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Pathways: lessons learned and future directions for school-based interventions among American Indians

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Abstract

Background—Pathways, a multicenter study to test the effect of a school-based program to prevent obesity in American Indian children, yielded many benefits and encountered many challenges. This paper explores what we have learned from this study and examines possible future directions.

Methods—Information presented in this paper is based on formative research, study results, and discussions with staff and investigators.

Results—Some of the lessons learned relate to having a strong relationship with the tribes, how best to engage the communities, the importance of formative research and achieving standardization in culturally diverse settings, how to incorporate cultural information into curricula, and the importance of family involvement. One of the strengths of the study was the collaborative process that teamed American Indian and non-American Indian investigators and staff. Researchers recognized that they must work in cooperation with research participants including their schools and communities to address challenges, to ensure accurate findings and analyses, and to share benefits.

Conclusions—The lessons learned from Pathways offer valuable insights for researchers into successful approaches to the challenges inherent in research in American Indian communities, particularly in schools, and how to maximize the benefits of such a study. © 2003 American Health Foundation and Elsevier Inc. All rights reserved.

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Keywords

American Indians; Children; Schools; Obesity; Prevention; Community participation

Introduction

This paper considers the significance of Pathways from a broad perspective. We believe that the benefits of this study go well beyond specific measured outcomes. Over the 9 years of the study, we encountered many challenges, but also found many important benefits at different levels. As mentioned by Stone et al. in this special issue and elsewhere, the school is an excellent locale for promoting health among children [1]. Researchers have long worked with schools to address health issues with early intervention and to identify the best prevention strategies. However, relatively little has been written about the experience of conducting school-based research.

The need for this kind of sharing is great. Many school intervention studies have reported no effects, when in fact the lack of results stemmed from poor implementation of the intervention, rather than from shortcomings in the intervention [2–6]. Furthermore, different results from similar prevention programs raise concerns that differential implementation may account for the variability [7]. For example, evaluations of education programs in which teachers have utilized classroom management and instructional practices have often focused on intervention and control group comparisons while assuming a dichotomous categorization between intervention and control groups [8]. This perspective assumes that all intervention students receive comparable treatments. In reality, large variations likely characterize the adoption and implementation of practices in the intervention group.

Another large gap in the literature relates to how intervention programs can best meet the special circumstances of American Indians. The scope and urgency of the American Indian child obesity problem is described in this issue (see Story et al.). The authors note that there is great variability among tribes due in part to differences in access to resources (financial, food, opportunities for physical activity), social norms, and rules about food and consumption within the household. This paper will present our overview of some of the key lessons learned from the Pathways study. These lessons are related to five main topics: how best to work in schools in American Indian communities, appropriate integration of cultural information, implementing effective community participation, role of standardization of intervention approach in these settings, and use of a theoretical framework (i.e., Social Learning Theory). In the last section of the paper, we will explore future directions and needs.

Methods

The information presented in this paper is based on a synthesis of previous experiences and recommendations of Pathways staff and investigators that formed the participatory foundation and approach used to develop the study during its feasibility phase [9], on the Pathways formative research [10,11], on study results presented in this issue, and on critical discussion and reflection about the Pathways experience among staff and investigators. The

theoretical and cultural rationale and the process to be used to construct the intervention were developed early in the study [9]. Formative assessment data collected in the feasibility phase of Pathways helped us to anticipate potential problems and develop intervention strategies that would be more likely to be successful. Our review of lessons learned from the feasibility phase was useful in implementing the full-scale study and in determining lessons learned for the overall study.

In the first year of the Pathways main trial, a structured school checklist was used to assess school resources and other environmental factors that would need to be accommodated in order for the program to succeed. During the implementation of the intervention, process evaluation (see Steckler et al., this issue) and school climate data (Gittelsohn et al., this issue) helped to assess reactions to different components of the Pathways study. In addition, each field center conducted regular meetings with project staff to assess the progress of the study and to deal with site specific issues.

Lessons learned

Nine lessons are presented in order of the stage of implementation of Pathways in which they were learned, from initial set-up, to development and implementation, and through evaluation.

