Received: 10 April 2019 | Revised: 30 June 2019 | Accepted: 17 July 2019

DOI: 10.1111/obr.12925

PUBLIC HEALTH/PEDIATRIC OBESITY

WILEY obesityreviews

National policies to prevent obesity in early childhood: Using policy mapping to compare policy lessons for Australia with six developed countries

Emma Esdaile[1,2] | Anne Marie Thow[3] | Tim Gill[2,4] | Gary Sacks[5] | Rebecca Golley[2,6] | Penelope Love[2,7] | Li Ming Wen[1,2,8] | Chris Rissel[1,2,9]

[1] Charles Perkins Centre, Prevention Research Collaboration, Faculty of Health and Medicine, Sydney School of Public Health, The University of Sydney, Sydney, New South Wales, Australia

[2] NHMRC Centre of Research Excellence in the Early Prevention of Obesity in Childhood, Sydney, New South Wales, Australia

[3] Menzies Centre, Charles Perkins Centre, The University of Sydney, Sydney, New South Wales, Australia

[4] Boden Institute, Charles Perkins Centre, The University of Sydney, Sydney, New South Wales, Australia

[5] Global Obesity Centre, Deakin University, Geelong, Victoria, Australia

[6] College of Nursing and Health Sciences, Flinders University, Adelaide, South Australia, Australia

[7] Institute for Physical Activity and Nutrition, School of Exercise and Nutrition Sciences, Deakin University, Burwood, Victoria, Australia

[8] Health Promotion Unit, Sydney Local Health District, Sydney, New South Wales, Australia

[9] Office of Preventive Health, New South Wales Ministry of Health, Sydney, New South Wales, Australia

Correspondence
Emma Esdaile, Level 6, Charles Perkins Centre The University of Sydney, NSW, Australia, 2006.
Email: emma.esdaile@sydney.edu.au

Funding information
Australian Government; Australian Research Council, Grant/Award Number: DE160100307; NHMRC, Grant/Award Numbers: 1101675, APP1117300 and APP1152968; National Heart Foundation of

Summary

Interventions for obesity prevention in early childhood (first 5 years of life) are likely to have a significant preventive health impact. This mapping review identified recommended policy options for the Australian Federal Government (AFG) by comparing countries with similar population, income, and language to Australia. Policies were mapped in six countries using two matrices. The first matrix examined policy context, describing obesity prevention governance. The second matrix examined policy content, compared with global recommendations. Policies were grouped into downstream (healthcare), midstream (lifestyle and settings), and upstream (determinants of health, including food and built environments). Results identified variance in obesity governance across the six countries including policy coherence, leadership, institutional drivers, and overlapping responsibility across different levels of government. While countries tended to have more downstream or midstream policies, upstream policies were more likely when countries had invested in system-wide approaches to obesity such as developing a national obesity strategy, having separate food/nutrition and physical activity plans, and a dedicated preventive health agency. This study recommends a range of initiatives for the AFG to strengthen policies for the prevention of obesity in early childhood, including prioritising the development of a national food/nutrition strategy.

KEYWORDS

early childhood, obesity prevention, policy

Acronyms: WHO, World Health Organisation; AFG, Australian Federal Government; WHO ECHO IP, World Health Organisation Ending Childhood Obesity Implementation Plan; OPA, Obesity Policy Action; UK, United Kingdom; ECEC, Early childhood education and care; ADGs, Australian Dietary Guidelines; BFHI, Baby Friendly Hospital Initiative; ACECQA, Australian Children's Education and Care Quality Authority; NPAPH, National Partnership Agreement on Preventive Health; Food-EPI, INFORMAS Food Environment Policy Index; NFP, National Food Plan; NNP, National Nutrition Plan

Australia, Grant/Award Numbers: APP1152968 and APP1117300; Australian Research Council Discovery Early Career Researcher Award, Grant/Award Number: DE160100307; NHMRC Centre for Research Excellence, Grant/Award Number: 1101675; Australian Government Research Training Program (RTP) Scholarship

1 | INTRODUCTION

Globally, 41 million children in their first five years of life (early years) are above their healthy weight.[1] Recent reports suggest that childhood overweight and obesity rates may have plateaued in some high-income countries, although remain at a high rate.[2] In Australia, 20% of children aged 2-4 years are above their healthy weight.[3]

The Australian National Health Survey (2011-2012) found children aged 2-3 years consumed approximately 30% of their total energy intake from foods and beverages higher in saturated fat, salt and added sugars.[4] In Australia, these foods and beverages are termed discretionary choices and are commonly energy dense.[5] However, this survey did not collect data on physical activity for this age group. A recent study among 248 Australian children attending childcare (mean age 4.2 years) found a high proportion of children met the new 24-hour movement guidelines in the domains of sleep (88.7%) and physical activity (93.1%) but far fewer met the screen time guidelines (17.3%).[6]

Although parents play a key role in the diet and levels of physical activity of their young children,[7] they are making these choices amid a broader social and physical environment. There is a growing body of evidence supporting interventions, which incorporate multiple strategies such as engaging communities, considering the built environment and settings, and acting across all levels of the socioecological model, beyond family-focused strategies, to fully address the problem.[8,9] Such an approach requires coordinated policy across multiple sectors and levels of government.

Australia's response to childhood obesity is impacted by a system that splits health care responsibility among the federal and state/territory governments. The Australian Federal Government (AFG) is responsible for national health policy development, administration of the national universal health care system, and funding most medical services and medicines.[10] Federally funded primary health care is delivered through independent health practitioners, supported by 31 Primary Health Networks responsible for improving the coordination, quality and efficiency of care across systems. State and territory governments are largely responsible for health service delivery in hospital and community settings and funding community health services.[10] Obesity and chronic disease prevention continues to be inhibited by a lack of coordination and cooperation across jurisdictions,[11] which is a barrier not unique to Australia.

A national policy framework focuses multiple levels of government and their respective sectors on a particular issue, such as obesity prevention in the early years. Policies can create leverage or work synergistically within or between sectors. Many researchers have identified classifications of "policy levers," but no universal typology exists.[12] Research has shown that single strategies often require multiple policy levers to be applied for successful implementation.[12] Policy levers are the tools available for government to drive a particular outcome, including: law and regulations, economic instruments (eg, taxation and incentives), organizational structure (eg, allocation of physical and human capital), procedures and standardized practices, or community education (eg, guidelines or mass media campaigns).[12]

Policy mapping is a method used to review policies in a systematic way. Policies are reviewed against a set of criteria to identify gaps and opportunities for developing a policy space. While there are examples of obesity-related policy mapping in Australia, these are limited to a focus on adult obesity or the food environment.[13,14] Policy mapping and between country comparison provide a useful approach for countries to address similar challenges, to identify policy gaps, and to improve policy coherence, especially for a "wicked problem" such as childhood obesity.

The aim of this review was to identify opportunities for a comprehensive national obesity strategy in Australia that prevents obesity in the first 5 years of life. This review drew on international recommendations and actions taken in other countries to identify what polices are available to the AFG for the prevention of early childhood obesity, what actions are presently happening, and what can be improved.

2 | METHODS

Policy mapping was conducted by the first author between July-December 2017. Three inclusion criteria were used. Included countries were defined as high income by the World Bank, majority English-speaking, and an a priori population range of 4-70 million was identified to exclude very large countries and small island states so the comparison was relevant to Australia. The first author completed data collection and extraction, and obesity experts in each of the identified countries (recognized in the acknowledgements) cross-referenced this work for both completeness and accuracy.

2.1 | Data collection

Official government websites were searched to identify national policy documents for the early prevention of obesity in childhood. Search terms included "childhood obesity," "obesity prevention," and "chronic disease prevention." Searches were also made against each of the Items of the WHO Ending Childhood Obesity Report: Implementation Plan (WHO ECHO IP),[15] directly through official government websites

and web searches (using Google search engine with regional settings). Policy documents identified through this search were reviewed for references to other relevant policies (see Figure 1). A more detailed explanation of the methods undertaken for data collection and abstraction is provided in Table S1 in the Supporting Information. It is important to note that the existence of a policy document expressing a government position or intention does not always indicate that action is being undertaken in practice, a phenomena known as "implementation deficit".[16] Policy searches were current at 31 December 2017.

Policies were mapped in each of the countries included and reviewed using two matrices to extract policy context and content. Policy content and context data provided the basis for country comparisons, identifying examples of specific policies for obesity prevention that could be adapted for implementation in an Australian context.

2.2 | Policy context

The first matrix was developed to extract policy context from key national policies that specified obesity or chronic disease prevention, into an Excel spreadsheet. Informed by policy theory,[17,18] the governance of obesity prevention in the early years was described. This included policy description, organizational oversight, identification of sectors involved, surveillance plans, associated plans for diet or physical activity, and key country characteristics.

