

Implementing the Alberta Nutrition Guidelines for Children and Youth In a Recreational Facility

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ABSTRACT

Purpose: In this mixed-methods case study, we explored factors influencing the adoption and implementation of the Alberta Nutrition Guidelines for Children and Youth within recreational facilities, and assessed the impact of their implementation on the food environment.

Methods: Qualitative data were generated via interviews, observations, and document reviews. The quality of the food environment was assessed using validated and newly developed food environment assessment tools.

Results: Whereas few barriers existed in terms of adopting the guidelines, implementing them proved much more challenging. Implementation was impeded by concerns about the lack of profitability of healthy items, time, and resource constraints. Guidelines that do not restrict the availability of unhealthy options are better accepted by stakeholders. Implementation of the guidelines supported creation of a healthy food environment, but the availability of healthy items remained very limited within the concession (16%) and vending machines (20%), and children continued to purchase primarily unhealthy items.

Conclusions: Findings suggest that children choose healthy options insufficiently when unhealthy items are present. Thus, although introducing the nutrition guidelines in a nonrestrictive format may have been advantageous in some ways, they should be strengthened over time so that they recommend near or total elimination of unhealthy options.

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RÉSUMÉ

Objectif. Dans cette étude de cas à méthodes mixtes, nous avons exploré les facteurs qui influencent l'adoption et l'implantation des *Alberta Nutrition Guidelines for Children and Youth* dans les installations de loisirs et avons évalué l'impact de leur implantation sur l'environnement alimentaire.

Méthodes. Des données qualitatives ont été générées au moyen d'entrevues, d'observations et de revues de la documentation. La qualité de l'environnement alimentaire a été évaluée à l'aide d'outils d'évaluation de l'environnement alimentaire validés et récemment mis au point.

Résultats. Si peu d'obstacles freinent l'adoption des directives, l'implantation présente pour sa part plus de défis. En effet, l'implantation a été entravée par des facteurs tels le peu de rentabilité associée aux articles santé, le manque de temps et les contraintes relatives aux ressources. Les directives qui ne restreignent pas la disponibilité d'options non santé sont plus facilement acceptées par les intervenants. Dans le cadre de l'implantation des directives, on soutenait la création d'un environnement alimentaire santé. Toutefois, l'offre d'articles santé demeurait très limitée dans les cafétérias (16 %) et les distributeurs automatiques (20 %), et les enfants continuaient d'acheter principalement des articles non santé.

Conclusions. Les résultats suggèrent que les enfants ne choisissent pas assez souvent des options santé lorsque des options non santé sont offertes. Ainsi, bien que la mise en place de directives sur la nutrition dans un format non restrictif ait pu présenter certains avantages, ces directives devraient être mises à jour afin de recommander l'élimination totale ou quasi-totale des options non santé.

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INTRODUCTION

The rise in obesity among children in past decades has led to increased interest in the role played by unhealthy environments that promote consumption of energy-rich and nutrient-poor foods, and that discourage physical activity (1). While significant momentum exists in Canada to improve school nutrition environments, little attention has been paid to improving other food environments of relevance to children. Empirical data have recently confirmed that recreational facilities are one such environment that should be addressed, as they are a primary community health resource offering affordable opportunities for physical activity and recreation (2,3).

Despite their health mandate, many recreational facilities offer foods inconsistent with recommendations for healthy eating (4-7) and thereby expose children to conditions that promote unhealthy dietary behaviours. As a result, some Canadian cities (8,9) and provinces (7,10-12) have taken action to improve the food environment in recreational facilities. In Alberta, the Alberta Nutrition Guidelines for Children and Youth (ANGCY) are intended to facilitate children's access to healthy food and beverage choices within schools, child-care facilities, and recreational facilities. Specifically, the guidelines provide recommendations for improving these food environments, and a food rating system that specifies the types of foods that should be offered (10). The food rating system takes into consideration fat, protein, fibre, sugars, sodium, and selected micronutrients to categorize food and beverages into three categories: "choose most often" (CMO), "choose sometimes" (CS), and "choose least often" (CLO) (10).

Uptake of the ANGCY in recreational facilities has been limited in comparison with other settings, however. Only 6% of facilities had implemented the guidelines one year after their release (6). Recreational facilities may require additional support to adopt and implement nutrition guidelines because their food services are often delivered on a for-profit basis, use of recreational facilities is voluntary, and their nutrition policies necessarily affect food options available to adults, as well as children.

PURPOSE

We investigated the nature of the food environment within a recreational facility that had adopted and implemented the ANGCY, as well as the factors that influenced their adoption and implementation. Diffusion theory provided generalizing principles to explain adoption and implementation of the ANGCY within this context. "Adoption" is defined here as a one-time decision to follow the ANGCY, whereas implementation refers to multiple acts that must be repeated over time to put an adoption decision into practice (13).

