

Underserved Populations

Using a SWOT Analysis to Inform Healthy Eating and Physical Activity Strategies for a Remote First Nations Community in Canada

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Abstract

Purpose. To plan community-driven health promotion strategies based on a strengths, weaknesses, opportunities, and threats (SWOT) analysis of the healthy eating and physical activity patterns of First Nation (FN) youth.

Design. Cross-sectional qualitative and quantitative data used to develop SWOT themes and strategies.

Setting. Remote, subarctic FN community of Fort Albany, Ontario, Canada.

Subjects. Adult ($n = 25$) and youth ($n = 66$, grades 6–11) community members.

Measures. Qualitative data were collected using five focus groups with adults (two focus groups) and youth (three focus groups), seven individual interviews with adults, and an environmental scan of 13 direct observations of events/locations (e.g., the grocery store). Quantitative data on food/physical activity behaviors were collected using a validated Web-based survey with youth.

Analysis. Themes were identified from qualitative and quantitative data and were analyzed and interpreted within a SWOT matrix.

Results. Thirty-two SWOT themes were identified (e.g., accessibility of existing facilities, such as the gymnasium). The SWOT analysis showed how these themes could be combined and transformed into 12 strategies (e.g., expanding and enhancing the school snack/breakfast program) while integrating suggestions from the community.

Conclusion. SWOT analysis was a beneficial tool that facilitated the combination of local data and community ideas in the development of targeted health promotion strategies for the FN community of Fort Albany. (*Am J Health Promot* 2012;26[6]:e159–e170.)

Key Words: Physical Activity, Nutrition, SWOT Analysis, Adolescents, Native Americans, Prevention Research. Manuscript format: research; Research purpose: program development, descriptive; Study design: qualitative, quantitative; Outcome measure: behavioral; Setting: local community; Health focus: nutrition, fitness/physical activity; Strategy: skill building/behavior change; Target population age: youth; Target population circumstances: geographic location, race/ethnicity

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PURPOSE

The health of Aboriginal (defined as Inuit, First Nation[s] [FN], and Métis under the Canadian Constitution¹) children and youth is of great concern. In particular, trends have been increasing for overweight, obesity, and type 2 diabetes among Aboriginal youth. Alarming, the Canadian Community Health Survey Cycle 2.2 estimated that Aboriginal children and youth aged 2 to 17 have significantly higher rates of overweight/obesity (41%) than non-Aboriginal Canadians (26%) in the same age range.² These high rates of obesity have been a contributing factor in the diagnosis of type 2 diabetes, a disease formerly typified by its adult onset, in Aboriginal children as young as 5 to 8 years of age.^{3,4} The rising obesity and type 2 diabetes among Aboriginal youth has primarily been attributed to changing lifestyles, specifically unhealthy diets and low levels of physical activity.⁵ Sedentary activities such as television, watching movies, and video games have taken the place of outdoor recreation and are associated with significantly higher risk of overweight.^{6,7} Traditional foods such as game meat, fish, berries, and plant foods have been replaced by nutrient-poor processed foods, high-fat meals, and added sugars.^{8–10}

Consequently, health promotion interventions targeting obesity and type 2 diabetes in Canadian Aboriginal communities have focused on improving dietary and physical activity behaviors and associated environmental factors.^{4,11–16} Lessons learned from these

interventions are that because of unique aspects of each Aboriginal community, health promotion strategies are more likely to be successful if they are based on local contextual data and incorporate community-specific approaches.^{15,17} Successful approaches used in Aboriginal communities also require cultural appropriateness as well as community-driven participatory assessment, planning, and implementation.^{4,11-18} Although these initiatives show that formative research is imperative for planning targeted comprehensive health promotion programs in Aboriginal communities, the process of developing these targeted interventions from formative information is often not well described or conducted systematically. Aboriginal communities require strategic planning processes that integrate and build community data and input into health promotion strategies that meet community needs.¹⁹

One systematic, strategic planning tool with the potential to achieve this aim is a strengths, weaknesses, opportunities, and threats (SWOT) analysis.²⁰ The purpose of a SWOT analysis is to “gather, analyze, and evaluate information and identify strategic options facing a community, organization or individual at a given time.”²¹ SWOT analysis can be the initial step towards participatory needs assessment²² and assist in focusing activities towards existing strengths of and capitalizing on the most significant opportunities for an organization or community.²³

SWOT analyses were originally intended for use in business and industry, as part of an environmental scan for strategic planning processes.²⁴ SWOT analyses have been used in other disciplines as strategic planning and evaluation tools²⁵ and to set priorities for action²⁶ and evaluate information collected on indigenous knowledge.²¹ Recently, SWOT analyses have been used to examine various aspects of health and health promotion, including community organizational capacity,²⁷ health care curricula and teaching,^{27,28} and health services.²⁹⁻³¹ Toivanen and colleagues³² specifically aimed to determine the applicability of SWOT analysis for measuring the quality of public oral health services. Results were interpreted using both

a conventional analysis and SWOT analysis. They found that the SWOT analysis provided a more structured interpretation and better organization of results, which proved more useful for deciding upon a plan of action for quality improvement.³² Private organizations³³ and the Canadian government³⁴ have recommended conducting SWOT analyses for strategic planning in FN communities. For example, Indian and Northern Affairs Canada developed a comprehensive community planning handbook for FN communities and suggested SWOT analysis as a planning tool that could be applied to a variety of key planning areas, including health.³⁴

Fort Albany FN community members were interested in taking part in a SWOT analysis to determine the health promotion strategies that were the most relevant for Fort Albany youth. Thus, the purpose of this study was to plan community-driven health promotion strategies based on a SWOT analysis of the healthy eating and physical activity patterns of Fort Albany youth. This study was designed to emphasize cultural and community relevance using a participatory approach. A combination of qualitative and quantitative approaches was used to generate local community data and was incorporated, along with community input, into a SWOT analysis. The data presented here were collected as part of a larger study of food and physical activity behaviors of FN youth living in communities along the west coast of James Bay, Ontario.

