

Primary Prevention of Type 2 Diabetes: Experiences of 2 Aboriginal Communities in Canada

Ann C. Macaulay^{1,2} MD, Stewart B. Harris³ MD, Lucie Lévesque⁴ PhD, Margaret Cargo⁵ PhD, Elizabeth Ford¹ MA, Jon Salsberg¹ MA, Alex McComber¹ MEd, Rod Fiddler⁶, Rhonda Kirby¹ BA, Anthony J.G. Hanley⁷ PhD, Louise Potvin⁸ PhD, Bernard Zinman⁷ MD, Joel Gittelsohn⁹ PhD, Kathryn Phillips¹⁰ BA, Olivier Receveur¹¹ PhD

¹Kahnawake Schools Diabetes Prevention Project (KSDPP) Center for Research and Training, Kahnawake, Quebec, Canada

²Department of Family Medicine, McGill University, Montreal, Quebec, Canada

³Centre for Studies in Family Medicine, University of Western Ontario, London, Ontario, Canada

⁴School of Physical and Health Education, Queen's University, Kingston, Ontario, Canada

⁵Centre de recherche, Centre hospitalier de l'Université de Montréal (CHUM), Montreal, Quebec, Canada

⁶Sandy Lake Health and Diabetes Project (SLHDP), Sandy Lake, Ontario, Canada

⁷Samuel Lunenfeld Research Institute, Mount Sinai Hospital, Toronto, Ontario, Canada

⁸Department of Social and Preventive Medicine, Groupe de recherche interdisciplinaire en santé, Université de Montréal, Montreal, Quebec, Canada

⁹Department of International Health, Johns Hopkins Bloomberg School of Public Health, Johns Hopkins University, Baltimore, Maryland, United States

¹⁰School of Public Health, University of Michigan, Ann Arbor, Michigan, United States

¹¹Faculté de médecine, Département de nutrition, Université de Montréal, Montreal, Quebec, Canada

ABSTRACT

In Canada, the national age-adjusted rate of type 2 diabetes mellitus in Aboriginal peoples is 3 to 5 times higher than in the general population. There is an urgent need for culturally appropriate community-based primary prevention programs to reduce this epidemic. This paper describes the similarities and differences in design, intervention and evaluation between 2 successful and ongoing primary diabetes prevention projects in Canada: in the Kanien'kehá:ka (Mohawk) community of Kahnawake, geographically close to Montreal, Quebec, and in the isolated Oji-Cree community of Ne gaaw saga'igan (Sandy Lake) in Northwestern Ontario. The 2 projects have recently initiated a collaboration with the goals of elucidating their successes, developing a comprehensive picture of 'best practice' sites and developing methods to measure intervention activities and incorporation of local

RÉSUMÉ

Au Canada, la fréquence nationale ajustée selon l'âge du diabète sucré de type 2 chez les Autochtones est de 3 à 5 fois plus élevée que dans la population générale. Il existe un besoin urgent de programmes de prévention primaire communautaires adaptés à la culture pour freiner cette épidémie. Ce compte rendu décrit les similitudes et les différences des points de vue de la conception, de l'intervention et de l'évaluation entre deux projets canadiens valables de prévention primaire du diabète présentement en cours : un dans la communauté de Kanien'kehá:ka (Mohawk), située près de Montréal (Québec), et l'autre dans la communauté oji-cri isolée de Ne gaaw saga'igan (Sandy Lake) du nord-ouest de l'Ontario. Les deux groupes ont récemment uni leurs efforts dans le but d'expliquer leurs réussites, d'élaborer une description détaillée des «meilleures pratiques» et de choisir des méthodes d'évaluation des interventions et d'incorporation des traditions locales. Les données qui seront recueillies serviront à améliorer les mesures de prévention et à mettre sur pied des programmes de prévention du diabète dans d'autres communautés autochtones.