METHODS

Study design

In this mixed-methods case study, Greenhalgh's diffusion of innovations theory was used as a heuristic to structure data

Table 1

Major components of Greenhalgh et al.'s conceptual model for considering determinants of diffusion, dissemination, and implementation of innovations in health service delivery organizations (14)

Framework components	Description
Attributes of the innovation	Perceived attributes of the innovation that help to explain variance in adoption rates
Elements of the user system	
Organizational antecedents for innovation	General features of the organization that make it more or less innovative
Organizational readiness for innovation	Readiness and/or willingness of the organization to adopt a particular innovation
Adoption process	Influential aspects of adopters and adoption as a process
Processes of assimilation	Organizations may move back and forth between initiation, development, and implementation of innovation
Implementation process	Specific steps taken to put a decision into practice
Communication and influence, diffusion and dissemination	Means of spreading the innovation
Outer context	External influences on the organization's decision to adopt an innovation
Linkage between developers and users	Connections that facilitate movement of the innovation from the resource system to the user system

collection, analysis, and interpretation, and to provide a basis for generalizing findings to new cases (Table 1) (14). The study was approved by the Faculties of Physical Education and Recreation, Agricultural, Life and Environmental Sciences and Native Studies Research Ethics Board at the University of Alberta. Informants provided written, informed consent before participating in this study. To protect participants' identity, descriptions of the setting are general and do not include details that might lead to identification of the case.

Data generation

Data generation and analysis were concurrent to permit exploration of emerging themes and adjustment of data-gathering instruments and procedures. The facility was chosen because it was the only one known to have implemented the ANGCY more than a year before the current study, which took place in summer 2010. A previous investigation identified one year as the minimum time frame within which significant change could be expected in this setting (15).

Interviews: The theoretical framework (14) guided devel-

Table 2
Theoretically informed, semistructured interview guide^a

1. What is the history of the facility and its food service?
2. Can you describe your role within the organization?
3. Tell me about when and how you first learned of the ANGCY (communication and influence).
4. How did you come to believe it was important for you to adopt and implement the ANGCY (communication and influence)?
5. Who made the decision to adopt the ANGCY (adoption process)?
 - a. How was the decision made?
 - b. When was the decision made?
 - c. What reasons were given?
6. Thinking about adoption, which is a one-time mental decision to use the ANGCY, what were the barriers to adopting the ANGCY (adoption process)?
 - d. Which were the most important?
 - e. How did you address these barriers? How could these barriers be overcome?
7. What things made it easier to adopt the ANGCY (adoption process)?
 - f. What was the most important factor?
 - g. What things would have made it easier to adopt the ANGCY?
8. How did you go about developing nutrition policies (adoption process)?
9. Thinking about implementing the ANGCY, which are the concrete steps to put the ANGCY into practice, what are all the things you had to do to implement the ANGCY (implementation process)?
 - h. Which aspects of the ANGCY did you implement, and why?
 - i. What changes did you make to the ANGCY during implementation (attributes of the innovation)?
 - ii. Did you implement any of your own nutrition policies/programs that were not part of the ANGCY (attributes of the innovation)?
 - iii. What aspects of the ANGCY did you want to implement but were unable to (organizational readiness for innovation)?
 - i. What resources did you have already, and what resources did you have to acquire to be able to implement the ANGCY (organizational antecedents for innovation)?
 - j. How did you communicate changes to your staff, and how did they provide you with feedback on the changes (communication and influence)?
 - k. What was the timeline?
 - l. What do you define as successful implementation?
10. What were the barriers to implementing the ANGCY (implementation process)?
 - m. Which were the most important?
 - n. How did you address the barriers to implementation?
11. What things made it easier to implement the ANGCY (implementation process)?
 - o. Which were the most important?
 - p. What things would have made it easier to implement the ANGCY?
12. What factors in the wider environment helped/hindered adoption and implementation (outer context)?
13. Can you describe the internal and external support and opposition you had throughout adoption and implementation (organizational readiness for innovation)?
14. In what ways did the ANGCY fit/not fit with your values and priorities (organizational readiness for innovation)?
15. In what ways did the ANGCY fit/not fit with your ways of working and skill sets (organizational readiness for innovation)?
 - q. What changes did you make to your ways of working to better fit the ANGCY?
16. How do you make sure the ANGCY policy continues to be followed (processes of assimilation and implementation)?
17. What outcomes have you observed from implementing the ANGCY (attributes of the innovation)?
18. As you look back on adopting and implementing the ANGCY, are there any other important factors that stand out in your mind (assimilation process)?
19. What advice would you give to a recreation facility manager who is deciding whether to adopt/implement the ANGCY (assimilation process)?
 - r. What, if anything, would you do differently next time?
20. What are your future plans with respect to the ANGCY (assimilation process)?