METHODS

Design

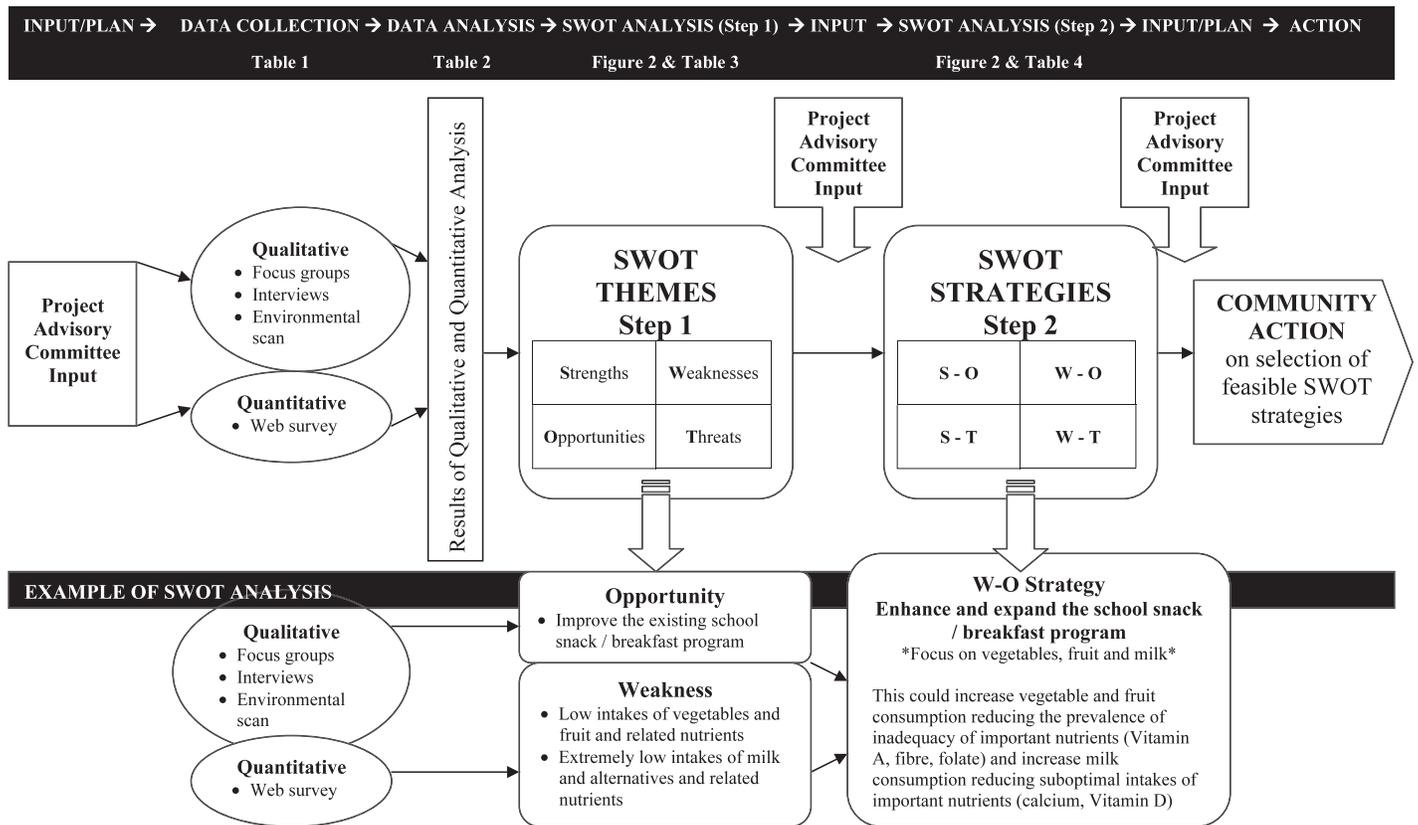
This study used a combination of qualitative and quantitative approaches to generate local community data, as shown in the top half of Figure 1. Themes derived from these data were categorized into a SWOT matrix and then integrated to develop strategies designed to increase healthy eating and physical activity among community youth. A project advisory committee (PAC) provided input during the initial planning stage and after step 1 and step 2 activities.

Sample

Twenty-five adults from Fort Albany participated in this study, with overlap from two of the subjects who participated in both of the adult focus groups and the individual interviews. Thirty youth in grades six to eight participated in three focus groups. Sixty-six youth in grades 6 to 11 completed the Web-based questionnaire, with most students in grades 6 to 8 participating in both the focus groups and the Web survey. Youth participating in this study represented 86% of the students in grades 6 to 11 living in the community.

Fort Albany FN, Ontario, Canada, was the focal community for this project. This community was chosen because community members expressed an interest in investigating and improving food habits and physical activity behaviors of local youth and had worked previously with the academic partners. Fort Albany is located on the west coast of James Bay and has a population of approximately 850 people. Fort Albany FN is geographically remote (52°15'N, 81°35'W) and only accessible by airplane year-round. There is access by a snow/ice road for only 6 to 8 weeks in the winter and by boat or barge during the ice-free season.³⁵ The native language of these people is Cree, and there is one on-reserve school in the community with students from kindergarten to grade 12. Thirty-eight percent of the Fort Albany population was less than 14 years of age according to 2001 Canadian census data.³⁶ The community has one grocery store, which is the major supplier of food, and two small convenience stores. There is no main recreational facility and therefore the school gymnasium, community center room within the school, and playground serve as the locations for most physical activities and local events. Community members participate in traditional hunting and fishing activities; however, availability and consumption of traditional foods from these endeavors are seasonal, vary in abundance from year to year, and are limited by individual resources. For example, many hunters experience financial constraints for traveling to hunting sites and have limited availability of ammunition.

Figure 1
Process for Planning Strategies Using a SWOT Analysis



Measures

Many aspects of the process were guided by a PAC and a participatory approach. Both qualitative and quantitative methods were used to collect data to inform the SWOT analysis. Table 1 is a summary of the methods, participants, and observations in this study.

From October 2004 to July 2005, qualitative and quantitative data were collected with community members of Fort Albany. Quantitative data were collected using a tool called the Waterloo Eating Behavior Questionnaire (WEB-Q). We defined our process and methods to be culturally appropriate when they incorporated the cultural beliefs, values, language, and visual images of Fort Albany community members. Continuous collaboration with and input from our PAC served as the determinant of whether our project components were culturally appropriate. For example, verbal consent

instead of written consent was deemed more culturally appropriate for Fort Albany residents and was obtained from all participants. This study was approved by the Fort Albany FN Chief and Council, the Mundo Peetabek Education Authority of Fort Albany, and the Office of Research Ethics at the University of Waterloo, Ontario, Canada.

Project Advisory Committee. This project was a collaborative effort involving a number of local stakeholder organizations: Band Council (elected FN governing body), Mundo Peetabek Education Authority (local education officials), Peetabek Academy (principals, teachers, director of the school snack/breakfast program, and students at the school), and Peetabek Health Services (health care workers). Representatives from these groups formed our PAC (n = 6) and were chosen based on their interest in participating in this study.

A trusting relationship between the university researchers and members/organizations in the community had been previously established; however, the establishment of a PAC¹⁸ was critical to creating a participatory environment between community members and researchers. Members of the PAC were involved in the design of data collection tools, including the development of focus group probes and the design of new WEB-Q questions. One example of the culturally appropriate methods used was shared feasts eaten during the adult focus group discussions.³⁷

The PAC assisted with recruitment. They disseminated information about the project through community posters and word of mouth and invited adult community members who were interested in the project to participate. Information and passive consent letters were reviewed and revised by the PAC and sent to the students' parents

**Table 1
Methods of Data Collection, Participants, and Observations**

Methods	Participants*	Observations†
Qualitative		
Focus groups 1, 2; semistructured	22 adults; community members, educational personnel, health care workers; 16 female, 6 male	
Focus groups 3, 4, 5; semistructured	30 youths in grade 6–8; 18 girls, 12 boys	
Individual interviews with key informants; semistructured, informal	7 adults; community members, educational personnel, director of the school snack/breakfast program, health care workers; 7 female	
Environmental scan observations; informal, direct		13
Quantitative		
WEB-Q; self-report	66 youths in grade 6–11; 38 girls, 28 boys	

* 30 youths participating in focus groups also participated in the WEB-Q.

