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ORIGINAL ARTICLE

# Reflections on community-based population health intervention and evaluation for obesity and chronic disease prevention: the Healthy Alberta Communities project

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**Abstract**
*Objectives* To reflect upon a population health intervention for obesity and chronic disease prevention, with specific attention to the processes of change and developing, implementing and evaluating an intervention in a community–university–government partnership context.
*Methods* To capture the value, process and context of our interventions, we employed a multi-layered, mixed methods research and evaluation design. Guided by assumptions of community-based participatory research, and using a validated capacity-building tool, the investigators described and reflected critically upon the level and nature of capacity built (for both research and intervention) as indicators of the process and contextual influences on intervention success.
*Results* Capacity was built in communities through collaborative approaches. We captured complexity of change in social context to advance understanding of how to intervene to transform environments. Developing novel community evaluation strategies can help to advance understanding of how environmental interventions affect health before health outcomes data demonstrate change.
*Conclusions* Our experience provides an example of operationalizing an ecological framework. As a community–university–government partnership, Healthy Alberta Communities provides an opportunity for developing promising practices for the health of communities, as well as a unique research platform for evaluating the process and establishing effectiveness of population health interventions.

**Keywords** Community interventions · Ecological models · Capacity building · Obesity · Health promotion · Evaluation · Population health

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## Introduction

Chronic diseases are the leading causes of death and disability worldwide (World Health Organization 2000). Chronic diseases are linked by preventable risk factors including tobacco use, unhealthy diet and physical inactivity (Public Health Agency of Canada 2005). The need to address diet and physical inactivity is made visible by rising obesity rates. From 1978 to 2004 obesity rates increased from 14 to 23% of adults (Statistics Canada 2005). In Alberta, where this research was conducted, 34.2% of adults are overweight [body mass index (BMI) ($kg/m^2$) = 25–29.9] and 15.6% are obese (BMI $\geq$ 30) (Alberta Cancer Board 2008). Evidence is strong to demonstrate significant public health implications of obesity (World Health Organization 2000), but systematic investigation into the means to intervene are still emerging. The purpose of this paper is to reflect upon a population health intervention for obesity and chronic disease prevention, with specific attention to the processes of change and of developing, implementing and evaluating an intervention in a community–university–government partnership context.

The determinants of obesity and associated chronic diseases include individual-level factors (diet and physical inactivity behaviours), environmental factors (context for behaviour including physical and economic access to healthy food and physical activity opportunities), and social factors (cultural, economic and political variables) that influence the behaviour of entire populations (Raine 2004). Efficacious interventions are more likely to result in effective programs and policy if they consider both individual and contextual determinants of behaviour and health (Glasgow et al. 1999). Ecological models systematize options for multi-level interventions to support healthy lifestyles among individuals and create opportunities for social and cultural change to promote healthy weights and prevent chronic diseases (Davison and Birch 2001; Goetz and Caron 1999; McLeroy et al. 1988).

"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, p 18). They may be designed and developed in the health sector or sectors such as education, housing or employment. Evidence on the effectiveness of multi-level population-based interventions for obesity prevention is still scarce but growing. The evidence gap is at least partially associated with a relative lack of in-depth understanding of the practice of changing environments to promote health as compared to behavioural and clinical interventions (Kumanyika 2007), combined with inadequacies of traditional research methodologies to evaluate interventions. With increasing frequency, the sense of urgency for change has led to implementing programs and policies in the absence of evidence or with inadequate evaluation planned. Rather than stifle momentum, researchers can work closely with practitioners and policy makers to implement social change based upon best available evidence. Indeed, such a partnership approach to population health interventions is a growing research area.

Within the Canadian context, we sought to expand the minimal evidence base and to inform development of yet-to-be-proven 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, p 18).

This paper describes and reflects upon the history, conceptual basis, development, implementation strategy and evaluation framework for a community-based population health intervention program that aims to contribute to the theory and evidence base in obesity and chronic disease prevention.