^a Questions initially were asked to open up areas of inquiry, and were followed by targeted probes when required. Theoretical domains addressed by each question are listed in parentheses. The domains for the probes are the same as those for the parent question, except where otherwise indicated.

opment of a brief, semistructured interview guide (Table 2). The guide was pilot tested with two recreational facility managers. The recreational facility manager participated in two in-person semistructured interviews lasting 60 and 90 minutes, respectively. Corroborating evidence and various perspectives were sought through 45- to 90-minute interviews with four other purposefully selected managers, including the local manager and the district manager for the privately operated concession, the manager responsible for the facility's privately oper-

ated vending machines, and another facility manager within the municipality who had played a key role in adopting and implementing the ANGCY. Three of these interviews were conducted in person, and one was conducted over the telephone. All interviews were recorded and transcribed verbatim.

Observations: Two independent observers conducted three formal 30-minute observations of the facility's food service at different times on different days. Observers were guided by a theoretically informed observation guide, supplemented by

field notes and “grand and mini-tour” observations during and after the observation sessions (16,17). Observers recorded the salient features of the food environment and staff and patron activities and behaviours within the environment. Observations recorded by both observers were transcribed and used in the analysis.

Document review: A review was conducted of general administrative documents related to the case, including policies, food service contracts, and the recreation department’s strategic plans. Printed and online sources of municipal statistics were consulted to obtain contextual and organizational information.

Sales data: Detailed sales data were requested from food vendors.

Assessment of the food environment: The food environment was assessed with four complementary measures to provide a comprehensive assessment of its multiple dimensions: food and beverage availability, the Nutrition Environment Measures Survey in Restaurants (NEMS-R), a nutrition profile of vending machine items, and ANGCY adoption and implementation scores.

Foods and beverages in vending machines and the concession were recorded and classified according to ANGCY criteria (10). Nutrition information was obtained from food vendors and company websites, as well as directly from manufacturers and, where necessary, from the Canadian Nutrient File (version 2010, Health Canada, Ottawa, 2010) and Food Processor SQL 10.6 (ESHA Research Inc., Salem, OR, 2010).

The NEMS-R is a validated observational instrument that provides a comprehensive and quantitative assessment of factors contributing to food selection in restaurants (18). A trained researcher completed the NEMS-R in the facility.

To determine the average nutrition profile of vending machine items, we obtained nutrition information for all items in vending machines from package labels, company websites, or the manufacturer (19).

Alberta Nutrition Guidelines for Children and Youth adoption and implementation scores from 0 to 38 were assigned by two raters on the basis of direct observations, review of menus and policies, and information provided by managers. Each scoring system consists of up to 19 policies or environmental characteristics recommended in the ANGCY (Table 3), for which facilities received 0, 1, or 2, according to whether the policy (adoption) or environmental characteristic (implementation) was present (1 = partially present, 2 = fully present) or absent (0); a higher score indicated greater congruence with the ANGCY. Discrepancies between raters were resolved through discussion to arrive at a mutually agreed-upon score. Qualitative observations were also recorded for each of the content items. Researchers and government officials involved in developing the ANGCY assessed the content validity of the scoring systems to ensure congruence with ANGCY recommendations. Two raters pilot tested the scoring systems in one facility for reliability and for clarification of decision rules.

Data analysis

Qualitative interviews, observations, and documents: Direct-

ed content analysis was used (20). This approach was used with the theoretical framework to guide development of an initial coding and categorizing scheme and operational definitions for the codes (20). Another member of the research team inspected the coding scheme to ensure congruence with the elements of the theoretical framework. A single investigator applied the scheme to all study data, using memos, constant comparison, and questions. NVivo software (version 8, QSR International, Cambridge, MA, 2008) was used to organize the data.

Assessment of the food environment: The number of CMO, CS, and CLO items available was expressed as a percentage of the total distinct items available for sale, and as a percentage of the total items within each food category (main dish and side items, snacks and desserts, beverages).

The NEMS-R score (range -27 to +63) for the concession was determined according to Saelens et al.’s standardized protocols (18).

Nutrients present within all items in food and beverage machines were added together to derive a total for each type of machine. An average was derived to represent the average nutrient content of an item from each type of machine (19).

The total ANGCY adoption and implementation scores were derived by summing the scores for individual content items. Scores were expressed as a percentage of the total possible score.

