

A snapshot of the scope of obesity prevention practice in Australia

Tahna Pettman¹, Kristy Bolton², Penny Love^{2,*}, Elizabeth Waters¹, Tim Gill³, Jill Whelan², Sinead Boylan³, Rebecca Armstrong¹, John Coveney⁴, Sue Booth⁴, Boyd Swinburn⁵, and Steven Allender²

¹School of Population and Global Health, University of Melbourne, Melbourne, Victoria, Australia,

²Population Health Strategic Research Centre, Deakin University, Geelong, Victoria, Australia, ³Boden Institute of Obesity, Nutrition, Exercise and Eating Disorders, University of Sydney, Sydney, New South Wales, Australia, ⁴School of Health Sciences, Flinders University, Adelaide, South Australia, Australia, and ⁵School of Population Health, University of Auckland, Auckland, New Zealand

*Corresponding author. E-mail: penny.love@deakin.edu.au

Summary

Community-based initiatives (CBIs) that build capacity and promote healthy environments hold promise for preventing obesity and non-communicable disease, however their characteristics remain poorly understood and lessons are learned in isolation. This limits understanding of likely effectiveness of CBIs; the potential for actively supporting practice; and the translation of community-based knowledge into policy. Building on an initial survey (2010), an online survey was launched (2013) with the aim to describe the reach and characteristics of Australian CBIs and identify and evaluate elements known to contribute to best practice, effectiveness and sustainability. Responses from 104 CBIs were received in 2013. Geographic location generally reflected population density in Australia. Duration of CBIs was short-term (median 3 years; range 0.2–21.0 years), delivered mostly by health departments and local governments. Median annual funding had more than doubled since the 2010 survey, but average staffing had not increased. CBIs used at least two strategy types, with a preference for individual behaviour change strategies. Targeting children was less common (31%) compared with the 2010 survey (57%). Logic models and theory were used in planning, but there was low use of research evidence and existing prevention frameworks. Nearly, all CBIs had an evaluation component (12% of budget), but dissemination was limited. This survey provides information on the scope and varied quality of the current obesity prevention investment in Australia. To boost the quality and effectiveness of CBIs, further support systems may be required to ensure that organizations adopt upstream, evidence-informed approaches; and integrate CBIs into systems, policies and environments.

Key words: obesity, Australia, community-based, prevention

INTRODUCTION

Excess body weight, poor diet and low levels of physical activity are key factors in the development of chronic diseases, contributing substantially to global burden of disease and associated social and economic costs. Much of this burden for individuals and communities is preventable. There is promising evidence that community-based initiatives (CBIs) lead to reductions in unhealthy weight gain (Waters *et al.*, 2011a,b; Wang *et al.*, 2013; Wolfenden *et al.*, 2014). CBIs for obesity prevention can be characterized as those which are based in settings (organizations or locations such as schools, public spaces) and which employ combinations of locally tailored strategies (actions such as policy, capacity building, education) to address physical, social and cultural factors that contribute to healthy eating and physical activity. Local tailoring is necessary to ensure that local demographic, cultural and environmental circumstances are appropriately addressed, which may result in more effective interventions through better adoption and sustainability (World Health Organization, 2012). CBIs generally use multiple types of strategies across multiple levels of the socio-ecological model (McLeroy *et al.*, 1988) via partnership mechanisms (Kumanyika *et al.*, 2002; World Health Organization 2002; Simmons *et al.*, 2009) and focus on community engagement, capacity building, policy and environment changes across a whole community. Robust evaluations confirm CBIs effectiveness (Taylor *et al.*, 2008; Johnson *et al.*, 2012; Swinburn and Wood, 2013; Pettman *et al.*, 2014) and cost-effectiveness (McAuley *et al.*, 2010; Moodie *et al.*, 2013). Additionally, CBIs may have a ‘spillover’ of effects into surrounding communities (Swinburn *et al.*, 2014). Ideally, these initiatives are applied within a broader portfolio approach to obesity prevention (World Health Organization, 2012).

No agreed single definition of CBIs is readily available, however, it is often acknowledged as an approach that involves the community and its capacity in various settings, to address a range of determinants of nutrition and physical activity behaviour (Bell *et al.*, 2008). Authors of a recent European CBI survey define CBIs as involving a complementary range of actions implemented at the local level that address the environment, the community’s capacity and/or the behaviour of individuals (Bemelmans *et al.*, 2014). Others characterize CBIs as being integrated and comprehensive, involving a range of locations; employ multiple interventions or strategies; include multiple individuals, organizations, groups; and involve the community in planning, implementation, management and evaluation (Merzel and D’Afflitti, 2003; Haby *et al.*, 2012). CBIs may focus on promoting healthy weight or

preventing unhealthy weight gain; and/or they may focus on promoting healthy eating or physical activity in a manner that could be expected to influence energy balance in communities or populations. In this paper, these terms are used interchangeably when referring to CBIs.

Almost two decades ago, feasible, scalable, cost-efficient approaches were called for in Australia (National Health and Medical Research Council, 1997; Bell *et al.*, 2008; Swinburn and Wood, 2013) to prevent obesity. Over this time, the number of CBIs has risen in response to various funding opportunities at federal, state and local levels, notably through the then-Australian Government’s National Partnership Agreement on Preventive Health (NPAPH) (Australian Government Department of Health, 2013a,b). This rapid expansion has led to the implementation of a disparate range of initiatives with varying characteristics and quality, and whose effectiveness is poorly understood. Best Practice Principles (BPPs) for community-based obesity prevention initiatives also emerged during this time (King and Gill, 2009; King *et al.*, 2011), but their application to practice has not yet been evaluated. Principles are considered to be core and non-negotiable aspects of practice, are aspirational, not universally achievable, and may be value-based, and therefore should not be used to directly judge or assess CBIs, but to guide optimal practice. Evidence-based guidelines or standards may be more useful for assessing ‘good’ practice. Such measures of quality exist (World Health Organization, 2011) but do not yet appear to be routinely applied.

The Collaboration of Community-based Obesity Prevention Sites (CO-OPS) is a national-level network and knowledge translation and exchange platform for CBIs. In 2011, CO-OPS identified the need for a survey of CBI in Australia (Allender *et al.*, 2011) as a means of routinely capturing a snapshot of CBIs (their characteristics and approaches to community intervention) and collating measures of their effectiveness. An overarching outcome is to monitor progress towards integrated best practice in CBIs, which is particularly important given the rapidly changing funding context for preventive health in Australia. This paper reports on a recent survey (2013) and compares a similar initial survey (2010). The primary aim was to describe the reach and characteristics, and to identify and evaluate elements known to contribute to best practice and likely effectiveness and sustainability, of CBIs in Australia that focus on obesity prevention.