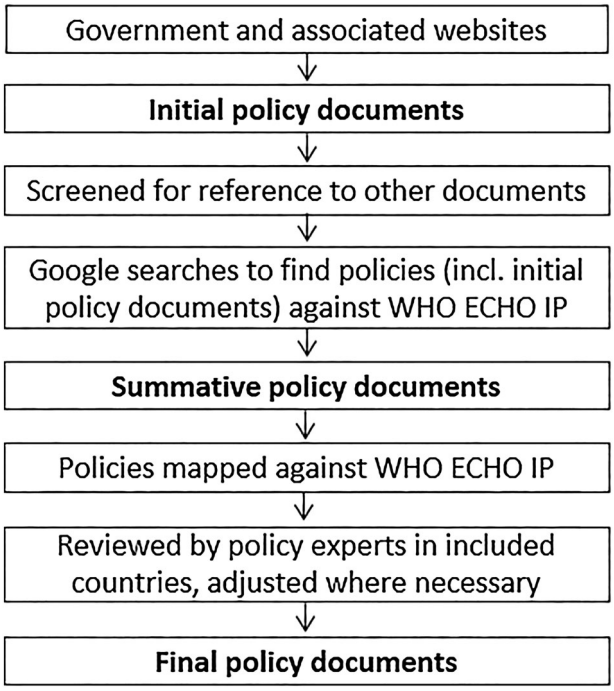

FIGURE 1 Search strategy process

2.3 | Policy content

The second matrix was developed using two existing frameworks. The WHO ECHO IP[15] and Obesity Policy Action (OPA) Framework[19] were used to analyse the comprehensiveness of national policies relevant to obesity prevention in the early years. The WHO ECHO IP was endorsed by the World Health Assembly to address the global problem of childhood obesity.[20] The OPA Framework recommends targeting policies that influence downstream or health system factors, midstream or lifestyle factors, and upstream or social determinants of health factors.[19] The OPA Framework was used to group the WHO ECHO IP Items, identifying policy solutions across the sociological policy spectrum. This study focused on the prevention of obesity in early childhood (ie, before children start school), so specific WHO ECHO IP Items for school-aged children or obesity management/treatment were excluded.

Information was extracted from identified policies into an Excel spreadsheet (one for each country included in the study), relating to each of the WHO ECHO IP Items. Data extracted included policy content and aims, policy mechanisms, and government agencies responsible. Policies were ranked ("Yes," "Partial," and "No") according to how comprehensively they related to each of the WHO ECHO IP Items. A "Yes" result indicated that a policy matching the item description had been implemented or there was a plan for its implementation. "Partial" indicated that either the policy lacked a plan for implementation or the policy in place lacked key elements described in the WHO ECHO IP Item. It is important to note that a "Partial" result has a large range, between meeting some to a substantial amount of the Item. Finally, a "No" result that indicated no policy was found that matched the Item description.

3 | RESULTS

Six nations were identified as meeting the inclusion criteria: England and Scotland in the United Kingdom (UK), Canada, Republic of Ireland, New Zealand, and Australia.

3.1 | Policy context

There are similarities and differences in political context across the countries included in this study. While the British Government rules England and passes laws that are applicable to all of the UK, Scotland has a devolved national government responsible for many of the policy decisions (although not all) around obesity prevention. The Australian, Canadian, and British Governments each have overlapping responsibilities for obesity prevention across different levels of government. New Zealand, Scotland, and the Irish Republic have more direct mechanisms for implementing policies. Canada in particular was the most contextually similar to Australia in terms of the division of responsibility between federal and state or provincial/territorial governments. A notable exception here is that in Australia the AFG regulates the early childhood education and care (ECEC) sector,

whereas in Canada, ECEC sector regulation is devolved to the provinces/territories. The health sector is central in all six nations. A summary of the national policy environment in each of the six nations, the first matrix, is in Table 1.

At the time of policy mapping, Australia was the only country not to have a national obesity strategy nor a national preventive health agency. There were no current national physical activity nor food/nutrition plans—such plans would support better implementation of dietary or physical activity guidelines by influencing the food system and built environment. Australia has had attempts at developing such plans, although at the time of policy mapping, there was only a White Paper, which focused on food exports (excluding population health or food supply sustainability) and not underpinned by the Australian Dietary Guidelines (ADGs) (see Table S3.1 Item 1.0). Institutionally, Australian and New Zealand policies were driven by their respective Health Departments, as opposed to the other countries where rhetoric around whole-of-government initiatives were prominent. It is important to note that despite an expressed intent to undertake a whole-of-government approach, competing priorities and stakeholders can make achieving this challenging.[16] New Zealand and Australia were both centre-right governments. The key difference was that New Zealand's policies were also driven by a social investment agenda, with a focus on early intervention (see Table S3.4, Item 1.0), and while New Zealand had a childhood obesity strategy, it had neither a food/nutrition nor a physical activity plan. It had voluntary guidelines about healthy food provision in health settings only (Table 1).

England and the Republic of Ireland were both centre-right governments with obesity strategies including children. England and the Republic of Ireland identified partnerships with the private sector, as major stakeholders, as central to addressing the environmental causes of obesity. While England had healthy food procurement policies in government settings, it did not have national food/nutrition nor physical activity plans. The Republic of Ireland had a physical activity plan and a food/nutrition plan in progress but not policies for healthy food provision in government settings (Table 1). Canada identified childhood obesity as a problem to be addressed across all levels of government, and across multiple sectors. Canada had a centre-left government with a childhood obesity strategy, a national food plan, a physical activity plan in progress, and healthy food provision policies for government settings. Like Australia, it has three levels of government and it used vertical governance to ensure childhood obesity was on the agenda nationally and at the province/territory level (Table 1).

Scotland was a centre-left government with an obesity plan including children, two plans for food/nutrition and a physical activity plan, and healthy food procurement policies in government settings. Scotland's policies were structured around the communities that people live in. It used horizontal governance to identify the cobenefits of a healthy nation across sectors. This included aims such as safe neighbourhoods and infrastructure to support active travel to encourage the population to not only be physically active but also to reduce congestion and pollution and lower crime. Scotland was the only country to have integrated physical activity and food and nutrition plans, though they were all in the process of being updated at the time of data collection (Table 1). The policy context in each of these countries has influenced the existence and type of policy content across the socio-ecological spectrum.

3.2 | Policy content

National policy documents were mapped against a total of 83 Items from the WHO ECHO IP. Of those, 13 (15.7%) were identified as downstream, 38 (45.8%) as midstream and 32 (38.6%) as upstream. The midstream items were further classified as healthy lifestyle information (lifestyle) (22 items, 25.5% of total) and settings young children occupy (settings) (16 items, 19.3%of total) (see list in Table 2). Upstream items were further classified as food environment (27 items, 32.5% of total), physical activity environment (3 items, 3.6% of total), and other determinants of health (2 items, 2.4% of total). The food environment Items make up a third of included WHO ECHO IP Items, emphasizing their relative importance to childhood obesity. Table 2 describes the matrix developed for policy content analysis. It also indicates where there is shared responsibility for obesity prevention across different levels of government in Australia.

Policy areas, where all six countries had "Yes" or mostly "Yes" (at least four "Yes" and zero "No") results, were highly concentrated in the downstream areas (clinical guidance [Items 3.1, 3.1.a, 3.2, 3.2.a, and 6.1.b) and preventive care guidance (3.4 and 3.4.a]) and midstream areas (nutrition promotion and guidance [Items 1.1.a-d, 4.6, and 4.7], physical activity guidance [2.1, 2.1.b-c, 4.12.a-b, and 4.13.b], and advice to caregivers about childhood obesity [4.13.a]). There were very few Items with all "No" or mostly "No" results (at least four "No" and zero "Yes"), most were upstream: laws on maternity leave, regulation of labelling, and marketing of foods (Items 1.6, 4.1.a, 4.4.a, and 4.5.a-c); but also midstream: guidance for nonchildcare settings to establish healthy food environments (Items 1.8 and 1.8.b). A range of detailed supplementary files have been provided. Table S2.1 represents a tabulation of policies from the second matrix, the extent to which policies were identified in each of the included countries, grouped by the policy action areas in the OPA Framework. A summary of national policies in each of the six countries mapped against the WHO ECHO IP Items are presented in Table S2.2. Finally, see Tables S3.1–S3.6 for the full mapping of all six nations.