Address for correspondence:

Ann C. Macaulay
Kahnawake Schools Diabetes Prevention Project (KSDPP)
Center for Research and Training
P.O. Box 989, Kahnawake Education Centre (2nd floor)
Kahnawake Territory, Kanien'kehá:ka (Mohawk) Nation,
Quebec
J0L 1B0 Canada
Telephone: (450) 635-4374
Fax: (450) 635-7279
E-mail: ann.macaulay@mcgill.ca

traditions. This knowledge will be used to inform local prevention practices and to partner with other Aboriginal communities for future diabetes prevention programs.

INTRODUCTION

There is an urgent need for the development and implementation of culturally appropriate community-based diabetes mellitus primary prevention projects to reduce the epidemic of type 2 diabetes in Aboriginal peoples (1). In Canada, the national age-adjusted rate of type 2 diabetes in Aboriginal peoples is 3 to 5 times higher than in the general population (2-4), with high rates of complications, a younger average age of onset and the emergence of type 2 diabetes in young children (5,6).

Type 2 diabetes in this population is a complex disease of mixed etiology, including genetic factors of Aboriginal ancestry and family history, combined with patterns of contemporary living (7,8). Diabetes is considered to be indicative of the negative sociocultural changes and acculturation experienced by Aboriginal peoples (9,10). Under these circumstances, it appears that the genetic susceptibility for diabetes is interacting with the environmental stressors of changing nutrition and a sedentary lifestyle, resulting in increased obesity.

Primary prevention is defined as the prevention of a disease by targeting or controlling modifiable risk factors (11). For primary prevention of diabetes, the recommended approach is to address the modifiable risk factors of obesity, physical inactivity, unhealthy eating habits and stress (10,12). Diabetes prevention strategies, focussing on populations of high-risk individuals with impaired glucose tolerance (IGT), have documented a positive relationship between lifestyle modification and the reduced incidence of diabetes (13-15). However, intervening with communities through population-based approaches and community mobilization to increase health benefits in the entire population may provide greater benefit in the long term (16), and is relevant for the primary prevention of type 2 diabetes (17-20). Moreover, this health promotion approach is congruent with the worldview of Aboriginal communities in Canada, where health is viewed holistically (21,22).

Community interventions include promoting ecological changes in the social and physical environments to support healthy lifestyles (23,24). It is also critically important to incorporate local social and cultural components into both the process of program decision making and specific intervention activities (25-27). Challenges to implementation and sustainability of community-based health promotion projects include the length of time required to document change, difficulties associated with acquiring long-term funding and the effort needed to establish and maintain collaborative relationships between the community and researchers (20). Several diabetes primary prevention programs implemented in Aboriginal communities have focussed on high-risk groups and entire communities (27-33).

This paper describes 2 successful ongoing diabetes primary prevention projects using a population-based approach in 2 very different Aboriginal communities in Canada: the Kahnawake Schools Diabetes Prevention Project (KSDPP) in the Kanien'kehá:ka (Mohawk) community of Kahnawake, which is close to Montreal, Quebec, and the Sandy Lake Health and Diabetes Project (SLHDP) in the isolated Ojibwe community of Sandy Lake in Northwestern Ontario. The aims are to outline the communities, together with the commonalities and differences of the community-researcher partnerships, the intervention programs and evaluation designs, and to describe plans for future joint collaboration.

METHOD

Information was gathered by reviewing all publications from both projects (KSDPP and SLHDP) and choosing those appropriate for the topic, by reviewing unpublished data and the published and unpublished documented history of both projects, and through discussions with members from both teams, including academic and community researchers, and community members.

