

# Chapter 1

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

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Unhealthy diets, particularly insufficient intake of fruits and vegetables and excess intake of ultra-processed foods,<sup>1</sup> are a major driver of global increases in preventable non-communicable diseases (NCDs).<sup>2</sup> Rural populations in Australia and other high income countries such as the United States<sup>3</sup> and Canada<sup>4</sup> have higher rates of obesity and NCDs compared with their metropolitan counterparts.<sup>5,6</sup> 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.<sup>3-6</sup> 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%.<sup>7</sup> 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.<sup>8,9</sup>

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.<sup>10</sup> 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.<sup>11,12</sup> 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.<sup>13</sup> 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.<sup>14</sup>

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.<sup>12,15-17</sup> 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)

### 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.

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.<sup>9</sup>

Study selection followed the process described in the *Cochrane handbook for systematic reviews of interventions*<sup>18</sup> and the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement.<sup>19</sup> 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.<sup>20</sup> This tool gives an overall study quality rating of strong, moderate or weak.<sup>20</sup> Studies involving Indigenous Australian populations were assessed by one author (TW; an Aboriginal researcher) using the CREATE critical appraisal tool.<sup>21</sup> 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.<sup>21</sup>

## 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,<sup>22-25</sup> and seven of the 21 studies only reported food environment change (ie, not change in consumer behaviour such as dietary intake or purchasing).<sup>23,25-30</sup> 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.<sup>30-34</sup> Three initiatives were conducted in very remote Australia<sup>31-34</sup> and one was conducted in regional Australia.<sup>30</sup> Four of the five articles focused on food environments in Indigenous communities and showed positive effects on consumer behaviour,<sup>31-34</sup> 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.<sup>32,33</sup>

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.<sup>32</sup> 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.<sup>33</sup> It reported a 27% reduction (95% CI, -44% to -4%;  $P = 0.02$ ) 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.<sup>31</sup> 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.<sup>31</sup> Brown and colleagues (2019) used an incentive program with vouchers for fruits and vegetables in a remote Indigenous community.<sup>34</sup> 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.

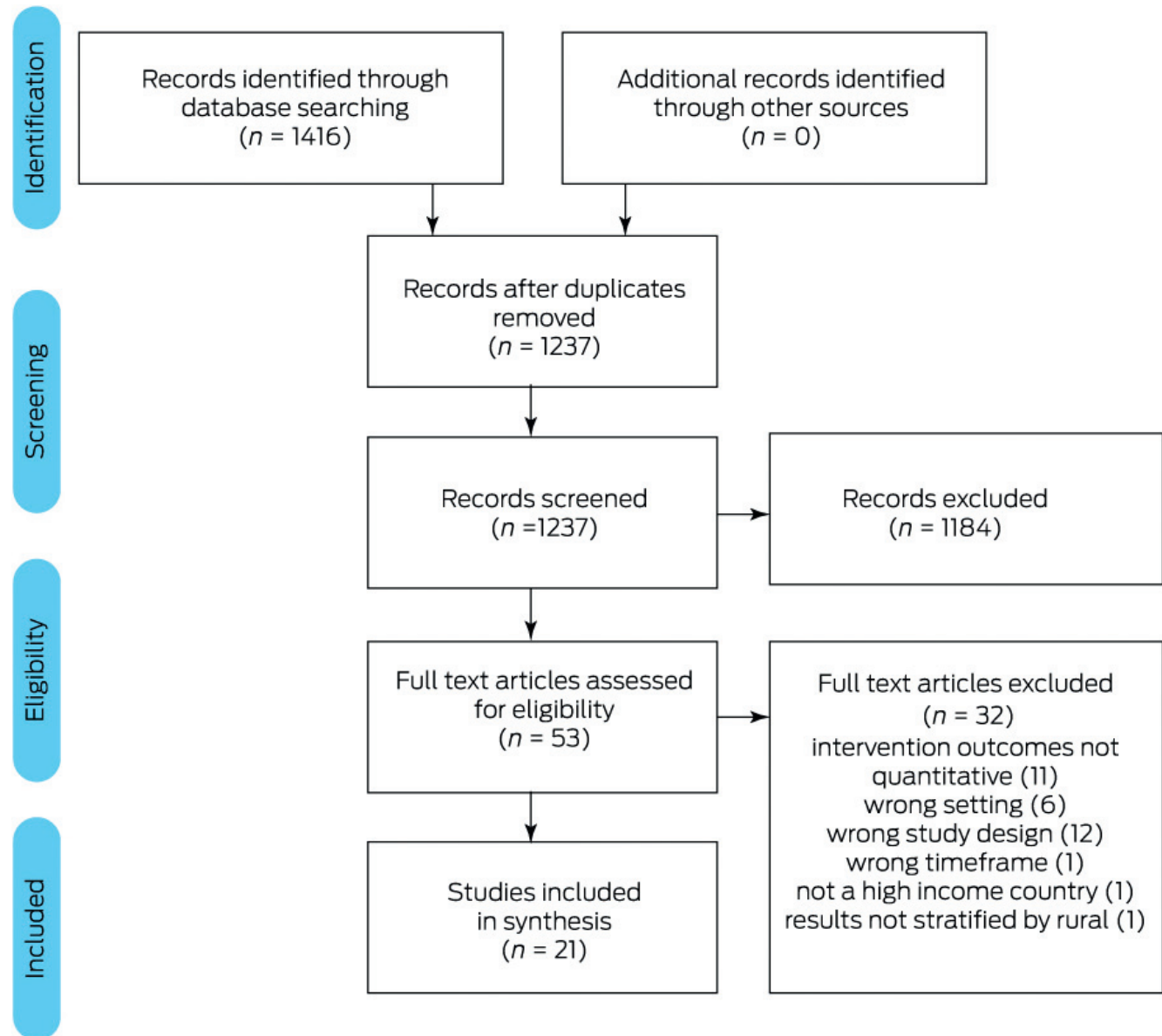
In the only Australian article that did not focus on Indigenous communities, Palermo and colleagues (2016) evaluated the impact of providing incentives to store owners in 21 regional Victorian towns to improve the variety and availability of healthy foods.<sup>30</sup> In this region, healthy foods had been found to be not easily accessible.<sup>35</sup> 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.<sup>30</sup>

