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The allied health workforce of rural Aotearoa New Zealand: a scoping review

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ABSTRACT

Introduction. The allied health workforce is a crucial, if at times poorly visible, component of modern healthcare systems. The services provided by allied health professionals may be particularly important for underserved populations, including rural and remote communities. **Aim.** To determine what is currently known through research about the allied health workforce in rural Aotearoa New Zealand. **Method.** A scoping review of diverse sources of literature from Aotearoa New Zealand was obtained from seven databases (July 2011–July 2021). **Results.** Eighty-nine articles were identified, of which 10 met the inclusion criteria; nine empirical studies and one narrative review. The included research fell into two main categories: geographic workforce distribution ($n = 8$), and the role of the rural allied health workforce ($n = 2$). **Discussion.** The paucity of research that meets the criteria for inclusion makes it difficult to draw conclusions about the allied health workforce in rural Aotearoa New Zealand. There is a focus in both the international rural allied health literature and the Aotearoa New Zealand rural medical and nursing literature on: measuring geographic workforce distribution; and rural-specific training. This suggests that these issues are important to the rural workforce. Similar research is needed in Aotearoa New Zealand to inform policy and ensure the rural allied health workforce reaches its full potential in improving health outcomes for rural New Zealanders.

Keywords: allied health, allied health occupations, allied health personnel, geographic workforce distribution, health workforce, New Zealand, rural health, rural health services, workforce.

Introduction

The allied health workforce is a crucial, if at times poorly visible, component of modern healthcare systems. 'Allied health' can be defined as the group of health professions that excludes medicine, nursing and dentistry. The Aotearoa New Zealand Ministry of Health's indicative list of allied health professions (Table 1) includes audiologists, dietitians, medical imaging technologists, medical laboratory scientists, occupational therapists, optometrists, pharmacists, psychologists, physiotherapists, and social workers, all of whom are members of healthcare teams in Aotearoa New Zealand. Allied health encompasses a very broad range of professional groups, many of which have specialised skills and small workforces and are therefore less likely to be found in rural areas.

The services provided by allied health professionals may be particularly important for underserved populations, including rural and remote communities.[1] Australia is currently the only country who has looked at the rural allied health workforce in depth. This has resulted in initiatives aimed specifically at supporting and growing the rural allied health workforce.[2] These rural practice-specific skills were developed in response to rural-practice context, including an increased burden of disease, access to health care, confidentiality, cultural sensitivity, and team practice. Efforts have been made to improve recruitment and retention in Australia, through undergraduate exposure and postgraduate vocational pathways.[3] A national Allied Health Rural Generalist Pathway has been developed that has resulted in rural- specific scopes of practice

WHAT GAP THIS FILES

What is already known: Rural populations have higher healthcare needs and face specific challenges in the provision and delivery of rural health care. The challenges health workforces face when practicing rurally have been documented in medical and nursing literature within Aotearoa New Zealand, and internationally for allied health professionals.

What this study adds: This research highlights a lack of information regarding the allied health workforce in rural Aotearoa New Zealand. Further research is required to fully understand the allied health workforce in the rural context of Aotearoa New Zealand in order for it to reach its full potential in improving health outcomes for rural New Zealanders.

supported by: (i) an education programme; (ii) workforce policy and employment structures; and (iii) rural generalist service models.[4]

In Aotearoa New Zealand, there is evidence that residents of rural towns represent a population with high healthcare needs[5] and that we may be underestimating the impact of rurality on health.[6] When compared to other geographic areas, residents of Aotearoa New Zealand's rural towns are more likely to be Māori, older, experience higher levels of deprivation, poorer access to health services and have poorer health outcomes.[5] There is considerable variation between rural communities both in the range of healthcare services that are locally available and in the way in which they are organised.[7] The challenges of rural practice within Aotearoa New Zealand have been documented for doctors and nurses. For example, the geographic maldistribution of the medical workforce, including shortages in rural areas, has been quantified.[8,9] Targeted initiatives have been developed to support recognised scopes of rural medical practice.[10–12] The potential for nurse practitioners to take a larger role in the rural areas has been recognised.[13,14]

The aim of this study was to describe what is currently known about the rural allied health workforce in Aotearoa New Zealand.

