

It's Time for Whole Grain Products in School Meals

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ABSTRACT

A growing concern about childhood obesity and the increased incidence of type 2 diabetes has placed pressure on school foodservice to serve foods that address these health issues. Recent studies indicate that whole grain intake lowers the risk for heart disease and type 2 diabetes, and it may contribute to lower caloric intake. However, children are only consuming one-third of the recommended three daily servings of whole grains. The inclusion of whole grain foods in school meals could substantially improve intake for school-aged children. To successfully achieve this goal, several issues should be addressed: 1) the acceptable level of whole grain flour in various types of foods; 2) the feasibility of gradually increasing whole grain flour content in school meals; and 3) the cost of introducing these whole grain foods. One approach is to experiment with the introduction of foods that consist of a 25/75 blend of whole grain to all-purpose flour and assess taste, acceptability, and cost.

INTRODUCTION

The prevalence of childhood obesity has increased steadily over the past 20 years (Centers for Disease Control and Prevention, 2002; Ogden, Flega, Carroll, & Johnson, 2002;) and appears to be linked to the increased incidence of type 2 diabetes in children (Kaufman, 2002; Steinberger & Daniels, 2003). Evidence shows that a higher intake of whole grain foods, approximately one to three servings per day, reduces the risk for type 2 diabetes (Liu et al., 2000; Meyer et al., 2000), heart disease (Anderson, Hanna, Peng, & Kryscio, 2000; Jacobs, Meyer, Kushi, & Folsom, 1998), some cancers (Chatenoud et al., 1998; Jacobs, Marquart, Slavin, & Kushi, 1998), and all-cause mortality (Jacobs et al., 1999; Jacobs et al., 2000). Furthermore, adolescents and adults who eat more whole grain foods have a lower body mass index (BMI) as compared to those individuals who consumed fewer servings (Kaufman, 2002; Liu et al., 2003; Steffen et al., 2003;). Additionally, the higher dietary fiber intake that results from the consumption of whole grain foods may help people feel fuller longer, which could contribute to a lower daily calorie intake.

The U.S. Department of Agriculture's (USDA) School Breakfast Program (SBP) and National School Lunch Program (NSLP) feed about 8 and 26 million children a day, respectively (U.S. Department of Agriculture, Food and Nutrition Service, 2003a; 2003b). Due to their size, these programs are in a critical position to aid children in meeting their daily dietary requirements and help shape their eating behaviors. In recognition of this influence, USDA introduced its School Meals Initiative for Healthy Children in 1995 to help school foodservice programs offer meals that meet the recommendations of the Dietary Guidelines for Americans (USDA & Center for Nutrition Policy and Promotion, 1995). While this initiative has been helpful in improving the dietary quality of school meals, more attention needs to be paid to the guideline that advocates eating a variety of grains on a daily basis, with a greater emphasis on whole grain intake.

Dietary Intake of Whole Grain Foods

Recommendations concerning whole grain intake have been established by government and health organizations, including the Healthy People 2010 Objectives program, which suggests three servings of whole grains daily (U.S. Department of Health and Human Services, 2000); the American Diabetes Association (2002); and the American Heart Association (Krauss et al., 2001). However, few Americans meet these daily recommendations. Data from USDA's 1994-96 Continuing Survey of Food Intakes by Individuals (CSFII) indicate that 10% of individuals between the ages of 20 and 59 consume the recommended three or more servings of whole grains daily (Kantor et al., 2001). Likewise, the intake of whole grains among U.S. children and adolescents was found to be similarly low, with only 9% of children aged 2 to 19 consuming three or more servings of whole grains daily. In 2002, the Institute of Medicine of the National Academies of Science (IOM) recommended, for the greatest protection against coronary heart disease, 31 and 26 grams of dietary fiber for children between the ages of 9 and 13, respectively (Institute of Medicine of the National Academies of Science, 2002).

