



Original Research | He Rangahau Motuhake

A Process to Inform Rural Nursing Workforce Planning and Development

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Nursing Praxis in Aotearoa New Zealand

With many rural health workers approaching retirement age, a local district in Aotearoa New Zealand embarked on a project to identify the current status of the nursing and kaiāwhina (support worker) workforce to develop a visionary plan for the future to match community health needs. There were four-stages to the project: 1) profile the current population and health resources available in the community; 2) profile the current nursing workforce; 3) survey local nurses regarding their current work and future plans; and 4) seek perspectives of local nurses, health managers and community representatives on strategies to sustain a future nursing workforce. This paper focuses on the first two stages of this project. Using postcodes as a geographic locator, the parameters of the health service catchment were established. Local council and census data relating to the catchment were used to build the district's profile, while websites provided information on current health service availability. Nursing annual practising data linked to postcodes provided the nursing workforce profile. The finalised framework was designed to inform a future match between the nursing workforce and the district's community's health needs. Replication of the process, this profiling framework, has the potential to benchmark progress with nursing workforce development over time, as well as benchmark nursing workforce capacity between rural localities. The findings from the profiling allowed us to demonstrate the uniqueness of the district's population, the health services available, and both the precariousness and potential of a nursing workforce.

Te reo Māori translation

He hātepe hei kawē whakamua i te whakamaheretanga tapuhi tuawhenua me te whakawhanaketanga

Ngā ariā matua

Nā runga i te tatanga o te huhua o ngā kaimahi hauora tuawhenua ki te reanga tuku mutunga mahi, i whakarewaina e tētahi rohe whāiti i Aotearoa tētahi kaupapa hei tautuhi i te tūnga o te kāhui kaimahi tapuhi, kaiāwhina hoki, hei tārei i tētahi mahere matawhānui mō āpōpō, kia hāngai ki ngā hiahia hauora o te hapori. E whā ngā kauwhata o te kaupapa: 1) he kawē i tētahi inenga o te kōtaha taupori, me ngā rawa hauora e wātea ana i te hapori; 2) he ine i te kāhui kaimahi tapuhi o nāiane; 3) he uiui i ngā tapuhi o te rohe mō tō tātou mahi o nāiane, me ō rātou mahere mō āpōpō; me te 4) rapu whakaaro o ngā tapuhi o te rohe, ngā kaiwhakahaere hauora me ngā kanohi hapori mō ngā rautaki whakaū i tētahi kāhui tapuhi toitū mō ngā rā e heke mai nei. E anga ana tēnei tuhinga ki ngā kauwhata tuatahi e rua o tēnei kaupapa. Nā te whakamahinga o ngā wāhere poutāpeta hei tūtohu takiwā, i tātaitia ngā taupā mō te whānui o te rohe hauora. I whakamahia ngā raraunga kaunihera ā-rohe, ngā raraunga tatauranga hoki mō te rohe, hei whakapūmau i te kōtaha o te takiwā, ā, i whakamahia hoki ngā pae tukutuku hei hora mōhiotanga mō te wāteatanga ratonga hauora o nāiane. Nā ngā raraunga mahi tapuhi ā-tau i paiheretia ki ngā wāhere poutāpeta i hora te kōtaha kāhui kaimahi tapuhi. I āta hoahoatia te anga i whakaotingia kia whakamahia hei pou tūtohu mō te whakatairitenga o te kāhui kaimahi tapuhi ki ngā hiahia hauora o te hapori o te takiwā. Ki te tukuruatia tēnei hātepe, mā te whakamahi i te anga ine i te āhua o te takiwā, ka taea pea te tiroiro mehemea kei te eke te whanaketanga kāhui tapuhi ki ngā tohu i whakaritea, waihoki, te tiroiro mehemea kei te eke haere te raukaha kāhui tapuhi ki ngā rohe tuawhenua maha. Nā ngā kitenga o tēnei inenga i āhei ai mātou ki te whakaahua i te āhua motuhake o te

taupori o te takiwā, i ngā ratonga hauora hoki e wātea ana, me te tītengi, te pitomata hoki o tētahi kāhui tapuhi.