## The Healthy Alberta Communities project

As part of the Canadian Heart Health Initiative (Robinson et al. 2007), the Alberta Heart Health Project (AHHP) has worked as a partnership between the Ministry of Health and academia for 15 years in Alberta, a geographically large, politically conservative, oil-rich province in Western Canada, to create knowledge and build capacity around small-scale demonstration projects for cardiovascular disease prevention (Collins-Nakai et al. 1998). The "dissemination phase" (1999–2005) examined organizational capacity building for health promotion in Alberta's publicly funded regionalized health services system. Our research revealed a shift in practice from a "heart health" approach to integrated chronic disease prevention. The AHHP took a leadership role in advancing chronic disease prevention at the provincial level through the initiation of the Alberta Healthy Living Network (AHLN), an intersectoral network of organizations with common goals in promoting health (Wolbeck Minke et al. 2007). This success in moving the province toward integrated chronic disease prevention strengthened the community–academic partnership with the health ministry. This partnership, along with strategically presented evidence on the North Karelia project (Puska et al. 1983), led to the Ministry committing resources ($3 million) for population-level health promotion interventions from 2005 to 2010 through the Healthy Alberta Communities (HAC) project.

The mission of HAC is to develop sustainable collaborative partnerships to improve the health of the community; and to gather and use evidence to influence values, change environments and create a culture supportive of healthy living. The goals are to: (1) reduce prevalence of overweight and chronic disease risk, (2) increase community capacity to promote health, and (3) inform policy, practice and research decisions. Ultimately, the community–academic–government partnership aims to create evidence for decisions regarding health promotion activities and resources which may eventually be incorporated into standard practice for communities.

At the time of funding in 2005, the Ministry selected four demonstration communities reflecting varied geographical and demographic characteristics. Communities included two in Northern Alberta (one rural and one with a burgeoning oil field industry; combined adult population 8,105), a small city in Southern Alberta; adult population 37,180, and a socio-economically disadvantaged neighbourhood in a major city; adult population 32,398. Each community presents opportunities for developing unique approaches to obesity and chronic disease prevention. The initial year of work (2005–2006) involved creating a research and intervention infrastructure. Dedicated program and research staff in addition to community coordinators in each site were hired, and we began to build relationships with local stakeholders to identify potential interventions. A provincial advisory committee was established to guide HAC through its lifespan and to facilitate the networking process. The committee includes multisectoral representation from all levels of government and key representatives from non-governmental and community-based organizations. We also engaged an interdisciplinary, international advisory board of key researchers in large-scale population health intervention programs to provide expertise and to critique our proposed methodologies.

During the first year, momentum developed around opportunistic projects following building relationships with local stakeholders, and identification of ongoing or planned initiatives relevant to HAC's goals. For example, a HAC community coordinator was able to provide coordination expertise and resources to reinvigorate a struggling grassroots effort to create a community garden. This fit HAC's goals by addressing access to healthy affordable food. Once HAC had developed trust and showed the project's ability to contribute to local priorities, collaborative work between researchers and community stakeholders was implemented to develop more targeted interventions grounded in evidence from research and culturally 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). Classifying environment by types (physical, economic, political, and socio-cultural), ANGELO frames elements that influence food intake and physical activity. In 2007–2008 we adapted and applied ANGELO workshops (Simmons et al. 2009) to help local community stakeholders identify environmental determinants of chronic diseases amenable to intervention in their own communities. We identified community priorities for action to supplement ongoing opportunistic interventions. In all communities, a number of inter-related initiatives were implemented with participation of community stakeholders, and coordination by the HAC community coordinators. Urban initiatives included expanded community gardening, a linked trail system for active transportation, and facilitating free access to leisure facilities and development of a social enterprise to address food insecurity for the inner-city neighbourhood. In the rural contexts, revitalization of the Farmers' Market became one focus, while, facilitating access to recreational space and healthy foods in restaurants were priorities for the community hosting the transient oil field workers.