Methods

A scoping review was selected to allow the inclusion of diverse sources of literature, including both formal and grey literature.[15] This scoping review used an adaption of the approach proposed by Peters *et al.*[16] which extends the Arksey and O'Malley[15] framework.

Stage 1: identifying the research question

The research question was kept intentionally broad to extend the breadth of literature coverage. The research question and key terms were deliberated on by the research team, which was made up of both allied health and medical professionals operating within clinical–academic roles. The question was defined as 'What is currently known through research about the allied health workforce in rural Aotearoa New Zealand?'. The key terms that required clear definition were 'rural', 'research' and 'allied health'. Work to define 'rural' for the purposes of New Zealand health research and policy is currently being undertaken.[17] Because this is a review of the existing literature, we have accepted the definition of rural adopted by individual authors. 'Research' was determined following discussions among the team, and in consultation with an expert subject librarian, as literature characterised by some form of transparent data collection and analysis reported in a way that allowed for review. The 'allied health' workforce is defined as those professions who are not part of the medical, dental, or nursing profession. For the purpose of this review, 'allied health' was considered as those professions recognised as 'Allied Health Scientific and Technical' by the Ministry of Health[18] (Table 1), and specifically those that are regulated through either the *Health Practitioners Competence Assurance Act* 2003 or are self-regulated by a professional body[19] and identified through discussion among the research team as being commonly present in rural Aotearoa New Zealand and across public and private services.

Stage 2: identifying relevant studies

Due to the nature of allied health, with a mixture of various independent professions, a comprehensive list of search terms was mapped with the assistance of an expert subject librarian to ensure a balance of broad and specific definitions of the professions within this group could be identified. Generalisability was maximised through an iterative process covered under four key concepts: 'allied health professions' AND 'rural environment' AND 'workforce' AND 'Aotearoa New Zealand'. An example of the search strategy used can be found in Supplementary Table S1.

Evidence sources included searching for all types of literature published between July 2011 and July 2021, within the following databases: CINAHL, Web of Science, Embase, PsycINFO, Medline, and SCOPUS. An additional web-based search was completed using the Google search engine. The most recent search was executed on 19 July 2021.

Stage 3: selecting the studies

Following the initial search, literature selection involved reviewing titles, then abstracts for inclusion. Discussions among the research team based on the research question and iteratively following the initial review of literature helped to develop the review criteria (Table 2). Extracted material included year, topic, key findings, and type of study.

Table 1. An indicative list of allied health professions within New Zealand.[18]

Anaesthetic technicians[A]	Drug and addiction counsellors	Orthotists and prosthetists[B]
Audiologists[B,C]	Exercise physiologists	Osteopaths[A]
Biomedical engineers and electronic technicians	Family and marriage counsellors	Paramedics[A]
Cardiac sonographers[A]	Gastroenterology scientists and technicians	Pharmacists[A,C]
Chiropractors[A]	Genetic associates	Pharmacy technicians
Clinical dental technicians[A]	Hospital play specialists[B]	Physiotherapists[A,C]
Clinical perfusionists	Magnetic resonance imaging technologists[A]	Podiatrists[A,C]
Clinical physiologists – dialysis (renal dialysis technicians)	Massage therapists[B]	Psychologists[A,C] (clinical, educational, child and family, counselling, health and neuro-psychologists)
Clinical physiologists – respiratory	Medical imaging (or radiation) technologists[A,C]	Psychotherapists[A]
Clinical physiologists and technicians – cardiac	Medical laboratory scientists[A]	Radiation therapists[A]
Clinical physiologists and technicians – sleep	Medical laboratory technicians[A]	Rehabilitation counsellors
Counsellors[B]	Medical photographers	Social workers[B,C]
Cytogeneticists	Medical physicists	Sonographers[A,C]
Dental assistants	Music therapists[B]	Speech and language therapists[B,C]
Dental hygienists[A]	Neurophysiology scientists	Sterile service technicians
Dental technicians[A]	Neurophysiology technicians	Traditional Chinese medicine practitioners
Dental therapists[A]	Nuclear medicine technologists[A]	Vision and hearing technicians
Dietitians[A,C]	Occupational therapists[A,C]	Visiting neurodevelopmental therapists
Dispensing opticians[A]	Optometrists[A]	
Diversional therapists	Orthoptists[B]	

[A]Professions regulated under the *Health Practitioners Competence Assurance Act* (HPCA).
[B]Professions self-regulated by a professional body according to Hogan.[19]
[C]Professions identified as being consistently present in rural Aotearoa New Zealand.