Ngā kupu matua:

Aotearoa, te ine i te hāpori, te kāhui kaimahi hauora tuawhenua, te tapuhi tuawhenua, ngā ratonga tapuhi tuawhenua, te whakmahere kāhui kaimahi

INTRODUCTION

Internationally, there is growing concern over the difficulties in recruiting and retaining the health workforce in rural and remote rural localities (MacKay et al., 2021; MacLeod et al., 2017; Ministry of Health [MoH], 2018; World Health Organization [WHO], 2020, 2021). Despite the plethora of literature on the characteristics of the rural workforce and strategies to attract and retain nurses in these settings, few studies have focused on the health needs of the specific community in the first place, to better identify the skill set and experience nurses need to meet the demand. Ensuring this fit exists is crucial given its potential to provide greater job satisfaction, increase sustainability of the workforce and effectively meet the needs of the community (Bragg & Bonner, 2015; MacKay et al., 2021). As the largest occupational group within the health sector (WHO, 2020), careful consideration of the role of nurses is crucial in developing strategies to ensure a safe and sustainable provision of quality healthcare that is fiscally responsible and meets the needs of the communities being served (WHO, 2021).

The maldistribution of the nursing workforce negatively impacting rural and remote rural communities has been the subject of research for many years (Collett et al., 2020; Doolan-Noble et al., 2019; Jones et al., 2019; Russell et al., 2013). Much of this research has focused on factors that influence the sustainability of the rural nurses' work life in rural communities. These include social factors that attract and retain the nurse within the community, appropriate and adequate resources, collegial and community support, training and education opportunities, and manageable workloads (Bragg & Bonner, 2015; MacKay et al., 2021). While the literature provides an interesting range of opinion on the reasons for nursing recruitment and retention issues in remote and rural localities, few studies have made links between the nature of the communities they service, including their unique health needs, and the specific skill sets and experience required of the health workers to meet these needs more comprehensively (Collett et al., 2020; Jones et al., 2019).

Aotearoa New Zealand is equally challenged by rural and remote rural nursing recruitment and retention issues (Doolan-Noble et al., 2019; Ross, 2017). In 2019, an estimated 13.3% of the population were identified as living rurally, a similar proportion to Australia (World Bank, 2019). Subsequent development of an Aotearoa New Zealand rurality classification for use in health (Whitehead et al., 2022), increased this estimate to 19%, or 900,000 people and included the entire district in this study. According to a 2018-19 Nursing Workforce Profile Report (Nursing Council of New Zealand [NCNZ], 2020), which was based on data required for nurses' Annual Practising Certificate (APC), 14% of nurses working in Aotearoa New Zealand lived in

rural postcodes. However, on further examination only 4% of these nurses indicated, based on the post code of their work address, that they worked in a rural employment setting (NCNZ, 2020).

This paper describes how a profiling framework was developed to inform a rural community's nursing workforce strategy. A recent WHO (2020) publication stated that, "Fundamental issues limiting the research (into recruitment and retention of the rural and remote rural health workforce) include a lack of baseline data, lack of agreed terms and definitions, a plethora of frameworks being used so that comparative research cannot be done, and the limitations of the studies rarely being discussed" (p. 4). However, a search of literature found limited information and no tools or frameworks relevant for the Aotearoa New Zealand rural context to provide direction on how to match nursing workforce with the current and future community health needs. Developing a profiling framework that maximised the use of readily available and regularly updated data, would enable replication of the process in other localities as well, to enable more reliable benchmarking between localities and identification of the intensity of the rural nursing workforce crises over larger jurisdictions.