METHODS

The intended sample for this cross-sectional survey was Australian CBIs focusing on obesity prevention operating

in 2013. A CBI was defined by CO-OPS as a programme of activities that occurred in the community, either through community settings (e.g. children's educational settings) or by engagement with existing community groups, with objectives that could be expected to influence energy balance by promoting healthy eating and/or physical activity (Nichols *et al.*, 2013). The survey tool used in the current study was based on a 2010 survey (Nichols *et al.*, 2013), with additional items taken from a previously validated tool (Dobbins *et al.*, 2001). The survey collected CBI characteristics (e.g. geographic location, duration), processes and practice; structures established, types of strategies, prioritization of policy and environment interventions, and use of evidence and theory. As the nature of CBIs is highly context-dependent (varies from one setting to another), potential confounders and effect modifiers were not considered in this survey. A copy of the survey is available on request from the corresponding author.

Pilot

Prior to implementation, the survey tool was piloted with a purposive sample of known experienced CBI professionals ($n = 13$). Participants were emailed a link to the online survey and were asked about readability, face validity, appropriateness of response scales and wording. Respondents reported the survey to be understandable and well designed, and recommended improving wording so as not to be leading towards an obvious or preferred answer. Modifications were made to relevant items.

Recruitment and participants

The CO-OPS Collaboration membership database was used to recruit a convenience sample of self-identified CBIs, by sending direct invitations to professionals, key organizations and government departments who had self-identified as being involved in CBIs in Australia previously (upon becoming CO-OPS members or through other interactions with CO-OPS). In line with CO-OPS' definition of obesity prevention CBIs (described previously), the email communication invited CBIs promoting healthy eating, physical activity and healthy weight to participate. Participants were also encouraged to share the invitation with their networks, to allow further self-identification of unknown CBIs. Contact details for other potential participants were obtained by emailing organizations involved in related public health activities.

No specific sample size was set prior to recruitment commencing. It was estimated through a separate CBI mapping project (Whelan *et al.*, 2014, 2015) that ~250 obesity prevention CBIs were operating in Australia.

In total, 1439 existing members were invited to participate by a targeted communication (email) from CO-OPS. Approximately 40% of recipients clicked on the invitation. To increase the response rate, two reminders were sent to the membership, and additional tailored emails were sent to CO-OPS staff networks (e.g. local government associations, health-related non-government organizations (NGOs) and university researchers). Further promotion occurred via social media and CO-OPS events. Where respondents had commenced the survey but not proceeded or completed, reasons were sought via contacting the respondents' email address where provided. Most often the reason for non-completion was that they had determined that their CBI was in early stages of development thus questions could not be fulfilled, or that their work was not relevant to community-based obesity prevention.

Consent and ethics

The survey was made available online using survey monkey (www.surveymonkey.com), with a plain language statement and consent form on the first page. After reading the plain language statement, respondents were required to provide consent before they were able to proceed with the survey. Responses for all other survey items were optional. Data were exported and identifying information for individuals and organizations was concealed prior to analysis. Ethical approval was granted from the Deakin University HREC, Victoria, Australia (approval number HEAG-H 105_2013).

Analysis

An analysis plan including research questions was developed to guide data analysis *a priori*, directly related to the survey aims of reach, characteristics, elements of best practice, effectiveness and sustainability of CBIs.

These questions fell into four key domains:

- (i) Reach, spread, duration and capacity of CBIs across Australia.
- (ii) Characteristics of CBIs (funding, delivery, initiation and strategies).
- (iii) Alignment with BPPs for community-based obesity prevention (King and Gill, 2009)
- (iv) Likelihood of effectiveness; contribution to practice-based evidence; and sustainability.

Quantitative data were analysed using basic descriptive statistics (counts, frequencies). Where multiple responses were allowed across several categories, all responses were counted and proportions of the total number of responses were calculated. Suspected outliers were then excluded if they were more than four standard deviations

from the mean ($n = 4$ data points in total). Missing data were not imputed in analysis.

Qualitative data (free-text responses) were coded within MS Excel spreadsheets for data reduction and to produce categories or themes. Longer strings of qualitative data were imported into NVivo version 10 (QSR International, Doncaster, Victoria) for coding and analysis.

Reporting

The analysis plan was used to guide reporting survey results, linked to the survey aims to describe and evaluate CBIs. Following data analysis, descriptive results were reviewed against selected items from the published BPPs for obesity prevention (King and Gill, 2009; World Health Organization, 2011), as a frame of reference to guide reporting. The principles used were selected as appropriate and relevant to the survey. The principles were not used to judge or assess CBIs, but to understand whether CBIs had pursued such principles in their practice. Recommendations from systematic reviews of community-based or settings-based obesity prevention initiatives (Waters *et al.*, 2011a,b; Hendrie *et al.*, 2012) were also used, to assist in making a judgement about likely effectiveness and sustainability of CBIs.

Data reported were compared with data from the earlier survey (2010) where appropriate and applicable (i.e. where survey question items were identical between the two surveys). The STROBE statement checklist for

cross-sectional studies (von Elm *et al.*, 2007; STROBE statement, 2009) was reviewed to ensure appropriate reporting of this snapshot survey.

RESULTS

Participants

Individual response, consent, participation and completion rates are shown in Figure 1. In total, 104 CBIs completed the survey. Approximately 12% of respondents had not heard about CO-OPS prior to completing the survey, indicating that recruitment strategies reached beyond the CO-OPS membership list.