Data integration: Mixed methods were used for the purposes of triangulation and complementarity, and thus the different methods remained independent during data collection and analysis (21). Following analysis, the range of possible scores for quantitative measures was divided into quintiles and transformed into textual descriptions to facilitate description. The top quintile (i.e., 81% to 99%) corresponded to a rating of “very high/healthy,” and was followed by “healthy/high,” “moderately healthy/high,” “limited,” and “very limited.” Quantitative and qualitative data were then integrated into a single case-study data set and interpreted jointly to produce the case report.

RESULTS

Local context and setting

The recreational facility was a new, large multiplex building that included a soccer centre, a pool, a gymnastics area, a fitness centre and studios, a climbing wall, a running track, a field house, and an arena. Approximately 50% of facility users were under age 18. Food service was provided by a concession that was part of a national chain popular for its fries, poutine, and pizza. The vending machine company was a small local firm with a similarly unhealthy food base.

Adoption of the ANGCY

Adoption of the ANGCY via nutrition policy: Following the release of the ANGCY in June 2008, the facility manager and a colleague used the ANGCY as the basis for developing a nutrition policy applicable to all recreational facilities within the municipality (Table 3). The policy was based on choice, in that

Table 3

Comparison of the Alberta Nutrition Guidelines for Children and Youth (ANGCY) with selected segments of the recreational facilities' nutrition policy and food service contracts

ANGCY recommendations	Choice-based nutrition policy	Concession contract	Vending machine contract
Healthy (CMO) options in all vending machines	≥25% of vending machine items are healthy according to <i>Canada's Food Guide</i>		≥25% of total vending machine items are CMO
Healthier items competitively priced	Healthier items competitively priced; no premiums on healthier items; healthy items put on sale	No premiums on CMO options; lower profit margin on CMO options compensated for by an increased profit margin on CS and CLO items	No premiums on CMO options; lower profit margin on CMO options compensated for by an increased profit margin on CS and CLO items
Healthier items prominently displayed	Healthier items prominently displayed, advertised in same manner as or more visible manner than unhealthy items	Healthy (CMO) items prominently displayed, placed in high-profile locations; advertising features CMO options more prominently than CS and CLO options	Healthy (CMO) items placed in high-profile locations
Healthier items attractively packaged	Healthier items attractively displayed	Healthy (CMO) items attractively packaged	
Healthier items convenient	Healthier items displayed alongside food of similar types		
Healthier items fresh			
Portion sizes consistent with <i>Canada's Food Guide</i>	Portion sizes consistent with <i>Canada's Food Guide</i> ; child-friendly portions available		
Snack items with 100 calories per package	Less-healthy options sold in small portions		
Milk and 100% fruit/vegetable juice available	Milk and 100% fruit/vegetable juice available; choices for lower-fat dairy should be available	Healthy food/beverage choices (CMO) always available	Not permitted to sell milk
Water always available		Healthy food/beverage choices (CMO) always available	
Unprocessed fruits and vegetables always available	Unprocessed fruits and vegetables always available	Healthy food/beverage choices (CMO) always available	Not permitted to sell fruit and vegetables
Whole grains always available	Nutrient-rich cereals, breads, and other whole grains available	Healthy food/beverage choices (CMO) always available	Not permitted to sell grain products
Lean meats, poultry, beans, lentils, plain nuts always available	Choices for leaner meats should be available	Healthy food/beverage choices (CMO) always available	Not permitted to sell meat and alternatives
Mixed dishes contain a whole grain (if grains present) and are low in fat, sugar, salt		Healthy food/beverage choices (CMO) always available	
	Foods prepared with little or no fat should be available		
	Reduced salt and caffeine options should be included		
	Elimination of products containing trans fats		
	Nutrition information available upon request		
	Establishment of an identifiable rating system to showcase nutrient-rich foods	Establishment of an identifiable rating system to showcase nutrient-rich foods	
	Inclusion of nutrition standards in programs and services; development of and support for initiatives that encourage healthy lifestyle choices		
		Food/beverage service is mindful of the environment	
			Vending may sell only soft drinks, bottled water, sports drinks, juice, hot beverages, frozen novelties, and packaged snack foods

CLO = choose least often; CMO: choose most often; CS = choose sometimes

it allowed healthy and unhealthy foods to be sold concurrently. The ANGCY policy score was 82% for this facility, indicating that the policy was very highly congruent with the ANGCY.

Factors influencing adoption of the ANGCY:

The facility manager became aware of the ANGCY through participation in a stakeholder consultation for an early draft of the guidelines (communication and influence) and through dialogue with local school boards (organizational readiness for the ANGCY). Later, the imminent expiry of the facility's food service contracts provided the principal adoption stimulus (organizational antecedents for the ANGCY), which was fuelled by the manager's strong personal convictions about the importance of healthy eating (the adoption process). Few barriers to policy adoption existed; however, the perceived financial risk associated with offering healthier items was a consideration, as was the fact that no examples of successful adoption (attributes of the ANGCY) were available to emulate. In addition, healthy eating in the recreational facility setting had little prominence within municipal discourse (the outer context), as the school food environment was the primary focus.