PROJECT DESIGN

A proactive community in a rural district of Aotearoa New Zealand had developed a series of projects to reinvigorate their local health services. The nursing workforce were viewed as being pivotal in maintaining the services the community had managed to retain. A new director of nursing had been recruited and sought a partnership with a university to undertake a project entitled, *The nursing and support worker (Kaiāwhina) workforce in our district - the current status and a visionary plan for the future*. Faculty from the University of Otago's Department of Nursing based in Christchurch were engaged to inform the development of the plan. Governance of this project was provided by the Director of Nursing and representatives of a local community foundation. The community foundation, established to reinvigorate the local hospital and associated health services, funded the part-time employment of a local nurse as a research assistant for the project. This ensured the project had local knowledge, advocacy for participation in the project among colleagues, and engendered a sense of local ownership of the process and outcomes. There were regular meetings between the researchers and the governance group at various stages in the project.

The project was undertaken in four stages. The first stage obtained a demographic profile of the community to picture their current and potential health needs, as well as their current health resources. The second stage involved profiling the current nursing and kaiāwhina workforce, and where possible, benchmarking this with the national data.

Table 1. Website and app sources for data collection

Organisation	Website
AA Time & Distance Calculator	https://www.aa.co.nz/travel/time-and-distance-calculator/
Healthpoint: Community health and social services	https://www.healthpoint.co.nz/community-health-and-social-services/
Nursing Council of New Zealand: Workforce Statistics	https://nursingcouncil.org.nz/Public/NCNZ/publications-section/Workforce_statistics.aspx
NZ postcode map	https://www.pdfFiller.com/80802609--nz-postcode-map
Stats NZ: 2018 Census place summaries	https://www.stats.govt.nz/tools/2018-census-place-summaries/

These two stages effectively constituted a stocktake used to inform the current state, and in the future, to measure the impact of any innovations generated out of the nursing workforce plan. The process could also enable findings to be compared with other rural localities in New Zealand. The third stage of the project used an e-survey to explore local nurses' feedback on aspects of their current work and their future plans. The final fourth stage, involved sharing the findings with the local nurses, health managers and community representatives in focus groups to fully explore current and future plans of the workforce, including strategies to sustain a suitable nursing and Kaiāwhina workforce going forward.

The focus of this paper is to share the methods used for the first two stages of the project. These stages were reliant on publicly available documents and data sets to increase the likelihood that the same sources could be used for stocktakes in other rural localities in Aotearoa New Zealand. While the data sets are Aotearoa New Zealand specific, it was likely that similar data sets are available in other countries. It is the identification and use of the data the authors are demonstrating in this article. Data on the kaiāwhina workforce was sourced through an e-survey of employers because there was no national process which consistently collects information on this workforce. The findings for this local workforce are not included in this article but were used for the workforce plan.

METHODS

The two first stages of the project reported here used primarily quantitative methods. The project was reliant on sourcing data captured in national data sets that were able to be aggregated. Information on health resources was obtained through a search of websites, such as the location and hours of operation for all the pharmacies, medical centres and other health providers. A spreadsheet of indicators was developed and grew as the project progressed and new relevant data sources were uncovered. To make the process as simple as possible for others to follow, Microsoft Excel was used to collate the data. Data were collected from various websites and apps during 2019 (Table 1). The findings were then presented to the nursing management team and governance group to ensure that the findings seemed to match their expectations and follow up any 'odd' findings. The project governance group were involved in prioritising indicators and the final set are identified in Tables 2 and 3.

Ethics approval was obtained from The Human Ethics Committee, Academic Committees and Services, University of Otago, Dunedin, New Zealand, for the entire project (Reference code 19/053).

Stage 1: The demographic profile of the community and available health services

On commencement of the project, it was deemed important to agree on the specific geographical boundaries of the locality in the project. This was established by searching and identifying the official mesh blocks used by local councils to demarcate their territories. Postcodes were the key indicators used for this. Once the governance group agreed on the boundaries (postcodes to be included), this enabled all other official measurements, such as census units, health data and data from NCNZ, to be matched as closely as possible to the confines of the agreed geographic boundaries of the locality under study.