† n = 13 for observations of grocery store, convenience stores, feasts, family meals, adult weekly volleyball, after-school activities, snack time at school, gym class, school kitchen, hospital, health center.

through the school prior to the days scheduled for focus group discussions and WEB-Q data collection. Participants were a convenience sample of community members interested in environment and health issues (adults), or were at school on the day of the focus groups and WEB-Q data collection (youths). All discussions and interviews were in English and/or Cree, and interpreters were used when necessary. Detailed notes were taken during each focus group and interview; tape recording was deemed culturally inappropriate by the PAC.

Community feedback was provided in the form of a presentation and school report following WEB-Q data collection with youth. The school report was discussed with community members from the PAC. Results from analysis of the SWOT themes and SWOT strategies were discussed with members of the PAC, who provided input and feedback on a draft of the SWOT strategies. The final strategies were determined jointly between the committee and the research team. This helped initiate conversation around which strategies might be feasible for the community to take action on.

Qualitative Methods. Focus Groups.

Directed focus group scripts,³⁸ which used probes to stimulate discussion, guided the adult and youth focus groups and were developed with specific attention to the SWOT categories for healthy eating and

physical activity. Questions were developed from previous conversations with the PAC and community members, and were influenced by academic literature related to physical activity, nutrition, and Aboriginal participation.^{39–41} Script questions and probes followed the same format for adults and youth, but differed slightly in the way they were phrased. For example, one of the questions related to “threats” to physical activity in the youth focus group script asked, “What kinds of things do you think keep you from being more physically active?”⁴² Whereas the question used in the adult script asked, “What are the barriers to physical activity for youth in the community?” The adult focus group discussions lasted approximately 1 hour, whereas those with the youth focus groups lasted 25 minutes. All focus groups were mixed gender and were held at the health center (adult focus groups) or the school (youth focus groups) at a time determined to be convenient for the participants and other involved members such as teachers. The moderator for both adult focus groups was explicitly selected because of his trusting relationship with the community for 18 years as a health care worker and environmental researcher. He is one of the lead researchers for this project. An informal group conversation approach was utilized. A conversational style of information gathering, similar to a “talking circle,” is a familiar and

recognized method for Aboriginal groups.^{43–46}

Interviews. Individual interviews with adults were semistructured and informal, allowing participants to lead conversations towards their own perspectives on healthy eating and physical activity of community youth. Although adults participated in the focus groups and individual interviews, the discussions and conversations were directed specifically towards ideas that might affect community youth. The interviews lasted from 15 to 45 minutes and were held either in the cafeteria at the school, while traveling from one location to another, or in the participant’s home, resulting in little disruption to work and daily routines.

Environmental scan. The environmental scan was based on direct observation of the social setting and school and community environments.^{47,48} The scan was critical because the physical and social environments can be determinants of healthy eating and physical activity.^{49,50} Observations were recorded in detailed field notes and electronic images taken each time the researchers visited the community.⁵¹ Full details of the qualitative data collection and methodology have been published elsewhere.⁴²

Quantitative Methods. Quantitative data were collected from the WEB-Q, a validated Web-based tool developed to assess food and physical activity behav-

iors of children and adolescents.⁵²⁻⁶⁷ All students in attendance on the day of the data collection were invited to complete the WEB-Q during class time. Each student was assigned a unique log-in and password for anonymity and confidentiality. A trained research assistant was present during the data collection to assist students with the WEB-Q. The WEB-Q collected demographic and anthropometric information; estimates of food intake, using a 24-hour dietary recall; estimates of selected food intakes, using a food frequency questionnaire; and valid measures of physical activity⁶⁸ in grade 6 to 11 students.

For the 24-hour recall portion of the WEB-Q, students were asked to describe in detail the food they had eaten over the previous 24 hours before the data collection. The prior 24-hour period was categorized by meals, and students selected foods eaten during breakfast, lunch, dinner, and snacks. The WEB-Q has icons and photo images of foods; visual images of portion sizes and comparisons to common objects (e.g., the size of a tennis ball); prompts for missed toppings, beverages, and snacks; and immediate individual feedback with respect to Eating Well with Canada's Food Guide⁶⁹ portions consumed relative to recommendations for the student's age. The feedback provided to students included an overall meal summary for the day, and they could make changes to their food selections if they noticed any inaccurate choices or forgotten items. The WEB-Q took up to 45 minutes to complete; this varied depending on the speed of the Internet access and the age of the student. Younger students tended to read more slowly and thus to take more time, but did not have any major difficulty completing the 24-hour recall. Possibly because of the anonymity and confidentiality of the participants, there was improved reporting of sensitive information (e.g., junk food intake) during the WEB-Q validation study, compared with dietitian interviews.⁵⁵

The physical activity measure used in the SWOT analysis was "Which ONE of the following describes you best for the last 7 days?" Possible responses (five) ranged from: "All or most of my free time was spent doing things involving little physical effort" to "I very often (7+ times last week) did physical things

**Figure 2
SWOT Matrix Framework**

	STRENGTHS	WEAKNESSES
	Positive characteristics and advantages of the issue, situation, or technique	Negative characteristics and disadvantages of the issue, situation, or technique
OPPORTUNITIES	S-O Strategy/Analysis	W-O Strategy/Analysis
Factors, situations that can benefit, enhance or improve the issue, situation, or technique	<i>Using strengths to take advantage of opportunities</i>	<i>Overcoming weaknesses by taking advantage of opportunities</i>
THREATS	S-T Strategy/Analysis	W-T Strategy/Analysis
Factors, situations that can hinder the issue, situation, or technique	<i>Using strengths to avoid threats</i>	<i>Minimize weaknesses and avoid threats</i>

*This figure combines definitions from three sources (shaded²¹ cells; clear cells^{70,71}).

in my free time." Other questions from the WEB-Q included in the SWOT analysis were related to time spent outside, hours of television viewing, convenience store purchases, and vending machine use.

Adaptations relevant to Fort Albany FN and suggested by the PAC were made to the WEB-Q. The primary adaptation involved the addition of traditional Aboriginal foods to the list of approximately 800 possible food choices in the 24-hour dietary recall. One food frequency question was added to ask students about the frequency of wild meat consumption. Additional questions added asked about participation in the school snack program, whether students wanted a designated physical education teacher, and level of concern about environmental contaminants. Following the adaptations to the WEB-Q, the Web survey was revalidated with a sample of 25 grade 6 to 11 students from Fort Albany. Students first completed the WEB-Q and then participated in a dietitian-administered interview. The results for the WEB-Q and dietitian interviews were compared and showed that there was good agreement (intra-class correlation coefficients > .67) for energy and key nutrient intakes. Students understood and were comfort-

able with the new questions that had been added to the WEB-Q. Students were excited to be able to select the traditional foods they had eaten on the previous day when completing the 24-hour recall portion of the WEB-Q.

