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Beyond the black stump

Rapid reviews of health research issues affecting regional, rural and remote Australia

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Beyond the black stump: rapid reviews of health research issues affecting regional, rural and remote Australia

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Contents

The Spinifex Network engages place-based researchers to identify research priorities to improve the health and wellbeing of communities living in regional, rural and remote Australia

Sonya R Osborne

Nearly 30% of Australians live in rural areas and are disadvantaged by factors such as socio-economic status, educational attainment, job opportunities, and access to health services and social support.[1] People living in rural and remote areas also have higher rates of disability, illness, engagement in risky behaviours (such as alcohol and other drug consumption and smoking), hospitalisations and premature death than other Australians.[1]

It is generally agreed that different models of health care and approaches to health promotion and disease prevention are needed in rural Australia to deal with challenges in health service delivery including access, cost, capacity and capability. In some cases, there is ample evidence about which service models work in different contexts and why, but no national strategy for using this knowledge to scale up and spread local successes.[2] Compounding this, less than 2.5% of government funding supports rural health research.[3] The historic lack of funding for rural health and medical research means limited research evidence in some areas to guide Australian health services administrators and policy makers about not only what works but how to make it work to realise improved outcomes in rural health.

In November 2019, more than 50 leaders representing rural, regional and remote communities, health service providers, academic institutions and research institutes came together to create a national rural health and medical research alliance, the Spinifex Network (https://spinifexnetwork.com.au/2020/02/04/australias-medical-researchers-unite-in-the-red-centre-for-rural-health). The founding member organisations voluntarily joined forces to provide seed funding to create a force for change in rural health. To date, the Spinifex Network has over 60 member organisations spread over 140 locations across Australia (https://spinifexnetwork.com.au/members).

The Spinifex Network has a geographically distributed approach and will advocate for more strategic and consistent funding for rural health and medical research, including support for place-based researchers living and working in the regions. The network aims to embed regional, rural and remote priorities into the national research agenda, build capacity for rural clinicians in research and for rural health services in evaluation, and champion a rural prosperity mindset, and has sought federal government funding to assist these efforts (https://spinifexnetwork.com.au/2020/09/21/pre-budget-submission).

Spinifex Network is solution focused. One of its first actions was to establish the Spinifex Network Rapid Review Subcommittee to commission, through a competitive process, a series of funded rapid reviews, published in this Supplement, engaging the expertise of network members to generate high quality, policy-relevant research in rural health (https://spinifexnetwork.com.au/rapid-reviews).

Rapid reviews were chosen as the methodology to synthesise and disseminate knowledge more quickly than a traditional systematic review for health decision makers who often need timely access to health information.[4,5]

The aim of this Supplement is to introduce the Spinifex Network as a leading national network supporting rural health and medical research and to showcase a few of the many rural health research priority areas. Four diverse issues are reported:

- **Food security in rural and remote Australian communities:** Alston and colleagues (Chapter 1) synthesise evidence on initiatives for improving food environments in regional and remote populations. Prioritising initiatives to improve the healthiness of food environments can be effective; however, the paucity of studies identified in the Australian context indicates a general underinvestment in this area.
- **Impact of natural disasters on people living in rural and remote areas:** Goodwin and colleagues (Chapter 2) review the research on the effectiveness of health and social care interventions in supporting the physical and mental health needs of rural populations experiencing natural disasters, and find a lack of robust evaluation of the various programs and interventions. Curtin and colleagues (Chapter 3) also consider the impact of natural disasters, but focus specifically on the short and long term effects of bushfire on children and highlight the need for research on effective supportive interventions to improve health and wellbeing outcomes in this population.
- **Recruitment and retention of a sustainable rural health workforce:** Walsh and colleagues (Chapter 4) review rural health workforce policies and highlight the lack of research using well designed longitudinal evaluation designs to evaluate not only the effectiveness of recruitment and retention strategies but also their alignment with policy objectives. Gillam and colleagues (Chapter 5) examine publicly available data sources currently used to inform health workforce and health services planning. They review the quality of these data sources in terms of relevance, accessibility and accuracy, and the limitations in appropriately describing the rural health workforce.
- **Global crises affecting people in rural and remote settings:** Lieschke and colleagues (Chapter 6) describe the complexity and challenges of tapering opioids in patients with chronic non-cancer pain, identifying several barriers and enablers associated with the current approach.

The rapid reviews in this supplement sought evidence of the effectiveness of interventions to inform policy and practice and also to identify research gaps in the currently available evidence. The result has been to highlight priority areas for targeted research

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funding to improve the health and wellbeing of people living and working in regional, rural and remote Australia. For more on the Spinifex Network visit https://spinifexnetwork.com.au.

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Chapter 1

Retail initiatives to improve the healthiness of food environments in rural, regional and remote communities

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Abstract

Objective: To synthesise the evidence for effectiveness of initiatives aimed at improving food retail environments and consumer dietary behaviour in rural, regional and remote populations in Australia and comparable countries, and to discuss the implications for future food environment initiatives for rural, regional and remote areas of Australia.

Study design: Rapid review of articles published between January 2000 and May 2020.

Data sources: We searched MEDLINE (EBSCOhost), Health and Society Database (Informit) and Rural and Remote Health Database (Informit), and included studies undertaken in rural food environment settings in Australia and other countries.

Data synthesis: Twenty-one articles met the inclusion criteria, including five conducted in Australia. Four of the Australian studies were conducted in very remote populations and in grocery stores, and one was conducted in regional Australia. All of the overseas studies were conducted in rural North America. All of them revealed a positive influence on food environment or consumer behaviour, and all were conducted in disadvantaged, rural communities. Positive outcomes were consistently revealed by studies of initiatives that focused on promotion and awareness of healthy foods and included co-design to generate community ownership and branding.

Conclusion: Initiatives aimed at improving rural food retail environments were effective and, when implemented in different rural settings, may encourage improvements in population diets. The paucity of studies over the past 20 years in Australia shows a need for more research into effective food retail environment initiatives, modelled on examples from overseas, with studies needed across all levels of remoteness in Australia. Several retail initiatives that were undertaken in rural North America could be replicated in rural Australia and could underpin future research.

Unhealthy diets, particularly insufficient intake of fruits and vegetables and excess intake of ultra-processed foods,[1] are a major driver of global increases in preventable non-communicable diseases (NCDs).[2] Rural populations in Australia and other high income countries such as the United States[3] and Canada[4] have higher rates of obesity and NCDs compared with their metropolitan counterparts.[5,6] Globally, these rural inequalities have been associated with poorer access to health care, geographical isolation, lower incomes, reduced access to healthy foods, and differences in modifiable behavioural risk factors such as smoking.[3-6] A recent Australian study found that if rural Australians could achieve the same levels of dietary intake, smoking cessation, alcohol intake and physical activity as their metropolitan counterparts, the rural–metropolitan disparity in ischaemic heart disease mortality would decrease by 38%.[7] About 7 million Australians live in rural, regional and remote areas, as defined by the Australian Statistical Geography Standard (ASGS), with evidence of poor diet and increased disease burden.[8,9]

One way to improve dietary intake, and reduce incidence of NCDs, is to address unhealthy food environments, including those that encourage overconsumption of processed foods and those that present barriers to accessing healthy foods such as fruits and vegetables.[10] The World Health Organization has identified improving food environments as a priority target to support healthy diets worldwide, especially in places with high levels of disadvantage such as rural communities.[11,12] Food environments are defined by the US Centers for Disease Control and Prevention as places where there are any factors that may affect a person's diet, including food availability, food accessibility and distribution of food stores and services.[13] Priority improvements, as outlined by the World Health Organization, include increasing the availability, variety and promotion of healthy foods in food retail environments, and reducing the dominance of unhealthy foods.[14]

In Australia, food retail environments in rural communities have been shown to be a barrier to healthy diets, with limited access to and promotion of healthier foods.[12,15-17] Evidence-based initiatives to improve food retail environments in rural settings are needed, yet no studies have systematically reviewed this evidence. We therefore aimed to synthesise evidence — including overseas evidence on food environment initiatives for communities in comparable rural settings — to inform research into future food environment initiatives for rural, regional and remote areas of Australia.

Methods

We systematically searched three electronic databases — MEDLINE (EBSCOhost), Health and Society Database (Informit) and Rural and Remote Health Database (Informit) — for studies published between 1 January 2000 and 31 May 2020. Search results across databases were merged using reference management software EndNote X9 (Clarivate Analytics) and Covidence systematic review software (Veritas Health Innovation), and duplicates were removed. The full electronic search strategy for MEDLINE is shown in Supporting Information, Table 1.1. Owing to the rapid timeline for this review, the protocol was not registered with PROSPERO.

Studies published in English were included if they contained data on initiatives targeting the food retail environment in a rural, non-urban, remote, regional or non-metropolitan area in any country. Studies were excluded if: they were reviews, study protocols, commentaries, editorials or grey literature; they did

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not include the primary outcome of change in food retail environment; or they assessed an initiative that was not available to the whole community. In the Australian studies, remoteness was defined by ASGS criteria.[9]

Study selection followed the process described in the *Cochrane handbook for systematic reviews of interventions*[18] and the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement.[19] Two authors (LA and KAB, JW, JB or ER) independently assessed studies according to the inclusion and exclusion criteria. Full texts of all potentially relevant studies were then assessed by two of us (LA and KAB or JW). Disagreements were resolved by discussion, and another author (ER) adjudicated. If multiple articles reported on the same initiative, they were only included if each article reported on different or separate outcomes.

One author (LA) extracted the data, and two authors (KAB, JW) independently extracted data from a random sample of 20% of included studies and compared results for consistency. We contacted study authors in cases of missing, incomplete or unclear data. Data extracted included: author and publication year, year of intervention, duration of study, study design, country, food environment setting, location (rural specification), community characteristics, description of food environment intervention, and outcome measures. We then synthesised the evidence, grouping studies by setting (eg, grocery stores) and comparing Australian and overseas studies.

Two of us (TW, AWS) independently assessed the methodological quality of studies using the Effective Public Healthcare Panacea Project quality assessment tool.[20] This tool gives an overall study quality rating of strong, moderate or weak.[20] Studies involving Indigenous Australian populations were assessed by one author (TW; an Aboriginal researcher) using the CREATE critical appraisal tool.[21] This tool consists of 14 questions that appraise studies conducted in Australian settings with Aboriginal and Torres Strait Islander people through an Indigenous-specific lens.[21]

Results

We retrieved 1416 records from the database searches, and screened 1237 titles and abstracts after removing of 179 duplicates. We assessed 53 full text articles and 21 studies were retained (describing 18 food environment initiatives) (Box). Four of the 21 studies did not report on rural communities experiencing significant disadvantage,[22-25] and seven of the 21 studies only reported food environment change (ie, not change in consumer behaviour such as dietary intake or purchasing).[23,25-30] A summary of included studies is provided in Supporting Information, Table 1.2.

Australian studies

Five articles covered four distinct food retail environment initiatives in rural Australia.[30-34] Three initiatives were conducted in very remote Australia[31-34] and one was conducted in regional Australia.[30] Four of the five articles focused on food environments in Indigenous communities and showed positive effects on consumer behaviour,[31-34] and two of them — by Brimblecombe and colleagues — reported different outcomes of the same initiative, which had high community engagement and input from local stakeholders.[32,33]

Brimblecombe and colleagues (2017) reported the impact of the Stores Healthy Options Project in Remote Indigenous Communities (SHOP@RIC) initiative on fruit and vegetable sales.[32] They found a 12.7% increase in sales of fruits and vegetables resulting from price discounts, and a further 7.6% increase linked to consumer education strategies. Diet beverage sales increased by 5.0%, along with a 5.5% increase in regular sugar sweetened beverages (SSBs). Increased fruit and vegetable sales coincided with statistically significant increases in total sodium and energy intake during and after the period in which discounts were applied, showing potential negative implications of price discounts as community members may have spent more on discretionary food items. The second article by Brimblecombe and colleagues (2018) described a survey of 148 community members to determine changes in dietary intake as a result of the SHOP@RIC initiative.[33] It reported a 27% reduction (95% CI, −44% to −4%; $P = 0{\cdot}02$) in SSB intake from baseline to the end of the initiative and an improvement in community member self-efficacy to purchase fruits and vegetables. Few other dietary changes were observed.

Lee and colleagues (2016) described the impact of 26 years of community efforts and store-level policy changes in the very remote, and predominantly Indigenous, Anangu Pitjantjatjara Yankunytjatjara lands.[31] Their assessment found that fruit and vegetable prices decreased by 9% between 2008 and 2014, with no changes in overall diet quality as measured using the store turnover method.[31] Brown and colleagues (2019) used an incentive program with vouchers for fruits and vegetables in a remote Indigenous community.[34] This evaluation revealed a 7% reduction in the purchase of fruit and no difference in the purchase of vegetables when compared with the year prior, and that uptake of the vouchers was low (< 30% of vouchers were redeemed). The authors noted that this might have been due to inadequate marketing of the incentives in stores.

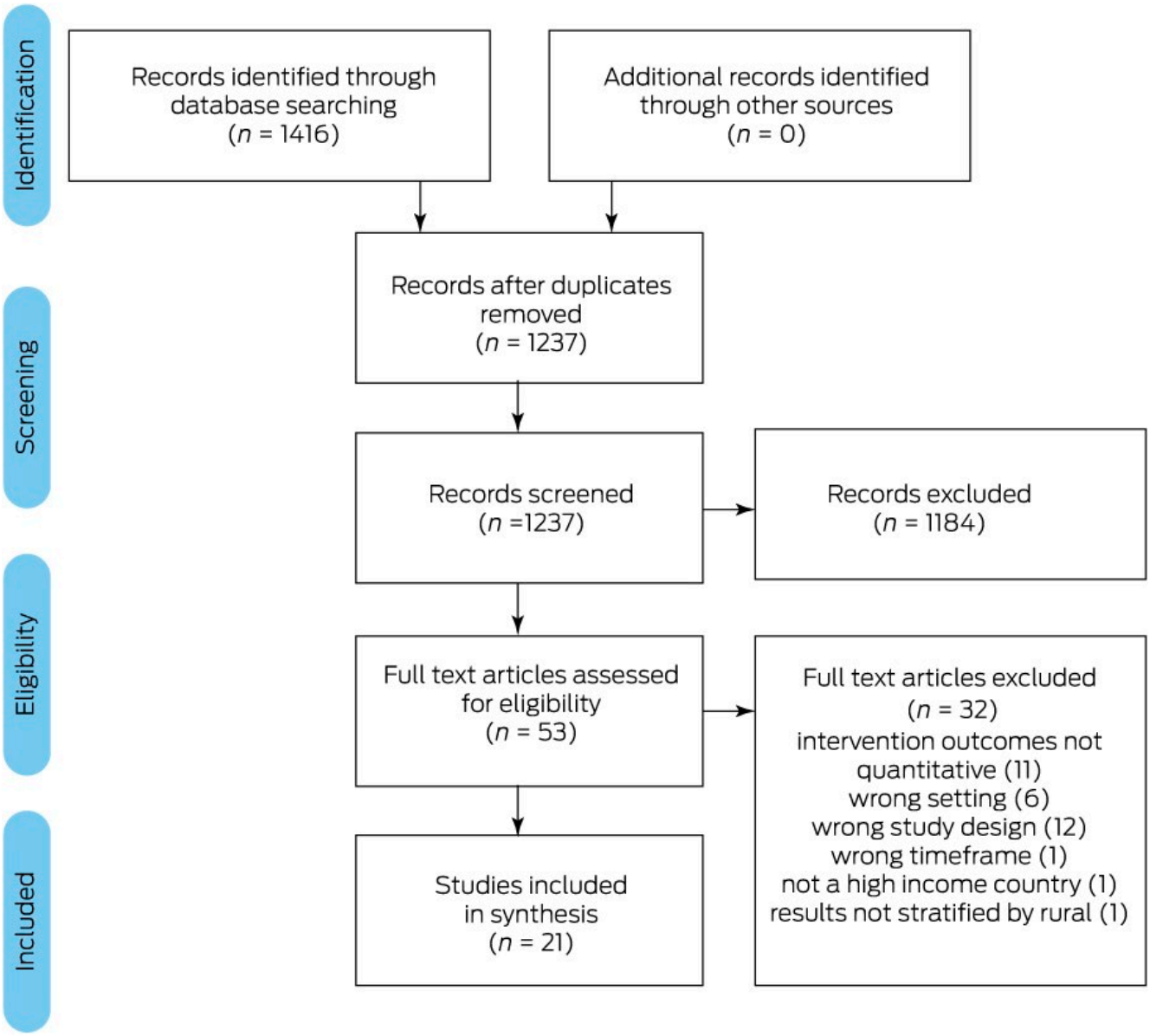
In the only Australian article that did not focus on Indigenous communities, Palermo and colleagues (2016) evaluated the impact of providing incentives to store owners in 21 regional Victorian towns to improve the variety and availability of healthy foods.[30] In this region, healthy foods had been found to be not easily accessible.[35] The evaluation revealed a significant increase in the median number of healthy food varieties — from 10 varieties to 17 varieties — across 15 stores ($P = 0.028$). The authors did not assess the effect of increased food variety on consumer purchasing behaviour.[30]

Overseas studies

In our review, we included 16 studies from rural settings in high income countries. Of these, 15 reported on evaluations of initiatives implemented in rural areas of the US, and one was from a rural area in Canada.[36] Three of the studies focused on Indigenous populations.[26,29,37] We did not identify any studies from low or middle income countries.