Table 2. Inclusion and exclusion criteria applied to the scoping review.

Inclusion	Exclusion
• Includes remote or rural information	• Not specific to Aotearoa New Zealand
• Empirical study or literature about allied health professions or workforce	• Not workforce-based (eg service delivery)
• Reported outcomes	• Opinion or perspective only
• Includes the Aotearoa New Zealand workforce specifically	• Not specific to health sector (eg education)
• Between July 2011 and July 2021	• Full-text not available

Stage 4: charting the data

The key categories were charted by reviewing the material and sorting it into key issues. Once initial ideas and thoughts were complied, authors then met to discuss these, re-reading the material, and progressively organising, synthesising, and interpreting. Excerpts from the articles were collated within the key categories for presentation within the results.

Stage 5: collating, summarising, and reporting the results

The results were organised into a narrative, with the purpose of outlining what is currently known about the Aotearoa New Zealand allied health workforce. The type and quality of evidence was also considered in the presentation of categories.

Ethics approval

This study used already published data and so did not require ethics review or approval.

Results

There were 105 publications identified overall from all seven databases, and 16 duplicates removed (Fig. 1). Abstract and

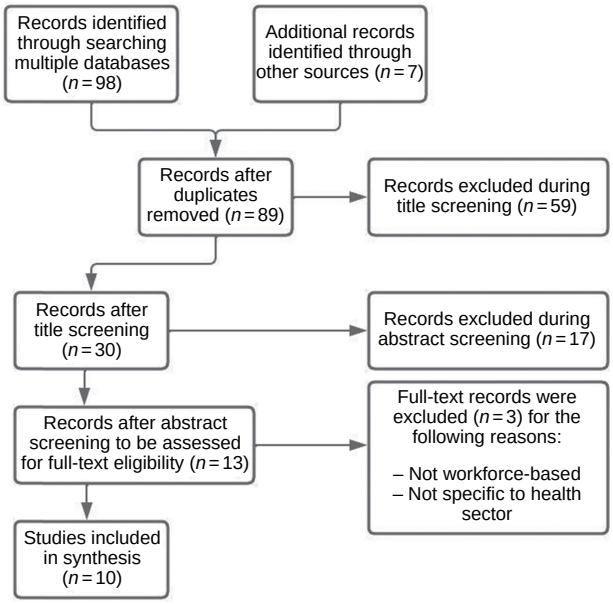

Fig. 1. Selection of sources of evidence.

title screening was completed with 13 publications remaining. A full-text review was then undertaken. Of these, 10 publications met the inclusion criteria; nine empirical studies, and one narrative review (Table 3).

The main themes of the publications included were the geographic workforce distribution (n = 8), and the role of the rural allied health workforce (n = 2).

Geographic workforce distribution

The majority of the publications (n = 8) included information on geographic workforce distribution. Although some allied health professionals are present in rural areas, it is suggested that this is at a lower density than in urban areas.[20–26] Some geographic workforce data were able to be extracted from national workforce surveys (Table 4) published by registration or professional bodies for individual disciplines.[22–26] Mapping the distribution of health professionals across rural and urban areas was not the primary aim of these surveys. The geographic workforce distribution data were a small part of larger reports; the findings were not discussed or considered in recommendations for future research. There was a lack of clear rural data as workforce distribution information was collected, defined, and reported on in a variety of ways (Table 4). This makes it difficult to draw conclusions about both individual professions and the allied health workforce as a whole.

The geographic workforce distribution was also recognised within other work. Both Gleissner[21] (in the context of Speech–Language Therapy) and Pullon *et al.*[27] suggested that geographic workforce distribution was a key contributor to obvious health needs not being met within rural areas. Reid and Dixon[24] quantified this for physiotherapists, where 81% worked in urban areas, citing challenges in the ability to recruit to rural areas. However, Pullon *et al.*[27] suggested that even with a workforce willing and able to practice in rural areas, there is a perceived lack of opportunity for career diversity or progression.

