



Volume 34, Issue 2, Fall 2010 - Bark; Stenberg; Sutherland; Hayes

Scheduling Recess Before Lunch: Exploring the Benefits and Challenges in Montana Schools

Katie Bark, RD, LN; Molly Stenberg, RD, LN; Shelly Sutherland, EdD; Dayle Hayes, MS, RD

ABSTRACT

Purpose/Objectives

The purpose of the *Montana Recess Before Lunch Survey* was to explore benefits, challenges, and factors associated with successful implementation of Recess Before Lunch (RBL), from the perspective of school principals.

Methods

An online written questionnaire was distributed to all (N = 661) Montana elementary and middle school principals (grades K-8), in partnership with the Montana Office of Public Instruction. A total of 195 principals completed the survey, for a response rate of 30%. Descriptive statistics were generated for each survey item and responses to open-ended items were organized according to their thematic content.

Results

Montana elementary principals reported a variety of benefits associated with a RBL schedule. These included student health and wellness benefits (increased food consumption, more pleasant eating environment), as well as positive changes for schools (improved student behavior across school settings). Most frequently noted challenges for schools included those associated with revising class schedules, developing efficient methods for hand washing, and providing adequate student supervision during lunch blocks. Important factors that promoted successful implementation of RBL included support from school staff, strong leadership by the administration, and effective cooperation among personnel. Staff, student, and parent acceptance were associated with continued implementation of RBL.

Applications to Child Nutrition Professionals

This study provides valuable information about the potential benefits and challenges of RBL, which can be used by child nutrition professionals to support school wellness efforts and to encourage implementation of RBL as an effective school-wide wellness strategy.

INTRODUCTION

Recess Before Lunch (RBL) is a school-based wellness strategy that involves scheduling recess prior to lunchtime for children. This scheduling allows children to engage in active play before consuming food, which encourages consumption of healthful foods and reduces the natural tendency for youth to rush through meals in order to go play. The arrangement of recess and lunch, including the amount of time available for active play and food consumption, impacts a variety of health and learning behaviors. In 2009-2010, about 32% of Montana elementary schools used RBL, which represents a 10% increase over the past three years (Montana Office of Public Instruction [OPTI], 2006-2009). The increasing popularity of RBL, nationally and throughout Montana, is likely due to its potential benefits for students and schools, with minimal or no cost to implement.

Lunch is an important part of the school day, providing essential nourishment to promote learning and time for children to engage in age-appropriate social interactions with their peers. The United States Department of Agriculture (USDA) National School Lunch Program is designed to provide one-third of a child's daily calorie and nutrient needs, helping to re-energize children for learning in afternoon classes. Taras (2005) identified the importance of nutrition in facilitating learning for young people, documenting the negative correlation between nutrient deficiencies and academic performance. Researchers have also described the impact of RBL on increasing intake of nutrient rich foods. Bergman, Buerger, Englund, and Femrite (2004) found that RBL increases student intake of total calories, as well as key nutrients, such as calcium, iron, and vitamin A. Calcium intake was 35% higher and fat intake was significantly lower for students in schools with RBL.

Published studies have indicated reductions in plate waste ranging from approximately 11-14% (Bergman, Buerger, Englund, et al., 2004; Getlinger, Laughlin, Bell, Akre, & Arjmandi, 1996), with the implementation of RBL. Several studies (Bergman, Buerger, Femrite, Englund, & Braunstein, 2004; Bergman, Buerger, Joseph, & Sanchez, 2000; Conklin, Lambert, & Anderson, 2002) point out that the length of the lunch period affects food consumption levels and also plays a role in regulation of satiety cues for children. Therefore, the manner in which school lunch is scheduled may affect life-long eating behaviors for young people. Another important benefit of RBL was described by Tanaka, Richards, Takeuchi, Otani, and Maddock (2005), who found that having recess before lunch reduced discipline problems among sixth grade students.

Montana's Team Nutrition Program (MTN) works with schools throughout the state to promote school wellness activities and increase access to healthier foods. Since 2002, MTN has assisted schools in implementing RBL and studied the impact of RBL in a pilot with four schools. Benefits reported by pilot school administrators and teachers (MTN, 2003) were similar to those cited in the published literature. They related benefits in a variety of areas, including increased consumption of nutrient-rich foods and beverages, such as fruits, vegetables, and low-fat milk; decreased plate waste; and a more pleasant eating and learning environment for children. Principals reported fewer discipline problems in the cafeteria, playground, and afternoon classes following implementation of RBL. Written discipline referrals declined in RBL pilot schools, confirming teacher reports of improved behavior. This is a potential benefit for schools, as time spent by principals and teachers in dealing with student discipline is freed up to enhance learning through school improvement and academic support activities.