Grocery store settings. Eleven overseas studies described initiatives targeting the food environment in grocery store settings[22,24-26,29,37-42] and two of these also included restaurants as part of the initiative.[25,43] They all showed a positive change in either the healthiness of the retail environment or consumer behaviour. Chapman and colleagues evaluated three "nudge" strategies in grocery and convenience store settings.[39] The nudges comprised promoting nutritious food, guiding customers in the direction of healthy foods (eg, using floor signs) and "scarcity nudges" relating to the availability of fruits and vegetables.[39] The combination of all three nudges was associated with increased sales of healthy foods during the trial period ($P = 0.001$).[39] Rushakoff and colleagues (2017) implemented and

PRISMA diagram of studies included in this review



PRISMA = Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

evaluated the Healthy2Go stores program and found that providing support to rural store owners to increase the promotion and placement of healthy foods over an 18-month period led to a 40% increase in stocking of healthy foods. In addition, the variety of healthy food in stores improved by 20%.[42] A survey of community residents (287 at baseline and 281 at the end of the study) showed significant improvements in customers' self-reported consumption of healthy foods.[42]

Gustafson and colleagues (2019) evaluated the impact of the Plate It Up Kentucky initiative.[40,41] Plate It Up Kentucky was a community-based initiative that used a community participatory design and was implemented in rural Kentucky grocery stores. It included overall marketing of the Plate It Up Kentucky program, end-of-aisle marketing of healthy food, and recipe cards and healthy food samples in stores. A dietary intake survey of more than 2500 rural Kentucky community members found that fruit and vegetable intake increased significantly — by 0.23 and 0.18 serves per day in the first and second years, respectively.[40] Another study used sales receipts to analyse the impact of Plate It Up Kentucky and found that, as a result of increased healthy food marketing in 10 stores, sales of fruits and vegetables increased by 8% and SSB sales decreased significantly in participating stores compared with control stores.[41] A similar initiative named Plate It Up Kentucky Proud was trialled in another 17 grocery stores across rural Kentucky.[24] Store provision of recipe cards was associated with higher proportions of customers reporting purchasing of vegetables 2–3 times per week (odds ratio, 2.8 [95% CI, 1.08 to 7.27]) and purchasing of fruits 2–3 times per week (odds ratio, 2.86 [95% CI, 1.03 to 7.94]) compared with before the intervention.[37] These studies show that combining a branded, community-owned marketing campaign (which broadly promotes healthy food) with healthy changes to the

food retail environment can positively influence purchasing behaviour in rural communities.[24,40,41]

Mackenzie and colleagues (2019) evaluated the Healthy Navajo Stores Initiative — a multilevel community initiative targeting rural indigenous American communities.[37] The initiative included changes to the grocery and convenience store food environment such as use of shelf talkers and recipe cards (to promote produce) and staff training on handling produce (to maintain freshness and promote longevity).[37] The authors found that the odds of purchasing healthy produce was 1.5 times higher among customers who shopped in participating stores compared with customers who shopped at non-participating stores ($P < 0.001$). Jillcott-Pitts and colleagues (2018) measured the impact of government funding (US$25 000) provided to small rural grocery stores to assist with improving the supply of healthy foods.[22] They found statistically significant improvements in healthy food environment scores among participating stores 1 year after the initiative commenced, compared with non-participating stores. There was no significant change in purchasing or self-reported consumption of healthy foods among customers from participating stores versus control stores, which the authors partly attributed to small sample size.

Two other studies in grocery store settings included participatory initiatives to help store owners provide a greater variety of healthy foods in their stores.[26,29] They reported greater variety of healthy foods, but did not measure effects on consumer behaviour.[26] Another two studies used the same participatory methods to support store and restaurant owners to provide and market healthier options.[25,43] Although food environment scores improved across both store and restaurant settings, no measures of effects on consumer behaviour were included.

Restaurant settings. Two studies were conducted in independently owned restaurant settings in the US. Neither measured impacts of the initiative on consumer behaviour[23,28] but they both showed positive changes to the food environment. Lindberg and colleagues (2018) evaluated the Heart of New Ulm initiative, which aimed to increase the promotion of and availability of healthy food and beverages in restaurants.[23] Participating restaurants improved their food environment scores and this was found to be highly feasible for restaurant owners.[23] Nothwehr and colleagues (2014) evaluated the effectiveness of a state-wide initiative aimed at supporting restaurant owners to increase healthy food options and marketing.[28] They found that 48% of restaurant owners reported having made healthy changes.[28]

Other settings. Three studies were conducted in retail settings other than restaurants and grocery stores. Although limited, they showed positive changes in target food environments. One was conducted in a farmers market,[38] one in a community pharmacy[36] and one in community-accessible food pantries.[27] In the farmers market setting, Plate It Up Kentucky Proud was implemented.[38] The marketing campaign, focused on increasing awareness of healthy food, was associated with a significant increase in the odds of people preparing healthy food at home (odds ratio, 2.47 [95% CI, 1.30 to 4.70]). Although the data were collected via a cross-sectional survey with a small sample size ($n = 125$), the authors suggested that marketing campaigns could improve consumer purchasing behaviour beyond grocery store and restaurant settings.[38] The study conducted in a community pharmacy, in rural Canada, assessed whether removing SSBs in the community pharmacy affected sales of SSBs in other outlets in the community (eg, convenience stores).[36] It showed that there was no compensatory change in SSB sales in other stores. The food pantry-based study focused on improving the availability of healthy foods by supporting and educating food pantry managers.[27] Food environment scores in participating pantries improved significantly compared with those for non-participating stores, but impacts on consumers were not evaluated.

Quality assessment. The methodological quality of studies varied (Supporting Information, Table 1.3). Three had global ratings of strong quality, four had moderate quality ratings, and 15 had weak ratings. Common limitations included: no reporting of important between-group differences before the intervention; lack of detail regarding controlling for confounders; and lack of participant and/or assessor blinding. The five studies that focused on First Nations communities and involved an Aboriginal or Torres Strait Islander researcher as an author were assessed using the CREATE critical appraisal tool, to determine whether they were likely to have been culturally safe and appropriate. Three of these studies scored "yes" for 71% of the CREATE criteria[32-34] and one scored "yes" for 64% of the criteria.[31]

Discussion

We only found studies which evaluated efforts to improve food environments in rural areas in high income countries in the past 20 years, and no such studies in low or middle income settings.[44] All studies showed that initiatives were effective, with positive improvements in healthiness of the food environment[22,23,25-29,43] and/or consumer behaviour.[24,31-34,37-42] As we identified only five studies from Australia,[30-34] studies from the US and Canada may provide a basis for informing the prioritisation and adoption of healthy food environment initiatives in Australian rural communities. The relevance of comparing rural communities in the same country and those from different countries has been debated owing to differences in definitions of rurality, differences in health care systems and substantial heterogeneity in rural communities.[45,46] However, it has been argued that there is significant value in comparing rural research across the international context, as this could lead to important health developments for rural communities.[46] Although all the studies were conducted in high income countries, the communities that they focused on were almost always characterised as populations experiencing high levels of socio-economic disadvantage and geographical isolation.[47] Studies from overseas may therefore be relevant to the Australian context, because the majority of the most socioeconomically disadvantaged communities in Australia are in rural and remote areas.[48]

The results of this review, particularly from the overseas evidence, suggest that initiatives focused on promoting and raising awareness of healthy foods, and including community ownership and branding, consistently lead to positive outcomes.[32,34,40,41,43] An example is Plate It Up Kentucky,[38,40,41] an initiative for which three evaluations reported high feasibility and acceptability. Future research in Australia should consider using similarly clear and consistent messaging and branding, plus meaningful community consultation to improve community and retailer engagement. Such research should also evaluate impacts on consumer behaviour and total dietary intake. An additional consideration for future initiatives is the dominance of unhealthy foods in retail settings. Further research is also required across the range of food environment contexts in rural areas, and strategies need to be trialled in a variety of retail

settings — beyond grocery stores (eg, restaurants, cafes, farmers markets, health services and other types of stores) and in communities that cover all levels of remoteness in Australia. Finally, the impact of strategies on consumer behaviour should be measured because such evaluation was often lacking in the studies we identified.

Although this review was not focused on indigenous populations, one-third of the studies identified (and all but one of those from Australia) were undertaken in rural or remote indigenous communities. A recent review of the impact of food policy actions on indigenous peoples highlighted the importance of complementing healthful food environments with initiatives that are culturally relevant and community-directed.[49] When designing food and nutrition initiatives for indigenous people, it is essential to consider the complex historical, social and cultural determinants of health. These determinants are underpinned and accentuated by ongoing dispossession, colonisation, racism and political disempowerment.[50] Improving indigenous health is ultimately systemic, and factors influencing food environments in remote areas are structural and external to the communities themselves. These factors are complex and were not discussed in detail in the studies included in this review, but they must be addressed to improve nutrition in these communities. Further, when designing future initiatives in an indigenous community context, researchers and health promotion practitioners should recognise and consider using culturally safe, respectful and appropriate quality appraisal tools to guide research design and implementation.[51]

Strengths and limitations

This is the first rapid review synthesising evidence on food retail environment initiatives in rural, regional and remote settings in high income countries. Limitations include the small number of studies (particularly in the Australian context), the poor methodological quality of most studies, and the variety of outcomes. These factors make it difficult to compare the effectiveness of different initiatives. Also, as we focused on outcomes related to food environment changes, food purchasing and dietary patterns, we did not comprehensively synthesise data on broad systemic factors (eg, social, financial and political factors) that influence food environments and health inequities. We acknowledge that these need to be addressed, and understood in the contexts of individual communities.

Conclusion

Initiatives promoting healthy food options and availability in rural retail settings are effective in improving healthier food availability and purchases. Given the paucity of studies identified in the rural Australian context, and the comparability of rural settings in other countries, future research based on evidence from overseas studies is worthwhile. Results from overseas studies could inform initiatives aimed at improving rural food retail environments in Australia.

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Supporting Information

Additional Supporting Information is included with the online version of this article.

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Chapter 2

Which interventions best support the health and wellbeing needs of rural populations experiencing natural disasters?

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Abstract

Objective: To explore and evaluate health and social care interventions delivered to rural and remote communities experiencing natural disasters in Australia and other high income countries.

Study design: We used systematic rapid review methods. First we identified a test set of citations and generated a frequency table of Medical Subject Headings (MeSH) to index articles. Then we used combinations of MeSH terms and keywords to search the MEDLINE (Ovid) database, and screened the titles and abstracts of the retrieved references.

Data sources: We identified 1438 articles via database searches, and a further 62 articles via hand searching of key journals and reference lists. We also found four relevant grey literature resources. After removing duplicates and undertaking two stages of screening, we included 28 studies in a synthesis of qualitative evidence.

Data synthesis: Four of us read and assessed the full text articles. We then conducted a thematic analysis using the three phases of the natural disaster response cycle.

Conclusion: There is a lack of robust evaluation of programs and interventions supporting the health and wellbeing of people in rural communities affected by natural disasters. To address the cumulative and long term impacts, evidence suggests that continuous support of people's health and wellbeing is needed. By using a lens of rural adversity, the complexity of the lived experience of natural disasters by rural residents can be better understood and can inform development of new models of community-based and integrated care services.

During the spring and summer of 2019–2020, many areas of Australia were affected by catastrophic bushfires and floods. This resulted in loss of life, homes, livelihoods, infrastructure and natural environments. The impact on rural and regional areas, following years of severe drought, was extreme. Communities affected by natural disasters experience adverse health and wellbeing outcomes which are exacerbated by geographic, social and economic factors that are unique to rural and remote locations.[1] In rural Australia, rates of poor mental health and suicide are higher than comparable populations worldwide, and this has been attributed to the compounding impact of drought and climate change acceleration.[2]

The environmental and economic consequences of natural disasters provide a distinctive challenge for rural communities. The 2019 Orange Declaration argued that authentic solutions must be developed through a sophisticated understanding of the rural experience, not least in response to natural disasters.[3,4] In February 2020, the Royal Commission into National Natural Disaster Arrangements commenced an inquiry into Australia's preparedness, response, resilience and recovery in relation to natural disasters.[5] On 2 April 2020, the Department of Regional NSW was established to better coordinate support for regional, rural and remote communities, including those impacted by natural disasters.[6] In this review, we seek to provide a timely synthesis of evidence on programs that may best address the health and wellbeing challenges of rural communities that experience natural disasters.

Methods

Rapid reviews demand systematic but pragmatic methods.[7] For this review, we used a search strategy that was limited to indentifying published research and grey literature which described and evaluated any health or social care intervention or program delivered to rural or remote communities experiencing natural disasters in Australia and other high income countries. Limiting the search to high income countries increased the relevance of our findings to the Australian context. First, we identified a test set of citations to articles that had been assessed by two of us (SL, GP) as relevant to natural disasters in rural settings. We then entered the PubMed unique identifiers of these citations into the PubMed PubReMiner open source data mining tool.[8] Next, we generated and analysed a frequency table of Medical Subject Headings (MeSH) terms used to index articles in the test set. We then used this table to identify relevant MeSH terms for the search strategy, and create a logic grid of relevant MeSH terms and keywords for the MEDLINE (Ovid) database (Supporting Information, Table 2.1).

We used combinations of MeSH terms and keywords relating to each concept to construct a search strategy for the MEDLINE (Ovid) database. This involved searching MeSH terms and keywords separately and combined using the Boolean operator "OR". Groups of synonymous terms were then combined using the Boolean "AND". We limited searches to articles published between 2000 and 2020, in English language only. The search strategy, including details of additional sources that we searched, is available online (Supporting Information, Table 2.2). We felt that a search covering Australian and overseas studies across a 20-year period would be enough to generate evidence on the effects of service delivery and response to natural disasters, and identify key themes of such research.

One of us (GP) screened the titles and abstracts of the retrieved references. Four of us (NG, SL, HD, GP) read and assessed the full text articles. Each article was assessed by at least one of us, and about 10 per cent of articles were assessed by two of us. We then carried out a thematic analysis of the studies, and in this review we report the results as a narrative synthesis owing to

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the disparate nature of the material. We examined the nature and strength of evidence presented in each article, but we did not use strength of evidence to determine whether to include articles in our review.

Results

We identified 1438 articles via database searches, a further 62 articles via hand searching of key journals and reference lists, and four relevant grey literature resources. After removing duplicates and undertaking two stages of screening, we included 28 studies in the qualitative evidence synthesis. The article review process is shown in the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flowchart in Supporting Information, Figure 2.1.

Overall, levels of evidence used to assess the impact of care programs were low. Studies mainly comprised qualitative research (surveys, focus groups and interviews) and descriptive case studies, and some included expert opinion or experience. In some instances, no formal evaluation of the described intervention or program was reported. In our thematic analysis of the articles, we divided the articles into three phases of the natural disaster response cycle, and we used this framework to analyse and describe the articles (Box). A summary of articles included in this review is available online (Supporting Information, Table 2.3).

Disaster planning and preparedness

Community disaster planning and preparedness programs, including risk assessment tools, were reported in seven studies. Disaster planning programs — such as the Rural Disaster Resilience Project in Canada[10] and the Inclusive Public Health Preparedness Program in rural Appalachia in the United States[11] — depended on existing community resources and robust partnerships across agencies (eg, emergency management, public health, social care, education, disability service and not-for-profit organisations) to produce emergency plans acceptable to local communities. The Inclusive Public Health Preparedness Program focused on the needs of vulnerable populations and those with special needs.