## Evaluation framework

To capture the value, process and context of our interventions, with the intent of contributing to the evidence base on the effectiveness of multi-level population health interventions, we employed a multi-layered, mixed methods research and evaluation design. The framework for evaluation is briefly presented here for context.

The Ministry's primary purpose in funding HAC was to answer the question, "Can community-based interventions reduce obesity and chronic disease risk?" However, recognizing that disease rates are unlikely to change rapidly, the researchers worked closely with the provincial and international advisory groups to negotiate a series of more focused research questions with associated data collection strategies:

1. What is the impact of the interventions on chronic disease risk factors in HAC communities as compared to secular trends in Alberta? [Comparison data were drawn from the Canadian Community Health Survey (CCHS) and the Canadian Health Measures Survey (CHMS), both large health surveys conducted by the federal government.]
    a. Self-reported behaviour change (physical activity, diet, tobacco use), cognitive change (intentions) and self-reported health status (including BMI) collected using Computer Assisted Telephone Interviewing cross-sectional surveys from pre-(2006) to post-intervention (2009)

b. Clinic measured height, weight, derived BMI, waist and hip circumferences and blood pressure in a sub-sample of survey respondents

Recognizing limitations of short time frames to assess health outcomes following relatively low-dose community interventions, we chose to incorporate methods to capture context and answer the question:

2. How have the interventions contributed to changes in community capacity and environments?

Our community evaluation uses qualitative and quantitative methodologies to add a rich context for understanding and interpreting the interventions. Specifically, community evaluation informs continuing intervention development (process), and assesses changes in the community over time (outcome). Evaluation of process is informed by ongoing documentation of networking experiences and community capacity building by the local community coordinators. In addition to informing ongoing intervention development, this documents challenges to effective implementation (including social and political contexts).

The evaluation of outcome documents levels and nature of community capacity built as assessed through community coordinators completed community capacity-building tools (Maclellan-Wright et al. 2007) for each community-driven intervention. Strength and reach of community networks for chronic disease prevention are appraised via social network analysis (Wasserman and Faust 1994) to explore the relationships among organizations/agencies engaged in the project. This enables us to understand HAC's coordinating role in building inter-organizational relationships for sustainable health promotion action. Observed changes in community environments is monitored using community-level data (demographic, programs and supports, policies and political contexts), to create community profiles.

## Methods

For the purpose of this paper, however, the methods were limited to assessing and reflecting on the level and nature of capacity built (for both research and intervention) as indicators of the process and contextual influences on intervention success. In doing so, we were guided by assumptions of community-based participatory research (CBPR). CBPR integrates research with community capacity-building to bridge knowledge development and health promotion practice in communities, and is well suited to "upstream" interventions with emphasis on policy and environmental change (Viswanathan et al. 2004) To structure our assessment, we used a validated and reliable capacity-building tool (Maclellan-Wright et al. 2007). The instrument covers 9 capacity domains and contains 26 items. The nine capacity domains assessed were defined as follows:

1. *Participation* "the active involvement of people in improving their own and their community's health and well-being".
2. *Leadership* "developing and nurturing both formal and informal local leaders during a project".
3. *Community structures* "smaller and less formal community groups and committees that foster belonging and give the community a chance to express views and exchange information".
4. *External support/funding bodies* The CBT identifies external support of funding and technical expertise as essential for initiating community momentum.
5. *Asking why?* "a community process that uncovers the root causes of community health issues and promotes solutions".
6. *Obtaining resources* "finding time, money, leadership, volunteers, information and facilities both from inside and outside the community".
7. *Skills, knowledge and learning* "qualities in the project team, the target population, and the community that the project team uses and develops".
8. *Linking with others* "creating partnerships or linking with networks and coalitions".
9. *Sense of community* "fostered through building trust with others".