The obstacles for the purchase and consumption of whole grain items that are most frequently cited are limited availability, low consumer awareness, confusion about the identification of whole grain versus whole-wheat or dark bread, and aversions to the taste, color, and texture of whole grain foods (Adams, 2000). These issues present challenges to school foodservice programs to provide whole grain foods that children will eat and to educate students about the health benefits of whole grain inclusion in their diets.

Whole Grain Products in School Meals

Including more whole grain foods in the SBP and NSLP provides children with several dietary advantages. First, an increased intake of whole grain foods may contribute to improved long-term health and the development of healthier eating habits that are carried into adulthood. Second, offering whole grain foods provides the opportunity for children to experience and accept a healthy new repertoire of whole grain alternatives in their diet at young ages. Due to the fact that children may initially reject the taste and texture of 100% whole grain products, school foodservice programs must explore innovative methods of incorporating such products into their school meals. These methods include new recipe development, sensory testing, and a determination of the acceptable level of whole grain flours in products such as bread, rolls, buns, pizza, and muffins.

Previous interventions have been made, through social marketing techniques and recipe modification, to successfully modify the intake of fruits and vegetables (Perry et al., 1998; Reynolds et al., 2000), fat, sodium (Ellison et al., 1989), and low-fat milk (Wechsler, Basch, Zybert, & Shea, 1998) of children in school cafeteria settings. For example, Ellison et al. (1989) devised an environmental program directed at foodservice departments in two boarding schools. The program demonstrated that changes in food purchasing and preparation practices markedly decreased sodium and modified fat content of foods, and the use of these practices resulted in significant changes in the nutrient intake of students. Even without an educational component directed at students who maintained their usual dietary practices, changes by foodservice workers led to a 15% to 20% decrease in sodium intake and a 20% decrease in saturated fat intake. Such modifications by school foodservice workers were well received by students, as the program provided them with palatable food options.

School foodservice workers are key to introducing whole grain products into school cafeterias. A preliminary survey was conducted by the authors in the greater Minneapolis/St. Paul area to determine what perceptions school foodservice employees had concerning whole grain foods. Respondents included 114 school foodservice employees who participated in the Minnesota School Food Service Association (MSFSA) Nutrition Conference and Workshop during Winter and Spring 2003. The group included staff from elementary schools (46%), middle school and junior high schools (19%), and high schools (26%). The remaining 10% of the respondents worked in miscellaneous locations, including childcare and district offices.

The results of the survey suggest that foodservice personnel would be receptive to including whole grain foods in their cafeterias. The majority of respondents to the preliminary survey (72%) reported they were somewhat or very motivated to serve whole grain foods and many (59%) were somewhat or very motivated to look for whole grain alternatives to add to school meals. The majority (77%) agreed that the inclusion of whole grain foods in school meals would provide health benefits for their students.

Although these results show that the perception of whole grain products is favorable, only half of the respondents indicated that whole grain products had been served in their facilities and only one-third indicated that whole grain products currently were being served. The responses also revealed that whole grain breads and buns were the most common whole grain foods served by foodservice staff.

About 51% of the respondents believed administrators were somewhat or very likely to support serving whole grain foods in their cafeteria. Serving whole grain foods was perceived by 75% of the respondents as an approach that would result in more satisfied customers. In terms of school meal programs, two-thirds of respondents believed that the addition of whole grain foods would not increase or would only slightly increase the workload, but a majority (65%) believed that serving whole grain products would increase the cost of school meals. Despite potential cost issues, foodservice personnel had an overall positive impression regarding the benefits of whole grain foods and their potential for improving school meals.

Recommendations to Increase the Consumption of Whole Grain Products in Schools

Improving the nutritional quality of school meals likely will raise their costs, although the relationship between the cost and success of school meal programs has not been examined in detail (Guthrie, 2003). It has been reported that most whole grain products cost more than their refined grain counterparts, with the exception of ready-to-eat cereals (Kantor et al., 2001). Representatives from the baking industry attribute the higher cost to more wear and tear of whole grain products on equipment due to the tougher bran constituents in whole-wheat flour, and to smaller-scale production associated with lower consumer demand (Rogers, 2002). Currently only 10% of retail grain products are made with whole grain (Kantor et al., 2001). Higher costs also are attributed to lower loaf volume and longer production time (Rogers, 2002).