MTN designed the *Montana Recess Before Lunch Survey* in 2008 to examine the extent to which the benefits and challenges noted in the initial (2002-2003) pilot sites applied to other Montana schools implementing RBL. The goal was to determine whether the benefits of RBL outweighed the challenges associated with modifying school schedules. We also wanted to collect recommendations and lessons learned from a wide range of schools, including those currently using RBL and those who used RBL in the past, in order to assist school staff with their implementation efforts. Thus, information from the *Montana Recess Before Lunch Survey* should prove to be a powerful tool in providing information to other school principals, within Montana and nationally, about the benefits, challenges, and tips for success in implementing RBL.

METHODOLOGY

Questionnaire Development

An online survey was developed to explore the experiences and opinions of elementary and middle school principals (grades K-8) regarding RBL. Questions were developed based on benefits, challenges, and factors associated with effective implementation of RBL in the published literature. Themes that emerged from brief interviews with Montana principals during the course of RBL implementation (from 2002-2007) also served as the basis for question development. An initial draft of the survey was reviewed by one national and four local experts in the fields of nutrition, school wellness, RBL programs, and survey design. The revised survey was test-piloted with five Montana principals (each of whom had some experience with RBL, either currently or in previous years), who participated in structured phone interviews immediately following their completion of the draft questionnaire. They were asked about their overall impressions of the survey, including amount of time and effort required to complete the form. They were also asked about the clarity of the survey's purpose, directions, and items. Survey items were reworded and expanded based on their feedback.

The final survey form contained both closed-option items (with opportunity for comments) and open-ended questions. Survey items were organized in a branching structure, so that each of three targeted groups of principals (those currently using RBL, those who used RBL in the past, and those who never used RBL) answered a different, though similar, set of questions. The longest version of the survey, for principals who previously used RBL, consisted of 16 questions and required approximately 15 minutes to complete. The shortest version, for principals who never used RBL, had only 3 questions and required approximately 5 minutes to complete. All groups were asked to indicate grade levels served at their schools and current scheduling of recess and lunch. Principals indicating that they were currently using RBL or had used RBL in the past received questions related to: (1) length of time utilizing RBL; (2) grade levels involved in RBL; (3) observed benefits, challenges, and facilitative factors; (4) the nature of feedback received from various key stakeholder groups; and (5) their advice for other principals who might be considering implementing RBL. Principals representing schools that discontinued use of RBL were asked questions related to: (1) reasons for discontinuing RBL; (2) perceived benefits of RBL; (3) perceived challenges of RBL; and (4) their interest in re-establishing RBL in the future. Principals from schools which had never used a RBL schedule did not receive the survey questions related to benefits and challenges of RBL scheduling so as not to skew perceptions based on lack of experience with RBL.

Previous and current users of RBL rated the extent to which they agreed that RBL contributed to a variety of potential benefits, such as improved student behavior and increased consumption of healthy foods. Response options included: (1) Strongly Agree, (2) Agree, (3) Disagree, (4) Strongly Disagree, and (5) Not Sure. For challenges, respondents were asked to rate the extent to which they experienced potential difficulties, such as stakeholder resistance and revising the daily school schedule, when implementing RBL. Response options for the challenge items included: (1) To a Large Extent, (2) To a Moderate Extent, (3) Somewhat, (4) Not at All, and (5) Not Sure.

Data Collection

During January 2008, surveys were completed by 195 Montana principals out of a total of 661, for a response rate of 30%. Montana's OPI sent the survey link to superintendents of all Montana public and private school districts serving elementary or middle school students (grades K-8). OPI explained the purpose of the survey, emphasizing how results would be used by the MTN to provide technical assistance to schools, and requested that the link be forwarded to K-8 principals in each district. One reminder was sent to superintendents from OPI during the three-week distribution period. Responses were automatically entered into the Key Survey software database during survey completion.