Lesson 1: Develop and maintain long-term relationships with American Indian communities

Research in American Indian populations historically has been conducted by non-American Indian investigators. Researchers generally are enculturated into the research environment of academia where the goals are benefiting humanity at large, expanding scientific knowledge, and advancing academic careers. They may remain unaware of their own attitudes and affect on the research participants. This has resulted in research that may be considered exploitative and a perception that the researcher is ignorant of the wishes and desires of American Indians [9,12]. Even though many researchers have begun to respond with increased awareness of and sensitivity to the wishes of Native people and are shifting away from conventional research approaches by designing studies in partnership with communities and in response to their needs, there remains suspicion and mistrust on the part of some Native communities.

Some of the universities that were a part of Pathways had strong existing relationships that had been well-established over years of collaboration and previous collaborative projects. Other universities developed relationships with the tribes over time, which sometimes led to delays. In our estimation, the strength of these previously established relationships helped us initiate the project. However, it was the nature of specific collaborative relationships during the Pathways study that allowed the study to proceed.

Lesson 2: Employ a variety of participation methods

Participation, feedback, and collaborative relationships with the American Indian communities were crucial to conducting Pathways, a finding common to many other projects with American Indians [13–15]. Pathways was organized (see Davis et al. and Stone et al.,

this issue) in a manner to support participation both externally (largely through the formative work) and internally. The internal structure of Pathways included American Indian voting representation at all levels, from the steering committee, to membership in most subcommittees and working groups. American Indians participated in or took the lead in all aspects of the development and implementation of the Pathways curriculum, family component, and all other materials developed. In addition, the Seven Nations subcommittee, which was comprised entirely of American Indians from all participating tribes, reviewed, commented, and voted on all instruments, procedures, and materials developed. Finally, American Indian staff were trained and participated in implementing the intervention and collecting the data for Pathways.

Lesson 3: Plan for extended time for IRB and tribal approvals when working with American Indian communities

One of the first steps relates to approval of the proposed study. All intervention researchers are accustomed to having their research protocol reviewed and approved by an Institutional Review Board. At the time of Pathways, researchers were required to get a Single Project Assurance (SPA) from each school prior to beginning research. This document, required by Office of Human Research Protections, is completed by school officials. In addition, it is highly recommended that a memorandum of agreement is established between the researchers and school officials outlining the expectations and agreeing to certain requirements and benefits. This protects the school and the researcher, especially if there is a turnover of school administration and/or staff who may or may not be as supportive of the project, or may not have had a clear understanding of the school's relationship with the study. Additional approvals were needed from school boards, and parental permission and child consents were obtained.

Another essential review that is required when working with American Indian nations is tribal approval. As sovereign nations, tribes may have a separate IRB and all require some type of tribal review and approval. Such approval may occur at various points during the research: before the research proposal is submitted for funding, after the intervention and measurements are designed, before they are implemented, and before abstracts, presentations, and manuscripts are submitted or delivered. In Pathways, various levels of tribal review required a great deal of time and attention. However, in some cases the many layers of approval provided a high level of support, as many sectors of tribal government became familiar with the study.

Lesson 4: Use formative research as a means to develop participatory relationships

Formative research can be conducted in a very extractive manner, where the emphasis is solely on providing information to the investigators, or it can also incorporate aspects of participation. In Pathways, the latter result was achieved by using multiple information gathering contexts, over multiple stages [10]. Parents, teachers, administrators, food service workers, students, and others were invited to share their input about how Pathways would be most successful. From teachers we learned about teaching methods that work in their classrooms. From parents we heard what they thought their children should learn about food, activity, and health. Community members provided input in many forms, including stories

that were used in the curriculum. The formative stage of Pathways provided the researchers with an introductory rapport-building process with local communities. Instead of coming to a community and telling them what was going to happen, we created a dialogue that encouraged participation and a sense of ownership of the process of creating Pathways. This interaction led to a high level of mutual respect among community members, school faculty and staff, and the university teams.

Lesson 5: Provide information from all participating cultures as a way both to help standardize interventions and to be culturally appropriate

Each of the seven American Indian Nations included in Pathways not only live in different parts of the country, but speak different Native languages and possess distinct customs, beliefs, and identities. It was recognized that the most successful intervention approach would be one that is adapted to the particular cultural, environmental, and economic setting of the tribe. This created a dilemma for the study, as site-specific interventions would mean a lack of standardization and make it very difficult to link interventions with outcomes. Yet a highly standardized intervention would potentially be at odds with cultural sensitivity.

