence that a core of highly active and cohesive political leaders in local health advocacy, while essential to accessing state resources, can exclude marginalised groups.

In view of New Zealand's relatively strong health information infrastructure, clearly voiced desires for rurally focused and geographically rich information resources and a 'rural index', and research underway in New Zealand universities using geo-spatial techniques (such as the work of Pearce and Blakely), the paucity of existing analysis is anomalous. Frameworks and new analyses for understanding demographic rurality, the health effects of rurality, and the economic effects of rurality on service provision are needed. This requires research and modelling work. Cross-sectional urban-rural analyses from Statistics New Zealand apply a useful construct about the impact of interplay with urban centres on rural areas. But the resulting urban-rural categories are not necessarily proxy determinants of health; some known health determinants vary widely *within* the urban-rural categories. Work such as that by Pearce to create an index of 'community resource accessibility', and (it is planned) to model links between index scores and health outcomes, employs the analytical techniques needed to better understand the role of 'rurality' in health. In developing this kind of work, important questions of framework and logical construct emerge in selecting which aspects of rural living should first be modelled against particular health outcomes.

Finally, rural health indicator frameworks developed in countries with long experience of rural health policy and service delivery – such as the framework of the Australian Institute of Health and Welfare – provide a useful guide to the kinds of information and analysis required to develop a comprehensive understanding of rural health status, and rural health system performance. This is the kind of information which future literature reviews of this kind should ideally draw on.

11. CONCLUSION

From a policy perspective, the defining difference between New Zealand and other countries with large rural regions and a largely publicly-funded health and disability sector is that New Zealand has not examined its local context nearly as thoroughly as other jurisdictions. This creates serious challenges for a locally relevant literature review of this kind.

The fact that 14% of the New Zealand population live in rural areas, the importance of rural areas to our economy and society, and the mark that New Zealand's strongly rural history still leaves on the New Zealand psyche, together mean that the health and independence of rural people should properly be the concern of policymakers and wider New Zealander society. According greater attention to rural health, starting with the development of informative data sources, is the least we can do.

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