Several qualitative studies produced evidence that can inform disaster planning and preparedness. For example, interviews with disaster response personnel, farmers and animal owners in South Australia about community fire preparedness identified three core practical initiatives: workplace catastrophic day leave, financial incentives to individuals to become bushfire-ready, and changes to farming practices.[12] A US-based study examined a dual intervention of mental health first aid (MHFA) and guided preparedness planning to enhance disaster mental health preparedness and community resilience in both urban and rural areas.[13,14] About 25% of participants reported that they provided MHFA to a disaster victim at least once in the 12 months following their training. Most participants confirmed that they were more interested in (89.2%) and more motivated to participate in (78.4%) disaster preparedness training.[14]

Two potentially useful disaster preparedness planning toolkits were identified. The Communities Advancing Resilience Toolkit[9] is an evidence-informed community intervention designed to measure and build community resilience, including resilience to disaster. Evidence of its perceived usefulness has been reported in four rural Tasmanian communities[15] but it is otherwise untested. An online community health and wellbeing risk assessment tool has been designed to support understanding of, and decision making on, local community challenges associated with the health risks of climate change. Its use in community workshops (also in rural Tasmania) was reported as supporting a complex, community-based assessment of health risks. However, concern was expressed that the consensus achieved on risks and priorities would not translate into actions without wider engagement and increased community resources.[16]

Immediate natural disaster responses

Ten studies focused on the immediate response to natural disasters. Such evidence has primarily been reported through individual case studies, including some from overseas literature.

In the US, a largely rural community in Louisiana that had been affected by successive natural disasters (including the Gulf oil spill disaster) was offered a program of trauma-informed behavioural health services integrated into primary care clinics by the Mental and Behavioral Health Capacity Project.[17-19] Evaluations demonstrated how their stepped care model helped to reduce symptoms and increase post-disaster resilience.

After Hurricane Katrina, the Baton Rouge Children's Health Project used a medical home model to provide integrated medical and mental health services to children and their families living in temporary accommodation.[20] Co-locating services increased the likelihood that mental health services would be used by people initially seeking treatment for physical conditions, although the evidence for this was limited to narrative case studies of service users.

Following the Xynthia storm in the Charente-Maritime region of France in 2010, free psychological support and post-trauma counselling outreach services were provided in local town halls in the five most affected communities.[21] This included the potential for onward referral to established mental health services, including by telephone. The inclusion of an ongoing surveillance program provided evidence for ongoing needs that extended the service from 1 to 6 months post-disaster, with a peak of demand at 4 months. The case suggests that epidemiology should be integrated into mental health and psychological support development in post-disaster contexts to ensure that services are not discontinued too early and remain responsive to local needs.

Three phases of the natural disaster response cycle[9]

Phase	Description
Disaster planning and preparedness	• Identifying threats and vulnerabilities • Identifying available resources • Undertaking planning with key stakeholder groups
Immediate natural disaster responses*	• Undertaking efforts to mitigate effects of the disaster, save life and save property • Delivering immediate aid, health care and social care
Long term response, recovery and reconstruction	• Undertaking recovery and rebuilding efforts • Using lessons learned in action towards further preparedness

* Some elements initiated in this phase may continue into the recovery phase. ◆

A review of mental health services deployed after the triple disaster of earthquake, tsunami and nuclear power plant failure affecting three rural prefectures in Japan in 2011 claimed that outreach services offered by public health teams in local communities (including in common areas of temporary housing) was effective in reducing barriers to accessing mental health services. Although no formal evaluation was undertaken, the authors recommended that mental health services be included in Japan's disaster management plans. A public mental health response, rather than a "medicalised" response, was likely to be more appropriate in the acute post-disaster period.[22]

These approaches represent variations on a care management model that seeks to actively identify and then support the physical and mental health needs of people in affected communities in a time-limited fashion. Such an approach was also observed in the Australian context. For example, the Warrumbungle Bushfire Support Coordination Service in New South Wales established a short-term (6-month), individualised, relationship-based, coordination service for bushfire-affected households. User surveys revealed high levels of satisfaction, probably because it was locally driven and had a solution-focused approach.[23] The Step by Step Blue Mountains Bushfire Support Service in NSW adopted a similar approach. The service was evaluated via qualitative methods and reported as successful in supporting clients' physical and emotional needs.[24,25]

The Victorian Bushfires Case Management Service took a community- and strengths-based approach to supporting victims of the Black Saturday bushfires.[26] Between February 2009 and June 2010, case managers based in local community hubs helped 5506 affected households to navigate the services available to them. The program was evaluated via two phases of surveys and focus groups — seeking feedback from professionals involved in service delivery in phase 1, and clients using the services in phase 2. Almost 90% of clients surveyed indicated that they would definitely (76.9%) or probably (13.0%) recommend the service to others impacted by natural disaster.

Long term response, recovery and reconstruction

A final set of 11 studies focused on approaches to developing a long term response — supporting people and communities to recover from the immediate effects of, and manage the ongoing recovery from, natural disasters. A common theme was the need to build social capital and networks to promote community resilience. For example, a case study following the 2006 bushfires in Tasmania recounted a range of creative ways in which people's health and wellbeing could be supported.[27] Such support was not driven by health service providers, but through assets within the communities, including volunteers. In a study of 642 people affected by bushfires in rural Victoria in 2009, a moderate level of volunteering was found to protect against post-traumatic stress disorder 3–5 years later.[28]

Local government interventions, such as those implemented in the Goulburn Valley area of Victoria during a 5-year drought (2006–2010), involved community organisations and delivered financial, mental health and collective wellbeing initiatives.[29] MHFA training of lay community members was found to be effective in the disaster recovery period in several studies. For example, the Skills for Psychological Recovery program facilitated mental health support training for health practitioners and lay people after the February 2009 bushfires in Victoria[30] and the 2010–2011 floods and cyclones in Queensland.[31] After training in this brief, skills-based approach, increased competence in disaster-relevant skills (such as recognising problems with coping in others) was reported by participants. Similarly, MHFA training provided to 32 advisory and extension agents supporting farmers in drought-affected rural Queensland resulted in reports of improved confidence to undertake MHFA with clients.[32]

Timing of disaster recovery interventions appears to be a key element in effective program planning. For example, the Sustainable Farm Families program (which provides workshops aimed at improving physical and mental health outcomes and building resilience) began in Australia in 2003 in response to drought. When it was adapted to support bushfire survivors and deployed to the Kinglake area of Victoria after the Black Saturday bushfires in 2009, it was 14 months after the disaster before immediate responses could safely be withdrawn.[33]

Example of a comprehensive response

One key Australian program, the Rural Adversity Mental Health Program (RAMHP), has addressed all three phases of the disaster cycle.[34-37] Developed in response to the long term Millennium Drought, this program focused on the mental health of farmers and other rural community members. Using the principles of community development, the RAMHP uses mechanisms including: interagency collaboration; mental health promotion through free community events and information forums; delivery of MHFA training; and provision of support to help people access services (eg, mental health care, agriculture- and industry-specific services, and financial assistance). RAMHP's network model uses local coordinators in designated rural areas in NSW, with each being responsive to emerging community needs. Improvements in mental health literacy, service collaboration and coordination have been observed.[34]

As the RAMHP has evolved, it has expanded its reach in recognition that a broader and more significant issue of rural adversity must be addressed. In 2016, a revised and co-designed program logic for RAMHP was developed and includes: development and dissemination of high quality mental health support information; tailored advice on linking to services and support; training in mental health literacy; and partnered work to strategically improve reach and impact.[36] A mobile app is also enabling improved data collection by the RAMHP coordinators.[38] Annual reports show that the program has met its objectives,[39] and a yet-to-be-published outcome evaluation has been conducted.

Discussion

This rapid review uncovered three key findings. First, community disaster planning and preparedness programs can increase collaboration between local communities and regional, state and national health care, social care and disaster response services. They may also support disaster plans that are more sensitive to the context of their application, taking into account specific community features such as assets, vulnerabilities, culture and values. This may lead to perceived benefits of increased community cohesion, social capital and the resilience needed to respond in times of natural disaster. Second, immediate natural disaster responses have benefited from variations on a care management approach in which health and care teams become embedded in local communities, often co-located with existing service infrastructure, to

help identify and support local people with disaster-related trauma. Although the depth and quality of the evaluation of such services has been limited, evidence suggests a need for ongoing care. Third, long term response and recovery strategies must operate alongside people and within local communities to provide contextually relevant support for building social networks, collaborative action and community resilience. Natural disasters have cumulative and long term effects, so continuous and ongoing health and wellbeing support is required. By using a lens of rural adversity, the complexity of the lived experience of natural disasters by rural residents over time can be better understood and can inform the development of new models of community-based and integrated care services.

Such findings have significant policy and practice implications. They show that single or uncoordinated response strategies in response to a specific incident (eg, funding enhancements for telehealth-based support or facilitating rapid access to specialist support) are not effective unless they are part of a more comprehensive, embedded and assets-based approach. The ability to strengthen community resilience in preparing for, responding to, and recovering from the direct and cumulative effects of natural disasters is therefore likely to benefit from an integrated and place-based strategy. However, we found that robust evaluation of the various programs and interventions that have been established is lacking. Given the urgency to find effective responses, this evidence gap requires investment in research activities to better understand the impact of health and social care interventions. This will shed light on design and implementation factors that can lead to better care experiences and outcomes for rural communities affected by natural disasters.

Our review has two main limitations. First, it was restricted to high income countries, and focused on the response of the health and social care system, but not other support mechanisms such as emergency housing and financial assistance. Second, it did not include the impact of natural disasters on Aboriginal communities, which merits further investigation and would need to be reframed to respectfully incorporate the holistic concept of Indigenous mental health, social wellbeing and emotional wellbeing.[40] Aboriginal people in rural NSW have observed how drought impacts the land, dislocates families through population shifts, and creates grief and loss.[41] Such observations challenge the framework we used to filter evidence across the disaster response cycle. Indeed, this was just one way to organise material that covers a cyclical process with overlapping phases. However, we believe that this is more of a conclusion of the review (ie, the state of the evidence) than a limitation of the review.

Conclusion

For many people living in rural communities in Australia, natural disasters are recurrent and not episodic events. The impacts are cumulative and long term, suggesting a need for continuous and ongoing health and wellbeing support. However, further research is urgently needed to evaluate and refine suitable interventions and strategies. As the RAMHP approach demonstrates, addressing rural adversity can be developed into a new approach to integrate and coordinate care. Indeed, others have highlighted the need to understand disasters such as drought within the context of existing rural disadvantage and the need for adequate social support.[42-44] Such an approach could capture the cumulative effects and spiralling disadvantage that can occur in rural communities, where disasters such as droughts and bushfires can deeply affect the physical and built environment, leading to economic downturn, loss of income and population migration. The subsequent loss of community social capital leads to less social support, more disadvantage and higher risks of poor physical and mental health. This, in turn, reduces the capacity to mitigate against future disasters or adversity.[3] It is perhaps not surprising, then, that approaches aimed at building social capital and supporting community resilience featured strongly in the articles that we reviewed.

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Supporting Information

Additional Supporting Information is included with the online version of this article.

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Chapter 3

The impact of bushfire on the wellbeing of children living in rural and remote Australia

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Abstract

Objective: To investigate the impact of bushfire events on the wellbeing of children living in rural and remote Australia.

Study design: Literature review completed using rapid realist review methods, and taking into consideration the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement for systematic reviews.

Data sources: We sourced data from six databases: EBSCOhost (Education), EBSCOhost (Health), EBSCOhost (Psychology), Informit, MEDLINE and PsycINFO. We developed search terms to identify articles that could address the research question based on the inclusion criteria of peer reviewed full text journal articles published in English between 1983 and 2020. We initially identified 60 studies and, following closer review, extracted data from eight studies that met the inclusion criteria.

Data synthesis: Children exposed to bushfires may be at increased risk of poorer wellbeing outcomes. Findings suggest that the impact of bushfire exposure may not be apparent in the short term but may become more pronounced later in life. Children particularly at risk are those from more vulnerable backgrounds who may have compounding factors that limit their ability to overcome bushfire trauma.

Conclusion: We identified the short, medium and long term impacts of bushfire exposure on the wellbeing of children in Australia. We did not identify any evidence-based interventions for supporting outcomes for this population. Given the likely increase in bushfire events in Australia, research into effective interventions should be a priority.

It is expected that the frequency of bushfires and other natural disasters in Australia will increase as a result of climate change, becoming recurring events that cause significant impact on vulnerable and at-risk populations such as rural and remote communities.[1] The catastrophic 2019–2020 bushfires across extensive areas of south-eastern Australia affected "an unprecedented number of communities, resulting in loss of life, homes, livelihoods, assets, farmlands, wildlife and natural flora".[2] These fires followed several previous fires in Australia that were labelled catastrophic and unprecedented, including the 1983 Ash Wednesday bushfires of South Australia and the 2009 Black Saturday bushfires of Victoria, from which the impact on affected communities has been the focus of numerous research projects. Bushfires are generally considered to be sudden onset disasters of usually short duration that can pose a fast acting threat to life, but they also lead to long term consequences.[3] Gibbs and colleagues state that much research has focused on the "short-term mental health impacts of natural disasters" with little attention paid to "how individual recovery was affected by social and community level changes over time."[4]

Children are often invisible in the urgent contexts of fires, yet they may experience significant consequences that affect their short and long term wellbeing.[3,5,6] The potential effects of these factors are clear in Caruana's review of the research on the functioning of the family in the aftermath of a sudden onset natural disaster, such as a bushfire.[3] She notes that children may present with several disorders and behaviours, including "depression, separation anxiety, re-experiencing of the event via nightmares and repetitive re-enactment in play" and that they "may also demonstrate guilt, avoidant behaviour, have fears of recurrence and worry for the safety of others."

A child's mental health response to exposure to natural disasters will be affected and moderated by the multiple contexts, as defined by Bronfenbrenner, in which they function (eg, the dynamic relationship that they have with their parents and family [microsystem]) and the impact of interactions of the different microsystems to which they belong (eg, interaction of school peers and networks [mesosystem]).[7-9] The child's response will also be influenced by other factors such as emergency response, government response, impact on the community (exosystem), and the social, cultural, political and economic environment (macrosystem).[7-9] In addition, changes may occur in the short term or over a longer time frame (chronosystem).[7-9]

In our review, we focused on identifying the dynamics associated with the mental health, behavioural and developmental outcomes of children living in rural and remote areas of Australia who have been exposed to bushfires, and interventions that lead to better outcomes. We hope that it will contribute to a better understanding of the impact of bushfire on children, and development of evidence-based interventions and policies that are specifically tailored to children in rural and remote Australia, where most bushfires occur and where service access is a significant challenge.

Methods

We used rapid realist review methods to guide this review,[10] and took into consideration the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement for systematic reviews. The Royal Far West and Charles Sturt University research team defined the scope of the project as being to understand the impact of bushfires on children living in rural and remote Australia, and interventions that lead to better outcomes, which led to two specific review questions. First, what are the dynamics associated with the mental health, behavioural and developmental outcomes for children impacted by bushfires? Second, which interventions lead to better outcomes for children affected by bushfires?

Given climate change, it is likely that many Australian children will be affected by bushfires in coming years. It is essential that the Australian Government, health and education departments,

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and organisations that support children are equipped with the latest evidence regarding the impact of bushfires on children's immediate and long term outcomes across all aspects of their development and wellbeing. It is also important that these organisations have evidence regarding effective interventions.

Two members of the research team (MC and RB) drafted a list of search terms to address the research questions, which was reviewed by the full research team. Search terms were adjusted based on the team's feedback to ensure comprehensive identification of articles relating to the research questions. The final search terms and search strategy that we used are available online (Supporting Information, Table 3.1). The research team decided to use the search term "Australia or Australian or Australians" rather than "rural and remote" because this would ensure that all bushfires in Australia were included in the search and because most bushfires in Australia occur in rural and remote locations. Any research regarding metropolitan bushfires could be removed from the final selection. Similarly, the term "intervention" was not included in the search strategy; instead, we looked for references to interventions when searching abstracts and reviewing articles. The inclusion criteria for sources in the review were: written in English; full text, peer-reviewed publication as a journal article, book or book chapter; and published between 1983 (the year in which the Ash Wednesday bushfires occurred) and 2020.

With help from a university librarian who has specialist skills in database searching, two of us (MC and RB) conducted the search for relevant articles by independently applying the above search strategy to six databases: EBSCOhost (Education), EBSCOhost (Health), EBSCOhost (Psychology), Informit, MEDLINE and PsycINFO. The search process is shown in Supporting Information, Figure 3.1. The two of us then independently reviewed the abstracts and titles of all the studies identified by the database search (60 articles after the removing duplicates, articles not written in English, research that was not peer reviewed, and studies that were irrelevant to the topic). Of these, only peer-reviewed articles focusing on rural and remote Australian bushfires were selected, and eight articles met the criteria for inclusion in this review (Supporting Information, Table 3.2). We then extracted the following data from the articles: aims and research questions, participants, time since bushfire, study design, measurement tools, outcomes, and conclusions. To validate the findings of the review, they were shared with the remainder of the research team (content experts in fields relevant to the research question, including psychology, speech pathology, occupational therapy, rural health and child development) and with the Royal Far West team involved in a bushfire recovery program.