3.2.1 | Downstream action areas: healthcare system

Australia's "Yes" results in the downstream action areas were focused on the establishment of guidelines for professional conduct and aligning services with clinical guidelines (Items 3.1, 3.1.a, 3.2, 3.2.a, 3.4, 3.4.a, and 6.1.b). Australia only partially met the description for Items about preconception care, especially to inform prospective mothers and fathers about the importance of good nutrition and other health behaviours for biological parents prior to conception (Items 3.3 and 3.4.b). New Zealand offers advice on health-related behaviours to

TABLE 1 National policy environment for obesity prevention in early childhood

	Australia	New Zealand	Ireland	England	Canada	Scotland
Country summary	Centre-right government. Constitutional monarchy, federation of eight jurisdictions. Three levels of government. Significant overlap between national and state/territorial government responsibilities for population health. Population 24.2 million.	Centre-right government.[a] Constitutional monarchy. Two levels of government. National government does not devolve policy authority to any jurisdiction, although implementation of policy is directed locally. Population 4.7 million.	Centre-right government. Republic and parliamentary democracy. Two levels of government. National government does not devolve policy authority to any jurisdiction, although implementation of policy is directed locally. Population 4.8 million.	Centre-right government. Constitutional monarchy. Three levels of government. British Parliament is first and second level, responsible for reserved matters across the UK (eg, broadcasting, industry, social benefits) and England. Population 53.0 million.	Centre-left government. Constitutional monarchy, federation of 13 jurisdictions. Three levels of government. Canada devolves a significant amount of authority to its provinces (eg, ECEC sector regulation), but retains much authority over its territories. Population 36.3 million.	Centre-left government, monarchy of the United Kingdom. Three levels of government, Scotland is the second level, responsible for ECEC settings and most built environment policy areas. Food policy and parental leave split with the British Government. Population 5.3 million.
Key policy document	National Strategic Framework for Chronic Conditions.[21] Oversight: Health Department. No national preventive health agency.	Childhood Obesity Plan.[22] Oversight: Health Department. Have a national preventive health agency.	A Healthy Weight for Ireland.[23] Oversight: Irish Government. Have a national preventive health agency.	Childhood Obesity: A Plan for Action.[24] Oversight: British Government. Have a national preventive health agency.	Curbing Childhood Obesity.[25] Oversight: Canadian Government. Have a national preventive health agency.	Preventing Overweight and Obesity in Scotland.[26] Oversight: Scottish Government. Have a national preventive health agency.
Key policy description	Policy focus is on chronic disease prevention and management. The early years are mentioned as a critical life stage but not in the context of obesity. Identified as a response to the *WHO Global Action Plan*. References midstream and downstream strategies, does not identify policy tools.	Policy focus is on childhood obesity. Identified as a response to the WHO Ending Childhood Obesity Report. Refers to downstream, midstream and upstream strategies. Policy tools centre on: community education, support through health services, sport sector and education, and voluntary codes of practice for industry.	Policy focus is on whole of population. Children are recognized as a special group. Identified as a response to *WHO ECHO Report*. Policy sits within a whole-of-government health framework,[27] incl. social determinants of health. Refers to upstream, midstream and downstream strategies. Policy tools include regulation, economic instruments, community education	Policy focus is on children. Identified as a response to the Foresight Tackling Obesity Report. Refers to downstream, midstream and upstream strategies. Policy tools include regulation, economic instruments, procedural guidelines, community education and support in health sector and settings.	Policy focus is on children and early action. Purpose is to articulate collective commitment from all levels of government. Identified as a response to WHO Global Action Plan. Refers to upstream, midstream and downstream strategies. Policy tools are not identified in key document, but are in linked policies: healthy food, acting early, supportive environments. Include	Policy focus is on population-wide obesity prevention. Children and the early years are recognized as a special group. Identified as a response to the Foresight Tackling Obesity Report. References to downstream, midstream and upstream strategies. Policy tools include regulation, economic instruments, procedural guidelines, community education and support in health sector and settings.

(Continues)

TABLE 1 (Continued)

	Australia	New Zealand	Ireland	England	Canada	Scotland
			and support in health and settings.		regulation, economic instruments, practice guidelines, community education.	
Multisector involvement	Focus is on the health sector, other sectors are briefly mentioned as partners. No separate plans for food/nutrition or a physical activity plan. No specific partnerships with industry identified. No healthy food provision policies in government settings.	Collaboration with sport and education sectors. Healthy Families NZ is offered in 10 communities and focuses on families and settings. No separate plans for food/nutrition or physical activity were identified. Partnerships with food and beverage industry are identified and voluntary. Healthy food provision policies in health settings only.	Multi-sector partnership approach (through high-level and intra/interdepartmental working groups), regulation and engagement with industry are identified in the key policy. Have a physical activity plan, nutrition policy was incomplete. Policy documents were identified across sectors with common goals. No healthy food provision policies in government settings.	Food industry major stakeholder, policy includes taxes and voluntary goals to improve food supply. Health and Education sectors identified, eg, voluntary guidelines for food policies in the early year's sector, and tertiary sector research partnerships. No separate plans for food/nutrition or physical activity. Healthy food provision policies in government settings.	Commitment of health sector across multiple levels of government to address childhood obesity. Identification of specific sectors (eg, infrastructure and education) to impact on communities and built environment. Canada has a food/nutrition policy, physical activity plan was incomplete. Healthy food provision policies in government settings.	Co-produced between national and local government. Partnerships with transport, planning, agriculture and food manufacturing, education and care. Local implementation through Community Planning Partnerships. Scotland has food/nutrition plan (incl. healthy food provision in government settings) and a physical activity plan.
Surveillance plan	Intermediary indicators for individual behaviour change are suggested (eg, diet or physical activity) but not for settings or broader environmental indicators.	Intermediary indicators identified, include individual behaviour change and some settings based measures. No investment into research evidence gaps.	Priorities identified for establishing a national obesity research plan, surveillance system for nutrition and physical activity, and annual reporting on progress.	No surveillance plan in this policy document. Public Health England regularly surveys population. Specific funds allocated to childhood obesity prevention research.	Measuring and reporting on progress through investment in research and monitoring child weight and health-related behaviours is one of three pillars in policy.	Tracking progress using identified intermediary indicators, population monitoring and investment into research and evidence gaps.

[a]New Zealand was a conservative government at the time data collection commenced.

TABLE 2 The policy content matrix

Policy action areas		WHO ECHO IP[a]
Downstream (health care services) approaches		
Health services and professional support	- Ownership of the early prevention of obesity in childhood - Allocation of resources and management of services - Programs in clinical settings - Access and availability of health services to the public (eg, subsidies to access services not formally within public health sector) - Monitoring of population weight status, mechanisms for reporting - Clinical practice guidelines (preconception; pregnancy care and management of co-morbidities; maternal and child health) - Professional development, training and curriculum	3.0, 3.1, 3.1.a, 3.2, 3.2.a, 3.3, 3.4, 3.4.a, 3.4.b, 3.4.c, 4.2, 4.2.a, 4.8.b, 6.1.b[c]
Midstream (lifestyle and settings[b]) approaches		
Healthy lifestyle information	Healthy lifestyle information: guidelines and/or programs - Preconception (mothers and fathers) and pregnancy - For parents with children aged 0-5 years which cover diet, sleep, physical activity, and sedentary behaviour (including screen time) guidelines for children aged 0-5 years Dissemination of healthy lifestyle information - Social marketing and public education campaigns - Easily accessible guidance for parents, carers and early educators - Community engagement and representation in public policy	1.1, 1.1.b, 1.1.c, 1.9.b, 2.1, 2.1.b, 2.1.c, 3.4.c, 4.0, 4.3.a, 4.12, 4.12.a, 4.12.b 1.1.a, 1.1.d, 2.1.a, 4.3, 4.13, 4.13.a, 4.13.b, 4.13.c, 4.13.d[c]
Settings young children occupy	Early childhood education and care centres - Standards for child diet, activity, screen time, and sleep in settings - Policies and procedures within settings to meet standards - Training programs for staff working in settings (formal education and professional development) Healthy food policies in other settings young children occupy	4.6, 4.7, 4.8, 4.8.a, 4.9, 4.9.a, 4.9.b, 4.10, 4.10.a, 4.10.b, 4.11, 4.11.a, 4.11.b 1.8, 1.8.a, 1.8.b[c]
Upstream (socio-logical) approaches		
Physical activity environment	- Access to appropriate spaces and equipment to be active - Design of neighbourhoods and transport supportive of active travel, consideration of green open spaces, safety, and places to play	2.0, 2.2, 2.2.a[c]
Food system	- Marketing and advertising of foods that compete with optimal feeding and eating practices - Access to and cost of healthy food, incentivising the consumption of healthy foods for disadvantaged families - Incentives to produce or manufacture healthy foods, including reformulation - Unhealthy food taxes or levies; subsides for healthy food - Agricultural policy and trade agreements - Food product information: nutrition labelling, front-of-pack interpretive labels, health claims, and nutrition disclosure in marketing practices	1.0, 1.2, 1.2.a, 1.2.b, 1.3, 1.3.a, 1.3.b, 1.3.c, 1.4, 1.4.a, 1.5, 1.5.a, 1.6, 1.6.a, 1.6.b, 1.7, 1.7.a, 1.7.b, 1.9, 1.9.a, 1.9.c[c], 4.1, 4.5, 4.5.a, 4.5.b, 4.5.c
Other determinants of health	- Employment rights of parents - Early childhood experiences (outside of settings, see below) - Housing and neighbourhood	4.4, 4.4.a

[a]WHO ECHO IP Items are in full in Tables S1 and S2.1-S2.6,

[b]Settings and lifestyle were identified as unique subgroups in the WHO ECHO IP.