Reach, spread, duration and capacity

The 104 CBIs were located in all states and territories of Australia (Table 1), generally following a pattern of population size distribution. The highest proportion of CBIs was reported in the states of Victoria (30%), New South Wales (19%) and South Australia (14%). Fewer CBIs (10%) were reported for Queensland, one of the more populous states of Australia. Geographic coverage of CBIs was comprehensive with most spread across major cities and inner regional or outer regional areas, and several CBIs reaching outer regional, remote and very remote areas of Australia (Australian Bureau of Statistics, 2011). Target population size was identified through three categories used in the 2010 survey. The majority of CBIs

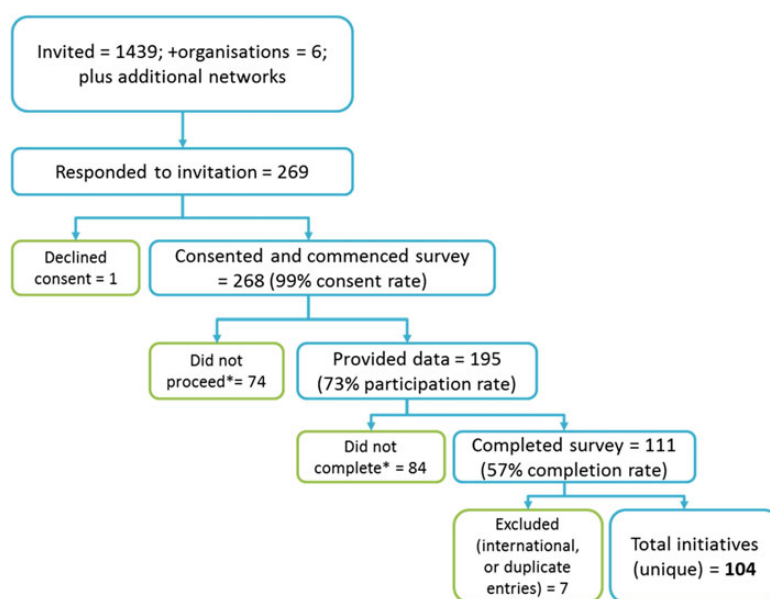


Fig. 1: Flowchart of survey responses, consent, participation and completion, 2013.

*Entered respondent's contact details only but no CBI data, or; entered CBI general details only but no further data.

Table 1: CBI location, capacity and duration by state or territory, Australia, 2010 and 2013

	Population size, millions (% of Australian population)		Total number of initiatives (% of total)		Staffing FTE, median (range)		Funding per annum, AU\$ '000, median (range)		Duration of initiative (years), median (range)	
	2010	2013	2010 (<i>n</i> = 76)	2013 (<i>n</i> = 104)	2010 (<i>n</i> = 70)	2013 (<i>n</i> = 92)	2010 (<i>n</i> = 50)	2013 (<i>n</i> = 47)	2010 (<i>n</i> = 58)	2013 (<i>n</i> = 90)
All	—	—	76	104	1.0 (0.05–17.0)	1.8† (0.0–13.0)	94.9 (2.5–4460.0)	234.5† (0–2000.0)	3.0 (0.8–1.0)	3.0 (0.2–21.0)
NSW	7.0	7.4 (32%)	14 (18%)	20† (19%)	1.5 (0.5–4.5)	1.5 (0.3–7.1)	53.9 (3.5–215.5)	234.5† (20.0–672.3)	1.8 (1.0–5.0)	3.5 (0.3–14.0)
VIC	5.3	5.8 (25%)	25 (33%)	31† (30%)	1.0 (0.05–7.2)	1.8† (0.2–13.0)	60.0 (2.5–1100.0)	257.2† (0–1666.7)	3.0 (1.0–5.0)	3.0 (0.3–12.0)
QLD	4.3	4.6 (20%)	4 (5%)	10† (10%)	1.0 (0.5–5.0)	2.5† (0.0–7.0)	137.7*	645.7† (400.0–1000.0)	1.6*	3.5 (0.2–9.0)
WA	2.2	2.5 (11%)	14 (18%)	13 (13%)	1.0 (0.3–9.0)	1.6† (0.5–11.0)	110.0 (6.7–1200.0)	233.3† (74.7–450.0)	2 (0.8–5.0)	3.0 (2.0–21.0)
SA	1.6	1.6 (7%)	10 (13%)	15† (14%)	3.6 (0.2–17.0)	1.8† (0.1–3.0)	240.4 (4.0–4460.0)	167.5† (75.0–333.3)	3.0 (1.0–10.0)	5.0 (2.0–10.0)
Tas.	0.5	0.5 (2%)	4 (5%)	3 (3%)	1.0 (0.7–2.5)	2.2† (1.5–2.5)	154.8 (100.0–277.5)	291.5† (234.5–400.0)	2.7 (1.0–4.4)	3.5 (2.0–5.0)
ACT	0.3	0.4 (2%)	—	2 (2%)	—	1.5*	—	1000.1 (141.5–2,000.0)	—	1.6 (0.3–3.0)
NT	0.2	0.2 (1%)	—	2 (2%)	—	5.0*	—	60.0*	—	3.0 (2.0–4.0)
National	21.4	23.1	4 (5%)	7† (7%)	8.3 (3.0–14.1)	1.5† (0.3–2.7)	1150.0 (1000.0–1300.0)	250.0† (40.0–366.7)	3.0 (3.0–3.0)	2.0 (1.0–3.0)

**n* = 1 initiative only.

†Removed outliers.

†Indicate an increase or decrease in 2013 compared with results of previous survey in 2010, not tested for statistical significance.

reported a large target population size, with over half (54%) targeting populations of more than 10 000 people, and nearly a third (30%) targeting populations of more than 500–10 000 people. The remainder (16%) focused on smaller populations of <500.

More initiatives were reported than the 2010 survey sample, which was expected due to the increase in national funding for preventive health implementation through the NPAPH. Owing to the difference in sample size, it is difficult to compare with the previous survey in 2010 ($n = 76$) (Nichols *et al.*, 2013). However, in 2013, the median duration of CBI implementation was 3 years, similar to 2010. Only 15% of CBIs reported access to ongoing funding, slightly <2010 (17%). Additionally, the mean duration of implementation (3.9 years) was longer than the mean duration of funding (3.4 years).

Higher total staffing (full time equivalent; FTE) was observed in the more populous states. Across all states, a slight increase or no substantial change in median staffing had occurred since 2010, except in one state which experienced a slight decline in FTE (South Australia).

Characteristics of CBIs

In both 2010 and 2013 surveys, the majority of CBIs were funded and delivered by government, community organizations or NGOs, rather than academic institutions.

Funding. The majority of CBIs (75%) relied on one major funding source, but various sources were utilized ($n = 144$) across all CBIs. Limited funding was obtained from sectors outside health, with the major funding source being the federal (28%) and state government departments of health (22%), in particular the NPAPH (Australian Government Department of Health, 2013a,b). Local government (11%), community health services (7%) and other federal government funding schemes (such as Rural and Indigenous health funds) (7%), supported several initiatives. Other government sources were utilized along with private businesses and grants, Medicare Locals, research funding bodies and health promotion foundations. Of the 47 CBIs who reported funding amounts, the median funding was \$250 000 per annum (range \$0–\$8 000 000) which represented a doubling of funding across Australia since 2010 from \$94 900, largely due to the NPAPH. In this sample, states/territories with larger population sizes did not necessarily come with larger funding provisions (Table 1).