Results

The eight studies included in this review were conducted in response to the 1983 Ash Wednesday fires in rural South Australia (six articles), the 2005 Lower Eyre Peninsula fires (one article), and the 2009 Black Saturday fires in rural Victoria (one article). The ages of the children at the times of the bushfires ranged from 5 to 12 years.

Most studies were longitudinal and included a matched control group (usually children who had not been exposed to bushfire). McFarlane and colleagues collected data at three time points after the bushfire: 2, 8 and 26 months.[11-13] McFarlane and Van Hooff and Galletly et al collected further data 20 years after the bushfire.[14,15] Gibbs et al collected data relating to academic performance 2 and 4 years after the bushfire.[16] Two groups of researchers collected data on a single occasion only: Yelland et al at 11–15 months,[17] and Bryant et al at 28 years.[18]

As well as collecting demographic data (including questions on bushfire exposure, separation from parents and extent of loss), studies used a range of survey instruments to collect data. Most of these measured aspects of physical and mental health symptoms. Some measures assessed the impact of the bushfire, and others focused on quality of life, relationships, academic outcomes and other miscellaneous factors. One study focused on the impact of being separated from parents during or after the bushfire,[14] and one focused on the impact of bushfire on academic performance.[16] No studies provided evidence that specifically supports interventions focused on reducing mental health sequelae following exposure to bushfire.

Onset of adverse outcomes

Findings indicated that children exposed to bushfire reported higher levels of mental health symptoms such as depression and anxiety compared with those not exposed, especially in the short to medium term.[12,13,17,19] Yelland et al found that children who reported persistent symptoms of post-traumatic stress disorder had a greater perception of personal life threat during bushfires and continued to experience loss and life disruption after the bushfire.[17] McFarlane et al found that mental health disorders were not immediately evident following exposure to bushfire; rather, symptoms had delayed onset, appearing 8–26 months after the event.[13] Gibbs et al suggest that the neurodevelopmental impact of exposure to trauma in children may only be noticed at later stages of development when higher order cognitive abilities and skills emerge.[16]

Factors that contribute to adverse outcomes of bushfire exposure

Galletly et al studied the emergence of psychotic symptoms in adulthood and found that being exposed to a single traumatic event, such as a bushfire, did not lead to an increased risk of these symptoms.[15] What appeared to contribute to increased risk of psychosis as an adult was exposure to multiple events such as higher rates of childhood adversity, emotional and behavioural disturbance, dysfunctional parenting, and alcohol and cannabis misuse. In their follow-up of children exposed to bushfire 20 years after the event, McFarlane and van Hooff found that bushfires had only a small direct impact on mental health symptoms of adults compared with those not exposed.[14] They suggest that assessments of the long term impacts of bushfire need to consider the impacts of other traumas experienced by individuals.

A factor that did appear to increase the risk of long term impact after exposure to bushfire as a single traumatic event in childhood was brief separation or absence from important caregivers during the event.[18] Findings suggest that a brief separation caused by a single intense event that threatens a child's sense of attachment security can destabilise their security attachment, and that this can persist into adulthood. Another factor that appeared to affect the mental health of children following exposure to bushfire was post-traumatic morbidity of parents.[11] Parental distress, family conflict, and parenting behaviour and practices (eg, overparenting) may have contributed to the children and adolescents experiencing mental health symptoms.[11,12]

Gibbs et al found evidence of a delayed impact of bushfire exposure on the reading and numeracy outcomes of children.[16] This may be due to the impact that exposure to bushfire has on neurodevelopment of children that becomes evident later (when higher order cognitive skills emerge). Also, in a 20-year

follow-up study of children impacted by bushfire, those exposed were more likely to have lower education levels, live in a rural area, be employed as production workers, have children, and be less socially mobile, compared with those who were not exposed to bushfire.[14]

Discussion

Children's mental health, behavioural and developmental outcomes

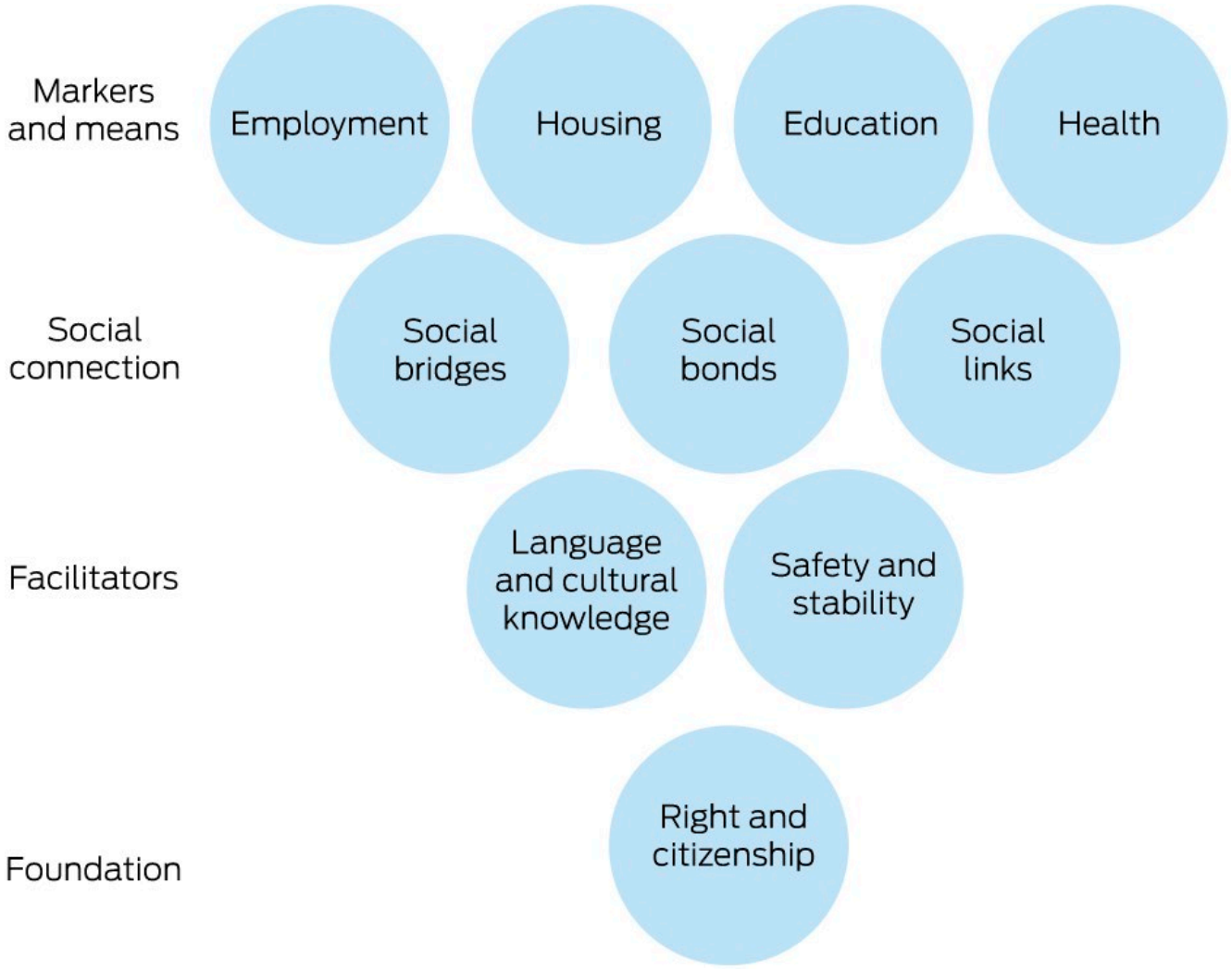
Children exposed to bushfire appear to be at a higher risk of mental health symptoms in the short, medium and long term compared with children not exposed.[12,13,19] Exposure to bushfire during childhood appeared to have long term mental health impacts into adulthood,[14] but the degree of the impact and the causal factors varied across studies. The risk of developing mental health symptoms later in life was increased when bushfire exposure was combined with other factors. These include: the family home being severely damaged by, or lost to, the fire; separation from parents during the fire;[18] post-traumatic morbidity of parents and changes to parenting style (especially overparenting);[11,12] and exposure to multiple traumas throughout life.[15] As well as the risk of developing mental health symptoms, exposure to bushfire appeared to negatively affect academic performance and possibly lifestyle choices made during adulthood.[5,18]

These findings align with conclusions drawn from research on adverse childhood experiences,[20] which highlight the lifelong sequelae of childhood trauma — effects on health, wellbeing, psychological and academic outcomes, and opportunity. Research has found that the lasting impact of trauma during childhood is significantly increased when children are exposed to multiple adverse experiences.[20] While some studies have investigated the combined impact of such experiences and exposure to natural disasters during adulthood, less is known about the lasting impacts of exposure to bushfire during childhood among children who have already been exposed to multiple adverse childhood experiences. Therefore exposure to bushfire alone may not have adverse impacts for children with strong support systems, but it may be particularly harmful for more vulnerable children.

Interventions aimed at improving children's outcomes

We did not find any research on effectiveness of interventions aimed at reducing the risk of the impact of bushfires. Gibbs et al

A conceptual framework defining core domains of integration*



*Reproduced with permission from Ager and Strang, 2008.[25]

observed, "there is a critical shortage of evidence for post-disaster intervention effectiveness for all ages, due to the ethical and pragmatic challenges of conducting research in post-traumatic settings."[21] Although several studies suggested screening children and adolescents after bushfires to identify those who may be at risk of mental health sequelae[17,22] and providing long term mental health support,[17,23] guidance on delivering the required support was lacking.

When planning and implementing interventions for children affected by disasters such as bushfires, short, medium and long term strategies need to be considered. The clinical framework for psychological recovery after disaster developed by Forbes et al may be an appropriate approach in the short to medium term (ie, up to several months after a disaster).[24] This approach has been extended by Gibbs et al in their post-disaster intervention framework for children,[21] modified from a multidimensional framework for refugee integration (Box).[25] Gibbs et al suggest that this framework could underpin the implementation of medium to long term multidisciplinary community-based interventions to "support a strength-based approach promoting opportunities for children and young people to develop a sense of self-efficacy and citizenship in disaster contexts."[21] It could ensure allocation of needed services and resources past a point when they would usually be reduced. This, they argue, is particularly important for children who may have "delayed emergence or ongoing issues requiring support several months to years after an event." This framework could be used to guide planning for and mapping of post-disaster initiatives for children by identifying multidimensional strategies to promote mental health, rights, social inclusion, citizenship and wellbeing among children and young people. It also has value in identifying the "different domains of influence on mental health, well-being and social inclusion for children and young people in disaster contexts",[21] in line with Bronfenbrenner's ecological approach.[7-9]

Despite the lack of evidence-based interventions found in this review, several considerations for interventions were made. It was strongly suggested that large scale post-disaster testing of children impacted by bushfire for psychopathological symptoms be done to identify those most at risk and to ensure targeting of limited mental health services.[17,19,22] This aligns with the World Health Organization's guidelines for providing psychological first aid to survivors of trauma, including bushfires.[26] The need for preventive and promotive long term mental health support for those impacted by bushfire was also highlighted.[17,23] In addition, it was suggested that the support for children should focus on assisting them to strengthen and maintain social relationships, as emotional support appeared to play a protective and promotive role, and encouraged higher levels of prosocial behaviour.[27] Furthermore, it was found that development of self-compassion in children impacted by a traumatic event, such as bushfire, functioned as a protective factor that reduced the risk of depression, panic, post-traumatic stress, and suicidality.[28] Moreover, it was also suggested that there should be a focus on supporting the mental health of parents because their post-traumatic distress, combined with overprotectiveness, appeared to have a significant impact on the mental health outcomes of children.[27,29]

Limitations

Few studies specifically focused on the impact that exposure to bushfire had on children living in rural and remote areas of Australia. The studies included in this review focused on rural rather than remote locations. We found no research that provided evidence-based interventions for children exposed to bushfire. Providing an evidence base for interventions should be a focus of future studies. This review only focused on the impact of bushfires. A review that focuses on the impact of natural disasters more broadly and interventions to reduce their impact may provide a fuller understanding of the most effective strategies to ensure positive wellbeing outcomes for children.

Conclusion

We found that children exposed to bushfires may be at increased risk of poorer wellbeing outcomes. Children particularly at risk are those from more vulnerable backgrounds who may have other compounding factors that limit their ability to overcome bushfire trauma. Of note was the finding that the impact of bushfire exposure may not be apparent in the short term but may become more pronounced later in life. Nonetheless, short term implications for the wellbeing of children may also be profound depending on the immediate consequences of the fire, such as homelessness, poverty, separation from parents and other family members, and separation from peers. Furthermore, the impacts of bushfire on a child's medium and long term wellbeing — including mental health, academic achievement, socio-economic status, and lifestyle choices related to place of residence — do not occur in isolation.

While we did not identify interventions specifically directed at this population, there are numerous suggestions for approaches to supporting children. The value of the post-disaster intervention framework proposed by Gibbs et al[21] lies in its emphasis on multidimensional community-based interventions that may not only involve children, but also families, schools and community organisations, reflecting the multiple levels of Bronfenbrenner's ecological model.[7-9] Research investigating the efficacy of such an approach should be of the highest priority given the likelihood of increased exposure to bushfire in Australia in the future.

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Supporting Information

Additional Supporting Information is included with the online version of this article.

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Chapter 4

The role of national policies to address rural allied health, nursing and dentistry workforce maldistribution

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Abstract

Objective: Maldistribution of the health workforce between rural, remote and metropolitan communities contributes to longstanding health inequalities. Many developed countries have implemented policies to encourage health care professionals to work in rural and remote communities. This scoping review is an international synthesis of those policies, examining their effectiveness at recruiting and retaining nursing, dental and allied health professionals in rural communities.

Study design: Using scoping review methods, we included primary research — published between 1 September 2009 and 30 June 2020 — that reported an evaluation of existing policy initiatives to address workforce maldistribution in high income countries with a land mass greater than 100 000 km^2.

Data sources: We searched MEDLINE, Ovid Embase, Ovid Emcare, Informit, Scopus, and Web of Science. We screened 5169 articles for inclusion by title and abstract, of which we included 297 for full text screening. We then extracted data on 51 studies that had been conducted in Australia, the United States, Canada, United Kingdom and Norway.

Data synthesis: We grouped the studies based on World Health Organization recommendations on recruitment and retention of health care workers: education strategies (n = 27), regulatory change (n = 11), financial incentives (n = 6), personal and professional support (n = 4), and approaches with multiple components (n = 3).

Conclusion: Considerable work has occurred to address workforce maldistribution at a local level, underpinned by good practice guidelines, but rarely at scale or with explicit links to coherent overarching policy. To achieve policy aspirations, multiple synergistic evidence-based initiatives are needed, and implementation must be accompanied by well designed longitudinal evaluations that assess the effectiveness of policy objectives.

Many countries have experienced longstanding challenges with heath workforce shortages in rural and remote areas, including issues relating to recruitment and retention of health professionals, and Australia is no exception. Countries with significant rural and remote footprints where population density is low and unevenly distributed experience pronounced challenges.[1] In some parts of Australia, annual turnover rates of remote area nurses are almost 150%, and the cost of this is estimated to be millions of dollars annually.[2] While health outcomes are not solely dependent on health services, health workforce maldistribution adversely affects service delivery for preventive interventions and treatment, ultimately impacting the health of the population.[3] Across the globe, countries have developed policies to help address these workforce challenges, which are often implemented through financial investment in recruitment, retention and practice initiatives that target health professionals in rural and remote areas. A lot of attention and resources have been devoted to the medical workforce, but it is only more recently that policy and dedicated strategies have focused on other health and allied health professions. This is despite clear evidence that nursing and allied health professionals assist patients[3-5] and can reduce pressure on overworked rurally based doctors and medical specialists.[6]

As health professionals and academics working in rural areas, and involved in health professional training and support, we are aware of the longstanding initiatives to address health workforce shortages in rural Australia. The policy framework and incremental changes in programs funded under the policies have been comprehensively summarised.[7] This provides valuable insight into Australia's response over time, although it does not specifically interrogate health workforce outcomes.

A review is being conducted to examine efforts to facilitate recruitment, development and retention of the rural and remote medical workforce to address maldistribution.[8] However, to our knowledge, no comprehensive review has been undertaken to evaluate the range and effectiveness of policies adopted in high income countries to address non-medical health workforce maldistribution. Several collaborative international policies and projects with the aim of advancing recruitment and retention have been implemented.[9] In 2010, the World Health Organization acknowledged shortages of health workers in remote areas as a global challenge and made recommendations to help governments and leaders develop policies and strategies to improve recruitment and retention of health workers in rural communities.[10] These were grouped into four categories: education strategies, regulatory change, financial incentives, and personal and professional support.