The first stage of this project focused on constructing a demographic profile of the specific locality and identifying the various health services and facilities offered throughout the district. The question explored at this point was, "What is the profile of the population in the district and what health resources do they currently have access to?"

Features of the district and demographic profile data

Census data was accessed through the Stats NZ website, providing information on local places, including population, ethnicity, religion, health, employment, income, education, and housing. Table 2 provides an overview of the data that was obtained from this source for the district.

Identification of available health services

Local health services were identified through Healthpoint's database of community health and social services, by entering in the specific district (Table 3). Annual reports and documents available on the specific health services' website also provided useful information on service availability and utilisation. This information provided the basis of a health directory for the district, which the governance group felt would be useful for them to monitor over time.

Table 2. Data specification for community profiling

Data categories	Specific data sets used for the community profile
Population and age structure	Age and sex in five-year age groups Growth over time and predicted growth Patterns of migration into and out of the area over time Born overseas
Household and housing profiles	Household make up and size House types and associated resources
Diversity	Age and sex by ethnicity in five-year age groups
Incomes and wellbeing	Volunteer work Employment status and type Income levels Smoking rates Deprivation index Sources of income
Education	Qualifications
Transport	Modes of travel

Table 3. Data specification for health service profiling.

Hospital based health services in the district.	Community based services available within the district. (Hours of availability and travel distances were included in the profile)
<p>Aged care facilities (name, locality, independent houses/ apartments, dementia beds, rest home beds, hospital beds)</p> <p>Hospitals (name, locality, bed numbers, inpatient services, day stay services and outpatient services)</p> <p>Maternity inpatient services</p>	<p>Ambulance and inter-hospital transport</p> <p>Child health</p> <p>Community nursing/home nursing</p> <p>Complimentary therapies</p> <p>Diagnostic services</p> <p>Dental services</p> <p>Disability services</p> <p>Maternity/midwifery services</p> <p>Mental health/psychology</p> <p>Pharmacies</p> <p>Podiatry</p> <p>Primary care services (including locality, enrolled population, number of doctors, nurse practitioners, nurses)</p> <p>Occupational therapy</p> <p>Physiotherapy</p> <p>Sexual health</p> <p>Telehealth</p> <p>Trauma, emergency and after-hours medical</p> <p>Youth health</p>

Service access

Travel times were calculated using the AA Time and Distance Calculator to determine accessibility to the base hospital with medical, surgical, trauma, obstetric and other specialist services. Forms of road and air retrieval available also informed the profile.

Stage 2: Nursing workforce profile

Each year when nurses apply for their Annual Practising Certificates, personal and employment data is updated into the NCNZ registration database. The NCNZ dataset is published in an annual report and data is made available for research purposes. While the data is de-identified, it does include the residential postcodes of nurses as well as the postcode of their work address. Data were received from NCNZ for the April 2019-March 2020 year, of all nurses

who either worked or lived within the postcodes in the district under study (Table 4). Using the New Zealand post code map app, the project team could confirm the postcodes within the geographic locality under study.

The data were used to identify the distribution of nurses within healthcare services and throughout the district to inform discussion on whether a redistribution of the nursing workforce would be the best first step and/or whether recruitment in specific areas would be required.

FINDINGS

The demographic profile of the district

The district covered 6,190 square kilometres, with a total resident population of almost 33,500, equating to a population density of 0.05 people per hectare. Most of the population were centred around one main town situated in the centre of the district and two much smaller towns located

Table 4. Indicators in annual data set received from the Nursing Council of New Zealand and used in the profile.