Delivery. CBIs were mostly delivered by local governments (34%), or by state departments of health or local/community health services (32%). The proportion of local governments delivering implementation increased since 2010

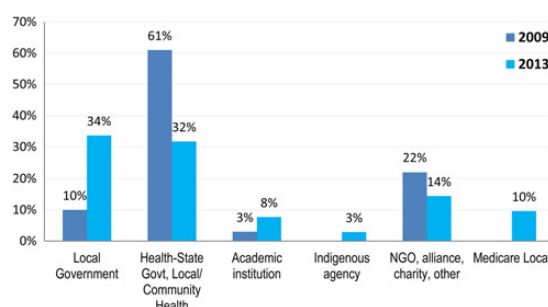


Fig. 2: Organization type delivering CBIs, 2010 and 2013.

(Figure 2). The majority of CBIs were delivered within partnerships, with nearly 91% reporting to have been co-ordinated and linked with relevant partner organizations and/or different sectors.

Initiation. CBIs reported various reasons for initiation. Primarily it was in response to an identified need, funding opportunity (e.g. grant received, government funded response or ministerial decision/direction), demand or a ‘good idea’.

Alignment to BPPs

The BPPs (King and Gill, 2009) were used as a framework to determine alignment of actual practice with recommended principles, based upon relevant items reported in the survey.

Community engagement. Within the survey, stakeholders were defined as ‘a person, group or organization who affects or can be affected by the community-based initiative’. CBIs reported having involved stakeholders in several stages of initiative planning/delivery, including implementation (85%), planning (78%) and evaluation (75%). Most CBIs were planned or delivered in partnerships, on average with 3.8 other organizations or sectors (median, range 0–18 organizations). Community engagement and stakeholder engagement were not delineated as distinct groups within the survey, and respondents may have considered these groups in various ways.

Settings. The majority of CBIs (70%) were implemented across more than one setting. The most common setting for initiatives was neighbourhood/community-wide/public facilities (25%), followed by healthcare or health services (18%). Non-health sectors and services were also cited (15%) together with schools (14%). Other settings included workplaces (12%), homes (9%) and preschool and early childhood settings (9%). A small proportion

(3%) of 'other' settings were reported which included council owned areas, sporting clubs, food systems/retailers, stores, businesses, maternal and child health centres.

Strategies. The majority of CBIs (71%) focused on both healthy eating and physical activity whilst others (29%) focused on one of these focus areas only, or other foci for example mental health. Most CBIs (90%) reported using more than one type of strategy (of environmental change, capacity building, social marketing, individual behaviour change). Many focused on capacity building (80%), and several had a social marketing component (60%). However, the largest proportion (84%) focused on individual behaviour change strategies (e.g. education, group programmes) and fewer (59%) reported environmental change strategies; which differed to the 2010 survey where environmental change strategies (63%) were almost as common as individual behaviour change strategies (67%).

In addition, ~59% of all CBIs reported that policy and environment changes were a priority for the initiative. Types of strategies described included settings-based policies, area-level public health policy or plans, modifying access to food and drink availability, outdoor exercise equipment and drinking fountains.

Programme design and planning. Most CBIs (91%) used guidelines or strategic plans to inform development and implementation of their initiative, however, many referred mainly to the use of behavioural dietary or physical activity guidelines (40%) rather than population-level frameworks for obesity prevention. Some reported state-based public health or prevention plans (17%) and local public health plans (12%).

From a list of nine possible types of evidence sources, CBIs reported using three different types of evidence most often (mode) in planning. Of all the types of evidence sources listed (Dobbins *et al.*, 2001), the most common types selected as being used in planning were previous experience (15.2%) and programme evaluation reports (13.3%). Other types included organizational practice and organizational beliefs (both 11.3%); 'what others are doing' and standards/policies/legislation (both 10.3%), and research information from individual studies (10.0%). The least common types used were evidence summaries (8.5%) and systematic reviews (9.7%).

On average CBIs used no peer-reviewed or synthesized sources (mode = 0). Theory of change was used in planning by approximately half of CBIs, and one in three CBIs developed a logic model. Aims and objectives were less clearly articulated in this survey. Positioning and

framing of the obesity issue and efforts to avoid stigmatization and victim-blaming or to minimize harms were apparent.

Target groups. Nearly half of CBIs targeted adults (18–65 years 27%; 65 years and older 17%), whilst others targeted whole populations (15%). Relatively fewer focused on children (0–5 years 9%; 5–12 years 12.5%; 12–18 years 9%). These findings are in contrast with the 2010 survey where a greater focus was on primary prevention targeting children (57%) than in the current survey (31%). Nearly two-thirds of CBIs (64%) reported targeting more than one vulnerable group (e.g. low socioeconomic status, Aboriginal or Torres Strait Islander populations, or culturally and linguistically diverse groups).

Theoretical underpinning. A mixed range of theoretical perspectives, ideological benchmarks, frames of reference and management models were reported to be used and/or adapted to plan the initiative or guide implementation, among 51% of initiatives. Detailed information on the sourcing and integration of these models to CBI practice was not collected. Some of the theories and models described included trans-theoretical behaviour change, social cognitive theory, health belief model, the Ottawa charter, ecological model, change management and Health promoting schools framework. Some emerging perspectives reported by CBIs included diffusion of innovations, knowledge transfer and complex adaptive systems.