In this review, we explore evaluations and outcomes of policy approaches and programs in relevant Organisation for Economic Co-operation and Development countries. We conceptualised policy as a deliberate system of principles to guide decisions and achieve rational outcomes, identifiable by a statement of intent that is implemented through procedures, training, funding or regulation. Understanding the range of policy approaches and their outcomes in practice can provide insight into the "best buys" for addressing rural workforce shortages in Australia.

Methods

To understand and present the evidence available, and in anticipation of a relatively large and varied body or work on the topic, we adopted scoping review methods. Scoping reviews are appropriate

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for identifying knowledge gaps, scoping a body of literature, clarifying concepts, investigating research conduct and informing systematic reviews.[11] Our scoping review was informed by the approaches of Peters et al[12] and Arksey and O'Malley[13], and adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) checklist. For this, we developed a protocol (unpublished) that included: identifying review questions using a population–concept–context statement; determining search strategies; defining inclusion and exclusion criteria (Box 1); extracting, charting and appraising data; and reporting results. Specifically, we aimed to: describe the range of evaluated policy responses by different national and jurisdictional governments; identify key features associated with successful and unsuccessful policy approaches; and use this information to make practical recommendations to improve health workforce recruitment and retention in rural and remote Australia. We included all Organisation for Economic Co-operation and Development countries with a significant rural and remote footprint (land mass greater than 100 000 km^2) in the search — the rationale being that they may experience maldistribution of the health workforce, have comparable non-coercive approaches that recognise an individual's agency, and be relevant to the Australian context. Our review included evaluations of non-medical workforce outcomes relating to a country's policy approach to attract or retain non-medical health professionals to work in rural communities. Academic librarians assisted with the search strategy (Supporting Information, Table 4.1) that included the following databases: MEDLINE, Ovid Embase, Ovid Emcare, Informit, Scopus, and Web of Science. We limited the searches to peer-reviewed literature to ensure a level of rigour, so we did not specifically search grey literature. To ensure the articles and policies were current, we only searched for literature published between 1 September 2009 and 30 June 2020 (which would incorporate policies that may have started many years earlier). Articles were imported into Covidence systematic review software (Veritas Health Innovation).

Two of us (SW, MJ) independently screened titles and abstracts, and disagreements were resolved by one of us (DML). We retrieved full text versions of articles identified as potentially eligible and reviewed them following the same process. All of us contributed to extracting data from the full text articles, using a customised data extraction tool; for each article, two of us independently assessed and extracted data, but none of us assessed our own published works. We assigned each article to one of the approaches described by the World Health Organization framework. Following data extraction, we synthesised the studies by discussing and refining their key themes and recommendations. Successful policy approaches needed to demonstrate recruitment and/or retention of rural health practitioners consistent with the policy objective, or provide evidence about additional factors or strategies required beyond the policy to achieve rural workforce outcomes. Finally, we grouped studies into the following categories when assessing whether an evaluation provided evidence that the policy approach improved recruitment or retention of nurses, allied health professionals or dentists in rural practice:

- positive association — comparison groups used to show an increased likelihood of rural practice;
- promising result — showed effective program delivery with initial reports of rural practice uptake, without comparative data;
- no evidence of association — approach not associated with increase in health professionals practising rurally; and
- evaluation focused on other related outcome variables (eg, intention to practise rurally, program acceptability) and did not report on rural workforce outcomes.

Results

Of 7252 articles identified, 5169 were screened by title and abstract, and 297 by full text (Box 2). Fifty-one publications that evaluated policy responses to rural health workforce shortages in nursing, allied health and dentistry were identified. They focused on national and jurisdictional responses from Australia (n = 24), the United States (n = 16), Canada (n = 6), Norway (n = 3) and Scotland (n = 2), which were implemented primarily through training, funding and/or regulation strategies.

Education strategies

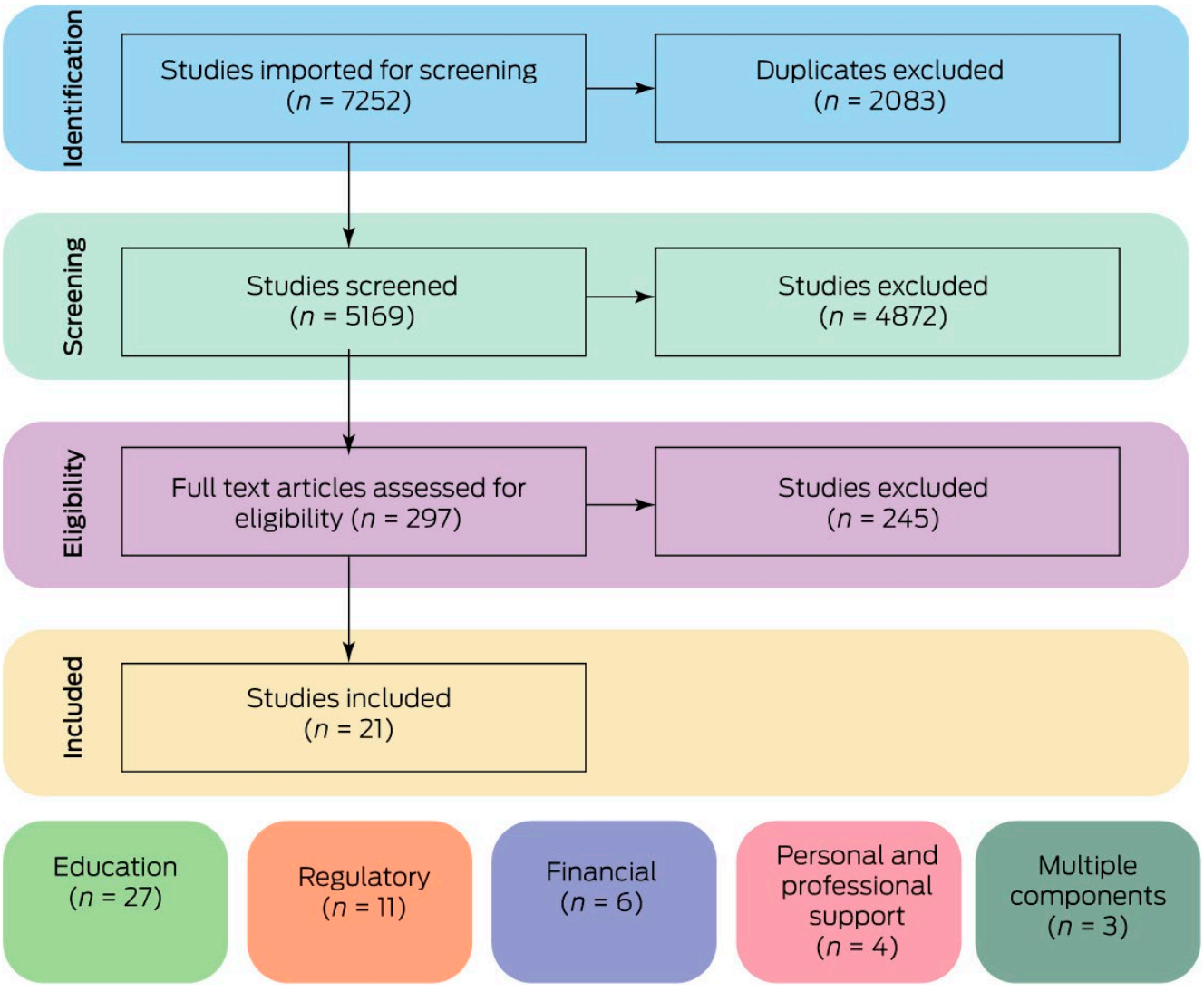
Twenty-seven articles (53%) focused on education strategies: student placements and internships (n = 16), decentralised education (n = 7), and creating a rural pipeline (n = 4) (Supporting Information, Table 4.2).[14-40] Studies examining different modes of undergraduate program delivery were conducted in most countries. They provided evidence that training in rural and remote settings attracts new graduates to practise rurally, although not all studies reported on the association between undergraduate program delivery and uptake of rural practice, and reporting was often limited to discussions of student satisfaction and intention to practise rurally. Successful approaches included:

- end-to-end training, including flexible delivery of nursing programs for people living and working in a rural community;[30,33,34]
- academic programs in dentistry[31] and midwifery[41] that support community-based education targeting specific population subgroups and/or regions; and
- provision of widespread access to rural and remote clinical placements for nursing, allied health and dentistry students from metropolitan (and regional) universities delivered by

1 Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
• State, national or jurisdictional government policy or strategy focused on workforce maldistribution • Policy focus on recruitment and retention of nursing and allied health professionals in rural and remote areas • Report includes an evaluation of activity underpinned by the policy • Primary research or evaluation • Conducted in one of the following countries: Australia, Canada, Finland, France, Germany, Greece, Italy, New Zealand, Norway, Poland, Spain, Sweden, United Kingdom, United States	• Full text not written in English • Study published before 2009 • Policy from a country not targeted • Focus was on medical workforce only • Opinion papers and editorials

2 PRISMA-ScR flow chart showing selection of studies included in this review



PRISMA-ScR = Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews.

regionally embedded academic units such as university departments of rural health in Australia.[14,15,19-21,23]

Rural training appeared to be more effective in attracting metropolitan origin students to rural practice as it reduced the large difference in uptake compared with rural origin students observed in the absence of rural exposure.[34] Successful graduate uptake of rural practice for dentists was more likely to occur when a school, faculty or another body was actively engaged in connecting graduates to rural employment and practice opportunities.[32,42]

An Australian study that examined factors related to long term rural practice outcomes (15–17 years after an undergraduate placement), including rural undergraduate exposure, found the most significant predictor was early uptake of rural practice.[34] This suggested that most of the benefit of rural exposure as a student was realised in the short term and that ongoing training and employment support for rural-based graduates is required to sustain and extend nursing and allied health careers in rural health.

Four studies, from Australia and the US, reported promoting health careers to school children from under-served or disadvantaged populations[38,39] or special programs to recruit people from minority groups into university courses.[37,40] While strategies were often comprehensive, at the time of reporting only program descriptions and/or promising findings such as university curriculum changes and increased recruitment into university programs were available.

Regulatory change

Eleven articles considered regulatory changes to improve rural nursing and allied health workforce recruitment and retention. Of these, eight considered scope of practice and new roles to deal with intractable rural workforce shortages, while the remainder evaluated overseas recruitment (Supporting Information, Table 4.3).[43-53]

The studies that considered scope of practice and new roles focused on nurse practitioners in North America and allied health assistants in Australia. The US experience with nurse practitioners showed that successful approaches required training, certification and legislation, as well as development of models of care.[47] Lack of relevant legislation to allow nurse practitioners to practise to the full extent of their licensure was identified as a major barrier to recruiting nurse practitioners to work in rural

areas in some states.[46] A pilot study on the introduction of allied health assistants in rural Australia raised issues of acceptance from established allied health professionals, so scope of practice issues need to be resolved for this approach to succeed.[49]

Some success was reported with recruiting overseas health professionals to rural areas in Australia.[52,53] However, an article examining the impact of recruiting foreign dentists in the US and changing accreditation procedures to support those dentists showed no lasting effect on their practising rurally.[51]

Financial incentives

Financial incentives in relation to workforce recruitment and retention had a positive impact on recruitment in the short term and retention in the longer term (online Supporting Information, Table 4.4).[42,54-58] Financial incentives may influence allied health professionals to take up rural positions, particularly if they offer a level of financial and job security. However, the influence of other factors — such as location of the rural community, practising a fuller scope of practice, and family adjustments to the community — is important in terms of the longer term impact of financial incentives. One study identified that even when financial incentives appear to improve recruitment and retention in rural areas, workforce shortages when compared with major cities persisted.[54]

Personal and professional support

Studies examining the use of professional development strategies to support workforce recruitment and retention presented limited outcome data (Supporting Information, Table 4.5).[59-62] Two programs had promising approaches that included an exchange program between metropolitan and rural hospitals and new graduate support programs to attract nurses to rural practice.[59,62] Three studies examined support provided to allied health professionals as they transitioned to rural practice.[60-62] In one of these, a Scottish study, most participants found the support beneficial.[62] An Australian article suggested that some level of case management for new allied health professionals may be useful for improving retention, assisting with adjustment to rural practice and identifying professional development opportunities.[61]

Approaches with multiple components

Three studies described case studies of approaches which had multiple components, including financial incentives, student placements and international recruitment (Supporting Information, Table 4.6).[41,63,64] All three were policy approaches aimed at addressing workforce shortages in remote indigenous communities.

The first case study reported on the implementation of regulated midwifery in Manitoba in Canada, to support local midwifery services and midwives drawn from local communities.[41] The strategies used included an aboriginal midwifery university program, professional engagement, service redesign, legislation, supported employment pathways, and targeted funding. Before the first local midwives graduated, early results showed improved access to midwifery services — more midwives were practising in northern Regional Health Authorities and the first midwifery practice in a first nations community had opened. The second case study examined the impact of increased sustained health funding on the supply and sustainability of health workforces in remote Aboriginal communities in the Northern Territory in Australia.[64] Key issues regarding workforce turnover remained, and researchers concluded that additional strategies were required to better support health workforce recruitment and retention. A third case study reported on changes in legislation to improve access to primary health care in rural and under-served areas of Nebraska in the US.[45] In other research from the US, the use of legislation to remove a policy barrier, to allow nurse practitioners to practise to the full extent of their licensure, was found to be an important and defining step in establishing a successful rural workforce strategy.[46,47]

The successful and promising approaches resolved key barriers to implementation or used multiple tailored strategies to deal with specific workforce issues. In contrast, more general approaches (such as increased funding without support from additional strategies) were insufficient for addressing workforce shortages.

Discussion

Our review highlights a range of policy responses to rural health workforce maldistribution in high income countries, many of which are complex and used in diverse settings. It is difficult to provide a robust comparison of the merits of different approaches, owing to variable quality of outcome evaluation, limited timeframes and differences in study designs. However, despite these differences, the policies generally aligned with the World Health Organization framework pillars relating to education, regulation, financial incentives, and personal and professional support. Our findings provide insight into how policy could be further developed and better implemented to support the recruitment and retention of non-medical health workers in rural communities. However, the extent to workforce maldistribution can be addressed in more remote areas by using these policies is unclear.

Overall, training in rural and remote settings is effective in exposing students to rural practice and can attract new graduates to practise rurally. Detailed analysis of nursing and allied health student placement activity in Australia suggests that about half of the rurally exposed students practise rurally on graduation — a rate about twice that of students who are not exposed to rural practice.[16] However, exactly where these rural placements are undertaken in terms of remoteness has not been not fully elaborated, and data on long term employment outcomes that ensue are not available. Similarly, the focus on education tends to be at the level of a single institution or site (ie, not the level at which workforce maldistribution on a wider scale can be addressed). Long term longitudinal exploration of workforce outcomes is needed in countries implementing these initiatives.

We believe that Australia has produced the best evidence of student placements as a rural recruitment lever. This may reflect that the Australian Government's Rural Health and Multidisciplinary Training (RHMT) Program funding encourages research on outcomes that can justify the substantial financial strategy investment, and that research is explicitly included in the strategy remit.[65] This may not be the remit for other policy frameworks and is a strength of the RHMT Program approach — worthy of consideration in other countries. Another strength of the RHMT Program is that a coordinated, long term approach to tracking the practice locations of graduates from several universities that receive RHMT funding is underway.[66]

Additional benefits of decentralised education are yet to be determined. While it may add value and social capital to rural communities, published evaluations did not report on whether decentralised education facilitated redistribution of the workforce beyond the rural communities in which education was delivered. We anticipate that these dynamics will be better understood once results from multi-institution tracking studies across broad geographic regions start being disseminated.

It is clear that role extension can be used to help address workforce maldistribution. In Canada, rurally located midwifery training and government support for rural and remote midwifery service models have had a positive impact. In the US, the influence of the *Affordable Care Act* was evident as a primary policy initiative that extended nurse practitioners' scope of practice and enacted state-level legislative changes. Economics will certainly be a driver of nurse practitioner expansion in rural areas, especially where attracting a physician or general practitioner has been challenging. Nurse practitioners may be considered easier to recruit, and the role provides an improved career pathway for registered nurses. The nurse practitioner strategy in the US, with programs that target under-served populations, shows promise. There is potential for other countries to enact similar legislative change, particularly for areas challenged by a lack of general practitioners. Such change should be accompanied by an evaluation of this strategy — not just on patient outcomes, but on the recruitment and retention of nurses in these areas.