Pathways addressed this concern by making the intervention inclusive of all the tribes involved [16]. The curriculum centered on exploring the customs of the different tribes that were part of Pathways. Staff from Pathways tribes helped to develop the interventions so that they were culturally appropriate but also to ensure they respect tribal and individual differences. For example, the curriculum included stories about an American Indian brother and sister who were about the same age as the students in the study. In the curriculum, Darrel and Amanda Whitehorse traveled to each of the communities included in the study and learned about the traditions and customs of healthy living, especially stories about healthy eating and physical and healthy role models from each of the tribes in Pathways. The high level of integration of cultural information also included American Indian stories provided by community members, visuals by local artists, and American Indian games. Importantly, the intervention significantly increased cultural identity (Davis et al., this issue), an indication of the benefits of this approach to the tribes.

One challenge to standardization that is often not anticipated is the difference in training and priorities of educators and researchers. Educators for the most part are trained to teach individual children basic knowledge and skills in specific areas such as math, spelling, reading, and so forth. They are encouraged to be flexible and creative in adapting each new lesson to the individual children in the classroom, often skipping around, repeating lessons, and bringing new material and techniques to the classroom as needed. Classrooms are heterogeneous and teachers are prepared to give different students different levels of materials as may be required whereas researchers want the same intervention presented to the entire class, because that is the usual study design and the school or classroom is the unit of measure.

Pathways encouraged standardization in the preparation of teachers and food service workers through training, newsletters, and visits by Pathways staff. However, it is important to note the high levels of implementation of the lessons overall. Teachers incorporated the Pathways curriculum into their teaching, often by expanding on the content, such as making

it part of the health sciences lessons. The standardization of the physical education trainings provided the physical education teachers a foundation of techniques for increasing the amount of activity in students. Each year part of the training included restating the reason for Pathways in the schools and the importance of healthy food choices and increased physical activity.

Considerable diversity exists both among and *within* each of the seven American Indian tribes that were part of Pathways. Part of the diversity within tribes related to religious affiliation and led to different opinions about the appropriate types of cultural information to be included. For example, traditional American Indian stories from each of the tribes were incorporated into the curriculum. Some traditional stories that were considered related to how human beings came to be and their relationship with their Creator. There was some discussion that this might be unacceptable to some families. Another consideration was the length of some of the stories. Many traditional stories are longer than would fit into a standard lesson; however, it was decided that it would be culturally inappropriate to shorten the stories.

Lesson 6: Reinforce key messages/skills at multiple environmental levels

As described in this issue (see Himes et al. and Cunningham-Sabo et al, this issue) Pathways was successful in terms of meeting its goal to change diet, with significant reductions in total fat and percent of calories from fat in intervention versus control schools. Dietary messages are notoriously difficult to communicate, because they involve so many different behaviors. Why was this component successful? Part of the reason may be due to the fact that diet was addressed on multiple levels, reflecting the social learning theory orientation of the study. Environmental change was instituted on the part of the school food service; individual and cognitive behavioral change was accomplished through the curriculum and family components. In addition, the family component of the intervention may have also contributed by impacting on the family food environment, although this was not directly assessed. Thus, change was reinforced at multiple levels.

Lesson 7: Allow time for interventions to be understood and adopted

Another lesson learned is that school-based interventions require time to be adopted. The intervention had little effect on mean intake of percent calories from fat during the first year, with increases seen in succeeding years. This paralleled the time period with which food service behaviors were adopted (Story et al. and Steckler et al., this issue).

Lesson 8: Involve the family more and find better ways to document their involvement

The greatest benefits of Pathways have been to students and their families. Students expanded their knowledge and skills in many areas. Families were involved in their children's education and with their children's school. Family events provided opportunities for social interaction and social support around healthful eating and physical activity behaviors. Families were able to learn at the same time what their children were learning through the family take-home packs. School administrators and staff frequently remarked that Pathways was highly successful in involving family members at school events as compared to regular events held at the school.