Evaluation and practice-based evidence. According to the initiating organization, it was determined that in most cases (> 90%) the primary purpose of CBIs was intervention/service delivery rather than evidence creation (e.g. through academic research). Nearly, all CBIs (99%) reported doing some form of evaluation, and on average, CBIs reported that 11.8% of the budget ($n = 41$, range 0.02–80.0%) was spent on evaluation. Over half (55%) combined external and internal capacity or outsourced the evaluation completely (e.g. universities, private consultants, scientific advisory groups). Others relied solely on internal capacity. In addition, when asked if any specialized assistance was sourced during any stage of evaluation and whether it was useful, just over half (53%) reported that external assistance was sourced. Of these, the majority reported that the assistance was very or somewhat useful and helpful. Most reported multiple purposes for evaluation, including: to inform others (22%); accountability or reporting to a funder (22%); for internal use, either instrumentally (22%) or conceptually (21%). More than half of CBIs (59%) had a dissemination plan,

but for most, the purpose of dissemination was limited to reporting internally and to funders. However, a few were exploring broader dissemination through peer-reviewed publications and conference. Approximately 76% of CBIs had an evaluation plan. However, less than half (39%) sought ethical approval for their evaluation. A combination of process and impact measurement and mixed methods were apparent. At least two methods comprising both process and impact measures were used in most (91%). Process monitoring was most common (89% of all CBIs) together with impacts on behaviours (75%), and knowledge, attitudes and capacity (75%). Measuring impacts upon physical, sociocultural, policy and financial environments was less common (58%). Less than half of CBIs measured impacts upon anthropometry (43%). On average CBIs measured three socio-demographic characteristics known to be important equity indicators according to the PROGRESS framework [Place, Race, Occupation, Gender, Religion, Education, Socio-economic status (SES), Social status] (Ueffing *et al.*, 2009). One in five included a comparison area or group in the evaluation. Long-term follow-up evaluations were planned among less than half of CBIs, meaning that data will be limited to determine sustained impacts. Statistical methods were included to determine outcomes of the evaluation in approximately half of CBIs (48%). Others were not using such methods *a priori*, were unsure, or this task was the responsibility of a different unit (e.g. funder, government department).

Implementation and sustainability. Of the CBIs linked with other organizations, 77% reported processes to co-ordinate actions across partner groups. More than half of CBIs said the initiative had reached their target group. Those that did not revealed challenges with community and stakeholder engagement, disinvestment/defunding, and reaching particular population groups and tailoring the approach within the resources available. Similarly, just less than half of CBIs (45%) reported that implementation had proceeded as planned, whilst others required adaptation, necessitated by changes in context, needs and resources, or to extend or sustain implementation. Dose of intervention was not clearly defined or collected in the current and previous surveys.

Components that are likely to contribute to sustainability (Luke *et al.*, 2014; Whelan *et al.*, 2014, 2015) were assessed using the available survey data. Many CBIs reported organizational commitment such as establishment of organizational policies, and processes established to coordinate actions across partner groups. Most CBIs involved community groups or stakeholders in the

initiative, and many had a specific focus on capacity building (96%), which may support longer-term implementation. Adapting and evolving the initiative was apparent among half of CBIs where it was noted that implementation had not proceeded as planned. Most CBIs did some form of evaluation for internal purposes. As noted earlier, use of research evidence in planning was low, not all prioritized policy and environment change, and many favoured individual-level strategies which are less likely to produce sustainable outcomes. About half of CBIs reported that organizational policies and office space would continue, but only 27% reported having ongoing staffing to coordinate activities beyond the designated funding/time period.

Governance and accountability. Structures for governance and organizational relationships are important elements that contribute to best practice. However, these elements were not assessed comprehensively in the current survey tool, therefore limited data are available. Accountability and funding sources were clearly described. Some funding was obtained from private industry, including private health insurance, pharmaceutical and mining.

DISCUSSION

There is currently no co-ordinated national system that routinely collects information regarding obesity prevention CBIs. The aim of the current study was to describe the reach and characteristics of community-based obesity prevention initiatives in Australia, and to identify and evaluate elements of CBIs that may contribute to best practice, effectiveness and sustainability. This survey is unique in Australia, but is comparable to a recent survey of European obesity prevention CBIs (Bemelmans *et al.*, 2014), describing general characteristics, settings and organizational structure, objectives, actions and strategies, process and effect evaluation, and reported CBI effects on weight indicators. This survey captured valuable specifics about actions performed within CBIs and was better able to differentiate between environment strategies (physical or social) and educational/individually targeted strategies used—this would have been useful to collect from Australian CBIs. The current survey has updated the Australian landscape, building upon a survey that was last conducted in 2010 (Nichols *et al.*, 2013).

Key findings of this study include that CBIs were being conducted in all states and territories of Australia, with the majority being linked with partner organizations; and a mixture of populations and population sizes were being targeted with a focus on both healthy eating and physical activity. The increase in action and some degree of

coordination within states is likely to be due to the NPAPH. Community engagement occurred through involvement of key stakeholders. Whilst the majority reported using guidelines to inform planning of initiatives, improvements could be made by integrating high-quality evidence, regional weight gain prevention frameworks and theories across all levels of the socio-ecological model (Trickett *et al.*, 2011; Golden and Earp, 2012; Haby *et al.*, 2012). The majority of CBIs reported conducting and allocating a budget for evaluation. Improvements regarding the purpose of the evaluation (i.e. ensuring broader utilization than accountability reporting), increasing ethical approval and improving dissemination plans would be beneficial. Capacity building and stakeholder engagement for implementation and sustainability was apparent; however, the focus on individual behaviour change strategies will ultimately limit the long-term effectiveness of the current investment. Organizational commitment to existing CBIs is largely unknown.

Effectiveness and sustainability

The results related to best practice emphasize the challenges in CBI delivery in Australia. The majority of survey findings suggest that current approaches to funding, implementing and evaluating CBIs could be improved, as well as ensuring sustainability of outcomes. CBIs have greater likelihood of achieving sustainable change by implementing multiple strategies, with an emphasis on environmental and policy change to modify factors that shape individuals' behaviours (Merzel and D'Aflitti, 2003; King and Gill, 2009; Haby *et al.*, 2012). It is acknowledged, however, that policy and environment changes are often the most challenging to implement due to conflicts with organizational cultures, community social norms and the time taken to implement and achieve impact. It is encouraging that most (70%) were implemented across more than one setting, similar to the European CBI survey (66%); and that most used more than one type of strategy (90%), similar to European CBIs (96%). The larger focus on individual-level behavioural strategies than environment strategies is consistent with other recent work in a smaller area of Australia (Cleland *et al.*, 2013). In contrast, the European CBI survey reported an average of four environmental strategies per CBI, which was similar to number of educational/individual strategies implemented per Australian CBI.

The predominance of individual-level programmes in the current study may be explained by a federally funded programme which recommended that agencies adopt individual behaviour change programmes (Australian

Government Department of Health, 2013a,b). The apparent 'midstream' focus (behavioural programmes in settings) is likely to be less effective for achieving a population-level effect size to impact on obesity (Golden and Earp, 2012; World Health Organization, 2012). It is also highly likely to be unsustainable due to the resourcing required for adequate reach and dose of behavioural programmes. Further, programmatic responses clearly need to be flexible, adaptable and tailored contextually to increase the likelihood of uptake and effectiveness. Extrapolating population sizes targeted across all respondents of this survey, at a minimum ~716 750 individuals may have been reached through CBIs, at a cost of A\$39.03 per person per year. This is already considered cost-effective (Moodie *et al.*, 2013) and could produce even more return on investment if effectiveness was improved. However, true reach is difficult to estimate from this survey and may have been limited given that 16% of CBIs reported targeting 'populations' of <500 people. There may be resource implications from investment in low-reach CBIs.