We found that there has been significant policy investment in financial incentives programs, yet only six articles that we reviewed associated financial incentives with a policy initiative. In Canada, there are 25 government-funded financial incentives programs for nurses, offered in all states and territories except the Yukon.[67] However, we did not identify any evaluations of these programs. Studies identified outside our search suggest that while financial incentives may be beneficial for improving recruitment and retention in rural areas, alone they are not sufficient to address workforce maldistribution.[68] Further research is needed to determine whether threshold financial incentives during the recruitment phase need to continue to ensure retention. Continued financial incentives could prove more cost-effective than recurrent recruitment.

Other studies identified outside our search have explored the views of rural health professionals, including what attracted them to rural practice and what keeps them in rural practice. These have highlighted the importance of personal and professional support.[69-71] However, few studies evaluated these types of support in terms of whether they were linked to a policy. We found that within a suite of other strategies, support for new recruits during periods of adjustment may be enhanced through case management.[32] An additional feature of this program was that case management commenced while students were completing their studies. This helped to link graduates with rural health services that have high workforce needs.

Our review highlights a disconnect between enacted policies and strategies regarding recruitment and retention. For example, the RHMT Program in Australia appears firmly entrenched in recruitment — exposing university students, from both metropolitan and rural backgrounds, to rural practice via undergraduate placements to positively influence rural practice intention. Similarly, decentralised education can provide people living in rural communities with the opportunity to study locally, with the intention that they will remain in their community after graduation. However, there is evidence that a rural job being the first job after graduation and good professional support are critical factors in health graduate employment, including in the medium and longer term.[23,28]

Policies and frameworks that seek to address health workforce maldistribution represent a significant investment for many governments. A notable gap in addressing the workforce issue is that a comprehensive evaluation of any country's complete strategy does not appear to have been published. Future research and evaluations should explicitly state the policy or strategy that they are tied to, particularly if no overarching evaluation is undertaken. Multiple studies funded by the same initiative could then be combined. If equitable distribution of the health workforce is to be achieved, we need to understand which elements, or combinations of elements, are most effective. While it is inevitable that the results of any geographically expansive policy will not have uniform results, a bespoke evaluation should be able to identify patterns emerging from its implementation. Once this is achieved, the process behind the patterns can be investigated more thoroughly, and policy adjustments can be made.

Limitations

We limited our review to peer-reviewed articles written in English from 14 countries with a significant rural footprint and comparable health care systems. Undertaking a similar review of policy evaluations in low income countries that experience significant workforce maldistribution would be a valuable contribution. Undoubtedly these countries experience different challenges and opportunities, but they may offer creative solutions to this complex issue. As our screening process required explicit linkage to a rural workforce policy, many articles were not included if this link was not explicitly stated. Further, policy reviews and evaluations are not all published in peer-reviewed literature — an accepted means of sharing knowledge broadly and developing an evidence base through critical review. This may not occur with internal or consultant-led evaluations, which are often used to evaluate government policy interventions. Notwithstanding the challenges of identifying such evaluations in multiple countries, a separate review of grey literature to identify and examine these is likely to be valuable.

Conclusion

Rural workforce policy approaches need to be based on best available evidence. Our review suggests a multifaceted approach to addressing the problem is required alongside longitudinal evaluation of policy outcomes. The promise of financial incentives, student placements, and decentralised education in addressing workforce maldistribution requires more scrutiny. Further consideration is needed to determine whether decentralised education addresses maldistribution beyond the community in which it is delivered, and whether student placements have a long term impact on recruitment and retention in rural areas. Further work is required to determine the combination of strategies needed to positively and sustainably impact health workforce maldistribution.

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Supporting Information

Additional Supporting Information is included with the online version of this article.

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Chapter 5

Availability and characteristics of publicly available health workforce data sources in Australia

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Abstract

Objective: Many data sources are used in Australia to inform health workforce planning, but their characteristics in terms of relevance, accessibility and accuracy are uncertain. We aimed to identify and appraise publicly available data sources used to describe the Australian health workforce.

Study design: We conducted a scoping review in which we searched bibliographic databases, websites and grey literature. Two reviewers independently undertook title and abstract screening and full text screening using Covidence software. We then assessed the relevance, accessibility and accuracy of data sources using a customised appraisal tool.

Data sources: We searched for potential workforce data sources in nine databases (MEDLINE, Embase, Ovid Emcare, Scopus, Web of Science, Informit, the JBI Evidence-based Practice Database, PsycINFO and the Cochrane Library) and the grey literature, and examined several pre-defined websites.

Data synthesis: During the screening process we identified 6955 abstracts and examined 48 websites, from which we identified 12 publicly available data sources — eight primary and four secondary data sources. The primary data sources were generally of modest quality, with low scores in terms of reference period, accessibility and missing data. No single primary data source scored well across all domains of the appraisal tool.

Conclusion: We identified several limitations of data sources used to describe the Australian health workforce. Establishment of a high quality, longitudinal, linked database that can inform all aspects of health workforce development is urgently needed, particularly for rural health workforce and services planning.

The health workforce is an essential part of the health care system. In Australia, geographic maldistribution of the health workforce, with respect to both number and type of workers, is a growing concern.[1,2] This is most evident in rural areas, where accessibility, availability and appropriateness of health services fall short relative to urban areas.[3] This inequality in health service access has been shown to be associated with poorer health outcomes, including higher rates of cardiovascular morbidity, diabetes complications and preventable hospitalisations.[4,5]

Availability of high quality data is critical for addressing health workforce maldistribution. Such data can help inform health workforce and services planning and policy development by identifying: areas where there may be gaps or surpluses in workforce supply; problems with recruitment and retention; and workforce issues regarding feasible provision of services that address population health issues. Although various policies and measures addressing workforce maldistribution have been in place for several years, the effectiveness of these strategies cannot be adequately assessed without robust, comprehensive and timely data on the health workforce. Thus, high quality data are essential for providing necessary evidence for priority actions aiming to reduce health inequalities.[6,7]

Even though a range of sources of health workforce data exists in Australia, the characteristics in terms of relevance, accessibility and accuracy of these data sources are not entirely clear.[8-10] In this scoping review, we aimed to address this knowledge gap by systematically identifying, describing and appraising publicly available data sources that may be used to inform health workforce and health services planning in Australia.

Methods

The method we used for this scoping review has been described in detail previously.[11] In brief, an adaption of the approach proposed in a methodology publication,[12] which extended the Arksey and O'Malley framework for conducting scoping studies,[13] was modified to map data sources rather than map literature. The key concept of our review was the health workforce — any discipline that provides health services (eg, nursing, medicine, physiotherapy or chiropractic). The context was Australia, which included data reported at national, state and regional levels. To ensure relevance of the findings to contemporary workforce planning, we limited the search to the period 1 January 2000 to 31 December 2019. An academic librarian assisted with development of the search strategy.

We included in our review any published or unpublished data source (eg, registry, administrative database or survey) or document reporting a data source (eg, journal article or report) that met the following criteria:

- publicly available (ie, accessible to anyone in the general public at liberty, or by request, subscription or purchase;
- contains data on the adult Australian health workforce; and
- provides data that are relevant to contemporary health services planning (ie, while recent data are useful to calculate current workforce estimates, older data are essential to calculate trends over time).

We excluded sources that contained data exclusively on:

- undergraduate students;
- people younger than 18 years;
- a single location (eg, a specific city or town);
- a particular setting (eg, health workforce in an intensive care unit or aged care facility);

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- a specific population (eg, health workforce delivering services to people with disabilities);
- workforce-related issues but not the workforce distribution per se (eg, nurses' intentions to stay in or leave the workforce); or
- service delivery rather than workforce (eg, provision of maternity services in Australia).

We searched nine bibliographic databases (MEDLINE, Embase, Ovid Emcare, Scopus, Web of Science, Informit, the JBI Evidence-based Practice Database, PsycINFO and the Cochrane Library) and the grey literature using an iterative process for the search strategy, which is described in Supporting Information, Table 5.1. Unpublished documents, and those published in non-commercial form, were searched using Google Scholar. Other pre-defined websites were also interrogated for potential workforce data sources, including those of professional associations (eg, Dietitians Association of Australia), government agencies and resources (eg, Medicare Benefits Schedule, Australian Bureau of Statistics [ABS], Health Workforce Australia, Australian Government Department of Health, Australian Institute of Health and Welfare, Labour Market Information Portal and Australian Government Productivity Commission), workforce registration agencies (eg, Australian Health Practitioner Regulation Agency [AHPRA] and Rural Workforce Agencies [RWAs]), international organisations (eg, World Health Organization [WHO], World Bank and Organisation for Economic Co-operation and Development [OECD]) and pertinent survey and project sites (eg, Medicine in Australia: Balancing Employment and Life [MABEL] survey, Bettering the Evaluation and Care of Health [BEACH] project).

Two reviewers (variously MG, DG, KM, ML, SW and TE) independently screened titles and abstracts using Covidence systematic review software. One of us (ML) resolved any disagreements. We retrieved full text versions of documents and data sources that were potentially eligible and reviewed them following the same process. Details of the screening process are reported in the protocol.[11]

A customised data extraction tool was developed to capture information on included data sources and documents, including the agency name, how information was gathered, aims, years, and workforce type. The quality of included data sources was assessed using a customised critical appraisal tool informed by the Data Quality Assessment Tool for Administrative Data (DQATAD) framework.[14] The tool includes 10 items, captured under three themes: relevance, accessibility and accuracy. Each item receives a score ranging between 1 and 3, with lower scores indicating lower quality or scope. Data sources were extracted from the documents and websites, and entered into the critical appraisal tool. Five of us (MG, ML, DG, KM, KT) shared the data extraction and appraisal tasks — for each data source, one of us independently assessed the source, and then one of us reviewed and checked the completed tools for accuracy. Host organisations were contacted if it was unclear whether the data source was publicly available.

We present the results in narrative form, informed by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) checklist.[15]

Results

The results of our systematic search, including each screening step, are shown in the PRISMA-ScR flowchart in Box 1. In our database search, we identified 13 232 records. After removing duplicates, 6955 records remained for title and abstract screening. Of these, we excluded 6555 records based on our exclusion criteria. For the remaining 400 records, we extracted and assessed the full text versions, and in doing so excluded a further 269 records. The reasons for exclusion are provided in the PRISMA flowchart (Box 1). From the 131 remaining records and examination of pre-defined websites, we identified 12 data sources. This included eight publicly available primary data sources and four publicly available secondary data sources (ie, those that collate data from primary data sources), shown in Box 2.[16-27] A brief description of each data source is available online (Supporting Information, Table 5.2).

Of the 131 records from which data sources were extracted, 26 (20%) reported use of more than one eligible data source. The most commonly used primary data source was the National Health Workforce Data Set (NHWDS) (n = 77), which includes AHPRA data, followed by ABS census data (n = 45), the MABEL survey (n = 24), the BEACH project (n = 6), the ABS Labour Force Survey (n = 5), and the RWAs (n = 1). Examination of the pre-defined websites identified one primary data source — the Household, Income and Labour Dynamics in Australia (HILDA) survey — and the following secondary data sources: the Australasian Medical Publishing Company (AMPCo), the WHO, the OECD and the World Bank database.

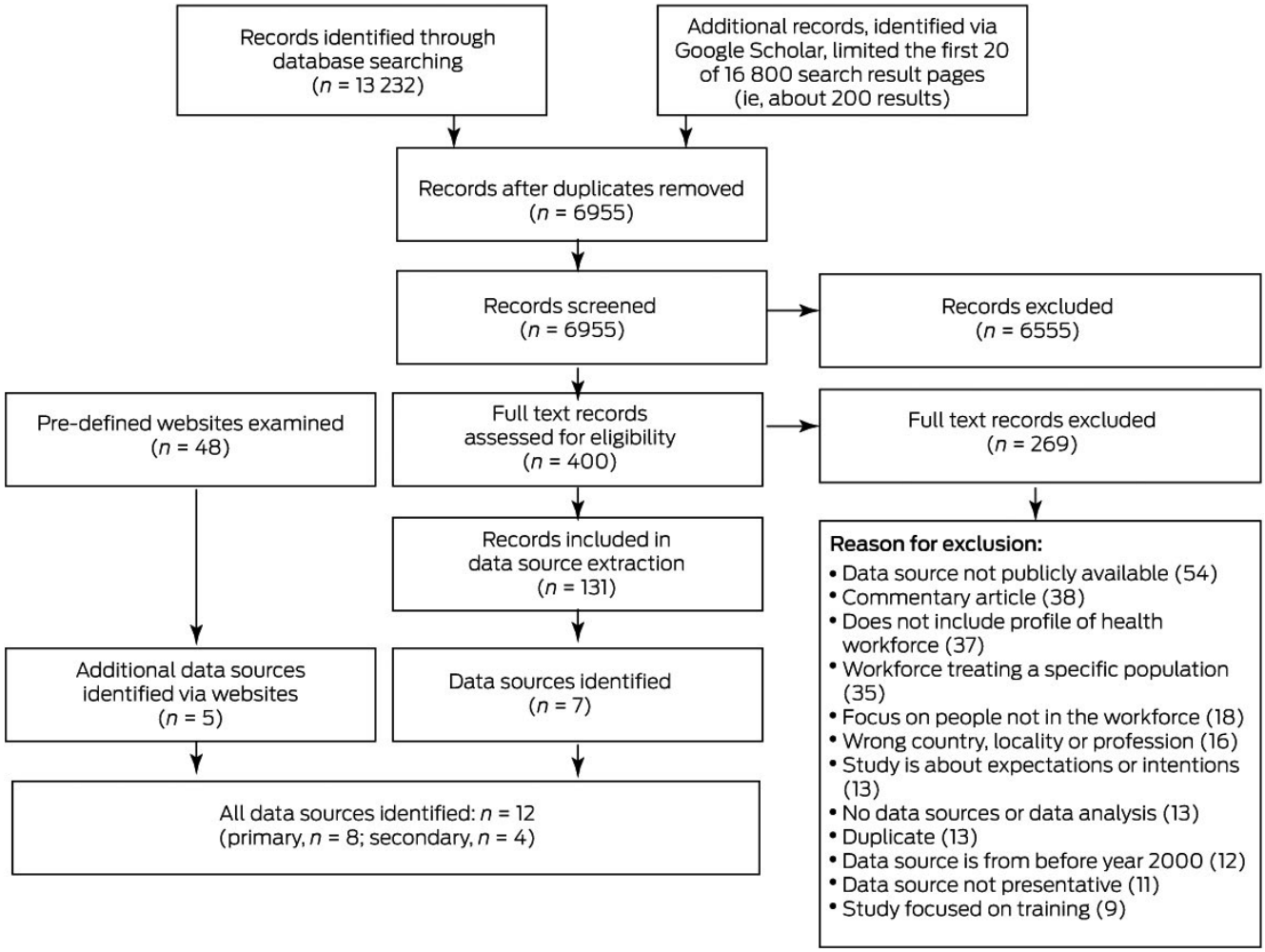
Key characteristics of each primary data source are summarised online (Supporting Information, Table 5.3). All primary data sources used survey methods, except NHWDS and AHPRA, which primarily included administrative data (note that NHWDS includes AHPRA data). Frequency of data collection ranged from monthly (ABS Labour Force Survey) to every 5 years (ABS census), and six data sources collected data annually (AHPRA, NHWDS, BEACH project, MABEL survey, HILDA survey and RWAs).

In terms of discipline coverage, three data sources (ABS census, ABS Labour Force Survey and HILDA survey) captured all health occupations as specified in the Australian and New Zealand Standard Classification of Occupations. NHWDS and AHPRA data were limited to 16 health professions, whereas MABEL, BEACH and RWA data primarily covered the medical profession. All data sources provided publicly available information on workforce age, sex, education and location except for AHPRA, which did not provide information on age and sex.

Workforce data were publicly available only in aggregate form in four data sources (NHWDS, ABS census, ABS Labour Force Survey and BEACH project), and as individual-level data in the remaining four (AHPRA, HILDA survey, MABEL project and RWAs). Four primary data sources provided direct access to publicly available data (AHPRA, ABS census, ABS Labour Force Survey and NHWDS), three provided data free of charge on application (HILDA survey, MABEL survey and RWAs), and one required payment of fees to produce specific reports (BEACH project).

Our appraisal of the relevance, accessibility and accuracy of the primary data sources is available online (Supporting Information, Table 5.4). Most data sources scored well for relevance (including discipline coverage, number of variables of interest, recency of data, and frequency of data collection), except for reference period (ie, ability to provide data for a specified data collection period required by the user), where most received a low score. Many data sources received moderate or low

1 PRISMA-ScR flow diagram of review process



PRISMA-ScR = Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews.

scores for accessibility (including access to datasets and data) and representativeness. Seven data sources provided data at the national level, and thus scored well for geographic coverage. Information on the completeness of data was missing or difficult to access for most data sources.

