

## Exploring the Use of Whole Grain Pasta in School Lunches

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*Please note that this study was published before the implementation of Healthy, Hunger-Free Kids Act of 2010, which went into effect during the 2012-13 school year, and its provision for Smart Snacks Nutrition Standards for Competitive Food in Schools, implemented during the 2014-15 school year. As such, certain research may not be relevant today.*

### ABSTRACT

Pasta is a popular grain food served as an entrée or side dish in both home and away-from-home settings. In schools, pasta is served less frequently than other entrées. Pasta, especially whole-grain pasta, offers an opportunity to incorporate less expensive, nutritious, and versatile dishes into school meals. A need exists to develop whole-grain pasta products and recipes to assist school nutrition personnel in the procurement, preparation, and service of high quality, nutritious meals. Additionally whole-grain products served in schools must meet the color, taste, and quality expectations of children. Barriers to incorporating pasta into school menus were determined by the use of focus group discussions with SN personnel. An integrated, cooperative effort by industry, government, nonprofit organizations, and schools is required to successfully to incorporate more pasta menu items, particularly whole-grain pasta, in school menus.

### Background: Rationale for Increasing Use of Whole-Grain Pasta in School Meals

The U.S. Department of Agriculture (USDA) provides guidelines for promoting a healthier school environment through the HealthierUS School Challenge award program. This award program recommends that whole grain(s) be served at least three times per week and defines a whole grain food as a product with whole grain as the primary ingredient by weight (U.S. Department of Agriculture).

In addition, USDA has recently proposed revised nutrition standards for school meals, including an increase in the availability of fruits, vegetables, whole grains, and fat-free/low-fat fluid milk; a reduction in the amount of sodium and saturated fat in meals; and changes in required calorie levels (Nutrition Standards in the National School Lunch and Breakfast Program, 2011). This proposal is based on an Institute of Medicine report entitled, *School Meals: Building Blocks for Healthy Children* (Committee on Nutrition Standards for National School Lunch and Breakfast Programs, 2009).

The USDA proposed regulation generally defines *whole grain-rich* foods as those that contain at least 51% whole grains and meet serving size requirements specified for the grains component of the meal pattern for school meals. A "staged approach" for increasing whole grains is proposed, to accommodate availability, labeling, and acceptability of whole-grain foods. If included in the final

rule, this staged approach would require at least half of the grain products offered during the school week be whole grain-rich, followed by a requirement that all grain products offered meet the whole grain-rich criteria (Nutrition Standards in the National School Lunch and Breakfast Program, 2011).

Researchers, school nutrition personnel, and manufacturers are investigating the challenges of incorporating more whole grains into school meals. In elementary schools, studies have documented that popular whole-grain foods are consumed at the same levels as the refined counterparts in either acute doses or by gradually increasing the whole-grain content in products ranging from entrées such as pizza crusts (Chan, Burgess-Champoux, Vickers, Reicks, & Marquart, 2008; Schroeder, Ronnei, Arndt, & Marquart, 2010), hamburger buns/dinner rolls (Rosen, Sadeghi, Schroeder, Reicks, & Marquart, 2008), and tortillas (Toma et al., 2009), to desserts and snacks, such as cookies (Toma et al., 2009) and crackers (Sadeghi & Marquart, 2009, 2010). With an increased demand for whole-grain foods in schools, manufacturers have reformulated a variety of popular grain-based foods to contain more whole grains, including breads, cereals, crackers, and pizza products. However, pasta, particularly pasta made with whole grain, has experienced less demand for purchase by school nutrition programs.

In school meals, the major food sources of energy, total fat, and sodium are combination entrées, defined operationally as the meat or meat alternate component plus any grain, fruit, and/or vegetables served with the meat/meat alternate (Crepinsek, Gordon, McKinney, Condon, & Wilson, 2009). More than 40% of combination entrées are pre-prepared items (Crepinsek et al., 2009). The most commonly offered grain-based entrées for elementary schools are peanut butter sandwiches, sandwiches with meat (e.g., turkey or ham), and Mexican-style entrées (e.g., burritos, tacos, and nachos). In secondary schools, choices include pizza, sandwiches with meat or poultry, and cheeseburgers (Condon, Crepinsek, & Fox, 2009). These grain-based entrées appear on more than 90% of all menus (Condon et al., 2009). In addition to use in entrées, grains/breads are offered as individual items in more than two-thirds of school menus surveyed, including white bread/rolls (30%); crackers and pretzels (25%); buttered toast/bagels (9%); rice (6%); corn/tortilla chips (6%); biscuits/croissants/cornbread (5%); whole-grain breads/rolls (5%); and pasta (4%) (Condon et al., 2009).

Since pasta is not frequently served in schools, barriers to serving both refined and whole-grain pasta in the school environment need further study. If these barriers could be better understood and overcome, whole-grain pasta could be used in a variety of ways to increase healthier whole-grain menu options in school meals.

## Whole Grain Pasta and Nutritious School Meals

Considering these proposed USDA meal pattern changes, whole-grain pasta may provide versatile options for school nutrition (SN) personnel implementing new grains component requirements. Pasta has many positive attributes. Pasta is naturally low in fat, provides several key nutrients, and is often served with a vegetable-based sauce (Antognelli, 1980).

Whole-grain rich pasta provides at least 2.5 times more fiber than refined-grain pasta. Children accept pasta at varying levels of whole wheat content. Children consumed 76-78% of spaghetti, fettuccini and rotini pasta made with 25-100% finely-milled white whole-wheat flour (Chan, Marquart, & Burgess-Champoux, 2005).