Data Analysis

Verbatim survey responses were downloaded from the Key Survey database and entered into SPSS (Version 16) for analysis. Item response frequencies were calculated two ways, both including and excluding "Not Sure" values. Tables 1, 2, and 3 report frequencies excluding the "Not Sure" values, to better capture the views of those respondents with definite opinions about RBL. Individual responses to open-ended questions were categorized according to themes that emerged from the content and were coded and organized under general thematic headings for ease in reviewing and sharing information with key stakeholder groups. Content was combined across respondent groups and survey questions, as appropriate, to reflect each of the thematic categories (e.g., implementation suggestions, benefits, challenges). Each response was also coded by targeted respondent group (current or previous users).

RESULTS AND DISCUSSION

Survey Respondents

Survey respondents represented a wide range of elementary and middle (grades K-8) school grades and school sizes, generally reflecting the overall makeup of Montana schools. The majority of principals completing the survey served students in grades K-5. For principals currently using RBL, 36% worked at schools with enrollments of 251 - 400 students, which is consistent with Montana's overall percentage of schools in this size range (39%). Twenty-six percent of responding principals were from schools with enrollments between 101 and 250 students, with 21% of responding principals from schools with 100 or fewer students enrolled.

Overall, 55% of respondents indicated experience in using RBL. The number of principals reporting current use of RBL (45%) is somewhat higher than the state reported rate of 32%. A majority of principals (61%) reported using RBL for more than 2 years, with 47% indicating use at all grade levels. RBL was implemented most often in grades K-5 (72%).

Benefits

Table 1 summarizes the percentage of principals who associated various benefits with use of RBL at their schools. Ratings by current RBL users were higher for all benefit items. However, improved student behavior (in afternoon classes and on the playground), as well as increased consumption of the lunch meal was noted by a majority of principals including those no longer using RBL. Least observed benefits (for combined groups) were reported in consumption of healthy foods (64%) and creation of a more orderly cafeteria atmosphere (66%).

Table 1. *Observed Benefits^a Associated with the Use of Recess Before Lunch (RBL) as Reported by Principals from Montana Elementary Schools*

	<u>Currently Using</u>	<u>Previously Used</u>	<u>Combined^b Groups</u>
Increased student consumption of lunches	86%	53%	81%
Improved student behavior in the afternoon classrooms	85%	60%	81%
Improved student behavior on the playground	85%	54%	80%
Decreased food and beverage waste by students	88%	44%	80%
Decreased discipline referrals	82%	36%	74%
Improved student behavior in the cafeteria	78%	39%	71%

Allowing students to take more time to eat their lunch and socialize with peers	78%	33%	70%
Creating a calmer, quieter and/or orderly cafeteria atmosphere	72%	35%	66%
Increased student consumption of healthful foods (such as salad bar or milk)	71%	25%	64%

^aPercentages represent "Strongly Agree" and "Agree" responses combined.

^bRepresents combined ratings from principals currently using and those who used RBL in the past.

Other benefits described by principals in written comments included: (1) increased instructional time due to enhanced student attention/concentration, fewer behavioral problems, and less mediation of playground problems in afternoon classes; (2) improved space utilization as a result of scheduling some classes for recess while other classes are in the cafeteria; and (3) more efficient transitions between classrooms, playground, and the lunchroom.

Challenges

The extent to which various challenges associated with RBL were noted by principals is outlined in Table 2. As would be expected, challenges were reported at higher levels by principals no longer using RBL. Difficulties related to revising school schedules, developing efficient methods for hand washing, and providing adequate student supervision during lunch/recess blocks were experienced most often by both groups. Cafeteria layout was reported as a relatively stronger obstacle at schools that discontinued use of RBL.

Table 2. *Challenges^a Associated with the Use of Recess Before Lunch (RBL) as Reported by Montana Elementary Principals*

	Currently Using	Previously Used	Combined^b Groups
Revising the daily school schedule	63%	74%	65%
Student hand washing process before lunch	36%	58%	40%
Adequate staffing (playground, cafeteria and hallway supervision)	36%	47%	38%
Cafeteria layout	26%	56%	31%
Staff resistance to the change	24%	47%	28%
School building layout	20%	35%	22%
Student resistance to the change	16%	42%	21%
Parent resistance to the change	17%	28%	19%

^aPercentages represent "To a Large Extent" and "To a Moderate Extent" responses combined.

^bRepresents combined ratings from principals currently using and those who used RBL in the past.