Despite these findings, it is clear that Pathways could have been more successful in involving families. Family events had lower adult participation than was hoped for (see Steckler et al., this issue), which partially is due to distances, especially at boarding schools. It also appeared that many of the same families would consistently show up at family events, possibly limiting the reach of the intervention into the community. It is important to note that these experiences are not unique to American Indian communities; parental involvement has been cited as a limiting factor in other school based health intervention studies [17–20]. Although families expressed satisfaction with Pathways in the process evaluation of family events, we actually know very little about what the children did after they left school. This remains a large gap in the study.

Lesson 9: Promote the wide variety of benefits of the project to the schools and tribes

The Pathways study provided a wide range of benefits to schools that should be emphasized in future studies. Teachers and food service workers enhanced their knowledge and skills in the area of health, nutrition, and activity. Teachers were provided with modeled Pathways curriculum lessons and PE lessons, professional support, and technical assistance. Teachers were also provided a curriculum and supporting materials, and the schools received sports equipment. They expressed great appreciation for the training, materials, and support that they received. Finally, as has been mentioned earlier, Pathways helped to encourage stronger linkages between schools and parents through the study's family activities.

The primary benefit of Pathways to the tribes was the delivery of a well thought-out and developed intervention. In addition, involvement with the project provided opportunities for participating in research, which thereby established and furthered collaborative partnerships between universities and tribes. Pathways provided employment, totaling over 50 jobs to tribal members, as well as shared authorship with many American Indian staff. The incorporation of cultural information into the materials that were developed is likely to be seen as a benefit of such programs.

Future directions and conclusions

This paper has explored some of the lessons learned from the Pathways study, including how American Indian tribes and universities can work together, the importance of formative research, how to incorporate cultural concepts, and how to set up interventions. These lessons are partially responsible for many of the successes of Pathways, including positive changes in diet (see Himes et al., this issue) and cognitive factors (see Stevens et al., this issue), and cultural identity (Davis et al., this issue), as well as high levels of acceptability by parents, teachers, and other school staff (Steckler et al. and Gittelsohn et al., this issue).

The lessons learned presented in this paper also raise some important issues. For instance, would a better approach have been to have a less standardized intervention? It may be that a more culturally and tribally specific intervention approach might have led to greater behavioral change. Yet, it might have been more costly to develop and more difficult to implement and measure.

A number of other school-based health programs for Native American schoolchildren have been developed for specific settings [13,21,22], and many of these have shown significant effects on behavior, particularly diet. On the other hand, like Pathways, these studies have not been able to demonstrate impacts on obesity. Future work should test ways to link school and family centered approaches for the prevention of obesity in a way that can incorporate cultural approaches, be effective, and not be overly costly.

Pathways used Social Learning Theory as the primary framework for developing the intervention and designing the evaluation. This was in part linked to earlier successes in the usage of this approach in schools. As reported by Stevens and colleagues in this issue, self-efficacy increased for physical activity only in girls, not in boys. Food intentions and knowledge did improve with the intervention. Why did self-efficacy among boys not follow the patterns for the other cognitive factors? Is it possible that the self-efficacy construct, central to social learning theory, is not culturally appropriate for this setting? Should we be speaking more of community-efficacy, just as other authors [23] have found that constructs such as individual body image are not appropriate in certain cultural settings? Self-efficacy is dependent in part on experiences of a sociocultural group, including their social and historical context. Considering the history of oppression and generations of social and economic marginalization faced by American Indians, it is not surprising that the tribes participating in Pathways may experience a collective as well as individual lack of self-efficacy [24].

Perhaps as well, social learning theory does not pay enough attention to culture. Although Pathways incorporated cultural information in many creative ways, most of the interventions were largely directed at individual behavior change, with attention to peer and family level influences as well. Would a broader, more ecological approach have yielded a different intervention method and/or outcomes? Future work in developing health behavior change approaches should first test the cultural appropriateness of key constructs, in order to demonstrate effects.

Recent work in schools and other settings have indicated the importance of an ecological approach, which may be more successful by addressing more macrolevel environmental factors, such as social norms and public policy [25–27]. Baranowski and colleagues [28] conclude that environmental influences may be more important and influential than psychosocial factors. The results of Pathways invite us to challenge even more severely the adequacy of models and constructs that focus primarily on individual behavior change, and place emphasis on selected environmental contexts. Although the Pathways intervention worked with several school environments (food service, physical education, etc.), many other potential environments were less central to the intervention or were not engaged at all.