DESCRIPTION OF COMMUNITIES

Kahnawake

Kahnawake is a Kanien'kehá:ka (Mohawk) community of 7200 inhabitants (in 2002) 15 km from Montreal, Quebec. Traditionally, foods were gathered through agriculture, fishing and hunting. In the late 19th century, agricultural and trading practices were gradually replaced as men became involved in the structural steel industry. By the 1950s, farming, local fishing and food gathering virtually disappeared due to appropriation of community lands. Today, men continue to work in construction, with an increase of men and women in local white-collar careers stimulated by community development. While the Mohawk Council of Kahnawake is the federally recognized government of the community, traditional government through the longhouse system is still strong. Community strengths include decentralization of power with control of education services (since 1967), health services (since 1970), youth recreation (since 1972), social and community services (since 1972) through locally elected boards of directors endorsed by the Mohawk Council of Kahnawake, and local economic development services initiated in the 1990s. The economic sector includes a variety of community-owned small businesses, including grocery stores. Kahnawake established a diabetes education team in the mid-1980s (34).

In the 1980s, physicians (including author A.C.M.) documented a high prevalence of diabetes and its complications in

Kahnawake (35,36). This resulted in elders requesting that “something be done” for the young children to save them from carrying the same burden of disease (37). Community-based health and education professionals invited academic researchers to join the research team. In 1994, KSDPP began as a 3-year pilot project (38). In this participatory research project, Kahnawake is represented by a Community Advisory Board of volunteers from multiple sectors of the community, who actively participate in all aspects of the project, from design through implementation, data interpretation and dissemination of results. This community-researcher partnership is reinforced through the KSDPP Code of Research Ethics, which was jointly developed at the beginning of the project (39). Health promotion in the elementary schools centres on the implementation of a health education program delivered by teachers in English and Mohawk, extracurricular activities and the schools’ healthy nutrition policy. The school interventions are supported by numerous multifaceted, community-wide programs involving families and peer groups to promote healthy lifestyles and reinforce the messages delivered in school. Resulting environmental changes include a new recreation path, with plans for extension. The original evaluation focussed on children in grades 1 to 6, while process evaluation documented changes in the school and community (40). The project has since evolved by increasing both the reach and intensity of healthy living interventions. Partnerships with local organizations, such as the youth centre and community media, have broadened to include local businesses (e.g. a computer software company). In addition to the core elementary school program, KSDPP is expanding to include preschool children and is engaging adolescents in youth empowerment projects. Finally, there is continuous momentum in active participation of community members involved in diverse activities ranging from research to supporting interventions. In 2001, the original partnership of Kahnawake, McGill University and Université de Montréal, together with community support, secured funding from the Canadian Institutes of Health Research (CIHR) to develop the KSDPP Center for Research and Training in Diabetes Prevention. The goals for 2001 to 2006 are to: a) complete 10 years of evaluation in Kahnawake; b) research how the KSDPP model is adapted by other Aboriginal communities; and c) offer academic and Aboriginal community researcher training.

Sandy Lake

Sandy Lake (Ne gaaw saga’igan), Ontario, is located about 2000 km northwest of Toronto, Ontario, in the subarctic boreal forest region of Central Canada. Approximately 2050 Oji-Cree live in this isolated community, which is accessible only by air for >10 months of the year. Historically, the people of this region led a hunter-gatherer lifestyle in small, extended family groups typical of other subarctic peoples. Their nomadic lifestyle was extremely physically active, and their diet was high in protein from wild meats, with seasonal

supplementations from berries and roots. With the development of Aboriginal reserves and residential school systems, the traditional lifestyle eroded and a welfare economy emerged with its accompanying social consequences. Notably, the primary source of food changed from wildlife to the Northern Store, a modern descendent of the Hudson’s Bay Company. Healthcare is delivered at a federally operated nursing station staffed by 6 outpost nurses with special training.

In 1991, the Sandy Lake Chief and Band Council approached the Medical Director (author S.B.H.) of Sioux Lookout Zone, Sioux Lookout, Ontario, with the goal of developing a partnership in order to better understand the etiology and effect of diabetes and to help reduce the increasing epidemic of type 2 diabetes. The partnership is built on a shared commitment to long-term solutions and the acknowledgement that each partner contributes unique and critical strengths. The Band Council and researchers collectively agree on all aspects of planning, implementation and evaluation of the intervention program, and the surveys to document diabetes prevalence and incidence, associated risk factors and complications. All research results are shared, and their implications for intervention are discussed with the community prior to publication.