[c]Items underlined indicate shared (or ambiguous) responsibility between Australia's federal, state, and territory governments.

prospective parents and Scotland is progressing work to consider preconception care, in primary health settings (see Tables S3.3 and S3.6).

Australia partially met the Baby Friendly Hospital Initiative (BFHI) Items (Items 4.2 and 4.2.a), primarily because states and territories are responsible for the provision of maternity facilities. New Zealand has a national requirement for all maternity facilities to ensure compliance with the BFHI in order to achieve accreditation. Scotland uses the same accreditation process as New Zealand; additionally, under the national maternal and infant nutrition strategy, curriculum training for all midwives and public health nurses will include BFHI (see Tables S3.4 and S3.6). While Australia does have a national breastfeeding strategy, it has been under review since 2016.There is potential for an updated Australian breastfeeding strategy to incorporate such strategies, including the BFHI. This could occur by engaging with state/territory governments and the national midwifery body. The only "No" result for Australia in the area was for the training of

community workers to support complementary feeding (Item 4.8.b), as training of community health workers usually sits with state/territory health departments. Australia's *Infant Feeding Guidelines* support the dietary guidelines around breastfeeding promotion and include complementary feeding (see Item 1.1 in Table S3.1). An updated breastfeeding strategy could connect these elements and Australia could learn from the training practices used in New Zealand, Scotland, England, or Ireland (see Tables S3.3-S3.6) to ensure consistently across the jurisdictions.

3.2.2 | Midstream action areas: Settings and healthy lifestyle information

The first midstream area was settings young children occupy. There is overlap between some Items in this area. Items 1.8 (including 1.8.a-b) and 4.9 (including 4.9.a-b), both relate to healthy food provision in settings. To distinguish, this study considered only ECEC settings for Item 4.9 and all other settings young children occupy in Item 1.8 (eg, activity centres or transport hubs). Further, this study interprets Items 1.1.a-d as dietary information to parents and Items 4.8 and 4.8.a as dietary information for carers, educators or managers in ECEC settings.

The ECEC sector is regulated at a national level in Australia under the National Quality Framework, administered by the Australian Children's Education and Care Quality Authority (ACECQA). Australian policies for these services had the most "Yes" responses compared with other countries (Items 4.6, 4.7, 4.9.b, 4.10, 4.10.a-b, and 4.11.a-b). Food and physical activity education were required to be part of daily routine and integrated into the core curriculum; these requirements were codesigned between health and education sector and are a training requirement at centres ("Yes" result for Items 4.10, 4.10.a-b, and 4.11). Statutory requirements exist for foods served at ECEC centres as do standards for physical activity in Australia; however, their implementation is different across the states and territories (eg, jurisdictions interpret the ADGs to recommend different serve sizes and daily amounts) (Items 4.9, 4.9.a "Partial" and 4.9.b, 4.11.a "Yes"). There were guidelines to support these requirements being met at the ECEC centres (see Item 4.9.a in Table S3.1). These centre-focused guidelines resulted in a "Yes" for Items that avoided unhealthy foods, encouraged a wide variety of healthy food and how to encourage children to be physically active (Items 4.6, 4.7, and 4.11.b) but "Partial" for age-specific portion sizes and support for young child feeding (Items 4.8 and 4.8.a). Guidance should be updated to include the new physical activity guidelines for under-fives (see Item 4.12 in Table S3.1). Scotland and the Republic of Ireland both have guidelines to support ECEC centres meet the statutory requirements for nutrition and physical activity (Table S3.3 and S3.6).

There were three non-ECEC sector settings items in government assets and private sector settings. All six countries had a "No" result for Items with statutory requirements for healthy food environments and catering services in community settings likely to be occupied by children (Items 1.8 and 1.8.b). For the Item about creating food provision standards, based on a nutrient-profile model, Australia had "No" with mixed for the other countries (Item 1.8.a). Policies are being progressed in government assets (New Zealand, Scotland, England, and Republic of Ireland; Tables S3.3-S3.6) and engagement strategies to support private businesses to provide healthier food options (voluntary) (England and Scotland; Tables S3.5-S3.6). England and Scotland both have procurement policies for foods provided in government settings.

The second midstream action area focuses on the provision of healthy lifestyle information and programs. There were several WHO ECHO IP Items, which focused on the creation of evidence-based guidelines to support breastfeeding, nutrition, physical activity, sleep, sedentary or screen-time, and healthy body size, across the life course (1.1, 1.1.b-c, 2.1, 2.1.b, 4.3.a, 4.12, and 4.12.a-b). Australian results were "Yes" to all of these Items. Several Items focused on the dissemination of healthy lifestyle information such as public awareness and education campaigns and providing support to parents (including prospective parents) and members of the public likely to impact on the development of healthy lifestyle behaviours—all of which were "Partial" in Australia (Items 1.1.a, 1.1.d, 2.1.a, 3.4.c, 4.0, 4.3, and 4.13.a-b). Two examples of this are the ADGs and movement guidelines for under-fives, which are evidence-based but not well disseminated (Items 1.1 and 4.12 in Table S3.1). While the ADGs underpin most nutrition initiatives and guidelines produced by the AFG, if the intent of these guidelines is to underpin food/nutrition policy, it was not explicitly stated. This leads to a "No" result for an Item requiring standards for nutrition-based programs to be based on dietary guidelines (1.9.b).

At the time of mapping there were no national education campaigns promoting healthy eating or being physically active.

In contrast, the dissemination of evidence-based healthy lifestyle information resulted in mostly "Yes" for the other countries. Some exceptions with low "Yes" results were public campaigns for prospective parents (New Zealand only), the promotion of breastfeeding for parents, and community and standards for programs, which include nutrition advice—"Yes" for New Zealand, England, and Scotland (see Items 3.4.c, 4.3, and 1.9.b in Tables S3.4-S3.6). Items specifically about community engagement and representation in the development of healthy public policy and to promote healthy lifestyles were also limited in Australia ("Partial" for Items 4.13 and 4.13.c; "No" for Item 4.13.d). These Items had mixed results in other countries (see New Zealand, Scotland and Ireland in Tables S3.3, S3.4, and S3.6).

3.2.3 | Upstream action areas: Food and physical activity environments and determinants of health

Policies for the food environment were very limited in Australia and were predominantly voluntary where they did exist. The only Item in this domain where all six countries had a "Yes" result was for mandatory laws for nutrition labelling (Item 1.6.b). While Item 1.6.b does not specify what information should be provided to consumers on nutrition labels, all countries labelling required: energy content, protein, carbohydrate, sugars, fat, and saturates. Only Canada required reporting of *trans*-fat in "nutrition facts" and all added sugars must be grouped together in the ingredient list. No country uses the

WHO definition of free sugars[28] in their back-of-pack nutrition information. For Australia, the only other "Yes" result was for consumer testing of its interpretive front-of-pack labelling scheme (Item 1.7.a). However, uptake of this scheme was voluntary resulting in "No" for an associated Item with mandatory provisions (1.7.b).

Several of the WHO ECHO IP Items recommend implementing the WHO *International Code on the Marketing of Breast-milk Substitutes* (the "WHO Code"). The WHO Code covers specific manufactured foods intended for young children: breast milk substitutes, infant formula, and follow-on formula (or "toddler milks") and commercially prepared complementary foods. The Items that relate to the marketing of breastmilk substitutes (4.1 and 4.1.a) and complementary foods and "follow-on" formula (4.5 and 4.5.a-c) to parents and carers of young children all had "No" results in Australia. Australia's preference was for voluntary measures, established by industry; was limited to infant formula only, and does not include the marketing of follow-on formula or commercially produced complementary foods. None of the countries had a "Yes" result for any items relating to the WHO Code. Canada had "Partial" across all of these items, many of their strategies were in progress at the time of data collection for this study and present an opportunity for policy learning in Australia (Table S3.2).