How best can investigators link school approaches with other types of environmental interventions? What other ways of reaching families exist other than through schools, and how can these interventions result in the best impact on health outcomes through the use of multiply reinforcing environmental interventions (such as fairs, powwows, grocery stores, clinics, and hospitals)? Recent reviews have described environmental factors which have led to increased food consumption, reduced activity, and overall higher rates of obesity [29,30].

There is evidence that multiple levels of environmental interventions are likely to have a stronger impact on diet [31]. Integrated environmental approaches that combine multiple institutions, such as schools and food stores, might have a better chance to be sustainable and to improve the diets and diet-related health in American Indian communities.

A final area for further work concerns the area of measurement. Psychosocial and lifestyle factors are part of the situation when choice can be exercised, but for elementary school children living in rural areas who are assessed on *school days*, less choice may be possible. Future work should make an effort to assess diet on the weekends and during the summer. As mentioned already, little is known about the impact of Pathways on family processes and behavior. This reflects an emphasis on individual (i.e., the student's) cognitive, behavioral, and physical measures as the primary and secondary outcomes of the study. Greater emphasis on the impacts of the intervention on areas outside the school, such as families, would likely yield valuable information and may explain differences in the success or failure of different components of interventions.

In conclusion, the Pathways study offers many lessons to future researchers on how best to conduct intervention programs to reduce obesity in children, to work in schools, and to work with American Indian populations.

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References

1. Basen-Engquist K, Parcel GS, Harris R, Kirby D, Coyle K, Banspach S, et al. The safer choices project: methodological issues in school-based health promotion intervention research. *J Sch Health*. 1997; 67:365–71. [PubMed: 9471087]
2. Harachi TW, Abbott RD, Catalano RF, Haggerty KP, Fleming CB. Opening the black box: using process evaluation measures to assess implementation and theory building. *Am J Community Psychol*. 1999; 27:711–31. [PubMed: 10676545]
3. Dobson LD, Cook TJ. Avoiding type III error in program evaluation: results from a field experiment. *Evaluation Program Planning*. 1980; 3:269–376.
4. Kassebaum, G.; Ward, DA.; Wilner, DM. *Prison treatment and parole survival*. New York: Wiley; 1971.
5. Quay, HC. The three faces of evaluation: what can be expected to work. In: Sechrest, L.; West, SG.; Phillips, MA.; Redner, R.; Yeaton, W., editors. *Evaluation studies review annual*. Vol. 4. Beverly Hills, CA: Sage Publications; 1979.
6. Basch CE, Slipevich EM, Gold RS, Duncan DF, Kolbe LJ. Avoiding type III errors in health education program evaluations: a case study. *Health Educ Q*. 1985; 12:315–31. [PubMed: 4077544]
7. Pentz, MA.; Trebow, EA.; Hansen, WB.; Mackinnon, DP.; Dwyer, JH.; Johnson, CA.; Flay, BR.; Daniels, S.; Cormack, C. *Effects of program implementation on adolescent drug use behavior the Midwestern Prevention Project (MPP)*. Vol. 14. Beverly Hills, CA: Sage Publications; 1990. p. 264-289.