SWOT Matrix. Definitions of strengths, weaknesses, opportunities, and threats for this study are outlined in Figure 2. A SWOT analysis attempts to answer two questions: (1) "What are the strengths, weaknesses, opportunities, and threats of the issue" (shaded boxes), and (2) "How can we address these issues with relationship to each SWOT category?" (clear boxes).^{21,70,71} Strengths and weaknesses are usually seen connected with the internal environment of an organization/community, and opportunities and threats are generally associated with the external environment.^{22,70}

Analysis

Qualitative. All qualitative data sources were compiled into one data file. This added to the rigor of the analysis as it allowed for triangulation of data sources. Thematic analysis was used to interpret qualitative data^{72,73} and was conducted by one of the lead researchers for this project. Qualitative data were initially organized by hand

and using QSR NVivo software (NVivo, version 2.0, 2002; Sage Publications Software, Doncaster, Australia). The thematic analysis began with open coding. Words, sentences, and/or paragraphs were assigned to a theme and could belong to more than one theme. Themes were collapsed or expanded, and subthemes were identified and organized according to the major themes. An iterative process was used to examine the interrelationships between themes and subthemes. For intercoder reliability, themes were confirmed by a second independent analyst with northern experience and familiarity with qualitative methods and analysis. Although the exact theme names were often not identical, the reliability between coders was more than 80% for the theme concepts. Hurricane thinking⁷⁴ and concept mapping⁷⁵ were used to illustrate findings (themes) and relationships between concepts.⁴²

Quantitative. Energy, food groups, and nutrient content of foods eaten during the 24-hour recall were calculated using the Canadian Nutrient File Database and ESHA food processor software (version 7.9; Esha Research, Salem, Oregon). SAS Windows software (SAS, version 9.1, 2002–2003; SAS Institute, Inc, Cary, North Carolina) was used to conduct the quantitative analysis. Foods not included in the ESHA food processor were inputted directly into ESHA by the researchers to determine their energy, food group, and nutrient composition. For example, some local traditional combination foods (e.g., bannock, moose stew) were not found in the ESHA food processor and the ingredients from local community recipes were inputted. Food group amounts and categories for each food in the WEB-Q food list were checked for accuracy by a registered dietitian. Dietary intake data, food frequency questions for selected food items, physical activity, and television viewing were compared to guidelines from Eating Well With Canada's Food Guide⁶⁹ and to Dietary Reference Intakes (by age category), including estimated average requirements and adequate intakes.^{76,77} These comparisons allowed for the categorization of which behaviors were strengths or weaknesses.

SWOT Analysis. The SWOT analysis itself is a two-step process, as shown in Figure 2. The first step is to identify the core themes that fall into each SWOT category. In this study, the core SWOT themes were developed from the results of the qualitative and quantitative analyses. The second step involves the actual analysis (strengths-opportunities [S-O], weaknesses-opportunities [W-O], strengths-threats [S-T], and weaknesses-threats [W-T]), where the themes identified in step 1 are fit together and transformed into strategies. For example, an item or theme can be matched from the strengths quadrant to one from the opportunities quadrant and combined to determine a strategy (resulting in an *S-O strategy*). Balamuralikrishna and Dugger²⁴ stress the importance of looking for a *stretch*, not just a *fit*, during the matching of the themes. This encourages thinking outside the box, being open to new strategies, taking advantage of strengths and opportunities, and acknowledging that there may be weaknesses and threats that need to be overcome to ensure interventions are successful. When two themes are stretched into a strategy, the community is challenged to take action on specific target areas where weaknesses or threats exist. During the two-step SWOT process for our project, the strategies and activities were determined from three sources: (1) the strengths, weaknesses, opportunities, and threats for healthy eating and physical activity in Fort Albany, identified from the formative research; (2) specific suggestions from the PAC and community members (during meetings, focus group discussions, and interviews); and (3) input from the research team.

RESULTS

Qualitative Findings

The qualitative analysis revealed a variety of interrelated themes and subthemes of primarily external contributing factors for healthy eating and physical activity in the FN youths of Fort Albany. Strengths included existing programs and facilities and the enthusiasm of some community members to suggest strategies for change. Themes categorized as weaknesses did not

emerge from the qualitative analysis. Opportunities included improvements to existing programs, applying for grants to fund more programs, increasing the programs available, and conducting a community survey to determine community needs. The main threat was the disempowerment felt by community members, including youth. Empowerment was defined as a lack of power or control over their ability to eat healthily and be physically active and was a repeated theme throughout the focus groups and interviews. Other threats that emerged were low socioeconomic status, geographic remoteness, food insecurity, lack of resources, low literacy, personal preferences for unhealthy eating and activity behaviors, and a lack of time and motivation.

Quantitative Findings

Table 2 depicts the results for specific variables of interest from the quantitative analysis of the Web survey. Fort Albany youth had high body mass index, were well below recommendations for some food groups (vegetables and fruit, milk and alternatives) and important nutrients (calcium, vitamin D, dietary fiber), had high intake of other foods (especially cola pop, French fries, salty snacks, candy/chocolate bars), often purchased food and snacks from convenience stores, and were relatively sedentary.

Step 1: Core SWOT Themes

Step 1 of the SWOT analysis resulted in 32 main themes: 10 strengths, 8 weaknesses, 5 opportunities, and 9 threats (Table 3). Healthy eating and physical activity were considered together in the same table as some themes overlapped between them.

Strengths and weaknesses were the positive and negative characteristics, respectively, of current eating and physical activity habits in Fort Albany youth and were primarily identified from the quantitative results based on the Web survey. Table 3 shows whether SWOT themes were developed from qualitative, quantitative, or environmental scan data.

Some themes, generally those derived from the quantitative data, were developed directly from the results of the data analysis. For example, results of the quantitative analysis from the 24-hour dietary recall of the Web survey

**Table 2
Demographic Characteristics and Food and Physical Activity Behavior of Youth by Sex***

Variable	Boys	Girls	Recommendation
Demographics and anthropometrics			
Age, y, mean	14.1	13.0	—†
BMI > 85th percentile, %	31	43	—
24-hour dietary recall‡			
Vegetables and fruit, servings/d	3.9	4.9	6–8 (CFG)
Grain products, servings/d	5.4	4.3	6–7 (CFG)
Milk and alternatives, servings/d	1.5	1.6	3–4 (CFG)
Meat and alternatives, servings/d	3.6	1.9	1–3 (CFG)
Other foods, servings/d	6.6	4.0	Limit (CFG)
Energy from added sugar, %	7.6	8.4	<10% (CDA, WHO)
Iron, mg/d	15.4	10.2	5.9 ♂ 5.7 ♀ (EAR)
Vitamin A, retinol equivalents	622	467	445 ♂ 420 ♀ (EAR)
Folate, µg/d	285	273	250 (EAR)
Calcium, mg/d	792	636	1300 (AI)
Vitamin D, µg/d	3.8	2.9	5 (AI)
Dietary fiber, g/d	10.1	7.5	31 ♂ 26 ♀ (AI)
Food frequency questions			
Milk, servings/wk	7.2	7.9	21–28 (CFG)
Cola-type pop, servings/wk	7.0	6.6	Limit (CFG)
French fries, servings/wk	5.0	5.0	Limit (CFG)
Salty snacks, servings/wk	5.9	6.1	Limit (CFG)
Pizza, servings/wk	3.4	3.7	—
Candy/chocolate bars, servings/wk	5.8	6.5	Limit (CFG)
Game meat, servings/wk	4.0	2.6	—
Food purchasing			
Convenience store purchases, % ≥ 1×/wk	86	85	—
Vending machine use, % ≥ 1×/wk	37	37	—
Physical/sedentary activities			
Physical activity, % ≥ 5×/wk	36	31	Be active every day (CFG)
Time spent outside, % most/all time	67	67	—
Television viewing, mean h/d	1.6	1.2	Limit (CFG)

* BMI indicates body mass index; CFG, Eating Well With Canada's Food Guide⁶⁹; CDA, Canadian Diabetes Association; WHO, World Health Organization; EAR, estimated average requirement^{76,77}; and AI, adequate intake.^{76,77}

† Dash in Recommendations column indicates that Canadian national recommendations are not available or not applicable.