Exeter *et al.*[20] outlines the challenges of the current workforce distribution, which are anticipated to worsen over time. These authors used Statistics New Zealand population projections from 2011 to 2061 to estimate the implications for the hearing workforce. It was estimated that in addition to an increase in rural populations, there would also be a significant increase in the proportion of those aged >65 within rural areas. This increase of elderly within rural areas is expected to impact heavily on a fragile workforce that is small in nature with a specific area of practice. Exeter *et al.*[20] suggests there is a strong possibility of critical hearing workforce challenges similar to that of general practitioners, nurses, and pharmacists in rural areas.

The role of the rural allied health workforce

The remainder of the publications (n = 2) identified the specific challenges the allied health workforce faces in delivering health care and developing a workforce suitable for rural Aotearoa New Zealand.[28] Both George *et al.*[28] and Awatere[29] acknowledge that practicing in rural areas requires unique practicing characteristics, in part due to the geographical and demographic characteristics of rural areas, but also the professional capacity required and the more generalist nature of clinical work. Interestingly, George *et al.*[28] was the only piece of research included that reported on allied health as a collective group. George *et al.*[28] also highlights the potential benefits for Aotearoa New Zealand's relatively undeveloped rural allied health workforce by adopting the workforce strategies developed by other New Zealand rural health professions and overseas rural allied health professional groups.

Discussion

This is the first comprehensive scoping review of the existing literature on Aotearoa New Zealand's rural allied health workforce. The most notable finding was the paucity of literature that met the inclusion criteria. Rural allied health workforce issues were the primary focus of only three publications, and only one paper considered the allied health professions as a collective group. This makes it difficult to draw conclusions about the allied health workforce in rural Aotearoa New Zealand. This is not the first time a formal review of the literature has generated few articles on a rural health topic in Aotearoa New Zealand.[30]

The literature identified in this review fell into two broad categories: (i) distribution of the workforce across rural and urban areas; and (ii) role of the allied health workforce in

Table 3. Data extraction chart.

Author (year)	Reference in text	Title	Purpose	Key findings related to topic	Type of study
Exeter *et al.* (2015)	[20]	The projected burden of hearing loss in New Zealand (2011–2061) and the implications for the hearing health workforce.	To outline the estimated future trends of hearing loss in New Zealand using Statistics New Zealand projection data, and the impact of this on workforce and provision of hearing health services.	It is expected that proportionally the older population will increase more in rural areas, requiring an increase in the hearing workforce in these areas, suggesting the possibility of critical workforce challenges similar to that of general practitioners in rural areas.	Population projections analysed in the context of recent national hearing loss prevalence studies and known workforce statistics of audiologists and otolaryngologists.
Gleissner (2018)	[21]	Private Speech and Language Therapy Practices in Aotearoa – New Zealand.	To describe the workforce demographics, services provided, and perceived professional needs of private speech language therapists in Aotearoa New Zealand.	Speech Language Therapy in the private setting is available across the majority of the country, with the exception of the West Coast region. It is unclear if or how the needs of more rural populations are being met as there is some evidence of an urban-biased geographic distribution.	Online survey distributed to speech language therapists working in private practice, distributed via public practice registers, special interest groups and social media. The survey was part of a larger Master's project which also included qualitative methods not relevant to this topic.
Stewart (2016)	[22]	The Aotearoa New Zealand Psychology Workforce Survey.	To improve knowledge about workforce profile, workforce activities, and workforce dynamics of the Aotearoa New Zealand Psychology workforce.	Psychologists are more common in urban areas; however, they are reported as being 'widely distributed'.	Online workforce survey distributed to all financially current psychologists, completed on a voluntary basis.
Physiotherapy Board of New Zealand (2021)	[23]	Annual Report.	The annual report of Aotearoa New Zealand's governing body for physiotherapy outlining governance, strategic goals, registration, competence, workforce, and finances.	Geographic workforce distribution relating to rural areas is not specifically discussed, data are only available regarding the density of physiotherapists in each District Health Board (DHB) area.	Online workforce survey distributed to registered physiotherapists, completed on a voluntary basis as part of annual practice certification process.
Reid and Dixon (2018)	[24]	M4KING SEN5E OF 7HE NUMBERS: Analysis of the Physiotherapy Workforce.	A report prepared for Physiotherapy New Zealand, the national professional membership organisation, seeking to define the key workforce issues in physiotherapy.	The physiotherapy profession in Aotearoa New Zealand has a significant issue with workforce retention. There is also a workforce maldistribution, with 81% of physiotherapists working in urban areas, and challenges noted when recruiting to rural areas.	A collective of qualitative research methodologies including focus groups, workshops, and semi-structured interviews. Additional quantitative data analysis was performed using data provided by the Physiotherapy Board of New Zealand 2018 Workforce Survey and from physiotherapy training providers.