In 1992, baseline information and ethnographic data on health beliefs and attitudes, perceptions of food and physical activity, and notions of disease causation were used extensively in the development and refinement of a comprehensive 3-pronged intervention program: community-wide education, including the home visit program, and the school-based and Northern Store interventions (41-47). The community intervention program focusses on education about modifiable risk factors for prevention and control of diabetes using a variety of media, including a weekly radio show, presentations at community events and on cable television, a community walking program and a home visit education program. The home visit program, developed using the baseline ethnographic results, consisted of 5 visits. Each visit focussed on a particular topic and included specifically targeted cooking demonstrations, taste tests, printed educational material and a human physiology kit to describe basic human physiology as it relates to diabetes. At the Northern Store, SLHDP worked with an existing health education project to develop bilingual labels for healthy food choices, ensure that lower fat, sugar-free alternatives were available and provided store tours for developing label-reading skills. SLHDP is conducting a long-term evaluation of this intervention by analyzing 5 years of sales records from the Northern Store. The cornerstone of the school-based intervention is the culturally appropriate curriculum for grades 3 to 5. This is complemented by family, peer and environmental interventions. A pre- and post-impact evaluation was included in the first year of the school-based program.

In 2001, the SLHDP research partnership secured CIHR funding to conduct a study on the prevalence of diabetes

complications and associated metabolic, lifestyle and genetic factors among individuals with diabetes and IGT.

DISCUSSION

These 2 innovative community-based diabetes prevention projects reveal several commonalities among several points of divergence. The authors believe that the longevity of both projects has resulted from several factors. Significantly, both projects share the philosophy of health promotion as (48): “the process of enabling people and communities to take control over their health and its determinants.” Table 1 highlights the principles of community-based participatory research, in which researchers and the community have collaborated

throughout the research process for shared decision making, from planning interventions, collecting the data, interpreting the data and dissemination of the results, and where both partnerships are strengthened by written or verbal research agreements (37,39,49,50). In Sandy Lake, this partnership was established with the Chief and Band Council, in contrast to the decentralized government of Kahnawake, where the community is represented through the KSDPP Community Advisory Board. In keeping with the prevailing ethic of respecting communities (51), both projects exemplify research *with* communities, not research *on* or *about* communities.

Other factors contributing to project sustainability are included in Table 2, which outlines the complex, multilayered,

Table 1. Community-researcher partnership: commonalities and differences between the KSDPP and the SLHDP

Commonalities	Differences	
	KSDPP	SLHDP
Community leadership approached local physician(s) to develop diabetes primary prevention projects (37)		
Adopted principles of participatory research with community-researcher partnership	Partnership between independent Community Advisory Board and researchers	Partnership between Chief, Band Council and researchers
a) Developed written ethical agreements b) Agreement that all results would be shared with the community before external dissemination	Code of Research Ethics outlines obligations of academic researchers, community researchers and the community throughout the research process. Allows for dissent at publication (39)	Written research ethics agreement between community and researchers deals exclusively with genetic testing for etiology of diabetes
Partnerships have existed for >10 years		
Multidisciplinary research teams	Academic researchers from Departments of Family Medicine, Epidemiology, Biostatistics and Community Health, Social Science and Preventive Medicine, Nutrition, and Physical Education and Health	Academic researchers from Departments of Family Medicine, Endocrinology and Metabolism, Epidemiology, Public Health, Health Education, Nutrition and Genetics
Designed and funded as research projects	Funded by NHRDP, CIHR, SSHRC, CDA, community of Kahnawake, Aboriginal Diabetes Initiative (Health Canada) and private foundations	Funded by NIH, CIHR, CDA, Ontario Ministry of Health and Long-term Care, Sandy Lake First Nations and Aboriginal Diabetes Initiative (Health Canada). Kraft, Eli Lilly and GlaxoSmithKline provided unrestricted grants for intervention programs with evaluation
Wide dissemination of results to Aboriginal and scientific audiences		

