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# Healthy Alberta Communities: Impact of a three-year community-based obesity and chronic disease prevention intervention

Kim D. Raine [a,*], Ronald Plotnikoff [a,1], Donald Schopflocher [a], Ellina Lytvyak [a], Candace I.J. Nykiforuk [a], Kate Storey [a], Arto Ohinmaa [a], Lisa Purdy [b], Paul Veugelers [a], T. Cameron Wild [a]

[a] School of Public Health, University of Alberta, 3-300 ECHA, 11405 87 Ave., Edmonton, AB T6G 1C9, Canada
[b] Department of Medical And Laboratory Sciences, University of Alberta, 5-412 ECHA, 11405 87 Ave., Edmonton, AB T6G 1C9, Canada

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ABSTRACT

*Objective.* To assess the impact of a 3 year (2006–2009) community-based intervention for obesity and chronic disease prevention in four diverse "Healthy Alberta Communities" (HAC).

*Methods.* Targeted intervention development incorporated the ANGELO conceptual framework to help community stakeholders identify environmental determinants of obesity amenable to intervention. Several interrelated initiatives were implemented. To evaluate, we surveyed separate samples of adults in HAC communities before and after the interventions and compared responses to identical survey questions asked of adults living in Alberta in two waves of the Canadian Community Health Survey (CCHS).

*Results.* The HAC sample included 4761 (2006) and 4733 (2009) people. The comparison sample included 9775 and 9784 respondents in 2005 and 2009–10 respectively. Self-reported body mass index showed no change, and neither were there significant changes in behaviors relative to secular trends. Most significant outcomes were relevant to social conditions, specifically sense of belonging to community in the intervention communities.

*Conclusion.* Health outcome indicators at the community level may not be sufficiently sensitive to capture changes which, over a relatively short term, would only be expected to be incremental, given that interventions were directed primarily to creating environmental conditions supportive of changes in behavioral outcomes rather than toward health outcome change directly.



## Introduction

The impact of chronic diseases – including cardiovascular diseases, diabetes, and cancers – is steadily growing (World Health Organization, 2011b). The causes are well established, including unhealthy diet, physical inactivity, obesity, tobacco and alcohol use (World Health Organization, 2011b). The United Nations Global Assembly recognized "…the incidence and impacts of non-communicable diseases can be largely prevented or reduced with an approach that incorporates evidence-based, affordable, cost-effective, population-wide and multisectoral interventions" (United Nations General Assembly, 2011).

In Canada, obesity has become a public health priority (Canadian Institute for Health Information, 2003; Public Health Agency of Canada, 2008). Twenty-year trends (1980–2008) of mean age–standardized body mass index (BMI) shows a persistent increase by 9.13% in men and 10.79% in women (World Health Organization, 2011a). The causes of obesity are multifaceted (Butland et al., 2007; The Public Health Agency of Canada and the Canadian Institute for Health Information, 2011). Human biology, growth and development early in life, eating and physical activity behaviors, and broader economic and social drivers all have a role to play (Butland et al., 2007; Kanoski, 2012). Thus, obesity does not have easy or obvious solutions. Currently, evidence is heavily biased towards causes rather than strategies for prevention. Controlled studies are few in number and limited in scope (Brown et al., 2007; National Institute for Health Clinical Excellence and National Collaborating Centre for Primary Care, 2006; Wareham, 2007). There is need for additional evidence in obesity prevention, especially (1) large-scale "pilot" or "demonstration" projects for obesity prevention and (2) population-based solutions, including studies of the built environment and diet/activity/obesity (Butland et al., 2007).

* Corresponding author.
*E-mail addresses:* kim.raine@ualberta.ca (K.D. Raine), ron.plotnikoff@newcastle.edu.au (R. Plotnikoff), don.schopflocher@ualberta.ca (D. Schopflocher), Ellina.lytvyak@ualberta.ca (E. Lytvyak), Candace.nykiforuk@ualberta.ca (C.I.J. Nykiforuk), Kate.storey@ualberta.ca (K. Storey), aohinmaa@ualberta.ca (A. Ohinmaa), Lisa.purdy@ualberta.ca (L. Purdy), Paul.veugelers@ualberta.ca (P. Veugelers), Cam.wild@ualberta.ca (T.C. Wild).
[1] Present address: Priority Research Centre in Physical Activity and Nutrition, The University of Newcastle Callaghan, NSW 2308, Australia.

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"Population-level health interventions are policies or programs that shift the distribution of health risk by addressing the underlying social, economic and environmental conditions" (Hawe and Potvin, 2009). In the Canadian context, a review on the effectiveness of multi-level environmental and population-based interventions for obesity prevention was inconclusive (Reeder et al., 2006). However, a long history of comprehensive chronic disease prevention programs beginning in 1972 with Finland's North Karelia project provides models of health promotion through community organization (Puska, 2002; Puska et al., 1994). Death rates from coronary heart disease, stroke and cancer fell dramatically (Puska et al., 1994). Although never specifically designed to address obesity, obesity rates stabilized at a time of rising global rates (Pietinen et al., 1996). During a similar time period, the Stanford Three Community Study showed success with mass media and risk reduction classes (Farquhar, 2001; Schooler et al., 1997). Studies patterned after these successes had significant risk factor changes, adding evidence for the effectiveness of community-based interventions (Farquhar, 2001). However, later attempts to scale-up such community-based interventions (Del Prete et al., 1993; Jeffery, 1995; Lefebvre et al., 1988) were less successful. Results of these mostly quasi-experimental studies were mixed, due in part to their varied contexts and difficulties with the "trial approach" (McLaren et al., 2007). Yet, community-based models of health promotion continue to gain currency because of the significance of community settings as leverage points to influence health.