‡ Values presented are medians.

showed that iron consumption was above the recommended estimated average requirements for both boys and girls (Table 2). Therefore, the corresponding strengths SWOT theme was that Fort Albany youth had adequate intake of iron. Other themes, generally those derived from the qualitative data, were less straightforward to generate from the results of the analysis. For example, one of the subthemes from the qualitative analysis was the accessibility and availability of facilities. A closer examination of the raw qualitative data revealed that this result could fall under two SWOT categories: strengths and opportunities. Similar to

the results from the environmental scan, community members felt that there was adequate access to existing facilities (SWOT strength), but that there were possibilities for improving this access (SWOT opportunity).

Step 2: SWOT Strategies

Having gathered data according to the SWOT categories, the next step was to conduct the analysis of the themes that had emerged. Observe the bottom half of Figure 1, which shows a specific example of the development of a W-O strategy. For this example, results of the WEB-Q showed Fort Albany youth had low intakes of vegetables and fruit

and of milk and alternatives, which became one of the weaknesses SWOT themes. One of the opportunities SWOT themes from the qualitative analysis was that there was an existing school snack/breakfast program and the potential to improve on it. Community members spoke enthusiastically about the school snack/breakfast program and were very proud of its success. However, they knew that changes could be made to make the program even better. The SWOT strategy of “expanding and enhancing the school snack/breakfast program with a focus on vegetables, fruits, and milk products” acknowledges that

**Table 3
Step 1: Strengths, Weaknesses, Opportunities, and Threats of Eating and Physical Activity Behaviors of Fort Albany Youth
From the SWOT Analysis Themes***

Strengths	Weaknesses
<ol style="list-style-type: none"> 1. Adequate intake of iron (QN) 2. High intake of game meats (QN) 3. Low intake of high-sugar/high-fat foods (QN) 4. Infrequent use of vending machines (QN) 5. Low amount of TV viewing (QN) 6. High amount of time spent outdoors (QN) 7. Existing school snack/breakfast program (QL, ES) 8. Accessibility of existing facilities, such as the school gymnasium, school kitchen, and community center (QL, ES) 9. Existing literacy summer camp for grades 1–6 (QL) 10. Enthusiasm of some community members to suggest strategies to address these issues that could be implemented locally (QL) 	<ol style="list-style-type: none"> 1. High prevalence of overweight/obese (38%); BMI >85th percentile was especially high (43%) in girls (QN) 2. Low intakes of vegetables and fruit (QN) resulted in decreased fiber and folate intakes 3. Extremely low intakes of milk and alternatives resulted in decreased calcium and vitamin D intakes (QN) 4. Added sugar above Canadian Diabetes Association/World Health Organization recommendations for 50% of participants (QN) 5. High intake of “mostly sugar” foods (QN) 6. High consumption of cola-type pop, french fries, salty snacks, pizza, candy/chocolate bars (QN) 7. Frequent use of convenience stores (QN) 8. Lack of physical activity (QN)
Opportunities	Threats
<ol style="list-style-type: none"> 1. Improve the existing school snack/breakfast program (QL, ES) 2. Improve accessibility of existing facilities (QL, ES) 3. Conduct a community survey to identify what the community wants (QL) 4. Apply for grants to fund programs and training (QL) 5. Increase programs and training in specific areas, such as caregiver education/skills (e.g., literacy, cooking classes), Good Food Box program, school/community garden (QL) 	<ol style="list-style-type: none"> 1. Disempowerment of community members including youth (QL) 2. Socioeconomic status (QL) 3. Geographic remoteness (QL) 4. Food insecurity from the cost, availability, variety, quality of available food (QL, ES) 5. Lack of resources, such as funding, personnel, equipment, facilities (QL, ES) 6. Low literacy (QL) 7. Personal preference/taste for foods and activities (QL) 8. Lack of time/motivation/interest (QL) 9. Competing activities, such as TV, video games, computer/Internet (QN, QL)

* SWOT indicates strengths, weaknesses, opportunities, and threats; QN, quantitative Waterloo Eating Behavior Questionnaire; BMI, body mass index; QL, qualitative focus groups and interviews; and ES, environmental scan. Data to generate SWOT themes were from QN, QL, and ES.

(1) community youth need to increase their consumption of specific healthy foods; (2) there exists an opportunity to facilitate this by improving the existing program; and (3) it is a strategy that community members are likely to buy into and take action upon.

Ideas suggested directly by community members during qualitative data collection and PAC meetings and used in the SWOT analysis are those not italicized in Table 4. See Figure 2 for an explanation of the S-O, W-O, S-T, and W-T categories and Table 4 for the

final draft of recommended strategies. The recommended strategies were initially drafted by the research team and then discussed with the PAC. The strategies were then revised into a final draft. Strategies focused around new or improved program and training initiatives and increased accessibility and availability of healthy foods and physical activities while incorporating elements of empowerment, resources, and building community capacity (Table 4). It is important to acknowledge that the combined SWOT analysis

categories were not discrete for all of the recommended strategies. Some of the recommendations incorporated three of the identified SWOT themes (e.g., W-O3, which included themes from O2, O5, W2, W3, and T7) and some recommendations could be undertaken in conjunction with other strategies (e.g., W-O2 and W-T1). The priority intervention activities in Table 4 were intended to fill gaps in current programming in Fort Albany and to strengthen existing activities. It is important to note that the list of

Table 4
Step 2: SWOT Analysis Strategies to Increase Healthy Eating and Physical Activity With Fort Albany FN Youth Proposed by Community Members and Research Collaborators*

S-O Strategies	W-O Strategies
<ol style="list-style-type: none"> 1. Maintain or increase the accessibility of the school gymnasium and introduce more physical activity programming (S8, S9, O2, O5).† 2. Organize more formal physical activities outdoors, such as leagues, tournaments/competitions (including the involvement of other communities) (S6, S9, O2); e.g., use baseball diamond. 3. <i>In conjunction with W-O3 and S-T2, capitalize on current consumption of game meats and provide programs/training for the preparation of traditional foods (S2, O4, O5).</i> 4. Have a community survey to prioritize facilities/programs/training people want; to direct funding applications. This process may facilitate the feeling of empowerment among community members (S9, O3, O4, T1). 	<ol style="list-style-type: none"> 1. Enhance and expand the school snack/breakfast program, which could increase vegetable and fruit consumption and reduce the prevalence of inadequacy of important nutrients (vitamin A, fiber, folate); this could also increase milk consumption (reducing suboptimal intakes of calcium and vitamin D) (W2, W3, O1). 2. Start up a Good Food Box program or community food cooperative (can be in conjunction with W-T1) (W2, O5). 3. Initiate a program specifically for young mothers and parents around the nutrition needs of their infants and children. This could include cooking classes, recipes, nutrition information/education, etc. This should have a special focus on vegetables/fruits and milk products (O2, O5, W2, W3, T7). 4. <i>Start up a community or school garden; this could be led by teachers and students and from part of the curriculum (O2, O5, W2).</i>
S-T Strategies	W-T Strategies
<ol style="list-style-type: none"> 1. <i>Capitalize on enthusiasm of key individuals to champion initiatives. This could empower others (S9, T1).</i> 2. Maintain or increase intake of game meats among youth by making them more available in the home or at school, which can reduce/replace the consumption of less nutrient dense foods (S2, W4, W5, W6, T7 [could also be a W-T strategy]). 3. Build upon the summer literacy program for children and include youth and adults; emphasize healthy lifestyles (S9, S10, O5, T6). 	<ol style="list-style-type: none"> 1. <i>Appoint or nominate a task force to work with the grocery store to improve the cost, availability, variety, and quality of produce. Some strategies of this task force might include the dissemination of information to the community on when specific fresh produce will be arriving, initiating a program for families to be able to order produce, and putting produce on sale more often rather than unhealthy foods (e.g., pop, chips) (W2, W3, W4, W5, W6, T1, T3, T4).</i>