CDA = Canadian Diabetes Association

CIHR = Canadian Institutes of Health Research

KSDPP = Kahnawake Schools Diabetes Prevention Project

NHRDP = National Health Research Development Program

NIH = National Institutes of Health

SLHDP = Sandy Lake Health and Diabetes Project

SSHRC = Social Sciences and Humanities Research Council of Canada

multistrategy interventions that combine interventions in the elementary schools and community, involving many settings, organizations and partners (34,38,41-47). Both interventions aim to (52): “reach the whole community and everyone in it.” This is in contrast to small-scale programs that seek to effect change in a subgroup and are often developed without significant evaluation (53). The KSDPP and SLHDP projects recognize the community as the unit of identity, emphasize building on pre-existing strengths, promote co-learning and empowerment, involve an iterative process, and disseminate findings and knowledge both internally and externally, as recommended by other authors (54,55). Other commonalities include the baseline assessments, which increased community knowledge; community leadership, who asked local physicians for assistance; and local researchers, who invited academic experts to join the community-based research teams. Most importantly, the Aboriginal leadership and grassroots support of these projects demonstrate adaptability to different sources of funding, available expertise and evolving community requests. Both projects include community members in key positions, which helps to develop trust and ensure incorporation of local traditions and values, and promotes empowerment, capacity building, sustainability and community ‘ownership’ (56,57).

One difference between the 2 projects’ interventions is the SLHDP home visit program, facilitated by the smaller community size in Sandy Lake. As well, SLHDP has been able to successfully implement food services interventions in the Sandy Lake Northern Store—a grocery store owned by outside interests. Similar food services interventions in Kahnawake, where stores are owned by community members, will require a strategy that would not interfere with the ability of community members to earn their livelihood.

Table 3 highlights the numerous differences in the methods of evaluation between the 2 projects (38,39,43-46,50,51, 57-64). SLHDP began with extensive ethnographic and epidemiologic evaluations of community members >10 years of age (41-44). This included blood sampling, which has yielded new genetic information and substantial epidemiologic knowledge about type 2 diabetes and the associated cardiovascular risk factors in Aboriginal peoples (44,45,47,62,65-68). SLHDP is now following both children and adults to determine the impact of the intervention program. In contrast, KSDPP did not conduct blood testing and followed elementary school children in grades 1 to 6 (with multiyear, cross-sectional and longitudinal evaluation of fitness, nutrition, physical activity and anthropometrics [58,59,69]), in addition to monitoring activity implementation (63) and evaluating the evolution of the community-researcher partnership (57). Other strengths of KSDPP include the development of a new interactive computer tool to evaluate children’s involvement in physical activity, the finding of a significant relationship between television viewing and adiposity in females in grades 1 to 6 (70), undertaking a youth empowerment

research project, and applying qualitative methods to evaluate both program trajectory and implementation of intervention activities (63,64). The differences in the focus of the evaluations, as well as differing levels of evaluation (i.e. process, impact, outcome), can in part be explained by the diverse interests and skills of the investigative teams, different funding opportunities and the support and interest of community members and local leadership.