The cost implications of increasing whole grain products in public schools will depend upon whether vendors charge higher prices for whole grain products, as compared to all-purpose flour products. The most recent prices reported by the U.S. Bureau of Labor Statistics (BLS) (April 2003) show white bread at \$1.047/lb. and whole wheat bread at \$1.448/lb., a difference of 38%.

Anecdotal observations of prices for other products, such as hamburger buns and pizza in Minneapolis-St. Paul grocery stores, show greater price premiums for the whole grain versions.

The researchers analyzed costs involved in shifting to whole grain products in one Minnesota elementary school menu in February 2004. Results showed that the cost of whole grain items at the estimated daily rate over an instructional year would increase the foodservice budget by approximately 4%. This figure was based on calculations of the number of grain-based products served, the average cost of pre-packaged whole grain versus non-whole grain products, and the number of students served.

This cost potentially could be managed through additional USDA allocations, either in the form of dollars or commodities that could be incorporated into whole grain foods by retailers or through recipe modifications by school foodservice personnel. Individual operations or, preferably, a regional consortium of school districts may address cost issues through efforts with local bakers and suppliers to encourage the development of highly palatable partial or 100% whole grain foods. Since federally funded school meal programs are responsible for feeding more than 26 million students a day, a favorable policy for increasing whole grain consumption could create a significant rise in demand. Increased demand would favor competition among bakers through new technologies, recipe development, and higher quality products. This would result in lower production, retail, and consumer costs associated with whole grain products.

As a promising sign for policy support, the Healthy Children Through Better Nutrition Act of 2003 includes a report to Congress that outlines the most efficient ways to increase the servings of whole grain foods in school nutrition programs. However, it likely will take several years for school foodservice directors to implement these recommendations. In order to effectively introduce whole grain foods into school meals, there are several important questions to consider:

1. What is the acceptable level of whole grain flour that children initially will accept in various types of grain products, such as bread, buns, and pizza? There has been success in introducing pre-packaged buns and rolls with a blend of 25% whole-wheat flour and 75% all-purpose flour. Using plate-waste studies, 70% to 80% of dinner rolls consisting of the 25/75 whole-wheat to all-purpose flour blend that were placed on tables in an elementary school cafeteria were consumed. The cost of baking whole grain foods in the school foodservice setting was not calculated.
2. Is it feasible to gradually increase the level of whole grain flour content in grain-based foods over the course of the school year, ranging from 25% to 100% whole grain flour content? The answer depends on the length of time it takes students to adapt to a higher level of whole grain content, such as a 50/50 blend of whole-wheat to all-purpose flour. It is also important to ascertain which grain foods most easily mask the whole grain flavor and what types of whole grain flour (white whole wheat, oats, or barley) provide the most acceptable products.
3. What is the potential cost of food and labor in introducing these new products in different school settings? This is a crucial issue in weighing the short-term cost to benefit ratio of serving whole grain foods along with the potential long-term impact on the risk for chronic disease.

4. What types of education programs are necessary to encourage greater whole grain consumption? Should whole grain education involve parents, teachers, and community support from local bakeries, distributors, grocery stores, and commodity programs, in addition to school foodservice staff?

One way to address these issues is to experiment initially with various grain foods containing a blend of 25% whole grain flour. There are a variety of breads, rolls, and buns available on the market with a full range of whole grain flour content. The use of white whole-wheat is becoming more popular as it is lighter in color, milder in flavor, and lighter in texture, as compared to traditional products made with red whole-wheat flour. These characteristics are child-friendly and are likely to increase the acceptability of whole grain foods. Through the gradual exploration of several partial or full whole grain foods, these items can be assessed for acceptability via plate waste studies and cost analysis. If these foods are acceptable in terms of taste and cost guidelines, the gradual introduction of higher levels of whole grain content might be explored. The success of these initiatives may serve as models to encourage other school foodservice personnel to adopt innovative methods to increase the presence of whole grain foods in their school meals.