Low reported use of research evidence and existing strategic frameworks is consistent with other recent work in Australia (Cleland *et al.*, 2013; Armstrong *et al.*, 2014) and underscores the ongoing need for more active efforts to support evidence-informed decision-making. The use of theory in designing obesity prevention interventions has been reported to increase effectiveness (Hendrie *et al.*, 2012). Although a range of theories, perspectives and frames of reference were reported to be used in CBI development and implementation, insufficient information was available to understand the extent to which these were applied.

Existing national, state and regional weight gain prevention policies and frameworks should be used in planning, to build links with the broader portfolio of efforts (state-based, national) (King and Gill, 2009; World Health Organization, 2012), reinforcing changes in behaviour. Similarly, the inconsistent quality of CBI evaluation designs and dissemination of findings require increased support and capacity building.

Sharing lessons learned and evaluation findings is paramount to understanding if progress is being made, how and why. In this survey, the majority of CBIs were funded by government or NGOs, where service delivery is primary. In these cases, budget and capacity for evaluation is often compromised, therefore external expertise may assist to achieve rigorous evaluations powered to determine the success of interventions (Swinburn *et al.*, 2007; Cleland *et al.*, 2013). However, there are significant challenges for CBIs in engaging external expertise, in the context of tight budgets, timelines and partnership

challenges. Notwithstanding, without the academic input, leadership and partnerships demonstrated previously, seminal reports that we now have as evidence of CBI effectiveness (Taylor *et al.*, 2007; Sanigorski *et al.*, 2008) would have been difficult to achieve. Opportunities exist for programme funders to establish, in partnership with academic institutions, comprehensive monitoring, evaluation, translation and dissemination structures and systems. There are Australian CBI examples which have successfully used combined evaluation models involving academic expertise, as well as research partnership structures for CBI implementation and evaluation. Some of these include Good for Kids (NSW Department of Health, 2009; Nathan *et al.*, 2012), *fun 'n healthy in Moreland!* (Waters *et al.*, 2008; Willenberg *et al.*, 2010), *eat well be active* Community Programmes (Pettman *et al.*, 2013), and more recently, large-scale coordinated initiatives OPAL (SA Health, 2012) and Healthy Together Victoria (Victorian Government Department of Health, 2013).

Strengths and limitations

The CO-OPS nation-wide survey is an evidence-based tool which represents the most comprehensive assessment of the characteristics of community-based obesity prevention in Australia. Other than the CO-OPS map (Whelan *et al.*, 2014, 2015), no other system exists nationally in Australia to routinely identify, assess and report upon CBI elements that could be contributing to obesity prevention. This survey can also be used to identify gaps in best practice for funding and implementing effective initiatives.

A number of limitations exist in this study. The tool was thoroughly piloted but not systematically tested for validity or reliability, which introduces imprecision and possible bias. Although broad recruitment strategies were used, the sample for this survey was self-selected, in order to allow self-selection of CBI respondents. However, having over 100 responses of even geographic spread may have helped with representativeness and generalizability of the findings to other Australian CBIs. It is possible that those responding were those that were better resourced, which may bias results. Self-identification has allowed the breadth of implementation in Australia to be documented, however, this also has inherent biases in terms of defining what a CBI is. This should be considered in future research, to ensure comparability of results of cross-sectional surveys over time. It is noted that a recent European CBI survey set eligibility criteria in order to generate findings about a homogenous CBI group (Bemelmans *et al.*, 2014). The World Health Organization definition goes further to define CBIs as those which represent bottom-up social

development models relying on full community ownership and intersectoral collaboration (Ardakani, 2007). Last, the survey is not well powered to describe the whole broader 'picture' of effort across the system, such as the links between national, state and local activities.

Limitations in the survey design will be used for future improvement of the tool, including capturing community and stakeholder engagement (including vulnerable populations); organizational processes and policies to build capacity; organizational links; governance structures, and processes for coordinating actions. Governance arrangements are important elements of practice and would be useful to understand particularly considering the NPAPH had federally set targets and common reporting measures across jurisdictions. Clearer capture of CBIs' aims and objectives could be used to compare with evaluation objectives and outcomes. More detailed information on the types and mix of strategies used is needed to understand whether CBIs constitute a multi-component approach (World Health Organization, 2012), and to accurately assess quality, equity and effectiveness. Further information on reported effectiveness could also be gathered more systematically, as has been achieved in a similar recent European survey (Bemelmans *et al.*, 2014).

Policy implications

CBIs are one component of a population portfolio strategy, offering promising and cost-effective approaches while more challenging actions like regulatory change (Swinburn, 2014) take longer to implement. CBIs are also a pragmatic way to embed healthy public policy at the local level (Allender *et al.*, 2012; Chircop *et al.*, 2013). Given the rapidly changing funding context, monitoring progress towards integrated best practice is critical, alongside coordination of population-level strategic planning for obesity prevention. This echoes sentiments of others in similar contexts (Cleland *et al.*, 2013; Middleton *et al.*, 2014; Swinburn and Wood, 2013). These findings highlight a need for routine and systematic analysis of CBI activity; greater application of existing and emerging evidence and practice principles; and dissemination of knowledge and evidence generated by CBIs to researchers and decision-makers. In Australia, CO-OPS aims to routinely identify gaps and needs, support quality practice through workforce capacity building, and encourage the creation and active dissemination of practice-based evidence.

Dedicated resources to actively support CBI design, implementation and sustainability may increase the likelihood of population-level impact on obesity prevention.

Knowledge translation and exchange strategies can be applied in partnership, across diverse organizational settings (Allender *et al.*, 2011; Haby *et al.*, 2012) to better support integrated CBI planning and delivery.

Implications exist for government decision-makers and other programme funders, researchers and programme initiators. Implementation quality and long-term impacts of existing initiatives will be limited unless CBIs have broader reach, become more upstream, evidence-informed and integrated into community structures and systems. Longer-term pragmatic evaluations will help to understand the cumulative effect of these investments. Addressing gaps such as those identified in this survey will assist in realizing the effectiveness, equity and efficiency of CBIs.