Principals from schools no longer using RBL described some reasons for discontinuance of the schedule. Thirty seven percent of principals discontinuing RBL discussed difficulties associated with hand washing, indicating that nurses and parents objected to the use of hand sanitizers as a primary cleansing agent. Soap and water hand washing was considered unfeasible by some principals, due to the need for additional supervisory staff and lack of sufficient restroom facilities for large-scale hand washing. Scheduling shared use of cafeteria space was seen as an insurmountable obstacle by some principals, especially those housing a wide range of grade levels (such as K-8 or K-12 schools). The need to keep older and younger children separated, in combination with limited physical space and use of the cafeteria for PE classes, made scheduling particularly difficult at some schools. Principals also cited transition difficulties and the monitoring of student behavior in the lunchroom as major impediments. Creating a procedure for the removal of winter clothing prior to eating was problematic at some schools. Principals related that children were often rowdy when entering the cafeteria following outside play and frequently needed adult mediation during lunch time to resolve playground issues. Other reasons cited for discontinuing RBL included staff and student dissatisfaction and not observing expected benefits of the program. In spite of obstacles described in comments, 68% of principals no longer using RBL indicated that they would be willing to consider its use again in the future.

Facilitative Factors

Over 90% of current RBL users rated school staff support of RBL, strong leadership by the administration, and effective cooperation among personnel (administration, food services, and school staff) as "very" to "moderately" important for successful implementation of RBL. In addition, positive perceptions of parents, students, and staff were associated with continued implementation of RBL. Table 3 summarizes the extent to which principals received generally positive feedback (versus generally negative or neutral feedback) about RBL from these key stakeholder groups. Principals from schools currently using RBL reported much higher levels of positive feedback from parents, students, and staff than those from schools discontinuing use of RBL. In written survey comments, 19 principals (24% of those respondents who produced written comments) described the importance of involving these three groups in RBL planning efforts. This underscores the importance of building support among key stakeholder groups to ensuring positive experiences during the initial phases of RBL implementation.

Table 3. *A Summary of Feedback on Recess Before Lunch (RBL) as Reported by Principals about Key Stakeholder Groups^a*

RBL Status	Stakeholder Group	Type of Feedback Received		
		Generally Positive	Generally Negative	Neutral

Currently using RBL	Parents	58%	40%	2%
	School Staff	76%	20%	5%
	Students	62%	31%	7%
Previously used RBL	Parents	12%	76%	12%
	School Staff	16%	42%	42%
	Students	17%	56%	28%

^aExcludes *Not Sure* responses.

Principals offered valuable advice for promoting successful implementation of RBL in written survey comments. Again, they discussed the importance of involving key stakeholders (parents, students, and staff) in the change process. Respondents suggested presenting research on health and academic benefits for students as a starting point, then encouraging all groups to have input on potential schedule changes. Some principals suggested recruiting student and parent groups as advocates and key decision-makers throughout the implementation process.

Initiating a trial period was another suggestion for promoting effective RBL implementation. Principals described this as a valuable way to work out potential scheduling problems, document positive changes, and allow students time to adjust to the change before large-scale implementation. Twelve principals (15% of those producing written comments) noted the importance of advance planning and being willing to practice new procedures and adapt routines as needed.

Survey respondents provided important insights on overcoming potential challenges. They described some specific procedures to deal with hand washing that worked at their schools, including providing additional supervision for children to wash hands in the restrooms and creating hand sanitizer stations in the cafeteria. Principals described ways in which they encouraged flexibility when developing schedules and procedures, including: (1) offering scheduling options for teachers and students, such as letting classes choose whether to eat before or after recess within a specified block of time; (2) scheduling extra time for younger students to eat early in the school year, when they were learning lunchroom procedures; and (3) allowing students to eat in their classrooms when the lunchroom was not available. Several principals suggested planning for transitions. Transition planning recommendations included: (1) developing procedures for lining up on the playground and in the lunchroom; (2) providing activities for students who finish eating early; and (3) developing systems for children to access lunch cards/tickets. Rainville, Lofton and Carr (2009) identified similar topics related to successful RBL implementation in elementary schools and developed a useful best practices checklist.

CONCLUSIONS AND APPLICATION

Results from the *Montana Recess Before Lunch Survey* were consistent with benefits and challenges reported in the literature (Bounds, Nettles, & Johnson, 2009; Rainville, Wolf, & Carr, 2006) and those described by Montana RBL pilot school principals (MTN, 2003). Schools that were able to overcome potential obstacles consistently experienced positive outcomes related to RBL scheduling. Even schools that discontinued use of RBL observed some positive outcomes from the program. In fact, a majority (68%) of principals no longer using RBL reported that they would reconsider its use in the future.