(*Continued on next page*)

Table 3. (*Continued*)

Author (year)	Reference in text	Title	Purpose	Key findings related to topic	Type of study
Social Workers Registration Board (2020)	[25]	Social Workers Registration Board Workforce Survey 2020.	To provide an overview of the registered social worker workforce at national and local levels within Aotearoa New Zealand.	Geographic workforce distribution relating to rural areas is not specifically discussed, data are only available regarding the density of social workers in each DHB area.	Online workforce survey distributed to all registered social workers, completed on a voluntary basis.
Pharmacy Council (2021)	[26]	Workforce Demographic 2021	The annual report of Aotearoa New Zealand's governing body for pharmacy outlining the register, and workforce, used to monitor and report on the demographic and geographic spread of pharmacists across New Zealand.	Geographic workforce distribution relating to rural areas is not specifically discussed, data are available regarding the density of pharmacists in each region.	Workforce survey distributed to registered pharmacists, completed as part of the annual practice certification process.
Pullon *et al.* (2021)	[27]	Five years on: Influences on early career health professionals from a rural interprofessional pre-registration immersion programme.	To ascertain former students' perceptions of and influences from a final year pre-registration, rurally located, clinically based, 5-week interprofessional programme on their subsequent work and career in the health professions.	Although the programme described had many positive influences on students' subsequent careers in relation to rural health, allied health professionals highlighted limited opportunities to practice regionally or rurally despite obvious health need.	Online free-text survey distributed to students who had previously completed the programme in the past 5 years, distributed via known contact details and social media. Responses were analysed using thematic analysis.
George *et al.* (2019)	[28]	Learning from those who have gone before: strengthening the rural allied health workforce in Aotearoa New Zealand.	An overview of health workforce development in New Zealand, highlighting opportunities and lessons for future workforce development.	By understanding workforce strategies used by other professions and for Alliied Health Professionals (AHPs) in other countries, New Zealand has the opportunity to positively influence national strategy and targeted development of the rural allied health workforce.	A narrative review of existing literature.
Awatere (2011)	[29]	What really does it have to do with Osteopathy anyway? New Zealand osteopath practitioners talk about rural Māori health.	Uses a qualitative approach to determine how osteopathy is provided to Māori in rural communities. Identifies many factors contributing to the osteopaths choosing to live and practice in the rural environment, as well as the determinants of quality health care provision for this population.	Discusses the practice and provision of osteopathy in rural areas; however, includes minimal information about the workforce as a whole, or the availability of these services in rural communities.	A qualitative methodology using semi-structured interviews and interpreted using narrative analysis to extract key themes relating to the topic.

Table 4. Variation in the rural allied health workforce data reporting.

	Pharmacy Council[26]	Physiotherapy Board of New Zealand[23]	Physiotherapy New Zealand: Reid and Dixon[24]	The Aotearoa New Zealand Psychology Workforce: Stewart[22]	Social Workers Registration Board[25]
Data collection					
Online survey	✓	✓	✓	✓	✓
Qualitative interviews and workshops			✓		
Geographical area defined as					
DHB		✓	[A]		✓
Regional	✓		[A]	✓	
Reporting method					
% of total workforce			✓	✓	✓
Per 10 000 PHO enrolees		✓			
Per 10 000 people	✓				

[A]Information not available. DHB, District Health Board; PHO, Primary Health Organisation.

rural areas. The first category provides evidence of geographic workforce maldistribution, with fewer practitioners in rural areas, for a range of allied health professions, although interpretation is complicated by the different definitions of 'rural' in use. The much smaller second category (two studies) identifies differences in the roles of rural allied health professional relative to their urban colleagues. Rural-specific scopes of practice or targeted postgraduate rural training were not specifically considered. George *et al.*[28] did, however, highlight the opportunity to build on existing research and training initiatives coming from rural allied health researchers in other countries, and rural medical and nursing researchers in Aotearoa New Zealand.