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REFERENCES

- Allender S., Nichols M., Foulkes C., Reynolds R., Waters E., King L., et al. (2011) The development of a network for community-based obesity prevention: the CO-OPS Collaboration. *BMC Public Health*, **11**, 132.
- Allender S., Gleeson E., Crammond B., Sacks G., Lawrence M., Peeters A., et al. (2012) Policy change to create supportive environments for physical activity and healthy eating: which options are the most realistic for local government? *Health Promotion International*, **27**, 261–274.
- Ardakani M. A. (2007) Community-based initiatives and their relation to poverty reduction and health development: experiences in the Eastern Mediterranean Region. *Eastern Mediterranean Health Journal*, **13**, 1243.
- Armstrong R., Pettman T. L., Waters E. (2014) Shifting sands—from descriptions to solutions. *Public Health*, **128**, 525–532.
- Australian Bureau of Statistics. (2011) 1216.0—Australian Standard Geographical Classification (ASGC), July 2011. Retrieved April 2014, from Doctorconnect website <http://doctorconnect.gov.au/internet/otd/publishing.nsf/Content/locator>.
- Australian Government Department of Health. (2013a) Healthy Communities Initiative. Retrieved 24 July 2014, from <http://www.healthyactive.gov.au/internet/healthyactive/publishing.nsf/Content/healthy-communities>.
- Australian Government Department of Health. (2013b) National Partnership Agreement on Preventive Health. Retrieved 26 July 2014, from <http://www.health.gov.au/internet/main/publishing.nsf/Content/phd-prevention-np>.
- Bell A. C., Simmons A., Sanigorski A. M., Kremer P. J., Swinburn B. A. (2008) Preventing childhood obesity: the sentinel site for obesity prevention in Victoria, Australia. *Health Promotion International*, **23**, 328–336.
- Bemelmans W. J., Wijnhoven T. M., Verschuuren M., Breda J. (2014) Overview of 71 European community-based initiatives against childhood obesity starting between 2005 and 2011: general characteristics and reported effects. *BMC Public Health*, **14**, 758.
- Chircop A., Shearer C., Pitter R., Sim M., Rehman L., Flannery M., Kirk S. (2013) Privileging physical activity over healthy eating: ‘Time’ to Choose? *Health Promotion International*, **30**, 418–426.
- Cleland V., McNeilly B., Crawford D., Ball K. (2013) Obesity prevention programs and policies: practitioner and policy-maker perceptions of feasibility and effectiveness. *Obesity (Silver Spring)*, **21**, E448–E455.
- Dobbins M., Cockerill R., Barnsley J. (2001) Factors affecting the utilization of systematic reviews. *International Journal of Technology Assessment in Health Care*, **17**, 203–214.
- Golden S. D., Earp J. A. L. (2012) Social ecological approaches to individuals and their contexts: twenty years of health education and behavior health promotion interventions. *Health Education and Behavior*, **39**, 364–372.
- Haby M., Doherty R., Welch N., Mason V. (2012) Community-based interventions for obesity prevention: lessons learned by Australian policy-makers. *BMC Research Notes*, **5**, 20.
- Hendrie G. A., Brindal E., Corsini N., Gardner C., Baird D., Golley R. K. (2012) Combined home and school obesity prevention interventions for children: what behavior change strategies and intervention characteristics are associated with effectiveness? *Health Educ Behav*, **39**, 159–171.
- Johnson B. A., Kremer P. J., Swinburn B. A., de Silva-Sanigorski A. M. (2012) Multilevel analysis of the Be Active Eat Well intervention: environmental and behavioural influences on reductions in child obesity risk. *International Journal of Obesity*, **36**, 901–907.
- King L., Gill T. (2009) *CO-OPS Collaboration Best Practice Principles for Community-Based Obesity Prevention*. Deakin University, Geelong.
- King L., Gill T., Allender S., Swinburn B. (2011) Best practice principles for community-based obesity prevention: development, content and application. *Obesity Reviews: An Official Journal of the International Association for the Study of Obesity*, **12**, 329–338.
- Kumanyika S., Jeffery R. W., Morabia A., Ritenbaugh C., Antipatis V. J. (2002) Obesity prevention: the case for action. *International Journal of Obesity and Related Metabolic Disorders*, **26**, 425–436.
- Luke D. A., Calhoun A., Robichaux C. B., Elliott M. B., Moreland-Russell S. (2014) The program sustainability assessment tool: a new instrument for public health programs. *Preventing Chronic Disease*, **11**, E12.
- McAuley K. A., Taylor R. W., Farmer V. L., Hansen P., Williams S. M., Booker C. S., Mann J. I. (2010) Economic