Results from the survey will be used to: (1) inform schools of the benefits and challenges of RBL; (2) provide recommendations for successful RBL implementation strategies; and (3) support the development of technical assistance resources for schools in Montana and across the nation.

Transferability of Findings

While survey findings appear to be relevant for Montana elementary and middle (grades K-8) schools, they may not be as applicable to schools throughout the nation. Schools in more urbanized areas may experience different types and levels of challenges. Montana schools are unique in that there are a large number of very small schools and schools with a wide range of grade levels. While lower school enrollment could potentially simplify scheduling changes, having a wider range of grade levels could create its own scheduling challenges. Smaller sized schools, working with MTN to implement RBL schedules, have generally reported fewer challenges in scheduling and staffing than larger sized schools.

Montana's extended winter weather can further complicate transitions from the playground to the lunchroom for young children. Schools need to develop time-efficient procedures, both for removing winter clothing and for hand washing, prior to eating. Some RBL pilot schools noted the need for additional supervisory staff or volunteers to assist students with hand washing and coat removal initially, but not necessarily in the long term. Survey comments suggested that some principals were able to schedule lunchtime supervisory staff in a more efficient manner with RBL. Overall, RBL appears to be cost neutral for Montana schools, neither increasing nor decreasing expenditures in most cases.

Key Implementation Issues

Scheduling. Regardless of the order in which recess and lunch are scheduled, it is critical that schools commit to allowing adequate time for students to eat lunch. Bergman et al. (2000), Bergman, Buergele, Femrite et al. (2004), and Conklin et al. (2002) found that a minimum of 20-30 minutes once students are seated is required for optimal nutrient consumption. Published studies have established that nutrient intake is associated with improved learning and behavior for youngsters (Action for Healthy Kids, 2004; Dani, Burrill, & Demmig-Adams, 2005; Florence, Asbridge, & Veugelers, 2008; Jyoti, Frongillo, & Jones, 2005). It is equally important that schools maintain adequate time for recess when modifying schedules. As Barros, Silver, and Stein (2009) have demonstrated, daily recess for elementary children improves overall group behavior in the classroom. Researchers have shown a positive association between physical fitness and academic performance in elementary school children (Carlson et al., 2008; Castelli, Hillman, Buck, & Erwin, 2007). Therefore, maintaining sufficient blocks of time both for eating and recess is important if schools are to fully realize the benefits of RBL.

Based on MTN's experience, it has been helpful for schools considering RBL scheduling to visit a similar-sized school using RBL (MTN, 2003). This allows school personnel to observe firsthand how an effective schedule can work and to observe student flow patterns during the lunch block. RBL pilot school principals described the importance of viewing schedule revisions "as a work in progress," realizing that it will take 2-3 revisions to develop a final schedule. The leadership of an effective, committed principal is also key to overcoming initial resistance to scheduling changes. Developing an optimal daily schedule involves teamwork among staff, including administrators, principals, teachers, aides, custodians, and foodservice personnel. A trial period of at least three months is often necessary to work out scheduling issues.

Pilot RBL schools found that noise level in the cafeteria may increase initially, until students become familiar with new lunchroom procedures. With continued use of RBL, most schools noted a calmer and more pleasant cafeteria atmosphere. This is another important reason to implement a trial period when switching to RBL.

Hand Washing. Hand washing is an important safety issue for all schools, regardless of their daily schedule. When schools consider RBL, it provides the

perfect opportunity to re-evaluate the current hand washing policy and to allow adequate time for hand washing in the daily schedule. The hand washing challenge is further complicated by the fact that using hand sanitizer alone is less effective at cleaning hands than the use of soap and water, as noted by Simonne (2008).

Teachers participating in the Montana RBL pilot reported an additional 5-10 minutes of morning instructional time as a result of not needing to complete hand washing prior to recess. Pilot teachers also reported gaining instructional time in afternoon classes, as students were calmer in returning from the lunchroom as compared to returning directly from the playground. Theoretically, these saved minutes could be incorporated into the lunch schedule, mitigating the loss of recess or eating time that is devoted to hand washing.