* Community members made strategy suggestions during project advisory committee meetings, focus groups, and interviews. Strategies not italicized were suggested by community members. SWOT indicates strengths, weaknesses, opportunities, and threats; FN, First Nation; S-O, strengths-opportunities; W-O, weaknesses-opportunities; S-T, strengths-threats; and W-T, weaknesses-threats.

† Alphanumerals in parentheses refer to specific SWOT themes from Table 3.

strategies in Table 4 is not exhaustive. These strategies were the basis of a final report for the PAC and community decision makers.

DISCUSSION

This paper describes how a SWOT analysis might benefit FN communities to inform healthy eating and physical activity strategies that fit within a local context. The qualitative findings included numerous strengths, opportu-

nities, and threats for healthy eating and physical activity among Fort Albany youth. The main threat for Fort Albany youth was a feeling of disempowerment. The main finding from the quantitative analysis was that Fort Albany youth consumed a very nutrient-poor diet. The SWOT analysis resulted in 12 strategies that could be initiated to improve the health of Fort Albany youth. The SWOT analysis proved to be a beneficial tool for incorporating local contextual data and community input into the deter-

mination of relevant health promotion strategies.

In a study highlighting indigenous knowledge of urban FN people, Van Uchelen and colleagues⁷⁸ concluded that “supporting existing strengths promotes [health] wellness in holistic, culturally appropriate, and empowering ways.” Part of this SWOT analysis involved focusing on identified strengths to take advantage of opportunities. Acknowledging that strengths and opportunities for healthy eating and physical activity exist in the

Fort Albany FN community may have motivated community members to take action.

The SWOT strategies emerging from this study were informed by evidence from qualitative and quantitative formative research, incorporated community input, and were confirmed by a PAC. Thus, they are likely suitable strategies for the community of Fort Albany, and may also apply to other FN communities. Indeed, since the completion of the SWOT analysis, Fort Albany community members have begun to implement SWOT strategies. Action has been taken on the following four strategies: the school snack/breakfast program has been expanded and enhanced; community members have organized a not-for-profit “farmer’s market”/community food cooperative where a plane is chartered to transport healthy foods into the community every few months; a school greenhouse and gardening project has been initiated through a community-university partnership; and a food security working group has been established as a task force to work on projects that improve the affordability, availability, and accessibility of healthy foods in Fort Albany.

A SWOT analysis can be subjective, as the stakeholders who determine the factors falling into the four SWOT categories may be too close or too distant from the intricacies of the community to be objective.²⁵ If this occurs, the findings of the SWOT analysis could be biased. However, in this study, the SWOT categories were informed by strong qualitative and quantitative formative research and input from community members leading to a more unbiased and objective set of findings. From a business perspective, Pickton and Wright⁷⁹ have critically examined SWOT analysis and highlighted the value and limitations of its use. They emphasize that the very process of carrying out a SWOT analysis is as beneficial to an organization’s strategic planning as the outputs produced by the SWOT analysis. Therefore, one of the strengths of this study was that considerable focus was placed on the process of the SWOT analysis. In addition to planning programs, SWOT analysis can be used as a framework for evaluation. Therefore, it

could be used to both plan and evaluate strategies in the same community, which can act to streamline the intervention process from the initial community analysis to the improvement of evaluated strategies.

This study is unique in its approach to the study of healthy eating and physical activity in FN youth. In particular, it combines qualitative and quantitative evidence using a SWOT analysis framework from the strategic planning literature. There are no other published studies in the health literature that describe the process of using a SWOT analysis in FN communities. Not only do the results from this study add to the academic literature on food and physical activity determinants and patterns in FN youth, the recommendations were targeted to the community level where they can be utilized. Dissemination of the information gained from this study to Fort Albany has enabled the community to use the knowledge towards the initiation of healthy eating and physical activity intervention strategies.

This study highlights the need for continued culturally appropriate, community-specific, participatory research on dietary and physical activity patterns in FN youth. The issue of empowerment should be considered in future studies of healthy living in FN communities and should also be taken into account while designing obesity and type 2 diabetes prevention programs. Our findings indicate that the SWOT analysis we used was a successful tool for developing targeted health promotion strategies in one FN community. However, FN peoples in Canada and their communities are exceptionally diverse culturally, linguistically, socially, economically, and geographically. Therefore, further research and investigation should focus on (1) increasing our understanding of the community contextual factors and determinants of healthy eating and physical activity in additional FN communities from varied geographic locations, (2) determining whether SWOT analysis is a feasible process for developing strategies for FN community issues other than healthy eating and physical activity, and (3) understanding processes that enable FN

communities to implement strategies generated from SWOT analyses.

SO WHAT? Implications for Health Promotion Practitioners and Researchers

What is already known on this topic?

Alarming rates of obesity and type 2 diabetes have been reported in Aboriginal youth and have been attributed primarily to unhealthy diets and a lack of physical activity.

What does this article add?

This study showed that a SWOT analysis can be used to integrate qualitative and quantitative data and community-driven recommendations to inform customized strategies for improving eating and physical activity behaviors.

What are the implications for health promotion practice or research?

Community readiness and a strong relationship between practitioners/researchers and community members are important to establish before carrying out the SWOT process. Health promotion practitioners and researchers working with Aboriginal and other indigenous communities should consider using a SWOT analysis to inform healthy eating and physical activity strategies that fit within a local context.

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References

1. Constitution Act. Rights of the Aboriginal Peoples of Canada. Dept of Justice Canada, Schedule B, Part II, §35 (1982).
2. Shields M. Overweight and obesity among children and youth. *Health Rep.* 2006;17:27–42.
3. Dean H, Degroot W, Henderson A. NIDDM in Aboriginal youth. *Diabetes News.* 1995;3:1–6.
4. Morrison N, Dooley J. The Sioux Lookout Diabetes Program: diabetes prevention and management in northwestern Ontario. *Int J Circumpolar Health.* 1998;57(suppl):S364–S369.
5. Willows ND. Overweight in first nations children: prevalence, implications, and solutions. *J Aboriginal Health.* 2005;2:76–86.
6. Bernard L, Lavallee C, Gray-Donald K, Delisle H. Overweight in Cree schoolchildren and adolescents associated with diet, low physical activity, and high television viewing. *J Am Diet Assoc.* 1995;95:800–802.