Implementation of the ANGCY

Assessment of the food environment: Implementation of the ANGCY was assessed through an evaluation of the quality of the nutrition environment. The NEMS-R score suggested a healthy nutrition environment and ANGCY implementation scores indicated high implementation, with an overall score of 68% for the facility (Tables 4 to 6). The availability of healthy (CMO) options was, however, limited in beverage vending machines and very limited in food vending machines and the concession (Tables 4 to 6). These quantitative findings were broadly congruent with observers' recorded qualitative observations, which indicated that although the food environment had many positive features, a majority of items remained energy-dense and nutrient-poor.

Sales data: The concession provided limited sales data showing that sales were lower following ANGCY implementation, and the vending machine company reported similar outcomes. Both attributed these losses to a combination of recessionary factors and the introduction of the ANGCY, contending that to comply with the ANGCY they had had to replace some highly saleable unhealthy items with less saleable healthy items. They added that healthy foods had lower profit margins and shorter expiry dates, and required more time to prepare and to source.

Implementation of the ANGCY via food service contracts:

Responsibility for implementing the ANGCY was devolved to food vendors through inclusion of selected nutrition standards from the nutrition policy document in renewed food service contracts beginning January 2009 (Table 3). This was believed to be the only feasible means of ANGCY implementation, given the facility's resource constraints.

Table 4
Assessment of the food environment of vending machines

Food environment item	Beverage vending (n=8)	Food vending (n=4) ^a	Total vending (n=12)
Availability of CMO items ^b	31%	2%	20%
Availability of CS items ^b	4%	8%	5%
Availability of CLO items ^b	65%	90%	75%
ANGCY implementation score	85%	67%	–

ANGCY = Alberta Nutrition Guidelines for Children and Youth; CLO = choose least often; CMO = choose most often; CS = choose sometimes

^a Non-food items (e.g., lozenges, breath mints) were excluded from the analysis.

^b Availability was assessed on two occasions, and the average was used; values represent percentage of shelf space.

Table 5
Average nutrient profile of vending machine items^a

Measure	Beverage vending (n=8)	Food vending (n=4) ^a
Energy	126 kcal (527.5 kJ)	216 kcal (904.4 kJ)
Fat	0	42%
Carbohydrate	98%	54%
Sugar	28 g	13 g
Fibre	0 g	1 g
Protein	3%	6%

^a Non-food items (e.g., lozenges, breath mints) were excluded from the analysis.

Table 6
Assessment of the food environment in the concession^a

Food environment item	Main dish and side items ^b	Snacks and desserts	Beverages	Total
Availability of CMO items ^c	23%	7%	16%	16%
Availability of CS items ^c	18%	9%	2%	11%
Availability of CLO items ^c	59%	85%	81%	73%
ANGCY implementation score	–	–	–	75%

ANGCY = Alberta Nutrition Guidelines for Children and Youth; CLO = choose least often; CMO = choose most often; CS = choose sometimes

^a The total Nutrition Environment Measures Survey in Restaurants score was +28.

^b Eighty-three percent of the items deemed to be healthy options within the company's corporate nutrition program met the ANGCY criteria for CMO options.

^c Food and beverage availability in the concession did not differ throughout the case study, and therefore only a single assessment was required. Values represent the percentage of total items available.

Factors influencing ANGCY implementation

Several factors influenced implementation of the ANGCY, including their attributes, communication and influence, organizational antecedents, the facility's readiness for implemen-

Table 7

Managers' selected quotations on factors influencing implementation of the Alberta Nutrition Guidelines for Children and Youth