Rural and remote allied health research is more abundant in Australia. When O'Sullivan and Worley[3] undertook a review of the international literature on the provision of allied health services in rural and remote communities, and the training of rural allied health professionals in 2020, they were able to identify 120 publications (Australia (n = 97), Canada (n = 8), USA (n = 2), and New Zealand (n = 1)) that met the inclusion criteria. Four key categories were identified in the O'Sullivan and Worley[3] review: (i) workforce and scope of practice; (ii) rural training pathways; (iii) recruitment and retention; and (iv) models of service. The only category echoed in our current Aotearoa New Zealand review is the 'workforce and scope of practice' category. Despite the progress made to support rural allied health scopes of practice in Australia, little data has been published on the distribution of this workforce across rural and urban areas. Potential reasons for this have been attributed to the variable nature and definition of allied health as a professional group, the complex context in which rural services are often provided (ie outreach and fly-in, fly-out services), as well as various funding models, lack of supporting infrastructure and policy, and challenges with both state and commonwealth government levels.[31] The absence of an Australian national dataset has not impeded all progress, but rather has forced a somewhat piecemeal approach with smaller, geographically limited data collection and workforce initiatives growing into national implementation such as the Allied Health Rural Generalist Pathway.[31,32] However, the challenge of quantifying the impact of these initiatives on a national scale remains.

As Aotearoa New Zealand embarks on major health system reforms, policy makers lack a substantive body of national allied health research on which to draw. The limited available evidence suggests that the allied health professions suffer the same geographic workforce maldistribution seen in medicine and nursing, but there are no data on the impact this may be having on health outcomes for rural populations, or the strategies needed to overcome it. Inferences can be made from the international allied health literature and the Aotearoa New Zealand medical and nursing literature. This includes the importance of defined rural scopes of practice and training initiatives that are embedded in rural clinical practice and rural communities. Further research is needed to determine whether these inferences can be generalised to the allied health workforce in the Aotearoa New Zealand context. Priority should be given to: (i) the collection of accurate data on the geographic distribution of the workforce; (ii) the role of allied health professionals in rural health services; (iii) rural scopes of practice and models of care; (iv) training for rural practice; and (v) growing a rural Māori allied health workforce. In all these research areas, there needs to be an emphasis on rural communities with high healthcare needs and poor access to services.

This review was time-limited, focusing on the period from 2011 to 2021 with the intention of identifying research

that was both current and relevant to the present workforce. This may have excluded some relevant research published outside of this date range. The selection of material included grey literature; there is less formalised processes for searching this literature and potentially relevant material may have been missed. Not all professions listed in the Aotearoa New Zealand Ministry of Health's indicative list (Table 1) of allied health professions were included in this study, and some studies referred to specialised disciplines. Professions that were unlikely to be working in rural Aotearoa New Zealand (eg clinical perfusionists), or professions that were unregulated and therefore unregistered, were not included. Although this review does not include all disciplines, the key findings are likely to be relevant to the wider allied health workforce.

The non-medical, non-nursing, and non-dentistry health professionals operating in the Māori cultural context are of particular importance to rural Aotearoa New Zealand, as they may have a crucial role in overcoming health inequities. Rongoā Māori practitioners[33] and Māori community health workers[34] are receiving increasing formal recognition, and arguably should be added to the Aotearoa New Zealand Ministry of Health's indicative list (Table 1) of allied health professionals. Kaupapa Māori researchers need to be supported to undertake research into the role of these emerging health professionals.

Conclusion

There is little published research focusing on allied health care in rural Aotearoa New Zealand. The emphasis placed on describing the geographic workforce distribution and rural-specific roles, as well as professional and training initiatives in both the international allied health literature and Aotearoa New Zealand's medical and nursing literature, suggests that these are important areas of research with the potential to improve the state of a rural health professional workforce. Similar research is needed, focusing on Aotearoa New Zealand's rural allied health workforce if it is to reach its full potential in improving health outcomes for rural New Zealanders.

Supplementary material

Supplementary material is available online.

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