### 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.<sup>36</sup> Three of the studies focused on Indigenous populations.<sup>26,29,37</sup> 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<sup>22,24-26,29,37-42</sup> and two of these also included restaurants as part of the initiative.<sup>25,43</sup> 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.<sup>39</sup> 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.<sup>39</sup> The combination of all three nudges was associated with increased sales of healthy foods during the trial period ( $P = 0.001$ ).<sup>39</sup> 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%.<sup>42</sup> 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.<sup>42</sup>

Gustafson and colleagues (2019) evaluated the impact of the Plate It Up Kentucky initiative.<sup>40,41</sup> 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.<sup>40</sup> 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.<sup>41</sup> A similar initiative named Plate It Up Kentucky Proud was trialled in another 17 grocery stores across rural Kentucky.<sup>24</sup> 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.<sup>37</sup> 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.<sup>24,40,41</sup>

Mackenzie and colleagues (2019) evaluated the Healthy Navajo Stores Initiative — a multilevel community initiative targeting rural indigenous American communities.<sup>37</sup> 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).<sup>37</sup> 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.<sup>22</sup> 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.<sup>26,29</sup> They reported greater variety of healthy foods, but did not measure effects on consumer behaviour.<sup>26</sup> Another two studies used the same participatory methods to support store and restaurant owners to provide and market healthier options.<sup>25,43</sup> 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<sup>23,28</sup> 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.<sup>23</sup> Participating restaurants improved their food environment scores and this was found to be highly feasible for restaurant owners.<sup>23</sup> Nothwehr and colleagues (2014) evaluated the effectiveness of a state-wide initiative aimed at supporting restaurant owners to increase healthy food options and marketing.<sup>28</sup> They found that 48% of restaurant owners reported having made healthy changes.<sup>28</sup>

**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,<sup>38</sup> one in a community pharmacy<sup>36</sup> and one in community-accessible food pantries.<sup>27</sup> In the farmers market setting, Plate It Up Kentucky Proud was implemented.<sup>38</sup> 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.<sup>38</sup> 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).<sup>36</sup> 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.<sup>27</sup> 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<sup>32-34</sup> and one scored “yes” for 64% of the criteria.<sup>31</sup>

## 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.<sup>44</sup> All studies showed that initiatives were effective, with positive improvements in healthiness of the food environment<sup>22,23,25-29,43</sup> and/or consumer behaviour.<sup>24,31-34,37-42</sup> As we identified only five studies from Australia,<sup>30-34</sup> 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.<sup>45,46</sup> 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.<sup>46</sup> 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.<sup>47</sup> Studies from overseas may therefore be relevant to the Australian context, because the majority of the most socio-economically disadvantaged communities in Australia are in rural and remote areas.<sup>48</sup>

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.<sup>32,34,40,41,43</sup> An example is Plate It Up Kentucky,<sup>38,40,41</sup> 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.<sup>49</sup> 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.<sup>50</sup> 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.<sup>51</sup>

### 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.