Indicators in NCNZ dataset
Employment setting and scope of practice
Ethnicity and work type
Age group by nursing scope
Head count by practice area
Main hours of work per week and full-time equivalent calculation
Reasons for working part-time
Initial nursing qualification and post registration qualifications
Main area of work for those residing and working within the locality
Main area of work for those residing in but working outside the locality
Main area of work for those residing outside and working outside the locality

approximately 30 minutes by car in either direction from the main town. Each of the smaller towns had a resident population of about 1,500 people. The district's only hospital, located in the main town, had no surgical, specialist inpatient or obstetric services, and was 60-90 minutes (depending on weather conditions and traffic) by road from the nearest base hospital. Between 2000 and 2020, the population in the district increased by 37%, but was predicted to slow, reaching 42,000 by 2043. Compared with the national average, the population over 65 years of age and those in the pre-school age group were higher, while there were less people in the 15- to 29-year age group. The district does not have any tertiary education facilities.

The largest workforce was employed in agriculture, forestry, or fishing (26%), compared with 5.9% nationally, and followed by manufacturing (12.1%), compared with 9.1% nationally. The proportion employed in healthcare, and in education and training were about half the national average. The population were predominantly European, with the Māori population less than half the national average. However, overseas arrivals into the district increased by 29.3% between 2013 and 2018 with the largest group being Filipino working in the agriculture sector. There was almost full employment, and despite the rate of postgraduate qualifications among the workforce being almost half the national average, more individuals were in the two highest income quartiles than the national average. Only a few high deprivation areas existed – some in the main town or in some of the smaller towns/settlements. Over a quarter of the population owned their home, higher than the national average, and only 3% of households did not own a car, which was essential as there was no public transport within the district. The district had a higher proportion of volunteers in the community compared to the national average.

Health services available in the district

The district's hospital provided inpatient medical, rehabilitation, short stay, midwifery services and palliative care as well as a venue for a variety of outpatient services, mainly for visiting medical specialists. Community services used the hospital as a base for delivering a range of health care services, including mental health, district nursing, and home support services. Other community health services included child health, school health, cancer and hospice

support, dental surgeries, hearing services, physiotherapy practices, youth health services and private mental health and counselling services. The district had seven aged care facilities, mostly privately owned, which provided dementia, rest home and hospital level care.

There were seven general practices in the district and eight pharmacies. None provided services after 7pm or 8pm on weekdays. Only one medical centre and two pharmacies provided a weekend service and only from 9am until 7 pm. The local hospital and ambulance services remained the only after-hours health services in the district. Approximately 2,500 people were admitted to the hospital's emergency department in the previous year. Medical staff were on-call for the hospital, but not always on site after hours or during the weekend.

The nursing workforce profile

The data received from the NCNZ identified the number of registered nurses, enrolled nurses and nurse practitioners employed in the district and their full-time equivalent (FTE) status. There were almost twice as many nurses aged over 60 years than the national average. Two thirds of all nurses had been practicing for more than 15 years and 15% had a postgraduate nursing qualification. Two thirds of the nurses worked part-time (less than 33 hours per week), mostly because of family commitments. Some nurses were employed for a small portion of their hours, as nurse specialists in a variety of areas including palliative care, diabetes, respiratory, urology, continence, stoma, wound care, gerontology, and oncology. The hospital wards and outpatient areas were primarily staffed by registered nurses.

The local hospital was the predominant employer of all nurses (56%), with other nurses mainly employed in aged residential care (19%) or primary care (17%), with figures higher than the national average of 10% and 13% respectively. Interestingly, 22 nurses travelled an hour or more to work into the district, mostly in mental health settings, while 40 nurses travelled outside the district to work, mainly in surgical areas in the base hospital an hour away. This was said to be related to the closure of the operating theatre and surgical ward in the local hospital a number of years ago.

For succession planning reasons, the district's nursing cohort aged 55 and over were explored in greater depth as they represented almost half of all the nurses. Differences

existed between this group and the district's younger nursing cohort. The older cohort more often worked in community settings; chose to work part-time/fewer hours; worked more in assessment and rehabilitation, and less in aged care and medicine settings. They were also more highly represented in leadership and nurse specialist roles.