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7. Hanley AJ, Harris SB, Gittlesohn J, et al. Overweight among children and adolescents in a Native Canadian community: prevalence and associated factors. *Am J Clin Nutr.* 2000;71:693–700.
8. Downs SM, Arnold A, Marshall D, et al. Associations among the food environment, diet quality and weight status in Cree children in Quebec. *Public Health Nutr.* 2009;12:1504–1511.
9. Khalil CB, Johnson-Down L, Egeland GM. Emerging obesity and dietary habits among James Bay Cree youth. *Public Health Nutr.* 2010;13:1829–1837.
10. Wolever TM, Hamad S, Gittelsohn J, et al. Nutrient intake and food use in an Ojibwa-Cree community in northern Ontario assessed by 24H dietary recall. *Nutr Res.* 1997;17:603–618.
11. Daniel M, Green LW, Marion SA, et al. Effectiveness of community-directed diabetes prevention and control in a rural Aboriginal population in British Columbia, Canada. *Soc Sci Med.* 1999;48:815–832.
12. Hanley JG, Harris SB, Barnie A, et al. The Sandy Lake Health and Diabetes Project: design, methods and lessons learned. *Chronic Dis Can.* 1995;16:149–156.
13. Macaulay AC, Harris SB, Lévesque L, et al. Primary prevention of type 2 diabetes: experiences of two Aboriginal communities in Canada. *Can J Diabetes.* 2003;27:464–475.
14. Ho LS, Gittelsohn J, Harris SB, Ford E. Development of an integrated diabetes prevention program with First Nations in Canada. *Health Promot Int.* 2006;21:88–97.
15. Ho L, Gittelsohn J, Rimal R, et al. An integration multi-institutional diabetes prevention program improves knowledge and healthy food acquisition in northwestern Ontario First Nations. *Health Educ Behav.* 2008;35:561–573.
16. Ho L, Gittelsohn J, Sharma S, et al. Food-related behavior, physical activity, and dietary intake in First Nations—a population at high risk for diabetes. *Ethn Health.* 2008;13:335–349.
17. Vastine A, Gittelsohn J, Ethelbah B, et al. Formative research and stakeholder participation in intervention development. *Am J Health Behav.* 2005;29:57–69.
18. Macaulay AC, Delormier T, McComber AM, et al. Participatory research with native community of Kahnawake creates innovative code of research ethics. *Can J Public Health.* 1998;89:105–108.
19. Young TK. Review of research on Aboriginal populations in Canada: relevance to their health needs. *Br Med J.* 2003;327:419–422.
20. Ansoff HI. *Corporate Strategy.* New York, NY: McGraw-Hill; 1965.
21. International Institute of Rural Reconstruction. *Recording and Using Indigenous Knowledge: A Manual.* Silang, Philippines: International Institute of Rural Reconstruction; 1996.
22. Burkhart PJ, Reuss S. *Successful Strategic Planning: A Guide for Nonprofit Agencies.* Newbury Park, Calif: Sage; 1993.
23. Van Marwijk H. How to improve mental health competency in general practice training?—a SWOT analysis. *Eur J Gen Pract.* 2004;10:61–65.
24. Balamuralikrishna R, Dugger JC. SWOT analysis: a management tool for initiating new programs in vocational schools. *J Vocat Tech Educ.* 1995;12.
25. Boone L, Kurtz D. *Contemporary Marketing.* 9th ed. Orlando, Fla: The Dryden Press; 1999.
26. Tanjasiri SP, Tran JH. Community capacity for cancer control collaboration: weaving an Islander network for cancer awareness, research and training for Pacific Islanders in Southern California. *Cancer Detect Prev.* 2008;32(suppl):S37–S40.
27. Caruana CJ, Wasilewska-Radwanska M, Aurengo A, et al. A strategic development model for the role of the biomedical physicist in the education of healthcare professionals in Europe. *Phys Med.* In press.
28. Henzi D, Davis E, Jasinevicius R, Hendricson W. In the students' own words: what are the strengths and weaknesses of the dental school curriculum? *J Dent Educ.* 2007;71:632–645.
29. Goel S, Gupta AK, Ahuja P, et al. Comparison of the health-promoting orientation of three tertiary care hospitals of India. *Natl Med J India.* 2011;24:83–85.
30. Ibargoyen-Roteta N, Gutiérrez-Ibarluzea I, Rico-Iturriz R, et al. The GRADE approach for assessing new technologies as applied to apheresis devices in ulcerative colitis. *Implement Sci.* 2010;5:48.
31. Kongnyuy EJ, van den Broek N. The difficulties of conducting maternal death reviews in Malawi. *BMC Pregnancy Childbirth.* 2008;8:42.
32. Toivanen T, Lahti S, Leino-Kilpi H. Applicability of SWOT analysis for measuring quality of public oral health services as perceived by adult patients in Finland. *Community Dent Oral Epidemiol.* 1999;27:386–391.
33. Melisek J. Strategic planning on First Nations, 2008. Available at: http://www.bdo.ca/library/publications/aboriginal/articles/Aboriginal_Planning.cfm. Accessed February 13, 2010.
34. Indian and Northern Affairs Canada. CCP handbook: comprehensive community planning for First Nations in British Columbia, 2006. Available at: <http://www.ainc-inac.gc.ca/ai/scr/bc/proser/fna/ccp/ccphb/pub/ccphb-eng.pdf>. Accessed February 14, 2010.
35. Indian and Northern Affairs Canada. First Nation profiles, 2006. Available at: http://pse5-esd5.ainc-inac.gc.ca/fnp/Main/Search/FNMain.aspx?BAND_NUMBER=142&lang=eng. Accessed February 13, 2010.
36. Statistics Canada. Community profiles, 2001. Available at: <http://www12.statcan.ca/english/profil01/CP01/Index.cfm?Lang=E>. Accessed February 14, 2010.
37. Hudson P, Taylor-Henley S. Beyond the rhetoric: implementing a culturally appropriate research project in First Nations communities. *Am Indian Cult Res J.* 2001;25:93–105.
38. Krueger RA, Casey MA. *Focus Groups: A Practical Guide for Applied Research.* 3rd ed. Thousand Oaks, Calif: Sage; 2000.
39. Bauer KW, Yang YW, Austin SB. ‘How can we stay healthy when you’re throwing all this in front of us?’ Findings from focus groups and interviews in middle schools on environmental influences on nutrition and physical activity. *Health Educ Behav.* 2004;31:34–46.
40. Buller DB, Woodall WG, Zimmerman DE, et al. Formative research activities to provide web-based nutrition education to adults in the upper Rio Grande Valley. *Fam Community Health.* 2001;24:1–12.
41. Thompson SJ, Davis SM, Gittelsohn J, et al. Patterns of physical activity among American Indian children: an assessment of barriers and support. *J Community Health.* 2001;26:423–445.
42. Skinner K, Hanning RM, Tsuji LJS. Barriers and supports for healthy eating and physical activity for First Nation youths in northern Canada. *Int J Circumpolar Health.* 2006;65:148–161.
43. Hodge FS, Fredericks L, Rodriguez B. American Indian women’s talking circle: a cervical cancer screening and prevention project. *Cancer.* 1996;78(suppl):S1592–S1597.
44. Perkins JJ, Sanson-Fischer RW, Giris A, et al. The development of a new methodology to assess perceived needs among indigenous Australians. *Soc Sci Med.* 1995;41:267–275.
45. Sayers S. Problems assessing Aboriginal infant mortality. *Med J Aust.* 1993;158:586–588.
46. Shannon C. Social and cultural differences affect medical treatment. *Aust Fam Physician.* 1994;23:33–35.
47. Patton MQ. *Qualitative Research and Evaluation Methods.* 3rd ed. Thousand Oaks, Calif: Sage; 2002.
48. Adler PA, Adler P. Observational techniques. In: Denzin NK, Lincoln YS, eds. *Handbook of Qualitative Research.* 1st ed. Thousand Oaks, Calif: Sage; 1994:377–392.
49. Giles-Corti B, Donovan RJ. The relative influence of individual, social and physical environment determinants of physical activity. *Soc Sci Med.* 2002;54:1793–1812.
50. Kubik MY, Lytle L, Fulkerson JA. Fruits, vegetables, and football: findings from focus groups with alternative high school students regarding eating and physical activity. *J Adolesc Health.* 2005;36:494–500.
51. Gibbs GR, Friese S, Mangabeira WC. The use of new technology in qualitative research. *Forum Qual Soc Res.* 2002;3(2). Available at: <http://www.qualitative-research.net/fqs-texte/2-02/2-02hrsge.htm>. Accessed February 10, 2010.
52. Forbes LE, Storey KE, Fraser SN, et al. Dietary patterns associated with glycemic index and glycemic load among Alberta adolescents. *Appl Physiol Nutr Metab.* 2009;34:648–658.
53. Gates M, Hanning RM, Gates A, et al. Assessing the impact of pilot school snack programs on milk and alternatives intake in two remote First Nation communities in northern Ontario, Canada. *J Sch Health.* In press.