The WHO *Set of Recommendations on the Marketing of Foods and Non-alcoholic Beverages to Children* (WHO Set of Recommendations) forms the basis of Item 1.3 (including 1.3.a-c), Australia's policies in this area focused on two separate industry-led and voluntary codes; results were "Partial" and "No" for these Items. Consideration of a sugar-sweetened beverage levy was very limited in Australia, mostly "No" results for Item 1.2 (including 1.2.a-b). England, Scotland, and the Republic of Ireland were in the process of strengthening existing regulations about marketing of unhealthy foods to children and have recently been advancing regulatory approaches as well as a sugar-sweetened beverage levy was due for implementation in April 2018 in the UK (Tables S3.3, S3.5, and S3.6).

Countries are also engaging with actors outside of health to improve the food environment for disadvantaged communities, although to a lesser extent (Items 1.9, 1.9.a, and 1.9.c). While Australia has previously considered these factors, current results for Australia for these Items were "Partial" for Items 1.9 and 1.9.a and "No" for Item 1.9.c (Table S3.1). Scotland has a comprehensive national food policy across the food system including a range of programs driven by community, supported by a government agency, and national planning for equal access to healthy food (Table S3.6).

The second upstream action area was the physical activity environment. Australia did not have national policies that support young children to be active nor were there policies for the structural support of different government agencies across different levels of government ("Partial" for 2.0 and "No" for 2.2 and 2.2.a). In an Australian context, most of the structural policy levers are available at the state/territory level (eg, planning or transport sectors). However, there are other policy levers that could be used. Canada was in the process of developing policies in this area, driven nationally but in consultation with its province/territory governments (Table S3.2). Scotland has a planning policy, which requires local authorities to ensure community access to open spaces for recreation and sports facilities in urban and rural areas. The physical environment for play, being active and transport, and the need to ensure a perception of neighbourhood safety, are identified as central to normalising being active (Table S3.6).

No country had a "Yes" result for the final upstream action area, other determinants of health. Both items (4.4 and 4.4.a) relate to parental working and paid leave rights, as well as legislation to protect breastfeeding.

3.3 | Australian governance of obesity prevention in the early years

The Australian Government had a "Yes" result for 27 of the included 83 WHO ECHO IP Items (32.5 percent), across 14 policy documents and three sectors. These included health, consumer protection, and early childhood care and education, although most were in the health sector. Across the OPA Framework, Australia had "Yes" results for 54% of downstream Items, 47% of midstream items, and 6% of upstream Items (Table S2.1). In total, 58 Australian policy documents across five sectors (above plus human services and agriculture) were included in the analysis (Table S3.1).

Australia's key policy document (Table 1) does not identify institutional responsibility for leading these priority areas, specific goals to achieve outcomes, or measures of success. There is no plan for accurate (measured) surveillance of childhood obesity nor its behavioural or environmental causes. It does not refer to other existing policies or strategies at the national or state/territory level that might be utilized for operationalization, such as comprehensive national food/nutrition or physical activity plans or agreements with its jurisdictions.

Policy responsibility was shared between different levels of Australia's government for 30 of the 83 Items (Table 2). While downstream items with shared responsibility had mostly "Yes" results, midstream and upstream Items were mostly "No" and "Partial" results. This indicates relatively high policy coherence in downstream action areas but relatively low policy coherence in midstream and upstream areas (Table 1). In regard to the food and physical activity environments (two of the upstream areas), while responsibility is shared across all levels of government, the key levers for improving the healthiness of the built environment for physical activity (eg, planning and transport) sits with state/territory governments in Australia. There were three shared Items between the AFG and state/territory governments in the food environment relating to the built environment. In contrast, the remaining 24 food environment items (75% of upstream Items) sit with the AFG as a result of the Bi-National Food Regulation Agreement with New Zealand. Yet, Australia had only two "Yes" results for these Items (see Tables S2.2 and S3.1).

4 | DISCUSSION

This study used the WHO ECHO IP to identify opportunities for the current Australian obesity prevention policy landscape, by comparing

policy context and content in six countries. In general, this study found that countries used policy levers geared more towards individual behaviour and were more likely to act in downstream and midstream areas and to a lesser extent in upstream areas. The findings of this study are unsurprising given that there are a range of competing interests and other factors that are not entirely within the control of a national government. However, establishing obesity prevention as a priority is within their control. The results of this study suggest countries with a specific policy focus on childhood obesity (New Zealand, England, and Canada) did not necessarily result in a more comprehensive policy approach. Countries that had food and/or nutrition plans (Canada and Scotland) had more policies relating to the WHO ECHO IP upstream Items. This suggests that while a childhood focus is important, it is not as important as a policy environment which also considers the upstream determinants of health. Countries tended to have more "Yes" results and better "Partial" content when they exhibited particular characteristics, including dedicated agencies for preventive health, taking a whole-of-government approach rather than health department led, policies linked up across different sectors (horizontal) and across different levels of government (vertical), separate plans for diet and physical activity, and community engagement. Given the need for a policy environment, which considers upstream approaches, the development of an early years obesity prevention strategy should be integrated into a national obesity strategy. Such a strategy would identify the early years as a key life stage and include downstream and midstream action areas specifically for the early years. It would also include upstream action areas for the population more broadly.

4.1 | Renewed political attention for a national obesity strategy

Obesity has had previous periods of political attention nationally in Australia, most recently under the National Partnership Agreement on Preventive Health (NPAPH) in 2008.[14] The policy responses of the NPAPH primarily focused on downstream and midstream areas, with limited upstream focus, preferring self-regulation with industry.[29] Some of the reasons why upstream policy actions are not currently being progressed have been identified in the literature. A study by Baker et al observed a change in institutional culture within the AFG Department of Health and Ageing around the time of the NPAPH, where the focus had shifted from upstream regulatory interventions aimed at addressing obesogenic environments to a focus on lifestyle interventions.[29] Interferences with market drivers and the costs associated with policy implementation/evaluation have commonly been used as justification for not supporting regulatory action.[29,30] However, it is likely that the political cost is a greater barrier than the financial costs with food and advertising industries having been identified as key inhibitors of establishing obesity as a political priority in Australia.[14,29,30] Evidence for interventions in the built and food environments is emerging, although many argue there is sufficient evidence to enact policies for health-supportive environments.[31,32] The translation of evidence into practice can also be obscured through oversimplifying multi-component issues or disparate work in separate disciplinary silos.[31,33,34] In order to prevent what Howlett[35] refers to as repeating policy cycles, Australia has an opportunity to learn from previous experiences in developing obesity policy and include regulatory, fiscal, environment and socio-cultural initiatives in downstream, midstream and upstream action areas.

Since data collection in late 2017, there have been recent developments in the progress of Australia's obesity policy representing opportunities for the development of a comprehensive plan to prevent obesity in the early years. While childhood obesity has not been on the political agenda nationally since the end of the NPAPH, it has continued, to varying degrees, as a priority in some jurisdictions. The Council of Australian Governments is the key intergovernmental forum in Australia, consisting of leadership from the AFG, the states/territory governments, and the peak local government association. It recently announced a commitment to develop a national obesity strategy, with a focus on prevention and early childhood,[36] and a national Obesity Summit was held in February 2019, led by the AFG Minister for Sport, with no attendance by other AFG Ministers. The Australian Healthy Food Partnership, established in 2015, is voluntary in nature and includes the AFG minister responsible for food policy, industry, and public health groups. It includes initiatives, which are not specifically identified in the WHO ECHO IP, such as the development of voluntary targets for food reformulation and portion sizes of manufactured foods.

A recent AFG Senate Inquiry into obesity focused on childhood and had 22 recommendations, many of these recommendations mirror the WHO ECHO IP.[37] Among these recommendations are the use of nonstigmatizing language and the establishment of a national obesity taskforce to oversee the development of a national obesity strategy, frequent revision of the ADGs, national education campaigns, a separate national childhood obesity strategy, and a national physical activity strategy (recommendations 1-5, 14, 15, and 18, respectively[37]). There are two areas of note. The first was the identification of the need for a separate childhood obesity strategy, but no mention of how this would be implemented or operationalized. The second was the absence of a recommendation to develop a national food/nutrition strategy despite 11 recommendations relating to the food system and there being a separate recommendation for a physical activity strategy. However given the opposition to these recommendations expressed by government Senators in their Dissenting Report,[37] any meaningful action on obesity prevention policy seems unlikely under the current government. Attempts to promote obesity prevention strategies must overcome several barriers such as narrow perspectives of departmental or ministerial responsibilities[30] and counter-arguments about personal responsibility powerfully put through lobbying from industry.[29,30] In the absence of a comprehensive national policy, Australian jurisdictions are seeking to address childhood obesity in a range of different ways. Future research in this area should consider the policy mechanisms available to Australian states and territories and the policy context for implementation.