Factor	Quotation
ANGCY attributes	
Relative advantage	"You can't just cut them off and say, 'Sorry, you're in the fatty food business, we're not going to talk to you anymore,' because... it's also the community that we would be kicking.... Without them sponsoring hockey teams you don't have those kids getting activity, so you know they're balancing it out."
Complexity	"I just wish it was cut and dried, and tell us... what products we can put in it, you know? But right now I've got to go read every package and try and match it up. And I've got other things to do, you know? I can't just sit there and read labels all day.... If they told me what I could put in, then it would be easier."
Communication and influence	
Champions	"It goes back to not having a champion who's dedicated to moving the initiatives further.... I wish there was someone further up the ladder who was more passionate or interested in it, because then it would probably move.... There's nobody leading the charge."
Interorganizational knowledge sharing	"It was really frustrating to me that there wasn't a lot of Canadian stuff out there that you could say, 'Well, look at how it's working.' I had reservations about what it would mean to revenue streams, public reaction: there's a few things that concerned me. So I really wanted to go and hear from other people who had done it—what the pitfalls were, what the successes were and the opportunities. I just couldn't."
Recreational facility readiness to implement the ANGCY	
Fit of ANGCY with facility context	"We need to balance what's sustainable in terms of support for the facilities because we get revenue or other assets from the sale of [unhealthy foods] at our facilities, and balancing our philosophy and our beliefs in terms of healthy lifestyles...., we're on a teeter-totter.... [We] can't do one without affecting the other one.... Like, you start taking away the revenue and all of a sudden your fees go up and... so now you've got kids eating healthy but they're not going in to swim."
Processes of assimilation and implementation	
Complex, nonlinear process	"I really think that we've missed the mark with implementing.... It's one thing to have it in paper and contracts, but it's another thing to deliver it.... Like, it's not as simple as writing a policy and people picking it up. It just doesn't work that way."

tation, and the processes of assimilation and implementation. These are detailed below and in Table 7.

Attributes of the ANGCY: Managers perceived that proceeding further with ANGCY implementation would reduce profitability for food vendors so that they would no longer be able to provide financial support for local organizations and activities, or infrastructure within the facility itself (e.g., scoreboards). Therefore, insofar as managers believed that selling healthy food was unprofitable, they believed the ANGCY did not provide them with a relative advantage.

The vending machine manager had difficulty finding and sourcing foods that fit within the CMO category, especially those that would also appeal to consumers. Adding to the complexity of this process was the fact that the vending machine manager found it time-consuming.

Communication and influence: The facility manager consistently attributed limited implementation of the ANGCY to the absence of an influential champion who could move things forward. In addition, interorganizational knowledge sharing was not possible. The facility manager had sought to learn from the experiences of other facilities that had adopted and implemented nutrition guidelines, but was unable to locate any such facilities.

Organizational antecedents for the ANGCY: Managers' overall positive attitudes toward change, supportive relationships with one another and their staff, and willingness to accept some financial risk were key facilitators of implementation.

Implementation of the ANGCY in the concession was greatly facilitated by its corporate nutrition program, which had provisions and standards similar to those of the ANGCY.

Readiness to implement the ANGCY: While implementation of a nutrition policy had made eating healthfully easier within the facility, managers' and researchers' observations suggested that children were not purchasing healthier items as a result. Negative implications of the policy were particularly evident when, each weekday, students from the two neighbouring high schools came to the facility to purchase primarily unhealthy foods for lunch because their schools' restrictive nutrition policies meant that only CMO items were available on school grounds. The choice-based format of the recreational facility nutrition policy allowed healthy and unhealthy items to be sold concurrently. The negative financial implications of a restrictive policy were expected to be even more problematic, however, and therefore the choice-based policy was maintained.

The ANGCY fit within the organization insofar as the facility could satisfy its health-conscious patrons' expectations, but the guidelines were incompatible with its goal of profitability. Adoption of a choice-based nutrition policy was the mechanism through which these competing mandates were balanced within a sociopolitical framework of individual responsibility for food choices.

Although reconciling their respective choice-based and restrictive nutrition policies was challenging, continued interaction and dialogue between the recreational facility and the

school boards helped to sustain implementation. No overt opposition to implementation occurred, although apathy was evident in staff who failed to “buy in” to the initiative, in food vendors’ and the municipality’s failure to prioritize child health, and in patrons who, by virtue of their buying power, demonstrated indifference toward the facility’s efforts through continued purchase of unhealthy items.

The processes of assimilation and implementation: Overall, assimilating and implementing the guidelines was a complex, nonlinear process. Collectively, all managers perceived adoption as a simple matter, whereas implementation was described as much more challenging. Although the choice-based policy had greatly facilitated adoption of the ANGCY, the model had become an important barrier to achieving meaningful change within the facility’s food service. Indeed, all managers readily admitted that relatively little had changed under the policy. Healthy options had always been available: implementation of the ANGCY-based policy simply meant more were available. Meanwhile, unhealthy foods continued to dominate the food landscape. The manager therefore sought to transition to a restrictive policy with “teeth” and impact. Such a move, however, required a new business model that did not rely on food service revenues, and the manager remained skeptical that stakeholders would support this change.

A lack of dedicated time and resources was a challenge. Staff and managers faced significant time pressures with respect to implementing the ANGCY. The near absence of supportive tools, resources, and persons specific to the recreational facility context also constituted an important barrier to implementation.

Implementation of the ANGCY was not monitored, and therefore managers were unsure whether food vendors were adhering to the terms of their contracts. This contributed to the atmosphere of ambivalence surrounding the ANGCY, as no one could be certain whether their efforts to adopt and implement the ANGCY had been worthwhile.