8. Kerr, DM.; Kent, L.; Lam, TCM. Evaluation Review. Vol. 9. Sage Publications, Inc; 1985. Measuring program implementation with a classroom observation instrument The Interactive Teaching Map; p. 461-482.
9. Davis SM, Reid R. Practicing participatory research in American Indian communities. *Am J Clin Nutr.* 1999; 69:755S–9S. [PubMed: 10195598]
10. Gittelsohn J, Evans M, Helitzer D, Anliker J, Story M, Metcalfe L, et al. Formative research in a school-based obesity prevention program for Native American school children (Pathways). *Health Educ Res.* 1998; 13:251–65. [PubMed: 10181023]
11. Gittelsohn J, Evans M, Story M, Davis SM, Metcalfe L, Helitzer DL, et al. Multisite formative assessment for the Pathways study to prevent obesity in American Indian schoolchildren. *Am J Clin Nutr.* 1999; 69:767S–72S. [PubMed: 10195601]
12. *Indians and Anthropology: Vine Deloria, Jr. and the Critique of Anthropology.* Tucson, AZ: The University of Arizona Press; 1997.
13. McComber AM, Macaulay AC, Kirby R, Desrosiers S, Cross EJ, Saad-Haddad C. The Kahnawake Schools Diabetes Prevention Project: community participation in a diabetes primary prevention research project. *Int J Circumpolar Health.* 1998; 57(Suppl 1):370–4. [PubMed: 10093308]
14. Macaulay AC, Gibson N, Freeman WL, Commanda LE, McCabe ML, Robbins CM, et al. The community's voice in research. *CMAJ.* 2001; 164:1661–3. [PubMed: 11450205]
15. Dickson G, Green KL. Participatory action research: lessons learned with Aboriginal grandmothers. *Health Care Women Int.* 2001; 22:471–82. [PubMed: 11508099]
16. Davis SM, Going SB, Helitzer DL, Teufel NI, Snyder P, Gittelsohn J, et al. Pathways: a culturally appropriate obesity-prevention program for American Indian schoolchildren. *Am J Clin Nutr.* 1999; 69:796S–802S. [PubMed: 10195605]
17. Bickham NL, Pizarro LJ, Warner BS, Rosenthal B, Weist MD. Family involvement in expanded school mental health. *J Sch Health.* 1998; 68:425–8. [PubMed: 9919498]
18. Nader PR, Sallis JF, Abramson IS, Broyles SL, Patterson TL, Senn K, et al. Family-based cardiovascular risk reduction education among Mexican- and Anglo-Americans. *Fam Community Health.* 1992; 15:57–74.
19. Nader PR, Sellers DE, Johnson CC, Perry CL, Stone EJ, Cook KC, et al. The effect of adult participation in a school-based family intervention to improve Children's diet and physical activity: the Child and Adolescent Trial for Cardiovascular Health. *Prev Med.* 1996; 25:455–64. [PubMed: 8818068]
20. Perry CL, Luepker RV, Murray DM, Hearn MD, Halper A, Dudovitz B, et al. Parent involvement with children's health promotion: a one-year follow-up of the Minnesota home team. *Health Educ Q.* 1989; 16:171–80.10.1006/pmed.1996/0077 [PubMed: 2732061]
21. Saksvig, B. Dissertation submitted to The Johns Hopkins University. Baltimore, MD: 2002. Diabetes prevention among First Nations school children in Sandy Lake, Ontario: evaluation of a culturally appropriate school-based nutrition and physical activity intervention.
22. Teufel NI, Ritenbaugh CK. Development of a primary prevention program: insight gained in the Zuni Diabetes Prevention Program. *Clin Pediatr (Phila).* 1998; 37:131–41. [PubMed: 9492122]
23. Becker, AE. *Body, self and society: the view from Fiji.* Philadelphia, PA: University of Pennsylvania; 1995.
24. Davis, SM. Doctoral dissertation. Albuquerque, NM: University of New Mexico; 1990. An ethno-history of a model program for improving the health of American Indian adolescents.
25. Birnbaum AS, Lytle LA, Story M, Perry CL, Murray DM. Are differences in exposure to a multicomponent school-based intervention associated with varying dietary outcomes in adolescents? *Health Educ Behav.* 2002; 29:427–43. [PubMed: 12137237]
26. Story M, Neumark-Sztainer D, French S. Individual and environmental influences on adolescent eating behaviors. *J Am Diet Assoc.* 2002; 102:S40–S51. [PubMed: 11902388]
27. French SA, Story M, Jeffery RW. Environmental influences on eating and physical activity. *Annu Rev Public Health.* 2001; 22:309–35. [PubMed: 11274524]
28. Baranowski T, Cullen KW, Baranowski J. Psychosocial correlates of dietary intake: advancing dietary intervention. *Annu Rev Nutr.* 1999; 19:17–40. [PubMed: 10448515]

29. Story M, Neumark-Sztainer D, French S. Individual and environmental influences on adolescent eating behaviors. *J Am Diet Assoc.* 2002; 102:S40–51. [PubMed: 11902388]
30. French SA, Story M, Jeffrey RW. Environmental influences on eating and physical activity. *Annu Rev Pub Health.* 2001; 22:309–35. [PubMed: 11274524]
31. Birnbaum AS, Lytle LA, Story M, Perry CL, Murray DM. Are differences in exposure to multicomponent school-based intervention associated with varying dietary outcomes in adolescents? *Health Ed Behav.* 2002; 29:427–43.

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