Sub-optimal outcomes of community-based interventions were attributed to effects of secular trends, difficulties measuring intervention "dose" (Fortmann et al., 1995; Guttmacher et al., 2010; Thompson et al., 2003), questions regarding defining intervention success (Green et al., 1986; Merzel and D'Afflitti, 2003), and questions regarding expectations of reasonable effect size (Fishbein, 1996; Mittelmark et al., 1993). New efforts in community-based interventions focused on improving community capacity to plan interventions, building on existing strategies while developing the new ones, and methods for evaluation (Guttmacher et al., 2010). Specifically, the last decade of community-based intervention research has emphasized factors which support community-based interventions: defining specific communities' priorities (Martinez et al., 2011; Schwarte et al., 2010), networking between communities (Allender et al., 2011), monitoring progress in meeting objectives (Cory et al., 2010), and process evaluation (Haby et al., 2012).

Community-based interventions offer three distinct advantages. First, because the intervention is implemented population-wide, it is inclusive and not dependent on the health care system. Second, by directing strategies at an entire population an intervention can reach individuals at all levels of risk. And finally, some lifestyle and behavioral risk factors are shaped by conditions not under an individual's control. Community-based interventions can be designed to affect environmental and social conditions (Institute of Medicine, 2012). However, methodological challenges remain (Lobstein and Jackson, 2007).

Ongoing community-based intervention projects for obesity and chronic disease prevention are varied and numerous (Bunnell et al., 2012; Cory et al., 2010; de Silva-Sanigorski et al., 2010; Drieling et al., 2011; Nichols et al., 2012; Samuels et al., 2010; Schwarte et al., 2010). Canadian evidence-based interventions for obesity prevention are primarily focused on children and adolescents in school settings (e.g. Veugelers and Fitzgerald, 2005).

Building upon this foundation within the Canadian context, we sought to expand the minimal evidence base and to inform development of interventions with potential for effectiveness, given evidence of environmental determinants of obesity (Raine, 2004). In doing so, we applied principles of population health intervention research, which "attempts to capture the value and differential effect of these interventions, the processes by which they bring about change and the contexts within which they work best" (Hawe and Potvin, 2009).

This paper describes the outcomes of a three-year, community-based obesity and chronic disease prevention intervention, the Healthy Alberta Communities (HAC) project. The history, implementation and conceptual framework of HAC are described elsewhere (Raine et al., 2010). Our primary objective was to assess the impact of community-based interventions on obesity and chronic disease risk factors in HAC communities as compared to secular trends in Alberta. A secondary objective, to be presented elsewhere, was to evaluate the impact of interventions on community capacity and environments.

## Methods

### *Overview*

In 2005, the Ministry of Health and Wellness selected four geographically dispersed Alberta communities with different demographic characteristics. Each community presented an opportunity for developing unique intervention approaches to chronic disease prevention. A provincial advisory committee including multisectoral representation from government, non-governmental organizations and community-based organizations oversaw project development and implementation. Researchers engaged an interdisciplinary, international advisory board for advice on study design.

### *The Healthy Alberta Communities*

Bonnyville is a town of 6000 people in northeast Alberta that acts as a service center for up to 10,000. Rich in natural resources, it attracts a transient population of adult oil-field workers. St. Paul is a rural community of 5000 near Bonnyville, with roots in agriculture and has a large aboriginal community nearby. Norwood/North Central Edmonton is a culturally diverse inner city of 120,000 in central Alberta that includes areas of socioeconomic disadvantage. Medicine Hat is a small city in south-eastern Alberta with a population of approximately 57,000. Demographics are summarized in Table 1.

### *Interventions*

To assess overall outcomes, and remaining mindful of principles of community-based population health interventions, we conceptualized the intervention as the collective efforts of the four unique communities in defining and addressing specific community priorities relevant to environmental and social determinants of obesity and chronic disease risk. While each community worked to develop community-specific projects relevant to their assessed needs, the communities also learned from each other. By being a part of the larger Healthy Alberta Communities project, communities were provided with common learning opportunities and templates to work through the process of intervention development, they shared experiences (successes and challenges) through regular teleconferences and semi-annual in person team meetings, and they had ongoing access to intervention development and evaluation expertise through the HAC central team. An overview of intervention development is published elsewhere (Raine et al., 2010), and specific details of community capacity-building and project implementation are provided through an on-line resource (http://healthyalbertacommunities.com/hac-model-resource-intro.html). A brief description follows.

The initial year (2005–06) involved creating a research and intervention infrastructure. Local community coordinators with established community networks were hired. Momentum developed around opportunistic projects following building relationships with local stakeholders. For example, one of the first tasks of the local community coordinator was to identify potential partners. In two communities local action to develop community gardens had already been initiated. Seeing the gardens as an opportunity to promote active living and access to fresh fruits and vegetables, the HAC community coordinators were able to work alongside the local organizers to supplement existing resources with coordinator time (St Paul) or to leverage networks to municipalities to gain access to donated land (Medicine Hat). Once HAC had developed trust and showed the project's ability to contribute to local priorities, collaborations developed more targeted interventions appropriate to each community context.

Targeted intervention development incorporated the ANGELO framework (Analysis Grid for Environments Linked to Obesity), as a conceptual model (Swinburn et al., 1999). The ANGELO framework is theoretically consistent with the ecological model of health promotion (McLeroy et al., 1988) which views behaviors as embedded within the context of environments. Classifying environment by types (physical, economic, political, and socio-cultural), ANGELO frames elements that influence food intake and physical activity. In 2007–08 we adapted ANGELO workshops (Simmons et al., 2009) to help local community stakeholders identify environmental determinants of chronic