- evaluation of a community-based obesity prevention program in children: the APPLE project. *Obesity*, **18**, 131–136.
- McLeroy K. R., Bibeau D., Steckler A., Glanz K. (1988) An ecological perspective on health promotion programs. *Health Education and Behavior*, **15**, 351–377.
- Merzel C., D’Afflitti J. (2003) Reconsidering community-based health promotion: promise, performance, and potential. *American Journal of Public Health*, **93**, 557–574.
- Middleton G., Henderson H., Evans D. (2014) Implementing a community-based obesity prevention programme: experiences of stakeholders in the north east of England. *Health Promotion International*, **29**, 201–211.
- Moodie M. L., Herbert J. K., de Silva-Sanigorski A. M., Mavoa H. M., Keating C. L., Carter R. C., et al. (2013) The cost-effectiveness of a successful community-based obesity prevention program: the be active eat well program. *Obesity*, **21**, 2072–2080.
- Nathan N., Wolfenden L., Bell A., Wyse R., Morgan P., Butler M., et al. (2012) Effectiveness of a multi-strategy intervention in increasing the implementation of vegetable and fruit breaks by Australian primary schools: a non-randomized controlled trial. *BMC Public Health*, **12**, 651.
- National Health and Medical Research Council. (1997) *Acting on Australia’s Weight: A Strategic Plan for the Prevention of Overweight and Obesity*. Commonwealth of Australia, Canberra.
- Nichols M. S., Reynolds R. C., Waters E., Gill T., King L., Swinburn B. A., Allender S. (2013) Community-based efforts to prevent obesity: Australia-wide survey of projects. *Health Promotion Journal of Australia*, **24**, 111–117.
- NSW Department of Health. (2009) Good for Kids. Good for Life. Retrieved November 2014, from <http://www.goodforkids.nsw.gov.au/Parents>.
- Pettman T., Magarey A., Mastersson N., Wilson A., Dollman J. (2013) Improving weight status in childhood: results from the eat well be active community programs. *International Journal of Public Health*, **59**, 43–50.
- Pettman T., Magarey A., Mastersson N., Wilson A., Dollman J. (2014) Improving weight status in childhood: results from the eat well be active community programs. *International Journal of Public Health*, **59**, 43–50.
- SA Health. (2012) OPAL. Retrieved November 2014, from <http://www.sahealth.sa.gov.au/wps/wcm/connect/public+content/sa+health+internet/healthy+living/healthy+places/where+we+live+and+play/opal>.
- Sanigorski A. M., Bell A. C., Kremer P. J., Cuttler R., Swinburn B. A. (2008) Reducing unhealthy weight gain in children through community capacity-building: results of a quasi-experimental intervention program, Be Active Eat Well. *International Journal of Obesity*, **32**, 1060–1067.
- Simmons A., Mavoa H. M., Bell A. C., De Courten M., Schaaf D., Schultz J., Swinburn B. A. (2009) Creating community action plans for obesity prevention using the ANGELO (Analysis Grid for Elements Linked to Obesity) Framework. *Health Promotion International*, **24**, 311–324.
- STROBE statement. (2009) Checklist for cross-sectional studies. Retrieved November 2014, from <http://www.strobe-statement.org/>.
- Swinburn B. A. (2014) Why are governments abdicating from dealing with the obesity crisis? In Haslam D. W., Sharma A. M., le Roux C. W. (eds), *Controversies in Obesity*. Springer, London, pp. 23–29.
- Swinburn B., Wood A. (2013) Progress on obesity prevention over 20 years in Australia and New Zealand. *Obesity Reviews*, **14**, 60–68.
- Swinburn B., Bell C., King L., Magarey A., O’Brien K., Waters E. and On behalf of the Primary Prevention Group of the Australian Childhood Adolescent Obesity Research Network. (2007) Obesity prevention programs demand high-quality evaluations. *Australian and New Zealand Journal of Public Health*, **31**, 305–307.
- Swinburn B., Malakellis M., Moodie M., Waters E., Gibbs L., Millar L., et al. (2014) Large reductions in child overweight and obesity in intervention and comparison communities 3 years after a community project. *Pediatric Obesity*, **9**, 455–462.
- Taylor R. W., McAuley K. A., Barbezat W., Strong A., Williams S. M., Mann J. I. (2007) APPLE Project: 2-y findings of a community-based obesity prevention program in primary school age children. *American Journal of Clinical Nutrition*, **86**, 735–742.
- Taylor R. W., McAuley K. A., Barbezat W., Farmer V. L., Williams S. M., Mann J. I. (2008) Two-year follow-up of an obesity prevention initiative in children: the APPLE project. *The American Journal of Clinical Nutrition*, **88**, 1371–1377.
- Trickett E. J., Beehler S., Deutsch C., Green L. W., Hawe P., McLeroy K., et al. (2011) Advancing the science of community-level interventions. *American Journal of Public Health*, **101**, 1410–1419.
- Ueffing E., Tugwell P., Welch V., Petticrew M., Kristjansson E. for the Cochrane Health Equity Field. (2009) Equity Checklist for Systematic Review Authors.
- Victorian Government Department of Health. (2013) Healthy Together Victoria (HTV). Retrieved November 2014, from <http://www.healthytogether.vic.gov.au/>.
- von Elm E., Altman D. G., Egger M., Pocock S. J., Gøtzsche P. C., Vandenbroucke J. P. (2007) The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: guidelines for reporting observational studies. *Preventive Medicine*, **45**, 247–251.
- Wang Y., Wu Y., Wilson R. F., Bleich S., Cheskin L., Weston C., et al. (2013) *Childhood Obesity Prevention Programs: Comparative Effectiveness Review and Meta-Analysis*. AHRQ Comparative Effectiveness Reviews. Agency for Healthcare Research and Quality (US), Rockville (MD).
- Waters E., Ashbolt R., Gibbs L., Booth M., Magarey A., Gold L., et al. (2008) Double disadvantage: the influence of ethnicity over socioeconomic position on childhood overweight and obesity: findings from an inner urban population of primary

- school children. *International Journal of Pediatric Obesity*, **3**, 196–204.
- Waters E., de Silva-Sanigorski A., Burford Belinda J., Brown T., Campbell Karen J., Gao Y., et al. (2011a) Interventions for preventing obesity in children. *Cochrane Database of Systematic Reviews*, DOI: 10.1002/14651858.CD001871.pub3.
- Waters E., de Silva-Sanigorski A., Hall B. J., Brown T., Campbell K. J., Gao Y., et al. (2011b) Interventions for preventing obesity in children. *Cochrane Database Syst Rev*, CD001871. doi: 10.1002/14651858.CD001871.pub3.
- Whelan J., Love P., Pettman T., Doyle J., Booth S., Smith E., Waters E. (2014) Cochrane update: predicting sustainability of intervention effects in public health evidence: identifying key elements to provide guidance. *Journal of Public Health*, **36**, 347–351.
- Whelan J., Love P., Romanus A., Pettman T., Bolton K., Smith E., et al. (2015) A map of community based obesity prevention initiatives in Australia following obesity funding 2009–2013. *Australian and New Zealand Journal of Public Health*, **39**, 168–171.
- Willenberg L. J., Ashbolt R., Holland D., Gibbs L., MacDougall C., Garrard J., et al. (2010) Increasing school playground physical activity: a mixed methods study combining environmental measures and children's perspectives. *Journal of Science and Medicine in Sport*, **13**, 210–216.
- Wolfenden L., Wyse R., Nichols M., Allender S., Millar L., McElduff P. (2014) A systematic review and meta-analysis of whole of community interventions to prevent excessive population weight gain. *Preventive Medicine*, **62**, 193–200.
- World Health Organization. (2002) *Food and Health in Europe: A New Basis for Action*. World Health Organization, Regional Office for Europe, Copenhagen.
- World Health Organization. (2011) *Good Practice appraisal Tool for Obesity Prevention Programmes, Projects, Initiatives and Interventions*. World Health Organization, Regional Office for Europe, Copenhagen.
- World Health Organization. (2012) *Population-Based Approaches to Childhood Obesity Prevention*. Gary Sacks, Boyd Swinburn and Godfrey Xueeb. World Health Organization, Geneva.