Discussion

In this scoping review, we identified almost 7000 documents reporting on the health workforce, but we only identified seven publicly available data sources from them. By examining predefined websites, we identified five more data sources. Of the total of 12 identified data sources, eight were primary sources and four were secondary. The primary data sources were generally of modest quality (as assessed with our appraisal tool), with low scores in terms of reference period, accessibility and missing data. No single primary data source scored well across all domains of the appraisal tool.

The most frequently used datasets were from the NHWDS and AHPRA. While these datasets were shown to be relevant and accessible, there were some limitations with using them to inform health workforce planning in Australia. The main issue regarding NHWDS and AHPRA data is that they only cover 16 registered professions; this poses a significant problem when aiming to describe the allied health workforce because many allied health professions are not registered (eg, audiologists, speech pathologists, dietitians, orthotists and prosthetists, social workers, and sonographers).[28] In contrast, the ABS census and ABS Labour Force Survey provide data on the full range of health occupations, meaning that they could inform system-wide health workforce and services planning. However, the ABS census is conducted every 5 years and the data are only available in aggregate form. Despite these limitations, the ABS census was identified as the most desirable data source for workforce planning purposes due to ease of access, breadth of health professions, range of variables and quality. While the ABS Labour Force Survey covers the same health professions as the census, it is less representative due to its sampling method.

An essential matter for health workforce policy and planning is the recruitment and retention of the workforce. This is especially relevant to rural settings, where there is often a high turnover of workers.[29] To adequately address factors associated with recruitment and retention, longitudinal data on geographical dispersion and skill mix of the health workforce are needed. While mapping of data sources for use in assessment of recruitment and retention was not within the scope of this review, two of the data sources that we identified provide longitudinal data (the HILDA and MABEL surveys). However, these datasets were not

2 Primary and secondary data sources identified in the review

Primary data sources

- Australian Health Practitioner Regulation Agency (AHPRA)[16]
- National Health Workforce Data Set (NHWDS)[17]
- Australian Bureau of Statistics (ABS) Census of Population and Housing[18]
- Australian Bureau of Statistics (ABS) Labour Force Survey[19]
- Medicine in Australia: Balancing Employment and Life survey (MABEL)[20]
- Bettering the Evaluation and Care of Health project (BEACH)[21]
- Household, Income and Labour Dynamics in Australia survey (HILDA)[22]
- Rural Workforce Agencies (RWA)[23]

Secondary data sources

- Australasian Medical Publishing Company (AMPCo)[24]
- World Health Organization (WHO)[25]
- Organisation for Economic Co-operation and Development (OECD)[26]

comprehensive, limiting their suitability for nationwide assessment of the health workforce (HILDA comprised a sample size of about 17 000 participants across a wide range of occupations, while MABEL covered the medical profession only). Thus, for comprehensive mapping of health worker turnover, longitudinal individual-level linked data should be regularly collected and analysed.[30-32] Furthermore, because of differences in retention characteristics between health occupations,[33] different occupations should be mapped separately.

Another important matter relating to recruitment and retention is health workforce supply and demand. Supply can be characterised by the numbers of health workers entering practice, currently working and exiting practice.[30] All the data sources that we identified could be used to assess the number of health professionals currently working, but assessment of health workers entering and exiting practice was not covered in our data appraisal. Health workforce demand relates to the provision of health care services, which ideally should be tailored to the health needs of the population being served.[2] It can be characterised by factors such as population characteristics, service use patterns, available treatments, and range and type of health professionals.[30] Of the data sources that we identified in this study, the only one that could be useful for this purpose was the HILDA survey, although the sample size may not be adequate. Future research is needed to determine the variables that should be included in data sources that can be used to assess the number of health workers entering, currently working in and exiting the workforce. In response to the global shortage and maldistribution of health workers, the WHO has developed a global strategy on human resources for health.[34] One of the objectives of the strategy is to strengthen data on human resources for health. The strategy also recognises the importance of data being in the public domain, to ensure transparency and accountability, and the need to involve researchers and academic institutions to address evidence gaps. Thus, this review sits within a global initiative to improve health workforce data by mapping and characterising publicly available data.

There are some limitations to this review, the main one being that the appraisal tool does not provide a comprehensive quality assessment of the data sources. The key aspect of quality with respect to data is that the data are suitable for their intended use.[14,35,36] Our appraisal tool covered relevance, accuracy and accessibility — three of the six data quality dimensions defined in the DQATAD framework,[14] which informed the development of our tool. We chose these three dimensions because we felt that they are suitable for critically appraising workforce data sources in the context of a scoping review. The DQATAD framework was originally designed to help users determine the fitness of an agency's administrative data for their intended use. The tool comprises 43 questions organised into three phases and has an average completion time of 6–10 hours. As such, the DQATAD framework was not considered suitable in its current form for our purpose. Some of the items in our appraisal tool may appear to have arbitrary cut-off values, or be lacking in detail, but the tool was not meant to provide a thorough quality assessment of the data sources. Rather, it was designed to provide high level comparisons and form the basis for further research into health workforce data sources.

While our search strategy was comprehensive, and included a search of both published and unpublished documents plus examination of pre-defined websites, as the review was limited to publicly available data sources, it is possible that some documents were overlooked as they may not have been published in the public domain (eg, internal reports).

Conclusion

In this scoping review, we identified a small pool of publicly available data sources to inform health workforce planning. Medicine was covered in all primary data sources, while three data sources covered the full suite of health professions. The quality of publicly available primary data sources was modest, as assessed with our appraisal tool, and quality in terms of reference period, accessibility and missing data was deemed low or unclear for many data sources. Future research should examine how data from different sources can be triangulated to provide more comprehensive information to inform health workforce and services planning, especially in rural areas. This could include linked national data sources, which can be used to assess inequalities in access to health care services and maldistribution of the health workforce. Moreover, given the crucial role of the health workforce in health care delivery, effort should be made to design and establish sustainable, high quality, longitudinal, national data sources across all the professions involved, and according to geographical location.

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Supporting Information

Additional Supporting Information is included with the online version of this article.

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Chapter 6

Rapid realist review of opioid tapering in the context of long term opioid use for non-cancer pain in rural areas

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Abstract

Objective: To describe interventions, barriers and enablers associated with opioid tapering for patients with chronic non-cancer pain in rural primary care settings.

Study design: Rapid realist review registered on the international register of systematic reviews (PROSPERO) and conducted in accordance with RAMESES standards.

Data sources: English language, peer-reviewed articles reporting qualitative, quantitative and mixed method studies, published between January 2016 and July 2020, and accessed via MEDLINE, Embase, CINAHL Complete, PsycINFO, Informit or the Cochrane Library during June and July 2020. Grey literature relating to prescribing, deprescribing or tapering of opioids in chronic non-cancer pain, published between January 2016 and July 2020, was identified by searching national and international government, health service and peek organisation websites using Google Scholar.

Data synthesis: Our analysis of reported approaches to tapering conducted across rural and non-rural contexts showed that tapering opioids is complex and challenging, and identified several barriers and enablers. Successful outcomes in rural areas appear likely through therapeutic relationships, coordination and support, by using modalities and models of care that are appropriate in rural settings and by paying attention to harm minimisation.

Conclusion: Rural primary care providers do not have access to resources available in metropolitan centres for dealing with patients who have chronic non-cancer pain and are taking opioid medications. They often operate alone or in small group practices, without peer support and access to multidisciplinary and specialist teams. Opioid tapering approaches described in the literature include regulation, multimodal and multidisciplinary approaches, primary care provider support, guidelines, and patient-centred strategies. There is little research to inform tapering in rural contexts. Our review provides a synthesis of the current evidence in the form of a conceptual model. This preliminary model could inform the development of a model of care for use in implementation research, which could test a variety of mechanisms for supporting decision making, reducing primary care providers' concerns about potential harms arising from opioid tapering, and improving patient outcomes.

Patients continue to be prescribed long term opioid therapy for chronic non-cancer pain (CNCP) despite a lack of evidence to support this approach.[1,2] In Australia, 60% of all opioids prescribed by health care practitioners are for the treatment of CNCP.[3] Higher opioid doses have been associated with significant risk, including overdose, opioid use disorder, depression, suicide, motor vehicle accidents and fractures.[4] These risks may be reduced by tapering opioid doses, but there is insufficient evidence to guide safe and effective tapering, especially in rural contexts.[5]

Considerable variation of opioid prescribing rates occurs across Australia, with a tenfold difference between the highest and lowest rates.[3,6] Opioid dispensing is highest in low socio-economic and regional areas and more prevalent among Aboriginal Australians, who are three times more likely to be prescribed opioids.[3] Rural reliance on pharmacological management of CNCP is reflected in the reported 30% increase in opioid prescribing in rural and remote regions between 2009 and 2014.[7]

It is well recognised that rural, regional and remote Australians are exposed to increased health risks and experience worse health outcomes than their city counterparts. Access to specialist pain services across Australia is severely lacking, with most public and private pain clinics located in capital cities.[3,7] Resources to support clinicians in rural and remote primary care settings have been developed and implemented.[3,7] However, disproportionate numbers of rural and Indigenous Australians remain on long term opioid therapy.[6,8] Also, despite considerable strategic, legislative and regulatory changes, effective tapering of long term prescription opioids in patients experiencing CNCP remains problematic. This is especially challenging for time-poor general practitioners who do not have access to multidisciplinary support.[9-11]

A 2017 Cochrane review exploring the efficacy of interventions for reducing prescribed opioid use in patients who have CNCP reported that no reliable evidence could be drawn because of limited data and poor quality studies.[12] Moving beyond systematic reviews to include a wider range of study designs, together with grey literature, may help improve our understanding of the contexts in which tapering occurs, the range of interventions being implemented and their potential for achieving effective outcomes in rural Australia.

This rapid realist review represents phase 1 of a three-phased study aimed at developing and evaluating a prescription opioid tapering intervention for patients with CNCP who reside in rural New South Wales, Australia. The objectives of the review were to identify prescription opioid tapering approaches used in rural primary care settings, in Australia and overseas, and to identify which approaches work, for whom and under what circumstances.

Methods

Realist reviews seek to produce explanatory analysis relating to how complex social interventions work.[13] The rapid realist review approach was utilised as a framework to guide knowledge synthesis in order to provide useful and time-sensitive information that can help address emerging issues.[14] An expert reference team was formed, which included: representatives from tertiary

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and rural specialist pain services, drug and alcohol services, and primary care services; an expert in chronic diseases that affect Aboriginal people; clinician researchers; and a research support librarian. The team agreed on the focus and scope of the review and contributed to the review process.

The questions guiding the review were:

- What is the current state of play in opioid tapering practice for people experiencing CNCP across and within rural primary care settings?
- What mechanisms that enable deprescribing are described in the literature, and how do they operate to achieve desired outcomes?
- How do contextual factors interact with these mechanisms to influence opioid tapering outcomes for patients experiencing CNCP?

Search strategy

We designed the search process to support the iterative nature indicative of a realist review, continuing for the duration of the review to assist with further developing, refining and testing emergent theories. We conducted key word searching, criterion referenced searching, and snowballing. Key words were opioids, deprescribing, tapering, dose reduction, discontinuation, cessation, weaning, chronic non-cancer pain and rural. One of us (AS, a research librarian) developed the initial search strategy in consultation with the expert reference group, and then an independent librarian peer reviewed the strategy using PRESS (Peer Review of Electronic Search Strategies) guidelines. We conducted searches in MEDLINE (Ovid), Embase (Ovid), CINAHL Complete (Ebsco), PsycINFO (Ovid), Informit and the Cochrane Library.

To gain a more thorough understanding of deprescribing practice, we searched for publications relating to barriers, enablers and facilitators for all stakeholders in MEDLINE. We also undertook supplementary searches to further explore the relationship of education and decision support to deprescribing practice. To better inform the review, we developed search strategies inside MEDLINE to capture details of the tools, programs, strategies, approaches, bundles and frameworks that are relevant to deprescribing.

We limited our searches to articles published between January 2016 and July 2020. We chose this period, in keeping with rapid review methods, as we felt it would be the most likely to identify new findings following publication of the *CDC guideline for prescribing opioids for chronic pain* in 2016[15] and two systematic reviews on opioid tapering interventions in 2017.[4,12]

We conducted Google Scholar searches and hand searching to capture literature that was not retrieved through database searching. The expert reference group identified grey literature, alongside searches of established grey literature sources and the websites of relevant organisations and government bodies. As with the database searches, we limited the grey literature searches to documents published between January 2016 and July 2020. All searches conducted for this review were undertaken between 1 June 2020 and 21 July 2020.

Citation screening and data extraction

To minimise the risk of selection bias and ensure that relevant studies were not inappropriately excluded, two of us (GL, VP) independently screened all article titles and abstracts against the title and abstract inclusion criteria. Decisions and rationale for exclusion of studies were recorded and stored on a dedicated, title and abstract screening tool accessed and stored in Covidence systematic review software (Veritas Health Innovation). After selecting potential references, two of us (GL, VP) independently reviewed the full text manuscripts against inclusion and relevance criteria (Supporting Information, Table 6.1). Decisions relating to exclusion were documented on a data extraction tool dedicated to full text reviews and stored in Covidence. Any disagreements regarding inclusion and exclusion were settled by another one of us (CH, AD, SH, RW or HR) or via discussion at expert reference team meetings. Key data regarding study type, setting, participants, intervention details and outcomes were extracted by one of us (GL) and checked for accuracy (VP). Discrepancies were resolved by referral to another one of us (CH, AD, SH, RW or HR). Descriptive data on all included studies are available in the Supporting Information, Table 6.2.[16-28]

Quality assessment

Selected studies were distributed among pairs of us for full text review, quality assessment and data extraction such that each study was independently reviewed by two of us using the mixed method appraisal tool (MMAT) version 2018.[29] All included studies except the study by Witt et al[28] achieved an MMAT score of 65% or higher, indicating variable levels of evidence. Owing to the low number and diversity of studies, and the understanding that different primary studies contribute different elements to the overall realist synthesis of evidence,[14] all studies that met the inclusion and relevance criteria were included, with any limitations acknowledged.

Data analysis

We developed hypotheses by questioning the data using key criteria relating to specific outcomes and their associations with identified interventions. Constructs identified as having potential utility for theoretical modelling included therapeutic relationships, the work of tapering, harm minimisation and supportive networks. We then tested associations for reliability across all appropriate studies and documents, and confirmed associations with the expert reference team. Due to the small number of studies, their heterogeneity and the inability to rely on data sources as sound evidence, the propositions that we offer in this review are preliminary.

Results

Of the 1354 articles initially identified, 32 were eligible for inclusion in our analysis. Only three studies reported interventions conducted in rural primary care settings, and all of these were conducted in the United States (Supporting Information, Figure 6.1).[24,26,28] A summary of the barriers to long term opioid tapering that we identified as relevant to patients with CNCP in rural areas, along with reported and recommended facilitators of tapering, is shown in Box 1.

Studies on opioid tapering for CNCP in primary care contexts

Reviews of interventions designed to support opioid tapering for CNCP generally report that inadequate evidence is available to guide primary care practitioners (PCPs) in their management of opioid reduction for patients experiencing

CNCP.[4,5,9,12,30,31] Most of the studies that we identified were conducted in the US, in academic settings, Veteran Affairs clinics, or safety net clinics located in hospitals. Australian studies included a survey of PCPs in a mixed urban–rural local health district,[32] an evaluation of an education intervention to support PCPs with prescribing[33] and a qualitative study conducted in urban practices.[22] There are several study protocols listed in PROSPERO.

Approaches to tapering described in the overseas literature included universal precautions, multimodal approaches, holistic patient-centred interventions, PCP support, guideline concordance, and combinations of these. Universal precautions applied to pain management more generally are most often included in tapering regimens and described in relation to patient contracts, urine testing and assessment for opioid use disorder.[34] Multimodal approaches involve dosage adjustment in conjunction with management of mental health concerns and motivation.[16,18,19,25,26,28] PCP support described in the literature included education, telementoring, telehealth and referral pathways.[17,27] There is consensus that tapering for many patients is a long term project and that tapering plans vary according to drug, drug combinations, pain interference and comorbidities.[19] Physicians and pharmacists are over-represented in the small amount of research conducted to date. Few studies have included psychologists, nurses, nurse consultants, physician assistants and physiotherapists.

In terms of applying theory, two qualitative studies used a health belief theory framework to inform examination of barriers of tapering and enablers of tapering.[18,20] Other studies focused on the role and nature of communication in enabling tapering, and one of these offered a theoretical model of patients' experiences of tapering.[19,21,23]

Several opioid prescribing guidelines have been developed overseas and in Australia. Recently published guidelines that specifically support the work of tapering were developed with reported challenges in mind.[15,35-40] However, few implementation studies have been conducted to evaluate the use of such guidelines and, to our knowledge, no such research has been conducted in Australia. Australian guidelines do not specifically address which groups of patients with CNCP should or should not be treated with opioids. Although suggestions are made about how to reduce opioid use, the questions of when and for whom are not sufficiently addressed.