As part of our community-level evaluation, community coordinators completed capacity-building tools for each community-driven intervention. In keeping with the methodology for assessing changes in community capacity over the course of interventions within each of the communities, the HAC project team (authors) used the same validated capacity-building tool (Maclellan-Wright et al. 2007) for the overall HAC initiative to facilitate a process of reflection on the successes and challenges of implementing and evaluating community-based interventions for obesity and chronic disease prevention. Project team members most closely involved with the establishment and implementation of the HAC initiative completed the capacity-building tool together, and invited discussion, debate and reflection from other members of the project team at team meetings and in preparation of this manuscript. Although this process was participatory within the research team, and reflections spanned a time frame of over 3 years of work in planning, implementing and evaluating the HAC project, we recognize the process of reflection may not have been inclusive of all perspectives of the multiple partners involved. It does, however, provide a rich description of the process of engaging in a complex

community–university–government partnership to address important health issues from the perspective of applied public health researchers, and provides a context for others embarking upon a similar journey.

## Results

The consensus of the HAC project team's (authors) assessment and reflections on the value, processes and context of our community-based population health intervention and evaluation are as follows. Results are organized according to the nine domains of capacity captured by the community building tool.

### Participation

At HAC's inception, we immediately contacted relevant stakeholders to participate. We recruited researchers to expand our disciplinary and methodological expertise, representatives of organizations active in promoting health and preventing disease, and community-level stakeholders with interest in promoting wellness locally. Engaging some partners was relatively easy; relationships built over time were fundamental to initial momentum. Years of working together had developed levels of trust and confidence in the ability to work together. The challenge was in nurturing relationships with stakeholders without a history of working in community-based health promotion, primarily at the local level. The relationship building phase required a significant investment in time on the part of the project team but enabled project stakeholders to appreciate the relevance of the project. In some cases, relevant organizations preferred to take a more passive role; maintaining open communication so we were informed of each others' activities while continuing business as usual in day-to-day activities. In other cases, community coordinators were instrumental in nurturing participation through their established networks. We developed a variety of strategies (websites, local presentations, news items) for keeping stakeholders informed. In other cases, particularly with governmental agencies and researchers, relationships developed into productive partnerships. For example, our work in training and developing the work of community coordinators was adopted by one government partner as a model for training newly established public service positions of health promotion facilitators. Throughout the duration of HAC, the health promotion facilitators and community coordinators worked closely together in each community. From a researcher perspective, finding a balance between investing precious time and resources in community-level evaluation and more widely accepted traditional health outcomes data posed challenges both in terms of maintaining coherent disciplinary perspectives and of upholding accountability to government funders. Interest in participation by members of the research team waxed and waned depending upon the stage of the project and the compatibility of the research stage with academic and practice interests.

### Leadership

Defining roles and responsibilities of the multiple participants was challenging and the subject of ongoing negotiation. Finding a balance between prescribing set tasks and allowing for emergent leadership qualities put our commitment to participatory principles to the test. Typically, team members and community partners sought more direction near the beginning of the project, but were grateful for the flexibility to adapt as complex relationships developed and comfort with diverse situations increased. Community coordinators participated in joint formal learning opportunities developed and led by HAC staff several times each year, which nurtured leadership qualities. The research process provided an opportunity for mentoring graduate students, both in developing unique research projects within the HAC project, and in assisting with intervention development and data collection and analysis. Senior researchers were presented with opportunities to work in close partnership with policy decision-makers. Although diverse perspectives provided some initial communication challenges, these close relationships promoted joint decision-making through a collaborative knowledge translation and exchange process.

### Community structures

In all of the communities, links were readily established with existing community groups; this was primarily facilitated through the introduction of a local community coordinator whose presence also facilitated communication and activity between existing organizations. For example, in one community many organizations expressed interest and commitment to reducing food insecurity, but were not working together. HAC facilitated coordination of efforts. In all communities, following the priority setting exercise of the ANGELO workshops, new steering committees were coordinated by community coordinators, connecting local groups in new ways. Within a research context, we experimented with a variety of structures to facilitate the research process. This included sub-groups of researchers with distinct expertise and interests supported by core staff to achieve discrete tasks (such as developing and validating measurement instruments or choosing data analysis strategies), and interdisciplinary teams with a goal of procuring infrastructure funding to advance knowledge development

relevant to community-based obesity and chronic disease prevention.