What constitutes success in community-based health promotion? Long term, both KSDPP and SLHDP are hoping to achieve a reduction in both the incidence and prevalence of diabetes. However, evaluations that use only health outcomes as the primary measure of program success risk missing the more sensitive, but important, program impact effects (71). Although many authors have discussed multifaceted evaluation methodologies (71-76), research on what actually defines success in community-based health promotion is limited. Many authors agree that evaluation of a project’s success should begin with measures of sustainability, effectiveness in terms of individual indicators of empowerment, skill development, self-efficacy and participation, and program reach (71-77). Other key indicators of program success are community capacity building and the collective empowerment to tackle other health issues (76), multilevel facilitation of dialogue, networking with other community organizations, the appropriate use of researchers (73) and social mobilization (71), all of which also directly contribute to program sustainability. Positive changes in health literacy (e.g. participation in health promotion activities, increases in knowledge, attitude changes), social mobilization (e.g. increases in community competence and empowerment) and public policy or organizational practice (e.g. institutionalization of health promotion programs, policy changes in reference to health promotion programs) may also be indicative of program success (71). In light of the difficulties with which health promotion evaluation programs are met, Wallerstein urges communities to identify and examine their own “indicators of success” using participatory evaluation models (78). This is expected to lead to evaluation research methodologies that have a ‘natural fit’ with community programs and that are sensitive to proximate and intermediate outcomes.

For KSDPP and SLHDP, there are many early and intermediate indicators for success. Baseline research results have provided communities and researchers with information to disseminate to a wide variety of Aboriginal and scientific audiences and the evidence to acquire ongoing, though sometimes intermittent, funding. Other indicators of the success of both projects are the community development of new, culturally appropriate health curricula for the elementary schools; teacher delivery of the health curricula and support of extracurricular school activities; environmental changes, including a “no-junk-food” policy at both communities’ schools and a “no-smoking” policy in all public buildings in Sandy Lake; the increased understanding among commu-

Table 2. Intervention: commonalities and differences between the KSDPP and the SLHDP		
Commonalities	Differences	
	KSDPP	SLHDP
Overall intervention approach		
Committed to population approach.	KSDPP's focus is primary prevention (pre-existing diabetes education team at community hospital [34]).	SLHDP's main objective is primary prevention. However, the intervention also incorporates messages promoting glycemic control and management of diabetes and its complications.
Interventions in elementary schools supported by community-wide interventions.		
Built on pre-existing community strengths, such as traditions of partnering with other community organizations to address a community-wide concern.	In 1994, the elementary school and community programs started at the same time (38).	In 1996, the community intervention began, and in 1998, the school intervention started.
a) Elementary school intervention		
Elementary school educational programs include culturally appropriate elementary school curricula, designed with community input, which focus on environmental and family aspects to enhance increased knowledge of diabetes and importance of healthy eating and physical activity.	Health education program for grades 1–6 (38).	Curriculum for grades 3–5.
Schools have healthy nutrition policies that ban junk food in the schools and promote healthy alternatives.	Health education program developed by dietitian and 2 community health nurses (1 Kanien'kehá:ka) employed by the community hospital, with input from teachers, KSDPP staff and external curriculum developer.	Curriculum developed by PhD student (health education) and a local Oji-Cree teacher, with regular guidance and input from key elders.
Teachers lead children in extracurricular activities promoting healthy eating and physical activity.	Transfer to school: Dietitian and community nurses piloted the program for the first 2 years in the presence of classroom teachers, then transferred the fully developed program to teachers, who deliver it in English and Kanien'kéha, with support from KSDPP staff.	Transfer to school: Curriculum developer and Aboriginal teaching staff worked together to implement program. Teachers deliver the curriculum.
	Structure of health education program: The health education program provides students with scientific knowledge and skills to make informed decisions regarding their health. The major components are understanding the human body, diabetes facts, lifestyle, fitness and nutrition. Each grade receives 10 45-minute lessons per year. The lessons are based on traditional learning styles, using practical experiences, and interactive and cooperative learning techniques.	Structure of curriculum: The school curriculum is based on social cognitive theory, Aboriginal learning styles and an ecological model of health promotion, and is accompanied by narratives written for the program.