CONCLUSION

Recent scientific evidence and policy recommendations place an emphasis on greater consumption of whole grain foods. School foodservice personnel are in a position to gradually increase the amount of whole grain foods consumed by children. However, collaboration among the government, the baking industry, and school foodservice is essential if the cost implications and health benefits of whole grain foods are to be incorporated successfully into school meals. The gradual integration of whole grain foods into school foodservice menus would be a major step in achieving the Healthy People 2010 goal of 50% of the U.S. population consuming three whole grain products on a daily basis.

REFERENCES

Adams, J.F., & Engstrom, A. (2000). Dietary intake of whole grain vs. recommendations. *Cereal Food World*, 45, 75-78.

American Diabetes Association. (2002). Evidence-based nutrition principles and recommendations for the treatment and prevention of diabetes and related complications. *Diabetes Care*, 25, 148-198.

Anderson, J., Hanna, T., Peng, X., & Kryscio, R. (2000). Whole grain foods and heart disease risk. *Journal of the American College of Nutrition*, 19(3), 291S-299S.

Centers for Disease Control and Prevention (CDC), NCHS. (2002). Prevalence of overweight among children and adolescents, United States: 1999-2000 [Available online:<http://www.cdc.gov/nchs/products/pubs/pubd/hestats/overwght99.htm>.]

Chatenoud, L., Tavani, A., Vecchia, C., Jacobs, D.R., Negri, E., Levi, F., & Franceschi, S. (1998). Whole grain food intake and cancer risk. *International Journal of Cancer*, 77, 24-28.

Ellison, R.C., Capper, A.L., Goldberg, R.J., Witschi, J.C., & Stare, F.J. (1989). The environmental component: Changing school foodservice to promote cardiovascular health. *Health Education Quarterly*, 16, 285-297.

Guthrie, J. (2003). Do healthy school meals cost more? Food Assistance and Nutrition Research Report No. (FANRR34-6) 2 pp, USDA, ERS July 2003. [Available online:[http://www.ers.usda.gov/publications/fanrr34/fanrr34-6/.](http://www.ers.usda.gov/publications/fanrr34/fanrr34-6/)]

Institute of Medicine of the National Academies of Science. (2002). *Dietary Reference Intake for Dietary Fiber*. Washington, DC: author.

Jacobs, D., Meyer, K., Kushi, L., & Folsom, A. (1998). Whole-grain intake may reduce the risk of ischemic heart disease death in postmenopausal women: The Iowa Women's Health Study. *American Journal of Clinical Nutrition*, 68, 248-257.

Jacobs, D.R., Meyer, K., Kushi, L., & Folsom, A. (1999). Is whole grain intake associated with reduced total and cause-specific death rate in older women? The Iowa Women's Health Study. *American Journal of Public Health*, 89, 322-329.

Jacobs, D.R., Marquart, L., Slavin, J., & Kushi, L.H. (1998). Whole grain intake and cancer: An expanded review and meta-analysis. *Nutrition and Cancer*, 30, 85-96.

Jacobs, D.R., Meyer, H.E., & Solvoll, K. (2000). Reduced mortality among whole grain bread eaters in men and women in the Norwegian Country Study. *European Journal of Clinical Nutrition*, 55, 137-143.

Kantor, L., Variyam, J., Allshouse, J., Putnam, J., & Biing-Hwan, L. (2001). Choose a variety of grains daily, especially whole grains: A challenge for consumers. *Journal of Nutrition*, 131, 473S-486S.

Kaufman, F.R. (2002). Type 2 diabetes mellitus in children and youth: A new epidemic. *Journal of Pediatric Endocrinology and Metabolism*, 15(Suppl 2), 737-744.

Krauss, R., Eckel, R., Howard, B., Appel, L., Daniels, S., Deckelbaum, R., Erdman, J. Kris-Etherton, P., Goldberg, L., Kotchen, T., Lichtenstein, A., Mitch, W., Mullis, R., Robinson, K., Wylie-Rosett, J., & Bazzarre, T. (2000). *American Heart Association Dietary Guidelines. Revision 2000: A statement for healthcare professionals from the Nutrition Committee of the American Heart Association*. *Circulation*, 102, 2284.