External support/funding bodies

The initial funding from the provincial ministry was instrumental in getting the project started. Without this investment which enabled the hiring of key staff centrally and in communities, the project would not have developed with the momentum we observed, if at all. The ongoing commitment of the ministry (e.g. representation on the advisory committee) represented significant external support. Situating the project within an academic unit also maximized research and evaluation resources. We quickly realized that the project provided a unique platform for additional community and research activity. As opportunities arose for additional program investment, we applied for funding for community projects, as well as for supplemental research funding. While the bulk of the initial research budget was consumed by health outcome assessment, we sought additional funding to enable a more comprehensive evaluation of community-level change. With a working project infrastructure we were able to lever significant funding. This allowed us to meet our expectations and remain accountable to our assessment of health outcomes, in addition to simultaneously developing novel evaluation strategies that could help us to understand the context of how change progressed as well as conditions for success.

Asking why?

In HAC, the use of the ANGELO workshops contributed to exploring root causes, as we systematically reviewed the physical, economic, socio-cultural and political environments as sources of health issues and set priorities for action. Perhaps the biggest challenge was to acknowledge where we had inadequate resources (time or money) to address the broad determinants of health identified. While we recognized that the communities could be sites for initiating advocacy for broader policy change, we did not have the skills, resources, or staff to actively pursue all opportunities for change uncovered by our exploration.

Obtaining resources

In all communities, we were able to effectively integrate into community structures and share resources. For example, we were able to coordinate office space use with local organizations, use existing meeting space, and collaborate with local health practitioners. Mobilization of volunteers was also facilitated by the presence of local community coordinators. Within the university, we were able to expand the network of researchers interested in building on the HAC platform to pursue unique research questions. For example, we had not anticipated conducting an economic evaluation of the program, but when one of the investigator's students showed interest, we recruited a health economist to become a member of the research team. By building a collaborative and productive research environment, we were also successful in levering scholarship money for trainees who became important contributors of human and intellectual resources to the project.

Skills, knowledge and learning

Establishing an interdisciplinary and intersectoral project team and advisory committee enabled us to take full advantage of a wide array of expertise and skills. As the team consolidated, members generously offered their time and skills in meetings and workshops to facilitate the learning of the rest of the team. Community coordinators were provided with multiple formal and informal opportunities for learning. The target communities were given a variety of opportunities for learning through HAC-initiated workshops, particularly the ANGELO workshops. The project became a valuable training environment for students and junior researchers.

Linking with others

HAC became a member of the Alberta Healthy Living Network; and as such, was able to inform and influence the work of over 80 organizations throughout the province. Reciprocally, HAC was able to benefit from a vast, integrated communications network, and from the expertise of multiple partners. At the community level, HAC was often the catalyst that helped to knit together the excellent, but sometimes uncoordinated, grassroots health promotion activities. As researchers, through our international advisory board and through hosting an international satellite conference on community-based approaches to promoting healthy weights in 2008, HAC researchers became members of a broader community with similar interests in advancing theory and practice.

Sense of community

In all HAC communities, the linkages made, investment of human and financial resources, and opportunities to collectively reflect on the root causes of chronic diseases fostered a sense of community. Although the economically disadvantaged inner-city neighbourhood HAC site was expected to pose the greatest challenge to developing a sense of community, we observed evidence of community building associated with HAC. For example, soon after

starting our work in the community we realized that other organizations shared our goals. Rather than compete for scarce resources, we partnered with a local community-based health organization and a local high school with an arts-based curriculum to produce a video on community-driven change. The high school attracts students throughout the city, many of whom know little about the community in which their school is located. Their project not only produced a video that we could use to tell the story of community-based capacity-building for promoting health, but the students proposed a video production project to engage local young children in understanding and improving their own community. This has become an independent project led by the school. As for us researchers, as HAC became a platform for spin-off projects, our interdisciplinary community grew and blossomed. For example, a geographer on the team was able to lever the relationships built in communities to negotiate participatory research investigating the role of the built environment on obesity. Later, a research project grew out of the recognized need for advocacy to address broader policies influencing community health but beyond community control.