DISCUSSION

The findings using the profiling framework provided knowledge on the current status of the local district's population, ethnicity, religion, health, employment, income, education, and housing; the health services currently available; and the nursing workforce engaged within the services. The application of the profiling process provided clarity on key factors relating to the nursing workforce in the district. It also provided more direction on the questions to be asked of the nurses in stage three of the project - the e-survey. As a result, there was the potential to match the local need with the required skill set of the nursing workforce; which is an asset in both recruitment and retention of nurses in rural and remote rural localities (Bragg & Bonner, 2015; MacKay et al., 2021; Ryan et al., 2017). A report on the profile was presented to the district's director of nursing, the hospital management team, the community representatives, and the nursing staff. The profile ensured the next stage of the nursing workforce planning process was undertaken with a shared understanding of where they were starting from.

The usefulness of the profiling framework was demonstrated by clarifying key features the local community considered to be important for the nursing workforce plan. The population of this district was characterised as predominantly belonging to one of two groups, either young families with an above average income who own their own homes and work in agriculture and industry, or an elderly cohort of retirees. For the young families, there would be a need to ensure the maintenance of family focused health services, including sexual health and child health. Given the growing ageing population, there would likely be increasing challenges for local health services associated with the management of chronic conditions (Blackberry & Morris, 2023; Breyse et al., 2021). As many of the district's population worked in high risk occupations, there was the potential for nurses to work in occupational health and safety roles.

The nursing workforce profile highlighted some key features for workforce planners to consider, including the inevitable attrition of their current nursing workforce given the proportion of nurses nearing retirement age (Doolan-Noble et al., 2019; Uthaman et al., 2015). Further, the district's older nurses seemed to work in more autonomous and specialist roles, therefore, it was seen as an imperative that younger nurses should be integrated into such advanced roles and mentored by the experienced nurses. Further, the health of the older nurses, particularly those who are living with long-term conditions, will themselves need to be supported within the workforce if they choose not to retire (Ryan et al., 2017). The nursing profile raised questions about local nurses travelling

out of the district to work and how they could be retained within the district. There were also considerations as to whether there was a better way to configure nurse specialist services so that there was less reliance on individual nurses holding the specialist knowledge. There was recognition that there was a gap in community health service access 'after hours' and at those times reliance on the hospital's emergency department, which could be managed by the employment of nurse practitioners.

Comparison of these findings with similarly available national data enabled focus on the unique aspects of their community and workforce, supporting the notion that the district needed to tailor their nursing workforce to fit in with the community need (Doolan-Noble et al., 2019; World Health Organization, 2020). Using this profiling framework, the size of the localities under study could be tailored, based on the use of postcodes associated with the data sources. The data for this profile was captured just before COVID-19. Repeating the profile could be used to identify any changes to the community and nursing workforce since the pandemic. The profile provides a benchmark against which future workforce development strategies could be measured.

Limitations of the study

The limitations related mainly to developing a comprehensive enough data set using only publicly available data. The census is only completed every 5 years, therefore, 2018 census data was used for this project which was completed in 2019. The next census data is available from May 2024. Updating of publicly available data may not always be timely or complete.

CONCLUSION

The WHO challenged those researching rural health workforce recruitment and retention to develop some standard measures against which health workforce needs could be assessed (WHO, 2021). The processes outlined in this article demonstrate the development and application of a profiling framework that can be used for these purposes. At each stage of data collection and reflection, implications for the nursing workforce can be drawn. Rural and remote rural communities and their associated health needs do vary, therefore, this process, using publicly available, consistently reliable, and regularly updated data can be used to more effectively highlight the health service gaps and specific needs of each community.

Funding for the Project

A local community foundation funded the research nurse role. The Foundation has not been named to maintain confidentiality of the locality.

Conflicts of interest

There were no perceived conflicts of interest.

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