The next two sections consider ways that Australia could improve national efforts across upstream, midstream, and downstream policy action areas.

4.2 | A focus on upstream policy action areas

A key finding of this review is that a national obesity strategy, which identifies the early years as a key life stage, requires a robust plan to address upstream approaches for the whole-of-population. While one third of the included WHO ECHO IP Items related to the food environment, the majority of Australia's results for food environment items were "No". Australian policy tools for upstream Items were limited; in the few places, they did exist; they were either a focus on personal responsibility (eg, mandatory food labelling laws) or the use of voluntary measures where broader environmental considerations was addressed (eg, voluntary codes for the marketing of discretionary choices to children).

Several studies support the findings of this review to address the gaps in upstream policy action Items, especially across the food environment. The INFORMAS Food Environment Policy Index (Food-EPI) has been applied in multiple countries as a way of influencing governments into action on creating healthy food environments,[38] including all but two of the countries in this study (Ireland and Scotland). Food-EPI Australia, conducted in 2017[13] and followed-up in 2019,[39] considered initiatives at the national and state/territory levels. In the countries included in the Food-EPI analyses, the studies found that there was limited action in upstream areas including regulatory and fiscal policies.[40-43] While Canada was noted for its strong leadership to support healthy food environments, Australia, New Zealand, and England were encouraged to develop or strengthen their national obesity strategies (with appropriately funded agencies for implementation) and food/nutrition plans as priority recommendations. In Australia, with high variability of policy implementation among Australian jurisdictions, there is a need for a nationally coordinated approach to issues such as food provision (including school food, and foods in healthcare settings) and restrictions of marketing to children.[39,40] As Australia moves towards the development of a National Obesity Strategy, it should consider the recommendations from the Australian Food-EPI reports and also look to Canada to identify lessons from another federated nation.

Two policy levers were central to WHO ECHO IP Items on food choice: regulatory and fiscal approaches. Australia lacks a clear and effective regulatory response to implement the WHO Set of Recommendations or the WHO Code, preferring limited voluntary measures. In the period since Australia introduced its voluntary responses to the WHO Code and the WHO Set of Recommendations, there has been a substantial increase in the promotion of toddler formula and commercial toddler foods[44] and an overall increase in the number of new discretionary choices from manufacturers who sign up to voluntary pledges.[45] Numerous studies identify the limitations of national obesity policy that exclude legislative approaches in the food system and warn against public-private partnerships where industry drives the agenda.[29,46-48]

The implementation of a sugar-sweetened beverage tax is a key fiscal approach. The UK Government actioned this through fiscal measures in conjunction with engagement with industry. The announcement of plans to implement a soft drinks industry levy (on manufacturers and importers) in 2016 stimulated product reformulation ahead of its implementation in 2018[49] alongside a voluntary program with industry to improve fat, salt, and sugar content of the foods they produce. Economic modelling in the UK indicates product reformulation leads to better population health outcomes than taxes alone.[50]

While these regulatory and fiscal approaches focus on marketing, price, and reformulation, there are other areas within the food system that influence consumption and the nutritional quality of foods available for purchase.[51] A national food/nutrition plan could consider these broader influences including agricultural, manufacturing, and food retail/service sectors, as well as marketing and reformulation, as is evident in the Scottish food plan. While such a plan would consider the prevention of malnutrition in all its forms (including undernutrition and chronic disease), obesity is only one consideration among many potential outcomes of an unhealthy food system. As such, a national food/nutrition strategy should be linked to, but ultimately stand apart from, a national obesity strategy.

The development of a national food/nutrition strategy for Australia can learn lessons from previous attempts. In 2010, Australia's National Food Plan (NFP) was intended to reflect "Paddock to Plate" components of the Australian food supply and its food environment. A recent study found that the NFP was heavily influenced by food and agricultural industries, underpinned by economic objectives, which resulted in aims for public health nutrition being shifted out to a National Nutrition Policy (NNP) (announced in 2011, but not progressed).[52] A scoping paper for an Australian NNP was undertaken in 2013 and released under a freedom of information request in 2016.[53] It considered international evidence and applied it to a conceptual framework of Australia's food and nutrition system. The scoping paper identified the need to integrate a NNP with the NFP, specifically around the production, processing, and distribution of food as well as nutrition knowledge and education.[53]

Soon after the NFP was released in 2013, there was a change in government and it was rescinded, the new government published a White Paper focused on food exports.[54] Australia lost an opportunity for an integrated national food and nutrition plans underpinned by the ADGs and linking nutrition and sustainability to the production of food.[55]

A physical activity strategy should also be linked to, but separate from, a national obesity strategy. Since mapping a national sports plan has been developed,[56] although it has a narrow focus on sport rather than population physical activity. Policies to improve the physical activity environment include planning guides for development, transport, and land use to support consistent physical activity environment outcomes across Australian cities and towns.[57] Contextually, while the WHO ECHO IP Items on physical activity have shared responsibility between different levels of government, most of the planning and transport policy levers reside with state/territory authorities in Australia. However, the development of a national physical activity strategy could support consistency across jurisdictions.

Other determinants of health centred on parental employment leave and breastfeeding rights. Sufficient duration and financial

support in parental leave are associated with multiple social and economic benefits, the effects of which are likely to be greater in less advantaged families.[58-60] Australia's regulatory framework in this area is insufficient; lessons from the UK and New Zealand could be used to adopt similar policies in Australia, with particular focus on paid leave for at least six months to increase rates of exclusive breastfeeding.

4.3 | Improving downstream and midstream policy action areas

In addition to action in upstream areas, an Australian national obesity strategy needs to identify solutions specifically for the early years, as a key life stage, through maintaining and improving downstream and midstream areas. Responsibility for downstream actions (healthcare) area is shared between federal and state/territory governments. That these Items had mostly "Yes" and zero "No" results indicates vertical collaboration within the health sector. Downstream policy recommendations include updating clinical guidelines to include preconception care for parents and updating the national breastfeeding strategy. This strategy, under review since 2016, could include training considerations for health workers and link to policies which uphold the WHO Code and international recommendations for parental leave to support exclusive breastfeeding.

Midstream Items had two areas of focus: settings young children occupy and lifestyle information. ECEC sector Items were mostly "Yes" and zero "No" results in Australia. The regulatory framework in Australia for the ECEC sector is fairly new, and there are opportunities through ACECQA to better support the sector to meet nutrition and physical activity goals. For example, a single set of ECEC menu planning guidelines across Australia. In non-ECEC setting supportive policies in government settings include food procurement guidelines and marketing of discretionary choices (eg, in transport hubs). Healthy food policies in government settings show leadership in establishing healthy food environments, also signalling demand to food outlets/catering services. In private or community settings, nonstatutory healthy food provision guides could be developed (eg, community centres or restaurants). Healthy lifestyle information could be better disseminated, eg, through funding a sustained national health promotion campaign to improve nutrition and physical activity across the lifespan. National dietary and physical activity guidelines could be explicitly linked to policy formation in these areas. Also, lifestyle programs should provide a seamless link between healthcare/clinical services and community settings. These downstream and midstream improvements to Australia's policy landscape are important, but insufficient. The current best evidence suggests that interventions, which impact on the upstream determinants of health are most likely to impact on childhood obesity.[61]

4.4 | Relevance for decision makers

In light of the renewed political attention on childhood obesity, a national obesity taskforce and childhood obesity strategy appear to be progressing. In the development of a National Obesity Strategy, due consideration should be given to pregnancy and the early years as a key life stages in downstream and midstream action areas. Australian-specific analyses reflect that the most cost-effective approaches to childhood obesity are legislative and regulatory[46,53]; these levers sit with the AFG. Examples of such actions include a sugar-sweetened beverage tax and legislation to restrict the marketing of discretionary foods to children.

The findings of this study suggest that the area the AFG is likely to have the biggest impact, given its authority over specific policy levers, is in the food environment. Food policy addresses a range of social, health, and climate change problems, of which obesity is just one. Multiple recent international bodies of work have identified the need for integrated food policies and include the *EAT-Lancet Commission*[62]; the *Lancet Commission on the Global Syndemic* of obesity, undernutrition, and climate change[63]; and the Food and Agricultural Organisation's Policy Guidance Series on nutrition and food security.[64] These bodies of work indicate that obesity sits within a wider context[65] and there has been a significant paradigm shift with the emergence of a food systems sustainability era in public health nutrition.[66] Domestically, a national approach is important to ensure food producers have a level playing field in terms of competition across jurisdictional borders. The AFG should focus on the development of an integrated national food and nutrition strategy. In developing such a strategy, the AFG should consider the shared responsibility with states/territory governments and work with jurisdictions especially around the built environment.