## Discussion

Healthy Alberta Communities was conceived as a public health strategy to promote healthy weights and prevent chronic diseases, with a systematic focus on supporting healthy living among individuals by creating opportunities for social and environmental change within diverse communities. We assumed that efficacious interventions are more likely to result in effective programs and policy if they consider both individual and contextual determinants of behaviour and health (Glasgow et al. 1999). HAC's predominant focus for intervention was changing environments, with a particular emphasis on the community level of the ecological model (McLeroy et al. 1988). We sought to fill an evidence gap about the practice of changing environments to promote health (Kumanyika 2007); in doing so, we applied principles of population health intervention research (Hawe and Potvin 2009).

This paper described the history, development, implementation strategy and evaluation framework for a community-based population health intervention program, and reflected upon the capacity built within the target communities and project team. This reflection contributes to the theory (in particular, the operationalization of ecological models for intervention and evaluation), and the challenges in expanding the evidence base in obesity and chronic disease prevention.

The strength of the community-level focus of the ecological model for intervention was in providing an opportunity for community participation in setting the direction of prevention activity by capturing the knowledge, experience and expertise of citizens, community agencies and elected leaders. Community partnerships developed into self-sustaining projects that influenced local citizens (such as community gardens). The legacy of HAC is that even though community intervention funding is no longer in place, many of the initiatives developed with the catalyst of HAC funding are still operating under community leadership. Perhaps as a testament to the strength of the ecological model, communities also realized that there were limits to what could be accomplished at the local level. In all communities, the need to address broader policy issues—whether the need for adequate income support to promote food security, or the need to develop policies to create a built environment supportive of active transportation—were acknowledged as boundaries placed on social change.

The collaborative, participatory process required a significant "up front" time investment that posed challenges to maintaining accountability to funders (meeting timelines was a recurring issue), interest of potential community partners (planning and collaborating frustrated those eager to start), and energy levels of program staff who negotiated relationships among the diverse partners. However, the return on that early time investment contributed to project sustainability described above.

Regarding research design, there was a disconnect between meeting the evidence expectations of funders, and ensuring application of an evaluation strategy that was harmonious with the intent of the intervention. From the beginning, traditional health outcomes surveillance for evaluation of effectiveness was expected. Although our long-term goal was to change health outcomes for which surveillance would have been appropriate for assessing intervention impact, we were concerned that health outcomes indicators may not be sufficiently sensitive to capture changes in environments that drive incremental improvements of health status over short periods of time. In addition, the interventions focused on changing community environments, yet surveillance measured individual-level indicators of behaviour and health status. Working in partnership with funders to negotiate an expanded evaluation design in order to capture community-level change advanced methodological innovation, while maintaining a commitment to monitoring impact on the ultimate goal; reducing obesity and chronic disease risk. Developing novel community evaluation strategies to capture complexity of change in social context can help to advance understanding of how transforming environments affects health before outcomes data demonstrate change. However, one disadvantage of our multi-level and layered evaluation framework is associated with an increase in

cost, both in terms of time and money. In conclusion, the sense of urgency for social change to promote health and prevent chronic diseases has led to implementing programs and policies in the absence of evidence or with inadequate evaluation planned. Rather than stifle momentum, we recommend that researchers work closely with practitioners and policy makers to intervene based upon best available evidence. Although the participatory process of building a research and intervention infrastructure in tandem usually falls outside of the scope of traditional funding agencies, the value of a partnership approach to research in population health interventions is a major contribution and impetus for change that reflecting upon our experience provides.

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