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Review

# A systematic review and meta-analysis of whole of community interventions to prevent excessive population weight gain

Luke Wolfenden [a,*], Rebecca Wyse [a], Melanie Nichols [b], Steven Allender [b], Lynne Millar [b], Patrick McElduff [a]

[a] The University of Newcastle, Faculty of Health, School of Medicine and Public Health, Newcastle, NSW, Australia
[b] Deakin University, WHO Collaborating Centre for Obesity Prevention, Faculty of Health, Geelong, VIC, Australia

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ABSTRACT

Population-based, 'whole of community' interventions utilise community engagement processes and implement multiple strategies to improve the health of populations defined by geographical boundaries (i.e. cities, villages or regions). The aim of the review was to systematically assess the current state of knowledge about the effectiveness of population-based whole of community interventions in preventing excessive population weight gain. Systematic searches of electronic databases (1990–2011) and reference lists of included trials and previous reviews were conducted to identify interventions to prevent excessive weight gain. Population-based, whole of community interventions were defined as those targeting the weight status of a population characterised along geographical boundaries. The review included eight trials. All of the identified trials targeted children or adolescents. Seven trials reported a significant effect favouring the intervention on at least one measure of adiposity. Meta-analysis of six trials revealed a small reduction in BMI z-score among participants in intervention communities (mean difference (MD) −0.09; 95% confidence interval (CI) −0.16 to −0.02). The review suggests that population-based, whole of community interventions can be effective in achieving modest reductions in population weight gain among children.



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* Corresponding author at: Newcastle University, C/O Hunter New England Population Health, Locked Bag 10, Wallsend, NSW 2298, Australia.
*E-mail address:* luke.wolfenden@hnehealth.nsw.gov.au (L. Wolfenden).

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## Introduction

Globally, almost 1.5 billion adults and 70 million children are overweight or obese (Finucane et al., 2011; Lobstein et al., 2004) with the prevalence of overweight and obesity projected to continue to rise in future decades (Wang et al., 2011). By 2030 in the USA and UK alone, an additional 76 million obese adults are expected to accrue up to 8.5 million cases of diabetes, 7.3 million cases of heart disease and stroke and approximately half a million cases of cancer (Wang et al., 2011). In response to the increasing burden of disease attributable to obesity, governments have set obesity targets (Crombie et al., 2008) and are implementing a range of policies and programmes in the community to prevent unhealthy weight gain (Fussenegger et al., 2008).

In recognition of the complex aetiology of obesity, population-based whole of community approaches to address determinants of obesity through multi-strategic interventions delivered across entire communities (e.g. towns, villages or cities) have been recommended to reduce population obesity prevalence (Waters et al., 2011; World Health Organization, 2009). Such strategies have intuitive appeal as even if moderately effective, exposing an entire community to programmes, policies and environments supportive of obesity prevention could deliver health and social benefits to large numbers of people. Indeed whole of community interventions to address excessive population weight gain are being implemented across the globe. For example, following a pilot of the '*Ensemble Prevenons l'Obesité Des Enfants*' (EPODE) programme in France, communities in Belgium, Spain, Australia and Mexico are following the community capacity building approach of EPODE to create community environments supportive of obesity prevention (World Health Organization, 2012). In the United States, the Healthy Eating Active Communities' initiative is being implemented in six low income communities in California to improve the local environment to promote healthy living (Samuels et al., 2010). Despite such initiatives, reviews of whole of community interventions targeting other chronic disease risks – including the high profile Pawtucket Heart Health programme and the Stanford Five-City project – have reported that the effectiveness of these interventions in improving community health has been mixed (Merzel and D'Afflitti, 2003; Nissinen et al., 2001).

Despite the potential merits of population-based community approaches to reduce population weight gain, the effectiveness of such approaches has not been previously synthesised in a systematic review or meta-analysis (Wolfenden et al., 2010). This review seeks to address this important gap in the scientific literature by addressing the following research question:

> What is the current evidence regarding the effectiveness of population-based whole of community interventions in preventing excessive population weight gain?

## Methods

The review was guided by procedures outlined in the Cochrane Handbook for Systematic Reviews of Interventions (Higgins and Green, 2011).

### *Types of studies*

Population-based, whole of community interventions were defined as those targeting the weight status of a population characterised along geographical boundaries, such as cities, villages or regions (a commonly used definition of community interventions (Atienza and King, 2002). Given the methodological challenges of complex public health interventions and the difficulty of random assignment of entire communities (Sanson-Fisher et al., 2007), both randomised and non-randomised designs with parallel control or comparison groups were eligible for inclusion. Specifically, the eligibility criteria included randomised trials including cluster randomised controlled trials, and quasi-experimental designs with a parallel control group. For each design, group allocation was required to be at the level of a geographically defined community. Studies not published in a peer reviewed journal, published before 1990, or in languages other than English were excluded.

### *Types of participants*

Eligible studies could include participants from community samples of children and/or adults or specific population groups within a community defined based on their demographic, ethnic or socioeconomic characteristics. Studies recruiting only overweight or obese persons were excluded as they were considered to represent a treatment rather than a primary prevention intervention approach. No other participant exclusion criteria were applied.

### *Types of interventions*

Any population-based, whole of community interventions which primarily sought to prevent population weight gain, targeted more than one determinant of population weight gain, and included community consultation or engagement processes to inform intervention development or delivery were eligible. This included interventions which may have incorporated educational/health promotion/social marketing/management/organisational/counselling/policy or legislative reform strategies. Interventions conducted in any setting, or across multiple settings were included. Interventions primarily focussed on chronic disease reduction (such as cardiovascular disease or diabetes) where obesity prevention was one of a number of targeted risk factors were excluded.

### *Comparison*

Trials with comparison groups that did not receive any intervention or that received 'treatment as usual', attention controls or waitlist controls, were included.

### *Types of outcome measures*

Trials reporting objectively measured indicators of adiposity including weight, body mass index (including standardised body mass index), waist circumference, body fat percentage, skin fold thickness, or objectively measured population prevalence of overweight or obesity were included. Such measures represent reliable assessments of population weight status (Lobstein et al., 2004; World Health Organization, 2000).

### *Information sources*

Medline, EMBASE, Cochrane Central Register of Controlled Trials, and Google Scholar electronic databases were searched independently by two reviewers (LW & RW) for articles published between 1990 and 2011. The electronic search strategy for each data-base can be seen in Table 1. Additionally, the reference lists of included trials and relevant reviews including the Cochrane review of interventions for the prevention of childhood obesity (Waters et al., 2011) and relevant narrative reviews and editorials on the issue of community-based obesity prevention interventions (Friedrich, 2007; Huang and Story, 2010; Swinburn and de Silva-Sanigorski, 2010) were examined.

### *Data collection and analysis*

Data collection and risk of bias assessment were performed independently by two reviewers. Differences in data extraction or risk of bias assessment were resolved via consensus.