Utilization of Findings

The MTN Program is using findings from the *Montana Recess Before Lunch Survey* to provide education and technical assistance to schools based on the long term outcomes of RBL scheduling. The existing *Recess Before Lunch: A Guide for Success* (http://www.opi.mt.gov/Programs/SchoolPrograms/School_Nutrition/Wellness.html?gpm=1_2) may be updated to include current information and advice from participants in the survey.

Future Action Research/Program Evaluation Activities

Several areas related to RBL could be explored in more depth. Studies related to cost-effectiveness of RBL programs would be particularly useful, especially as more schools adopt RBL schedules. Potential costs associated with specific scheduling decisions, supervision issues, and reduced discipline referrals could be examined. In addition, it would be useful to collect information from RBL schools about cost implications of higher student food consumption rates.

It would also be valuable to collect information from classroom teachers regarding benefits, challenges, and classroom outcomes associated with RBL, from their perspectives. A large-scale survey of Montana teachers involved with RBL could be undertaken in collaboration with the Montana OPI. This information would be useful in supplementing school principal opinions and suggestions from the *Montana Recess Before Lunch Survey*. Another potentially valuable study could be to examine the extent to which instructional time is impacted by RBL scheduling and whether RBL can foster longer uninterrupted blocks of instructional time. Finally, it would be useful to evaluate the overall impact of RBL on academic success.

Summary

RBL scheduling is an effective component of a comprehensive approach to school wellness. The RBL scheduling option helps children obtain key nutrients through improved consumption of foods and beverages served at lunch. Increased consumption of healthy foods and beverages improves children's chances of meeting energy requirements and recommended levels of key nutrients for overall growth and supports learning in afternoon classes (Dani et al., 2005; Florence et al., 2008). Sadly, more than 60% of school-aged children are not currently meeting recommended guidelines for daily calcium intake (Moshfegh, Goldman, Ahuja, Rhodes, & LaComb, 2009). Observations from Montana's RBL pilot schools (MTN, 2003) suggest that we can encourage increased consumption of milk (and other healthy foods) for students through no-cost scheduling modifications.

The results of this survey further suggest that the benefits of a RBL schedule are worth overcoming initial challenges. Improvements in student behavior, nutrient intake, and lunchroom environment can have a cumulative positive effect on students' academic performance, as well as their mental and physical health. RBL increases opportunities for students to socialize with their peers in a calmer and more pleasant eating environment. Healthy and happy students are absent less often and perform better on standardized tests, which help schools maintain funding (Action for Healthy Kids, 2004). Therefore, it is in the best interest of communities and schools to establish procedures that support the development of healthy eating behaviors in children.

ACKNOWLEDGEMENTS

This article was supported by a USDA Team Nutrition Training grant administered by the Montana Office of Public Instruction and a grant from the Department of Health and Human Development at Montana State University, Bozeman campus. Its contents are solely the responsibility of the authors and do not necessarily represent the views of the grant funding agencies.

REFERENCES

Action for Healthy Kids. (2004). *The learning connection: The value of improving nutrition and physical activity in our schools*. Skokie, IL: Author. Retrieved from <http://www.actionforhealthykids.org/resources/files/learningconnectionec.pdf>

Barros, R. M., Silver, E. J., & Stein, R. E. (2009). School recess and group classroom behavior. *Pediatrics*, *123*, 431-436.

Bergman, E. A., Buergel, N. S., Englund, T. F., & Femrite, A. (2004). The relationship of meal and recess schedules to plate waste in elementary schools. *The Journal of Child Nutrition and Management*, *28*(2). Retrieved July 22, 2010, from <http://docs.schoolnutrition.org/newsroom/jcnm/04fall/bergman/bergman1.asp>

Bergman, E. A., Buergel, N. S., Femrite, A., Englund, T. F., & Braunstein, M. R. (2004). Relationships of meal and recess schedules to plate waste in elementary schools. National Food Service Management Institute. *Insight*, *24*, 1-6.

Bergman, E. A., Buergel, N. S., Joseph, E., & Sanchez, A. (2000). Time spent by schoolchildren to eat lunch. *Journal of the American Dietetic Association*, *100*, 696-698.

Bounds, W., Nettles, M. F., & Johnson, J. T. (2009). Recess before lunch programs in elementary schools: Perceptions and practices of school professionals. *The Journal of Child Nutrition and Management*, *33*(1). Retrieved July 22, 2010, from <http://www.schoolnutrition.org/Content.aspx?id=12502&terms=recess+before+lunch>

Carlson, S. A., Fulton, J. E., Lee, S. M., Maynard, M., Brown, D. R., Kohl, H. W., et al. (2008). *Physical education and academic achievement in elementary school: Data from the early childhood longitudinal study*. American Journal of Public Health, *98*, 721-727.