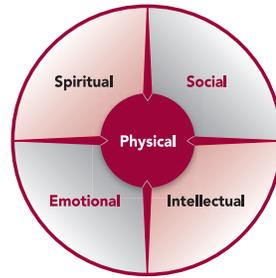
54. Hanning RM, Woodruff SJ, Lambraki I, et al. Nutrient intakes and food consumption patterns in grades six, seven, and eight. *Can J Public Health*. 2007;98:12–16.
55. Hanning RM, Royall D, Toews JE, et al. Web-based food behaviour questionnaire: validation with grades six to eight students. *Can J Diet Prac Res*. 2009;70:172–178.
56. Hlimi T, Skinner K, Hanning RM, et al. Traditional food consumption behaviour and concern with environmental contaminants among Cree schoolchildren of the Mushkegowuk Territory. *Int J Circumpolar Health*. 2012;71:17344. doi:10.3402/ijch.v71i0.17344.
57. Minaker LM, McCargar L, Lambraki I, et al. School socio-economic status and geographic locale is associated with food behaviour of Ontario and Alberta adolescents. *Can J Public Health*. 2006;97:357–361.
58. Storey KE, Forbes LE, Fraser SN, et al. Diet quality, nutrition and physical activity among adolescents: the Web-SPAN (Web-Survey of Physical Activity and Nutrition) project. *Public Health Nutr*. 2009;12:2009–2017.
59. Storey KE, Hanning RM, Lambraki I, et al. Determinants of diet quality among Canadian adolescents as assessed by a web-based survey. *Can J Diet Prac Res*. 2009;70:58–65.
60. Sutherland C, Skinner K, Hanning RM, et al. A Cree perspective on gathering community input for physical activity programming in the Mushkegowuk Territory. *Pimatisiwin*. 2007;5:169–184.
61. Vance VA, Woodruff SJ, McCargar LJ, et al. Self-reported dietary energy intake of normal weight, overweight, and obese adolescents. *Public Health Nutr*. 2009;12:222–227.
62. Woodruff SJ, Hanning RM. Associations between family dinner frequency and specific food behaviours among grade six, seven, and eight students from Ontario and Nova Scotia, Canada. *J Adolesc Health*. 2009;44:431–436.
63. Woodruff SJ, Hanning RM. Effect of meal environment on diet quality rating. *Can J Diet Prac Res*. 2009;70:118–124.
64. Woodruff SJ, Hanning RM. Associations between diet quality and physical activity measures among a Southern Ontario regional sample of grade 6 students. *Appl Physiol Nutr Metab*. 2010;35:826–833.
65. Woodruff SJ, Hanning RM, Lambraki I, et al. Healthy eating index-C is compromised among adolescents with body weight concerns, weight loss dieting, and meal skipping. *Body Image*. 2008;5:404–408.
66. Woodruff SJ, Hanning RM, McGoldrick K. Lunch-time food intake and portion size are influenced by the physical and social context of eating among students in grades six, seven, and eight from Southern Ontario. *J Sch Health*. 2010;80:421–428.
67. Woodruff SJ, Hanning RM, McGoldrick K, Brown KS. Healthy Eating Index-C is positively associated with family dinner frequency among students in grade six, seven, and eight from Southern Ontario, Canada. *Eur J Clin Nutr*. 2010;64:454–460.
68. Crocker PRE, Bailey DA, Faulkner RA, et al. Measuring general levels of physical activity: preliminary evidence for the Physical Activity Questionnaire for Older Children. *Med Sci Sports Exerc*. 1997;29:1344–1349.
69. Health Canada, Eating well with Canada's food guide, 2007. Available at: http://www.hc-sc.gc.ca/fn-an/alt_formats/hpfb-dgpsa/pdf/food-guide-aliment/view_eatwell_vue_bienmang-eng.pdf. Accessed February 10, 2010.
70. Renault V, Schultz J. The community toolbox, 2011. Available at: http://ctb.ku.edu/en/tablecontents/sub_section_main_1049.aspx. Accessed September 1, 2011.
71. David FR. *Strategic Management*. 4th ed. New York, NY: Macmillan Publishing; 1993.
72. Daly J, Kellehear A, Gliksmann M. *The Public Health Researcher: A Methodological Guide*. Melbourne, Australia: Oxford University Press; 1997.
73. Fereday J, Muir-Cochrane E. Demonstrating rigor using thematic analysis: a hybrid approach of inductive and deductive coding and theme development. *Int J Qual Methods*. 2006;5:7.
74. Kirby SL, McKenna K. *Experience, Research and Social Change: Research from the Margins*. Toronto, Canada: Garamond Press; 1989.
75. Edmondson KM. Concept maps and the development of cases for problem-based learning. *Acad Med*. 1994;69:108–110.
76. Otten JJ, Pitz Hellwig J, Meyers LD, eds. *Dietary Reference Intakes: The Essential Guide for Nutrient Requirements*. 1st ed. Washington, DC: National Academies Press; 2006.
77. Whitney EN, Rolfes SR. *Understanding Nutrition*. 9th ed. Belmont, Calif: Wadsworth; 2002.
78. Van Uchelen C, Davidson S, Quessette S, et al. What makes us strong: urban Aboriginal perspectives on wellness and strength. *Can J Community Ment Health*. 1997;16:37–50.
79. Pickton DW, Wright S. What's swot in strategic analysis? *Strateg Change*. 1998;7:101–109.

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Michael P. O'Donnell

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