DISCUSSION

Overall findings

The use of mixed methods within this study added a depth and a breadth to findings that could not have been achieved otherwise. Overall, study findings suggest that the facility was relatively successful in implementing the ANGCY, as the qualitative findings and the NEMS-R and ANGCY implementation scores showed many healthy characteristics in the nutrition environment. Areas for improvement remained, however: food availability scores, observations, and interviews revealed that the balance of items was still heavily weighted toward unhealthy options, a finding not captured by the NEMS-R or ANGCY implementation scores. As Naylor et al. (15) have demonstrated, positive change in recreational facility food environments can be achieved within a relatively short time if facilitation, resources, and support are provided. Provision of these may enable greater change in this setting, a conclusion supported by qualitative findings from the current study.

Children’s food purchasing decisions

Researchers’ and managers’ observations revealed that the changes in this facility’s food environment had little impact on children’s food purchasing decisions. Other studies in recreational facilities have shown that poor sales (5,7,22) and a lack of demand for healthier items (23) are important barriers to offering healthier options. In eight British Columbia recreational facilities, approximately 75% of patrons reported that their food purchases were unchanged (12,15) after a 20% increase in healthier items in vending machines and other measures to promote sales of healthier items. Empirical evidence from other settings confirms that increasing the proportion of healthier options is unlikely to influence children’s dietary behaviours when nutrient-poor, high-calorie items continue to predominate (24,25). Environmental interventions are most effective when they include healthy options, and restrict the availability of unhealthy options (24-26). Thus, the proportion of CMO options within the facility may have been insufficient to improve children’s dietary behaviours noticeably. However, many provincial nutrition guidelines, including the ANGCY, permit sales of unhealthy items as long as some healthy options are available. This could explain why the ANGCY implementation scores were high despite limited availability of healthy items. Future studies should investigate whether guidelines formulated in this manner can improve children’s food purchasing decisions. Moreover, although the ANGCY addresses many barriers to healthy eating, more comprehensive measures at multiple ecological levels may be required to overcome a wider range of barriers that children encounter.

Choice-based nutrition policy

The choice-based format of the ANGCY-inspired nutrition policy may have done little to improve children’s dietary behaviours. It was, however, an important facilitator of ANGCY adoption, as few stakeholders would have supported a restrictive nutrition policy. Thus, adopting a staged approach to nutrition policy implementation may be advantageous. With this approach, healthy and unhealthy foods can be sold concurrently for a time. As healthy foods become integrated within the food environment and stakeholder support builds, policies can be strengthened to a restrictive format that supports improved dietary behaviours. Similarly, at the provincial level, the current ANGCY format may be optimal at this early stage. Once a critical mass of adopters is reached, the ANGCY should be strengthened so that elimination of unhealthy options is recommended or mandated.

Study limitations

This qualitatively driven case study was grounded in principles of analytic generalization, which seeks to expand and generalize theories (27). Thus, study findings are not representative of all recreational facilities in Alberta. Greenhalgh’s diffusion theory provided a highly useful framework for distilling and synthesizing the factors important to adoption and implementation of the ANGCY in this setting. Findings suggest that future studies can use Greenhalgh’s theory to inform points of intervention.

Potentially, this approach could lead to stronger effects than interventions with no theoretical basis (28).

Specific nutrition information for all menu items was not available from the concession. Some of this information therefore was obtained from a nutrient database, which provided a more generic nutrient analysis.

The tool used to assess ANGCY adoption and implementation has not been fully tested for construct validity. Nevertheless, preliminary findings indicate good congruence with the NEMS-R measure and an ability to distinguish ANGCY adopters from nonadopters. Quantitative sales data were not available to substantiate the finding that children's food purchases were primarily unhealthy. However, several managers and researchers made this observation.

Individual behaviour to make healthy dietary choices can occur only in supportive environments with accessible and affordable healthy food choices. Unhealthy food environments, by contrast, subvert informed and responsible food choices, and undermine the health messages that parents and other adults communicate to children. The ANGCY represents a collective approach to the problem of childhood obesity that, by making healthy options available, may help improve children's diets. The ANGCY may therefore offer an effective complement to individually oriented strategies within a larger ecological approach to obesity prevention. Findings suggest that implementing the ANGCY supported creation of a healthy food environment, although a higher proportion of healthy foods may be needed to support improved dietary behaviours among children.

RELEVANCE TO PRACTICE

Growing recognition of the need to improve children's food environments offers new avenues for dietetic practice. Findings from this study highlight areas in which dietitians might support the efforts of recreational facilities to sell healthier items, can inform future points of intervention for dietitians working in policy, practice, and research settings, and will contribute to a body of knowledge surrounding the optimal formulation of nutrition guidelines.