Castelli, D. M., Hillman, C. H., Buck, S. M., & Erwin, H. E. (2007). Physical fitness and academic achievement in third and fifth grade students. *Journal of Sport and Exercise Psychology*, *29*, 239-252.

Conkin, M. T., Lambert, L. G., & Anderson, J. B. (2002). How long does it take students to eat lunch? *The Journal of Child Nutrition and Management*, *26*(1). Retrieved July 22, 2010, from <http://docs.schoolnutrition.org/newsroom/jcnm/02spring/conkin/>

Dani, J., Burrill, C., & Demmig-Adams, B. (2005). The remarkable role of nutrition in learning and behaviour. *Nutrition and Food Science*, *35*, 258-263.

Florence, M. D., Asbridge, M., & Veugelers, P. J. (2008). Diet quality and academic performance. *Journal of School Health*, *78*, 209-215.

Getlinger, M. J., Laughlin, C. V., Bell, E., Akre, C., & Arjmandi, B. (1996). Food waste is reduced when elementary-school children have recess before lunch. *Journal of the American Dietetic Association*, 96, 906-908.

Jyoti, D. F., Frongillo, E. A., & Jones, S. J. (2005). Food insecurity affects school children's academic performance, weight gain and social skills. *The Journal of Nutrition*, 135, 2831-2839.

Montana Office of Public Instruction, School Nutrition Programs. (2006-2009). [Recess before lunch data set]. Unpublished raw data.

Montana Team Nutrition Program, Montana Office of Public Instruction, School Nutrition Programs. (2003). *A recess before lunch policy in four Montana schools: Pilot project report*. Retrieved July 22, 2010, from <http://www.opi.mt.gov/pdf/schoolfood/rbl/RBLPilot.pdf>

Moshfegh, A., Goldman, J., Ahuja, J., Rhodes, D., & LaComb, R. (2009). *What we eat in America*, NHANES 2005-2006: Usual nutrient intakes from food and water compared to 1997 Dietary Reference Intakes for vitamin D, calcium, phosphorus, and magnesium. Washington, DC: U.S. Department of Agriculture, Agricultural Research Service. Retrieved July 22, 2010, from http://www.ars.usda.gov/SP2UserFiles/Place/12355000/pdf/0506/usual_nutrient_intake_vitD_ca_phos_mg_2005-06.pdf

Rainville, A. J., Lofton, K. L., & Carr, D. H. (2009). Recess before lunch in elementary schools: Development of a best practices checklist. *The Journal of Child Nutrition and Management*, 33(2). Retrieved July 22, 2010, from <http://www.schoolnutrition.org/Content.aspx?id=13240>

Rainville, A. J., Wolf, K. N., & Carr, D. H. (2006). Recess prior to lunch in elementary schools: What are the barriers? *The Journal of Child Nutrition and Management*, 30(2). Retrieved July 22, 2010, from <http://docs.schoolnutrition.org/newsroom/jcnm/06fall/rainville/index.asp>

Simonne, A. (2008). *Hand hygiene and hand sanitizers*. (Publication No. FCS8788). Retrieved July 22, 2010, from University of Florida, Florida Cooperative Extension Service website: <http://edis.ifas.ufl.edu/fy732>

Tanaka, C., Richards, K. L., Takeuchi, L. S. L., Otani, M., & Maddock, J. (2005). Modifying the recess before lunch program: a pilot study in Koheohe Elementary School. *Californian Journal of Health Promotion*, 3(4), 1-7.

Taras, H. (2005). Nutrition and student performance at school. *The Journal of School Health*, 75, 199-213.

BIOGRAPHY

Bark and **Stenberg** are, respectively, Project Director and Project Assistant for Montana Team Nutrition Program located at Montana State University in Bozeman, MT. **Sutherland** is Program Evaluation Coordinator for Montana Nutrition and Physical Activity Program located at Montana State University. **Hayes** is President of Nutrition for the Future, Inc. located in Billings, MT.

 Digg  Delicious



[Contact Us](#) | [Advertise on SNA](#) | [Site Map](#) | [Media Center](#) | [Privacy Policy](#)

© 2000 - 2010 School Nutrition Association, All Rights Reserved