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Commonalities	Differences	
	KSDPP	SLHDP
b) Community intervention		
Use of local radio and newspapers for educational messages and advertising activities.		Uses community television.
Interventions aim to reach the entire community. Focus is on the family, with promotion of knowledge about healthy eating, physical activity, and positive attitude, and organization of community events to allow people to participate in healthy lifestyle activities during different seasons (e.g. food sampling, cooking classes, walking trails).	Community interventions were based on Bandura's Social Learning Theory, Ottawa Charter of Health Promotion and Precede-Proceed Model, all modified based on Aboriginal learning styles and community traditions (38).	SLHDP incorporated baseline results from epidemiologic and ethnographic research into the development and evaluation of the intervention (41-47).
Partnership with other community organizations build on pre-existing strengths.	1994–present: More than 100 different interventions targeting individuals of all ages, families, organizations, and political groups, many in partnership with other community organizations, aim to promote healthy eating and physical activity and provide fun events for individual and family participation. Additional activities include pricing for healthy food baskets, label reading and cooking classes.	1996: Delivered complete home visit education program to 115 individuals. 1996–present: Interventions at the Northern Store include Oji-Cree/English labelling, ensuring availability of lower-fat, sugar-free alternatives and store events to increase label-reading skills. A wide variety of intervention activities, some offered in partnership with other community organizations, focussing on low-fat, high-fibre diets, increasing physical activity and the effective management of diabetes and its complications.
Intervention staff are from communities, which ensures inclusion of local traditions and culture in decision making and implementation of activities.	Intervention staff were formerly teachers.	

KSDPP = Kahnawake Schools Diabetes Prevention Project

SLHDP = Sandy Lake Health and Diabetes Project

nity members of the link between lifestyle and disease; job creation; capacity building at many levels, including Aboriginal community researcher training and Aboriginal summer student internships; positive ecological changes to support healthy lifestyles through new recreation paths and healthy nutrition policies (40); an ability to attract continued funding after 10 and 12 years for KSDPP and SLHDP, respectively; and requests for program continuation in both communities. In addition, both projects have provided critical academic training in Aboriginal health research for Aboriginal and non-Aboriginal students of all levels, from undergraduate to postdoctoral fellowship. Programs like KSDPP and SLHDP have a broad impact on community life. Both projects have demonstrated early promising results in the lifestyle changes of improved nutrition and increased physical activity (currently under review) (59-61). It is impor-

tant to note that the effect sizes for intermediary outcomes will be statistically small given the size of the communities, the multiplicity of health determinants and measurement variability. However, their impact on public health can be large in terms of reduction of disease burden (16,79). These challenges in evaluation of endpoints will always exist in communities of small size, but, ideally, communities will eventually be able to pool their results to achieve greater numbers for improved statistical significance.

To better understand health promotion within Aboriginal communities, KSDPP and SLHDP have recently initiated a collaboration to jointly evaluate their programs and attempt to elucidate reasons for the current longevity and community support for project continuation in both Kahnawake and Sandy Lake. The teams are developing assessment methods to jointly and prospectively document the use of local traditions

Table 3. Evaluation of impact, outcomes and process changes: commonalities and differences between the KSDPP and the SLHDP		
Commonalities	Differences	
	KSDPP	SLHDP
<i>a) Elementary school evaluation</i>	Evaluation design: 1994–1999: Grades 1–6 combined cohort/cross-sectional data collection. Data collection resumed fall 2002.	Evaluation design: Fall 1998 to spring 1999: Grades 2–5 conducted baseline and post-intervention data collections.
Evaluation of anthropometric measurements and lifestyle habits	Outcome measures for children, grades 1–6: <ul style="list-style-type: none"> • Anthropometric measurements: weight, height, waist and hip circumferences, triceps and subscapular skinfolds. • Questionnaire on knowledge, self-efficacy and perceived parental support; questionnaires for 7-day recall of eating habits, physical activity and television/video; and fitness testing with a mile or half-mile run or walk (38,58–60). 	Outcome measures for children, grades 2–5: <ul style="list-style-type: none"> • Height, weight, estimate of percentage of body fat, lean body mass and bioelectrical impedance (all with TBF-305 Body Fat Analyzer, Tanita, Arlington Heights, Illinois, US), 24-hour food recall, food diaries, health knowledge and behaviour questionnaire, 24-hour physical activity recall, weekend and weekday television viewing and video-game playing. • Scales were developed for assessment of dietary knowledge, dietary intent, dietary preference, dietary self-efficacy, behavioural capabilities and perceived support for healthy behaviours from parents, guardians and teachers (43–46).
	In 1994, 1998 and 2002, for grades 4–6: 24-hour nutrition recalls (50,51).	
	In 1998–2000 and 2002, for grades 4–6: Developed, piloted and validated a CD-ROM-based physical activity interactive recall tool.	
Questionnaires to parents	Parent questionnaire: Diabetes status, family history of diabetes, personal lifestyle and support of healthy eating and physical activity of their children.	Parent questionnaire (pre/post design, fall 1998/spring 1999): Usual food purchases, knowledge of foods low in fat, usual television watching, attitudes toward being physically active and making healthy food choices, social support and perceived body image of children, diabetes status (61).