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References

- World Health Organization. Obesity: preventing and managing the global epidemic. Geneva: World Health Organization; 2000.
- Godbey GC, Caldwell LL, Floyd M, Payne LL. Contributions of leisure studies and recreation and park management research to the active living agenda. *Am J Prev Med.* 2005;28(2 Suppl 2):150-8.
- Bocarro J, Wells M. Making a difference through parks and recreation: reflections on physical activity, health and wellness research. *J Park Recreation Adm.* 2009;27(3):1-7.
- Chaumette P, Morency S, Royer A, Lemieux S, Tremblay A. Environnements alimentaires des sites sportifs, récréatifs et culturels de la Ville de Québec: un portrait de la situation. *Can J Public Health.* 2009;100(4):310-4.
- Naylor PJ, Bridgewater L, Purcell M, Ostry A, Wekken SV. Publically funded recreation facilities: obesogenic environments for children and families? *Int J Environ Res Public Health.* 2010;7(5):2208-21.
- Olstad D, Downs S, Raine K, Berry T, McCargar L. Improving children's nutrition environments: a survey of adoption and implementation of nutrition guidelines in recreational facilities. *BMC Public Health.* 2011;11:423-35.
- Thesenvitz J, Prange M. Eat Smart! Recreation centre program pilot project process evaluation report. Toronto: Nutrition Resource Centre, Ontario Public Health Association; 2009.
- Payton L. Gatineau deep-sixing the deep fry at hockey arenas. *Ottawa Citizen.* 2009 Feb 3.
- City of Hamilton Community Services Department (Culture & Recreation Division). Healthy nutritional environments in city recreational facilities (CS06015). Hamilton, ON: City of Hamilton Community Services Department; 2006 Jun 1.
- Alberta Health and Wellness. The Alberta nutrition guidelines for children and youth. Edmonton: Alberta Health and Wellness; 2010.
- Healthy Eating Physical Activity Coalition of New Brunswick. Healthy foods in recreation facilities. It just makes sense. [place unknown]; Healthy Eating Physical Activity Coalition of New Brunswick; 2009.
- Naylor PJ, Wekken S. Healthy food and beverage sales in recreation facilities and local government buildings. Process and impact evaluation final report. Victoria, BC: University of Victoria; 2009.
- Rogers E. Diffusion of innovations. 5th ed. New York: Free Press; 2003.
- Greenhalgh T, Robert G, Macfarlane F, Bate P, Kyriakidou O. Diffusion of innovations in service organizations: systematic review and recommendations. *Milbank Q.* 2004;82(4):581-629.
- Naylor PJ, Wekken SV, Trill D, Kirbyson A. Facilitating healthier food environments in public recreation facilities: results of a pilot project in British Columbia, Canada. *J Park Recreation Admin.* 2010;28(4):37-58.
- Spradley JP. Making descriptive observations. Participant observation. New York: Holt, Rinehart and Winston; 1980.
- Spradley J. Participant observation. New York: Holt, Rinehart and Winston; 1980.
- Saelens BE, Glanz K, Sallis JF, Frank LD. Nutrition Environment Measures Study in Restaurants (NEMS-R): development and evaluation. *Am J Prev Med.* 2007;32(4):273-81.
- Buhler S, Raine K. Partnering with a commercial vendor to improve a hospital food environment. *Obes Rev.* 2010;11(S1):460.
- Hsieh HF, Shannon SE. Three approaches to qualitative content analysis. *Qual Health Res.* 2005;15(9):1277-88.
- Caracelli V, Greene J. Data analysis strategies for mixed-method evaluation designs. *Educ Eval Policy Anal.* 1993;15(2):195-207.
- Thomas H, Irwin J. Food choices in recreation facilities: operators' and patrons' perspectives. *Can J Diet Pract Res.* 2010;71(4):180-5.
- Atkinson J. Healthy foods in recreational facilities: a follow up investigation. Fredericton, NB: New Brunswick Department of Wellness, Culture and Sport; 2010.
- Institute of Medicine. Preventing childhood obesity: health in the balance. Washington: National Academy Press; 2005.
- Larson N, Story M. Are 'competitive foods' sold at school making our children fat? *Health Aff (Millwood).* 2010;29(3):430-5.
- Centers for Disease Control and Prevention. Recommended community strategies and measurements to prevent obesity in the United States. *MMWR Recomm Rep.* 2009;58(RR-07):1-26.
- Yin R. Case study research design and methods. 4th ed. Thousand Oaks, CA: Sage Publications; 2009.
- Michie S, Prestwich A. Are interventions theory-based? Development of a theory coding scheme. *Health Psychol.* 2010;29(1):1-8.