Liu, S., Manson, J.E., Stampfer, M.J., Hu, F.B., Giovannucci, E., Colditz, G.A., Hennekens, C.H., & Willett, W.C. (2000). A prospective study of whole grain intake and risk of type 2 diabetes mellitus in U.S. women. *American Journal of Public Health*, 90, 1409-1415.

Liu, S., Willett, W.C., Manson, J.E., Hu, F.B., Rosner, B., & Colditz, G. (2003). Relation between changes in intakes of dietary fiber and grain products and changes in weight and development of obesity among middle-aged women. *The American Journal of Clinical Nutrition*, 78, 920-927.

Meyer, K.A., Kushi, L.H., Jacobs, D.R., Slavin, J., Sellers, T.A., & Folsom, A.R. (2000). Carbohydrates, dietary fiber and incident type 2 diabetes mellitus in older women. *American Journal of Clinical Nutrition*, 71, 921-930.

Ogden C.L., Flegal K.M., Carroll M.D., & Johnson C.L. (2002). Prevalence and trends in overweight among U.S. children and adolescents 1999-2000. *The Journal of the American Medical Association*, 288, 1728-1732.

Perry, C.L, Bishop, D.B., Taylor, G., Murray, D.M., Mays, R.W., Dudovitz, B.S., Smyth, M., & Story, M. (1998). Changing fruit and vegetable consumption among children: The 5-a-Day Power Plus program in St. Paul, Minnesota. *American Journal of Public Health*, 88, 603-609.

Reynolds, K.D., Franklin, F.A., Binkley, D., Raczynski, J.M., Harrington, K.F., Kirk, K.A., & Person, S. (2000). Increasing the fruit and vegetable consumption of fourth-graders: Results from the High 5 project. *Preventative Medicine*, 30, 309-319.

Rogers, D. (2002). Effects of processing on nutritive and physiological impact of grains. Grains for the health of it: Increasing grains and whole grains consumption as a strategy for health. (Proceedings). Wheat Foods Council and University of Minnesota, September 20-21.

Steffen, L.M., Jacobs, D.R. Jr., Murtaugh, M.A., Moran, A., Steinberger, J., Hong, C.P., & Sinaiko, A.R. (2003). Whole grain intake is associated with lower body mass and greater insulin sensitivity among adolescents. *American Journal of Epidemiology*, 158(3), 243-250.

Steinberger J., & Daniels S.R. (2003). Obesity, insulin resistance, diabetes, and cardiovascular risk in children: An American Heart Association scientific statement from the Atherosclerosis, Hypertension, and Obesity in the Young Committee (Council on Cardiovascular Disease in the Young) and the Diabetes Committee (Council on Nutrition, Physical Activity, and Metabolism). *Circulation*, 107, 1448-1453.

U.S. Department of Agriculture, & Center for Nutrition Policy and Promotion. (1995). *Nutrition and Your Health: Dietary Guidelines for Americans* (4th edition). Home and Garden Bulletin, Vol. 232.

U.S. Department of Agriculture, Food and Nutrition Service. (2003a). Nutrition program facts: School Breakfast Program [Available online:<http://www.fns.usda.gov/cnd/breakfast/AboutBFast/bfastfacts.htm>.]

U.S. Department of Agriculture, Food and Nutrition Service. (2003b). Nutrition program facts: National School Lunch Program [Available online:<http://www.fns.usda.gov/cnd/lunch/AboutLunch/NSLPFactSheet.htm>.]

U.S. Department of Health and Human Services. (2000). Healthy People 2010. (2nd ed). With Understanding and Improving Health and Objectives for Improving Health. 2 vols. Washington, DC: U.S. Government Printing Office.

Wechsler, H., Basch, C.E., Zybert, P., & Shea, S. (1998). Promoting the selection of low-fat milk in elementary school cafeterias in an inner-city Latino community: Evaluation of an intervention. *American Journal of Public Health*, 88, 427-433.

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