BIA = bio-impedance analyzer

BG = blood glucose

KSDPP = Kahnawake Schools Diabetes Prevention Project

OGTT = oral glucose tolerance test

SLHDP = Sandy Lake Health and Diabetes Project

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Commonalities	Differences	
	KSDPP	SLHDP
b) Community evaluation		
		Baseline prevalence survey (1993–1995): <ul style="list-style-type: none"> • Anthropometric measurements: Assessment of body composition by BIA • Fasting venous samples for BG, lipids, creatinine, urea and genetic analysis • OGTT • Evaluation of individual risk factors • Physical activity instrument (modified for the subarctic) (62)
		Outcome evaluation of home visit program (1996–1997): <ul style="list-style-type: none"> • Height, weight, percentage of body fat and lean body mass (all but height measured with TBF-101 Body Fat Analyzer; Tanita). • Questionnaires administered at 3 time points: pretest, posttest (1 week after visit 3) and follow-up (approximately 6 months later). Questionnaires for Knowledge, Attitudes and Practices and Stages of Change.
		Outcome evaluation of Northern Store (1993–1999): <ul style="list-style-type: none"> • Tracking sales of 'key' food items to determine whether there was an overall trend towards the behaviours recommended by the intervention.
Process evaluation of changes over time	Process evaluation: 1994–2002: Evaluation of evolution of project over time 1996–1999: Evaluation of evolution of community-researcher partnership over time (57) 1996: Community telephone survey of 5% of homes to assess awareness of and agreement with objectives of KSDPP (39) 1996–1997: Evaluation of KSDPP partnerships with other community organizations for promoting physical activity involvement 1998–2001: Mohawk youth against diabetes youth empowerment project 2002: Evaluation of development of intervention activities (63,64)	Process evaluation: 1996–present: Random weekly questionnaires to assess listenership of the Diabetes Radio Show. Number of calls to radio show and age of callers to Youth Radio Show are recorded. Basic demographics of 'samplers' and response to current recipe are evaluated during monthly food demonstrations.

in the development and implementation of interventions, and to evaluate the quality of activity implementation and the ongoing evolution of community mobilization and partnerships with other organizations. Particular attention will be focussed on documenting the quality of intervention activities, the incorporation of local traditions into intervention activities, communication information (audio, visual, print), skill development (personal empowerment workshops, cooking demonstrations), improvement in physical resources (recreation path, food availability) and, most importantly, community mobilization through the roles of employees, volunteers and community organizations.

The goal of the collaboration is to develop a comprehensive picture of 'best practice' sites and to seek to discover if there are common key community characteristics and intervention strategies that support these long-term projects. This knowledge will then be used to identify additional Aboriginal communities and to partner with those communities to design interventions that incorporate the strengths of both KSDPP and SLHDP.

This joint evaluation will contribute to both local and general knowledge by furthering the understanding of "what constitutes success." Such knowledge for the primary prevention of diabetes is essential to both improve existing health promotion initiatives and to reduce the current epidemic of type 2 diabetes in Aboriginal communities.

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