4.5 | Limitations

While every effort was made to ensure the most comprehensive mix of policies from the six study countries, it is likely that documents exist that are not publicly available (through a web search) and were therefore not included in this analysis (eg, some policies are only available as a hard copy). Another limitation is that there may be implicit intent in a policy (eg, the use of ADGs to underpin all nutrition policy) but not explicitly stated, and therefore not captured in the analysis. Conversely, a policy may express an intent of government that is not carried out, referred to as "implementation deficit".[16] The policy mapping undertaken in this study is not tied to process or outcomes, which is a limitation. However, given the current activity in this space, this paper provides an important baseline mapping, which can be used to measure progress and recognize if identified gaps are being filled. This analysis compared nations at a set point in time and as such policy options and their modes of operationalization will surely change over time, forever influenced by changing political climates. As an example, an election was held in New Zealand in the middle of the data collection phase (on 23 September 2017). This mapping exercise shows a snap shot of polices that were current at the end of 2017.

5 | CONCLUSIONS

Policy mapping was a useful tool for identifying potential opportunities for policies to prevent obesity in early childhood in Australia, identifying examples of these policies across the six countries included in this study. Obesity prevention in the early years is likely to have the biggest impact on health and reducing economic burden.[42] Given the expected benefits of preventing obesity in the early years, the development of a national obesity strategy should identify early childhood as a key life stage for the focus of downstream and midstream action areas, while ensuring upstream actions are applied for the benefit of the whole population. Consideration of health-supportive environments is key. Such a strategy should integrate national plans for food/nutrition and physical activity and consider the built environment as a "setting" for experiencing healthy living. It is unlikely that a single piece of policy can undertake all of these tasks; however, policy integration and cohesion can be managed when obesity prevention is a political and organizational priority. This study identified that most policies to prevent obesity in early childhood were in the downstream and midstream areas across all six countries. It also found that those countries, which fulfilled more of the upstream WHO ECHO IP Items, had dedicated plans for food/nutrition systems and/or the physical activity environment. This analysis suggests the broader impact of these plans over childhood obesity policies in isolation. Given the number of ways in which the AFG is not meeting upstream policy action areas, and the relative emphasize of the food environment to the WHO ECHO IP, it is the recommendation of this study that Australia prioritize the development of a national food/nutrition strategy.

ACKNOWLEDGEMENTS

The authors would like to acknowledge the input from the following experts in cross-referencing the mapping work undertaken in all six countries by E.E.: Ms Marita Hennessy, SPHeRE PhD Scholar, Health Behaviour Change Research Group, NUI Galway (Republic of Ireland); Dr Alison Fildes, Academic Fellow, University of Leeds (UK – England); Chris Patterson, MRC/CSO Social and Public Health Sciences Unit, University of Glasgow & Professor John Reilly, Ms Jenny Gillespie and Mr Stephen Malden, Physical Activity for Health Group, University of Strathclyde (Scotland); Professor Louise Signal, Health Promotion and Policy Research Unit, University of Otago (New Zealand); and co-authors GS and TG (Australia). The Canadian experts requested anonymity.

CONFLICTS OF INTEREST

All authors declare they have no conflicts of interest

AUTHOR CONTRIBUTIONS

EE conceptualized the research and undertook the data collection and analysis; the data collection was checked for accuracy by experts (see acknowledgements) in each of the six countries included in the study. All authors critically reviewed the manuscript and responded to reviewer comments.

FUNDING SOURCES

E.E. is supported by and Australian Government Research Training Program (RTP) Scholarship. Several authors receive support from a NHMRC Centre for Research Excellence (grant #1101675) in the Early Prevention of Obesity in Childhood (E.E., C.R., R.G., P.L., L.M.W., and T.G.). G.S. is the recipient of an Australian Research Council Discovery Early Career Researcher Award (DE160100307) and a Heart Foundation Future Leader Fellowship from the National Heart Foundation of Australia. He is also a researcher within NHMRC Centres for Research Excellence entitled Reducing Salt Intake Using Food Policy Interventions (APP1117300) and Food Retail Environments for Health (APP1152968) (Australia).

ORCID

Emma Esdaile https://orcid.org/0000-0002-9166-1001
Gary Sacks https://orcid.org/0000-0001-9736-1539
Penelope Love https://orcid.org/0000-0002-1244-3947

REFERENCES

1. United Nations Children's Fund (UNICEF), World Health Organization (WHO), and World Bank Group. *Levels and trends in child malnutrition*. New York: UNICEF; 2017.
2. Abarca-Gómez L, Abdeen ZA, Hamid ZA, et al. Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128·9 million children, adolescents, and adults. *Lancet*. 2017;390(10113):2627-2642. https://doi.org/10.1016/S0140-6736(17)32129-3
3. Australian Bureau of Statistics (ABS). *National Health Survey: First Results, 2014-15*. Table 16: Children's body mass index, waist circumference, height and weight—Australia. Data cube. cat. no. 4364.0.55.001. 2015; viewed 5 January 2018. http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4364.0.55.0012014-15?OpenDocument
4. ABS. *Australian Health Survey: nutrition first results - Foods and Nutrients, 2011-12*. cat. no. 4364.0.55.007. 2014; viewed 8 January 2018. http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/4364.0.55.007~2011-12~Main%20Features~Discretionary%20foods~700
5. National Health & Medical Research Council (NHMRC). *Eat for health: Australian Dietary Guidelines*. Canberra: NHMRC; 2013.
6. Cliff DP, McNeill J, Vella SA, et al. Adherence to 24-hour movement guidelines for the early tears and associations with social-cognitive development among Australian preschool children. *BMC Public Health*. 2017;17(5):857. https://doi.org/10.1186/s12889-017-4858-7
7. Xu H, Wen LM, Rissel C. Associations of parental influences with physical activity and screen time among young children: a systematic review. *J Obes*. 2015;2015:23-23. https://doi.org/10.1155/2015/546925
8. Whelan J, Love P, Romanus A, et al. A map of community-based obesity prevention initiatives in Australia following obesity funding 2009–2013. *Aust NZ J Publ Heal*. 2015;39(2):168-171. https://doi.org/10.1111/1753-6405.12296
9. WHO. *Consideration of the evidence on childhood obesity for the Commission on Ending Childhood Obesity: report of the ad hoc working group on science and evidence for ending childhood obesity*. Geneva: WHO; 2016.
10. Australian Institute of Health and Welfare (AIHW). *Australia's Health 2018*. Canberra: AIHW; 2018.