In the US, expert review of Centers for Disease Control and Prevention guidelines raised several concerns. Notable concerns were the inflexible way in which guidelines are sometimes interpreted and applied, limits on prescription duration, abrupt cessation in dependent patients, lack of access to the recommended multimodal care, difficulty diagnosing opioid use disorder and accessing appropriate treatment, underuse of preventive naloxone therapy, and incomplete data reporting. Other concerns highlighted were the legal, ethical and regulatory challenges inherent in situations where significant risks and unclear benefits may undermine the possibility of consensual tapering.[41]

US studies that focused on rural primary care settings

Focusing on deprescribing in family practices in small rural communities in the US, Stack and colleagues reported significant reduction in opioid prescribing and reduction in mean daily doses in an intervention group and a crossover group when they implemented a comprehensive opioid reduction protocol.[26] Their protocol, based on Centers for Disease Control and Prevention guidelines, involved risk assessment, intervention in high risk cases, patient education, support and counselling, universal precautions, treatment of psychiatric comorbidities, maximum use of non-pharmacological pain treatments, and a goal to taper below a dose threshold (50 mg or 90 mg oral morphine equivalent daily dose [oMEDD]) with no expectation to stop completely. Tapering involved a slow process of about approximately 10 mg oMEDD per month.

This study revealed several barriers and facilitators.[26] Barriers encountered were lack of direct referral pathways, difficulties accessing pain specialist services, no licensed prescribers to initiate substitution therapy for patients with opioid use disorder, and stigma arising from staff preconceptions about patients receiving long term opioid therapy. Facilitators of success were pre-implementation factors (such as enlisting key providers and staff in the development of the protocol), being empathetic and responsive to staff concerns, providing staff education, building relationships with addiction medicine experts, streamlining referral processes, and establishing a relationship with a pain medicine specialist who could provide telehealth consultations.

In another US study, Parchman and colleagues used a team approach in which they applied six previously devised building blocks. [24] They showed that the re-design of rural clinic schedules and processes, including allocation of dedicated time and redeployment of staff, can lead to fewer patients receiving high doses of opioids. This study highlights the importance of enabling structural supports that underpin tapering work, such as leadership, policies, tracking systems and resources.

Witt and colleagues implemented and evaluated guidelines for tapering in a small rural practice in the US based on recommendations from a multidisciplinary collaborative reference team.[28] The recommendations included coordination by a PCP, standardised approaches to managing patients on long term opioid therapy, increased support (nursing and administrative), improved access to specialist care, and development of a case review panel. Implementation strategies included developing a long term opioid therapy registry, developing standardised tools and educating clinicians. This quality improvement study suggests that a systematic supported approach can improve guideline concordance in small rural practices with limited resources.

These three studies conducted in rural contexts share a focus on multidisciplinary engagement and the need to redesign services to enable tapering.[24,26,28] They resemble studies conducted in non-rural contexts, but with a focus on establishing or modifying elements that are lacking in rural environments. With so few studies, it is not possible to generalise, but these studies provide some direction in terms of what is required and what can be achieved. What requires further attention is how to procure and support sustainable models of care that enable tapering across a range of rural contexts, particularly in Australia.

Non-rural studies that are relevant to rural contexts

Several urban implementation studies published since 2017 describe elements that may inform tapering models in rural settings, particularly in terms of who should be involved and in what way.[16,17,27]

A physician specialist-supported model implemented by Sullivan and colleagues used a physician assistant trained in cognitive behaviour therapy and motivational interviewing to deliver a 22-week tapering support intervention.[27] While the study did not show statistically significant reductions in opioid dose or pain intensity, improvements relating to pain interference, pain

1 Barriers and recommended facilitators for long term opioid tapering in patients with chronic non-cancer pain in rural contexts

Barriers	Recommended facilitators
Practitioner reported	
• General practitioner reluctance to change specialist prescriptions	• Education and greater autonomy for general practitioners
• Disruption to prescriber–patient relationship	• Establishment of long term trusting relationships
• Managing difficult conversations • Fear of adverse outcomes • Feeling a sense of obligation to provide pain relief	• Education and resources for having difficult conversations, managing pain, and managing adverse effects and withdrawal
• Lack of knowledge and support • Lack of specific deprescribing guidelines	• Support and mentoring
• Perceived lack of options	• Provide choice
• Lack of access to specialist services • Emotional burden • Fears about physical and psychological dependence • Patients are medication focused • Mandated tapering adds tension to therapeutic relationships	• Peer review and support
Patient reported	
• Varying ideas about tapering and what it means	• Empathising with patients' experiences
• Fear of pain or fear of worsening pain • Low perceived personal risk from long term opioid therapy	• Preparing patients for opioid tapering • Explaining reasons for tapering
• Pain in the present trumps opioid risks in the future • Pessimism about non-opioid options to manage pain	• Empathy and patient-centred language, discussing adverse effects, and building long term trusting relationships
• Fear of withdrawal • Fear about negative effects on functioning and quality of life, ability to attend to responsibilities, and social relationships	• Individualised implementation of the tapering plan
• Ineffective pain management	• Negotiating the tapering plan
• Fear of addiction	• Providing options, control and collaboration
• Stigma — salient enough that some patients hide their opioid use • Fear of abandonment	• Assuring patients that they will not be abandoned
• Fear of impact on mood	• Monitoring of mood, sleep and motivation with appropriate management strategies
Structural barriers	
• Workload	• Staff training — having conversations
• Inadequate remuneration	• Motivational interviewing
• Insufficient resources	• Opioid use and tapering guidelines
• Inadequate time • Inadequate training	• Establish professional relationships and networks
• Lack of access to multidisciplinary teams and networks	• Telehealth consultations
• Non-specific guidelines and policies, no one guideline fits all cases	• Telementoring • Case videoconferencing
• Need for attention to implementation strategies	• Greater involvement of pharmacist, nurses and other primary care providers

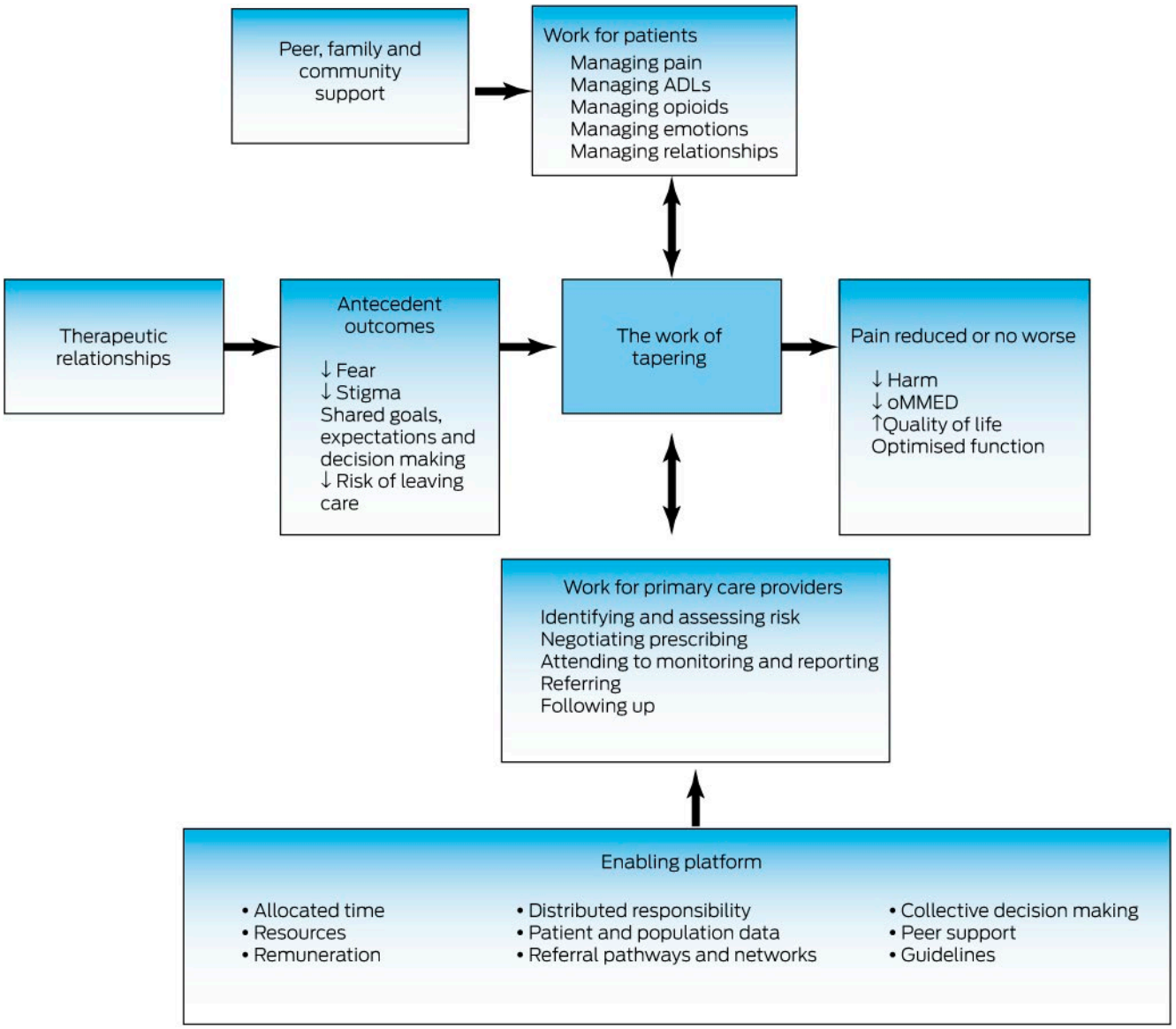
self-efficacy and prescription opioid problems (patient-reported psychosocial and control concerns attributed to opioids) were reported. A rural approach using practice nurses or nurse practitioners might lead to similar outcomes.

A study conducted by Darnall and colleagues[16] used a physician-led, patient-centred model (without interdisciplinary support) to deliver a 4-month voluntary outpatient opioid tapering program. The approach achieved statistically significant reductions in median oMEDD, with reductions to 150 mg (interquartile range, 54–248 mg; $P = 0.002$) for 51 patients on moderate to high baseline opioid doses (median oMEDD, 288 mg) who had been prescribed opioids over a mean duration of 6 years.

Integral to both of these approaches were patient education, the development of flexible individualised tapering plans, and ongoing access to clinician support for the duration of the tapering period.[16,27] What is not clear from these studies is the relationships between the educational approaches used and their impact on weaning.

Focusing on provider support, Flynn and colleagues implemented a telementoring program involving pain medicine specialists and evaluated its impact on prescribing behaviour as reflected in long term opioid therapy reduction and cessation.[17] The telementoring intervention included interactive competency-based education and opportunities for complex case-based discussion. No difference in opioid dose reductions was shown

2 Opioid tapering in patients with chronic non-cancer pain in rural contexts: a conceptual model



ADLs = activities of daily living. oMEDD = oral morphine equivalent daily dose.

between groups, but cessation of long term opioid therapy in patients assigned to PCPs attending telementoring was proportionally higher than in patients of non-participant control PCPs (25% ± 3.6% *v* 16% ± 3.6%; $P < 0.05$). The authors postulated that telementoring could increase PCP capacity and rapidly diffuse knowledge in and across practice settings, particularly when used for individual case conferencing relating to patients with complex care needs.

Notably, opioid tapering achieved in these three studies was realised without increases in pain intensity or interference.[16,17,27]

Conceptual model

The conceptual model that we have developed, shown in Box 2, builds on the work of Henry and colleagues.[20] It represents the relationship between key context, mechanisms and outcomes associated with opioid tapering. The model could be applied and tested in rural practice settings.

Discussion

The evidence to date emphasises that tapering requires planning, preparation and ongoing work. This involves conversations, education, assessment, development of shared goals, and honesty about what will happen. This takes time and requires trusting relationships.[19,20,21,23] Conversations between patients and PCPs are critical to any successful intervention. However, there is minimal evidence to support how best to undertake these conversations. Many attempts to taper are unsuccessful, and patients who succeed in tapering often report more than one experience of tapering.[30]

Tapering is a different experience for each patient in terms of their views about opioids and the need for tapering, their pain and duration of opioid use, and their emotional state, supports and relationships.[19,20] Patients fear worsening pain and abandonment and do not always agree that tapering is necessary or in their best interests.[18,20,21,23] Plans need to be individualised and co-produced with patients — flexible, adapted to their mood

and pain, and considerate of other things happening in their life.[21] Plans also need to be negotiated regularly, as frequently as weekly,[23] and PCPs must be responsive to necessary changes.

Australian general practitioners have varying views about if, when and how to deprescribe.[22,32,33] Across all the studies that we reviewed, PCPs reported serious concerns about the implications and safety of tapering for many patients. For PCPs, the work of deprescribing is daunting and time consuming, with many people in each practice needing tapering support, and about one-quarter of them requiring complex multifaceted interventions.[22,30] Lack of flexibility and resources in the health care system hampers the ability of PCPs to be responsive to patients' needs. This is compounded by increasing demands to fulfil regulatory requirements and gain the necessary authority to prescribe opioids for CNCP.[41]

Prathavadi et al conducted a study of Australian GPs and found that attitudes vary by age of patient and goal of therapy.[11] GPs felt obliged to prescribe opioids recommended by specialists even if they believed the opioids were unsafe. These authors highlight the need for interventions that value the autonomy of GPs while also encouraging a collaborative approach.

For rural primary care contexts, tapering requires time far beyond other types of consultations — time that is hard to find in a busy clinic schedule with limited resources. It also requires the weighing up of risks, not limited to the significant risks to patients if tapering is not managed well but also to the professional position and reputation of clinicians. The context of tapering is complex for all PCPs and more challenging in rural environments where there are fewer health care professionals and where personal relationships and community membership are foregrounded.

Evidence to support tapering of opioids for CNCP in rural contexts remains inadequate. While there is a growing number of studies and a clear indication that there are groups of researchers working in the area, study numbers are low and reported outcomes are inconsistent and inconclusive. Very few studies provide longitudinal data or data on patient follow-up. The complex clinical and ethical context in which tapering occurs also poses significant challenges for researchers. While the evidence broadly points to the ineffectiveness of opioids for CNCP, discerning between the effects of opioids on reducing pain, distinct from effects on moderating associated distressing emotions, makes the task of evaluating opioid responsiveness for CNCP problematic.

High quality qualitative studies have provided insight into the complex contexts in which tapering occurs, patient and PCP experiences, and barriers and potential enablers for successful tapering. There is evidence to suggest that tapering can be achieved without increased levels of pain and loss of functional capacity, especially when tapering occurs slowly.[16,19,30] The biggest gap in evidence lies in evaluating which patients or tapering characteristics are associated with benefit or harm.[5] This gap needs to be addressed to assuage the front-of-mind fear for both PCPs and patients, particularly in relation to accidental overdose and adverse events relating to mental health.

Implementation studies are required to support introduction of new models of care, redesign of services, and development of a robust platform to support PCPs in rural practice settings. The ability to achieve satisfactory deprescribing outcomes in rural contexts requires urgent implementation research focused on community-specific solutions, including development and review of processes, pathways and networks with stakeholder and community engagement.

To date, little research has examined specific roles, relationships, models of care, interprofessional networks or ways in which community-based resources could be deployed to support the work of tapering in Australian rural settings. Likewise, the costs of existing and potential models have not been examined. This type of research is necessary to develop an understanding of who is best placed to assist patients with tapering, and how they can be deployed and supported to achieve optimal tapering outcomes. This will necessarily differ according to differing community characteristics.

Limitations

Our review is limited by the time constraints inherent in conducting a rapid review, the limited number of heterogeneous studies to inform the review, and the over-representation of studies from the US. Prescription opioid consumption rates in the US are more than double those for Australia, and the two countries have significantly different cultural, regulatory and prescribing characteristics. Also, since we excluded studies that focused on prescribing, we might have missed studies that included deprescribing as an outcome measure.

Conclusion

Overcoming the challenges associated with long term opioid treatment is complex and involves weighing risks against benefits. Significant barriers face PCPs in rural practices, including lack of time, support and resources. Mechanisms by which these barriers can be overcome were described in the literature that we reviewed. These include telementoring, multidisciplinary team support, specialist referral pathways, peer support and case review, and structural changes such as clinic redesign, guideline implementation and local policy development.

In the absence of adequate evidence, we provide a preliminary model that incorporates mechanisms likely to succeed and conditions in which success can be achieved. Further research is required to implement and test the model, and to determine whether interventions improve support for PCPs and opioid tapering outcomes for patients.

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Supporting Information

Additional Supporting Information is included with the online version of this article.

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