11. Armstrong RM. Obesity, law and personal responsibility. *Med J Aust*. 2007;186(1):20.
12. Grace FC, Meurk CS, Head BW, et al. An analysis of policy levers used to implement mental health reform in Australia 1992-2012. *BMC Health Serv Res*. 2015;15(15):479. https://doi.org/10.1186/s12913-015-1142-3
13. Sacks G for the Food-EPI Australia project team. *Policies for tackling obesity and creating healtheir food environments: scorecard and priority recommendations for Australian governments*. Melbourne: Deakin University; 2017.
14. Swinburn B, Wood A. Progress on obesity prevention over 20 years in Australia and New Zealand. *Obes Rev*. 2013;14(S2):60-68. https://doi.org/10.1111/obr.12103
15. WHO. *Report of the Commission on Ending Childhood Obesity: Implementation Plan*. Geneva: WHO; 2017.
16. Hill M, Hupe P. The multi-layer problem in implementation research. *Public Manag Rev*. 2010;5(4):471-490. https://doi.org/10.1080/14719030320000178545
17. Hall PA. Policy paradigms, social learning, and the State: the case of economic policymaking in Britain. *Comparative Politics*. 1993;25(3):275-296. https://doi.org/10.2307/422246
18. Stone D. Learning lessons and transferring policy across time, space and disciplines. *Politics*. 1999;19(1):51-59. https://doi.org/10.1111/1467-9256.00086
19. Sacks G, Swinburn B, Lawrence M. Obesity Policy Action framework and analysis grids for a comprehensive policy approach to reducing obesity. *Obes Rev*. 2009;10(1):76-86. https://doi.org/10.1111/j.1467-789X.2008.00524.x
20. World Health Assembly. *Report of the commission on ending childhood obesity, WHA 70 (19)*. Geneva: WHO; 2017.
21. Australian Health Ministers' Advisory Council. *National Strategic Framework for Chronic Conditions*. Canberra: Australian Government; 2017.
22. New Zealand Ministry of Health. *Childhood obesity plan*. Auckland: New Zealand Government; 2015.
23. Department of Health. *A healthy weight for Ireland*. Dublin: Republic of Ireland; 2016.
24. HM Government. *Childhood obesity: a plan for action*. London: Crown Press; 2016.
25. Public Health Agency of Canada. *Curbing childhood obesity*. Ottawa: Government of Canada; 2010.
26. Scottish Government. *Preventing overweight and obesity in Scotland*. Edinburgh: The Scottish Government; 2010.
27. Department of Health. *Healthy Ireland*. Dublin: Republic of Ireland; 2016.
28. WHO. *Sugar intake for adults and children*. Geneva: WHO; 2015.
29. Baker P, Gill T, Friel S, Carey G, Kay A. Generating political priority for regulatory interventions targeting obesity prevention: an Australian case study. *Soc Sci Med*. 2017;177):141-149. https://doi.org/10.1016/j.socscimed.2017.01.047
30. Cullerton K, Donnet T, Lee A, Gallegos D. Playing the policy game: a review of the barriers to and enablers of nutrition policy change. *Public Health Nutr*. 2016;19(14):2643-2653. https://doi.org/10.1017/S1368980016000677
31. Thompson S, Paine G, Judd B, Randolph B. Towards a nuanced understanding of health-supportive place using composite research methods. *Geographical Research*. 2019;57(1):24-39. https://doi.org/10.1111/1745-5871.12329
32. Townshend T, Lake A. Obesogenic environments: current evidence of the built and food environments. *Perspect Public Health*. 2017;137(1):38-44. https://doi.org/10.1177/1757913916679860
33. Lawrence RJ, Gatzweiler FW. Wanted: A transdisciplinary knowledge domain for urban health. *J Urban Health*. 2017;94(4):592-596. https://doi.org/10.1007/s11524-017-0182-x
34. Thompson S, McCue P. Healthy planning: An evolving collaborative partnership. *Urban Pol Res*. 2016;34(1):73-89. https://doi.org/10.1080/08111146.2016.1140032
35. Howlett M. *Studying public policy: policy cycles and policy subsystems*. Toronto: Oxford University Press; 1995.
36. Council Of Australian Governments (COAG) Health Council. *Communique: 12 October 2018*. Canberra: COAG:2018.
37. Select Committee into the Obesity Epidemic in Australia. *Final report: obesity epidemic in Australia*. Canberra: Commonwealth of Australia; 2018.
38. Vandevijvere S, Barquera S, Caceres G, et al. An 11-country study to benchmark the implementation of recommended nutrition policies by national governments using the Healthy Food Environment Policy Index, 2015-2018. *Obes Rev*. 2019;1-10. https://doi.org/10.1111/obr.12819
39. Sacks G, Robinson E for the Food-EPI Australia project team. *Policies for tackling obesity and creating healthier food environments: 2019 progress update, Australian governments*. Melbourne: Deakin University; 2019.
40. Food-EPI Australia Project. In: Deakin Univeristy, ed. *Scorecard and priority recommendations for Australian governments*. Melbourne; 2017.
41. Swinburn B, Vandevijvere S, Mackay S. In: The University of Auckland, ed. *Benchmarking food eenvironments: progress by the New Zealand government on implementing recommended food environment policies and prioritised recommendations*. Auckland; 2017.
42. The Food Foundation. *Food environment policy index (Food-EPI) for England*. London: Food Foundation; 2016.
43. Vanderlee L, Goorang S, Karbasy K, Schermel A, L'Abbe M. *Creating healthier food environments in Canada: current policies and priority actions—summary report*. Toronto: University of Toronto; 2017.
44. Smith J, Blake M. Infant food marketing strategies undermine effective regulation of breast-milk substitutes: trends in print advertising in Australia, 1950–2010. *Aust N Z J Public Health*. 2013;37(4):337-344. https://doi.org/10.1111/1753-6405.12081
45. Spiteri SA, Olstad DL, Woods JL. Nutritional quality of new food products released into the Australian retail food market in 2015—is the food industry part of the solution? *BMC Public Health*. 2018;18(1):222. https://doi.org/10.1186/s12889-018-5127-0
46. Ananthapavan J, Sacks G, Brown V, et al. *Assessing cost-effectiveness of obesity prevention policies in Australia 2018 (ACE-Obesity Policy)*. Melbourne: Deakin University; 2018.
47. Knai C, Petticrew M, Douglas N. The public health responsibility deal: using a systems-level analysis to understand the lack of impact on alcohol, food, physical activity, and workplace health sub-systems. *Int J Environ Res and Public Health*. 2018;15(12):2895. https://doi.org/10.3390/ijerph15122895
48. Mooney JD, Jepson R, Frank J, Geddes R. Obesity prevention in Scotland: a policy analysis using the ANGELO Framework. *Obes Facts*. 2015;8(4):273-281. https://doi.org/10.1159/000438500
49. Roache SA, Gostin LO. The untapped power of soda taxes: incentivizing consumers, generating revenue, and altering corporate behavior. *Int J Health Policy Manag*. 2017;6(9):489-493. https://doi.org/10.15171/ijhpm.2017.69

50. Briggs ADM, Mytton OT, Kehlbacher A, et al. Health impact assessment of the UK soft drinks industry levy: a comparative risk assessment modelling study. *Lancet Public Health*. 2016;2(1):15-22. https://doi.org/10.1016/S2468-2667(16)30037-8
51. Turner C, Aggarwal A, Walls H, et al. Concepts and critical perspectives for food environment research: a global framework with implications for action in low- and middle-income countries. *Glob Food Sec*. 2018;18):93-101. https://doi.org/10.1016/j.gfs.2018.08.003
52. Carey R, Caraher M, Lawrence M, Friel S. Opportunities and challenges in developing a whole-of-government national food and nutrition policy: lessons from Australia's National Food Plan. *Public Health Nutr*. 2016;19(1):3-14. https://doi.org/10.1017/S1368980015001834
53. Lee A, Baker P, Stanton R, Friel S, O'Dea K, Weightman A. *Scoping study to inform the development of the new National Nutrition Policy (RFT 028/1213)*. Brisbane: Queensland University of Technology; Released under FOI March 2016; 2013.
54. Commonwealth of Australia. *Agricultural competitiveness White Paper*. Canberra: Australian Government; 2015.
55. Friel S, Barosh LJ, Lawrence M. Towards healthy and sustainable food consumption: an Australian case study. *Public Health Nutr*. 2014;17(5):1156-1166. https://doi.org/10.1017/S1368980013001523
56. Commonwealth of Australia. *Sport 2030*. Canberra: Department of Health; 2018.
57. Sallis JF, Bull F, Burdett R, et al. Use of science to guide city planning policy and practice: how to achieve healthy and sustainable future cities. *Lancet*. 2016;388(10062):2936-2947. https://doi.org/10.1016/S0140-6736(16)30068-X
58. Avendano M, Berkman LF, Brugiavini A, Pasini G. The long-run effect of maternity leave benefits on mental health: evidence from European countries. *Soc Sci Med*. 2015;132):45-53. https://doi.org/10.1016/j.socscimed.2015.02.037
59. Beuchert LV, Humlum MK, Vejlin R. The length of maternity leave and family health. *Labour Econ*. 2016;43):55-71. https://doi.org/10.1016/j.labeco.2016.06.007
60. Carneiro P, Løken KV, Salvanes KG. A flying start? Maternity leave benefits and long-run outcomes of children. *J Political Econ*. 2015;123(2):365-412. https://doi.org/10.1086/679627
61. Hillier F, Pedley C, Summerbell C. Evidence base for primary prevention of obesity in children and adolescents. *Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz*. 2011;54(3):259-264. https://doi.org/10.1007/s00103-010-1227-4
62. Willett W, Rockström J, Loken B, et al. Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems. *Lancet*. 2019;393(10170):447-492. https://doi.org/10.1016/S0140-6736(18)31788-4
63. Swinburn BA, Kraak VI, Allender S, et al. The global syndemic of obesity, undernutrition, and climate change: The Lancet Commission report. *Lancet*. 2019;393(10173):791-846. https://doi.org/10.1016/S1040-6736(18)32822-8
64. Food and Agricultural Organisation (FAO). *Policy guidance series: strengthening sector policies for better food security and nutrition results*. Budapest: FAO; 2017.
65. Kleinert S, Horton R. Obesity needs to be put into a much wider context. *Lancet*. 2019;393(10173):724-726. https://doi.org/10.1016/S0140-6736(18)33192-1
66. Ridgway E, Baker P, Woods J, Lawrence M. Historical developments and paradigm shifts in public health nutrition science, guidance and policy actions: A narrative review. *Nutrients*. 2019;11(3):531. https://doi.org/10.3390/nu11030531

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

How to cite this article: Esdaile E, Thow AM, Gill T, et al. National policies to prevent obesity in early childhood: Using policy mapping to compare policy lessons for Australia with six developed countries. *Obesity Reviews*. 2019;20:1542–1556. https://doi.org/10.1111/obr.12925