SN professionals nationwide are exploring ways to serve healthy school meals, including the use of "menu innovation" days that bring personnel from a school district together to create and taste new menu items. Also, some school nutrition programs are partnering with local chefs to develop great-tasting, nutritious recipes. A new program, "Chefs Move to Schools" was recently launched as part of First Lady Michelle Obama's "Let's Move!" campaign, to promote these partnerships.

New or slightly altered recipes need to be kid-friendly in appearance, taste, and texture. Even small changes possess great potential to increase the inclusion of whole grains, vegetables, and legumes on school menus and their consumption by children. Combining vegetables, fruits, and legumes with

whole-grain pasta will help familiarize children with a variety of textures and flavors and may increase their desire to eat more foods that are consistent with recommendations of the *Dietary Guidelines for Americans* (U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2010). The versatility of pasta was demonstrated by its inclusion in almost half (9 of 21) of the food categories identified as major dietary contributors in the U.S. population, based on 2001-2002 National Health and Nutrition Examination Survey data (Bachman, Reedy, Subar, & Krebs-Smith, 2008).

## Input from School Nutrition Directors and Managers

Given the potential for usage of pasta offerings and the need for more whole grains served in school meals, focus groups were conducted to categorize pasta usage and to investigate attitudes of SN professionals regarding the use of refined- and whole-grain pasta in school meals. The attitudes of SN professionals regarding the selection, preparation, and service of all pasta products must be understood to successfully increase the use of pasta in school meals.

Both individual interviews ( $n = 9$ ) and focus groups were conducted with SN directors and managers from Minnesota. In addition, SN directors and managers attending the 2009 Annual National Conference of the School Nutrition Association (SNA) participated in seven focus groups. Participants at the SNA conference focus groups did not include SN professionals from Minnesota. This convenience sample ( $N=79$ ) included representation from 40 school districts nationwide, including SN directors ( $n = 41$ ) and managers ( $n = 38$ ). The sessions were audiotaped and transcribed verbatim by the moderator and two assistants. Segments of text were coded independently by two investigators according to categories based on discussion questions. Differences in coding were reconciled and investigators worked together using qualitative data analysis procedures to generate common themes. Few participants were from small school districts (<4,000 students), a little over one-quarter from medium-sized districts (4,000-10,000 students), and about half were from large school districts (>10,000 students). Participants reported a range of students eligible for free and reduced (FRP) meals; one-quarter reported a high level (>30%) of children eligible for FRP meals, about half reported a medium level (10-30%), and others reported they had a low level of children eligible for FRP meals or they did not have the information.

Based on focus group responses, several themes emerged regarding the use of pasta in schools. Pasta was mainly served as an entrée and as a refined product. On average, pasta was served weekly or bi-monthly in elementary schools, but as frequently as daily or every other day in middle and high schools. When asked to rate the importance of pasta in the overall meal, with one being least important and 10 being most important, the mean of the responses was 7.0 and the mode was 8.0.

Table 1 summarizes the participant responses when asked to provide reasons for their rating of the importance of pasta school meals. When the responses were categorized, those participants rating the importance of pasta greater than six reported that pasta was well-liked by children, a good source of energy, inexpensive, nutritious, low in fat, easily available in a variety of shapes, and versatile. Participants who rated the importance of pasta lower than six responded that pasta comprised only one component of the meal and was not as important as other meal components such as fruits and vegetables; competed with other popular items such as burgers and pizza; and required more labor to prepare and serve in a relatively short time period. This group also reported pasta might be served less frequently in some schools due to constraints of kitchen and cafeteria facilities, as well as lack of staff and appropriate equipment.

Table 1: *Focus Group Themes from Individual School Nutrition Directors and Managers Rating Pasta in the Overall Meal*

**Responses to the question, "How important is pasta as part of the overall meal?"**

Scale: 1 = Least important, 10 = Most important

Mean/median 7.0

Mode 8.0

### Feedback from Focus Group Individuals Who Gave Pasta Higher Ratings

- Kids just like pasta -"Students love it."
- Variety/versatility
- Nutritious --"It is naturally a fat-free product so that eliminates part of the challenges."
- Inexpensive
- Energy food (especially athletes)

### Feedback from Focus Group Individuals Who Gave Pasta Lower Ratings

- Inexpensive item and do not want to spend commodity money/dollars on pasta
- Just another component of the meal; fruits, vegetables, and entrée take precedence over low cost of pasta
- Competes with other popular items
- Requires more labor than some other meals
- Want other whole-grain pastas not just wheat--"We're seeing more and more wheat allergies"
- Requires recipe adjustments when using whole-wheat pasta

Participants reported that whole-grain pasta was served in less than 25% of the schools represented in the survey. Table 2 summarizes focus group themes that emerged from participant responses, including SN personnel had less experience with cooking, holding and maintaining the overall quality of whole-grain pasta compared to traditional, refined pasta; whole-grain pasta's limitations included a darker color, different, chewier texture, longer cooking time, higher cost, difficulty procuring, availability in fewer shapes than refined pasta, and need for recipe modifications including additional sauce. As one advantage, respondents reported whole grain pasta's better holding properties.

Table 2: *Focus Group Themes from School Nutrition Directors and Managers Regarding Whole-Wheat/Grain Pasta*

|  |   |
|--|---|
| <b>Procuring Whole-Wheat/Grain Pasta</b>                                       | <ul style="list-style-type: none"><li>• Whole-wheat pasta is not as readily available or as easy to find as refined pasta</li><li>• Usually have to special order / harder to get</li><li>• The product received may be different than the product that was originally ordered</li></ul>  |
| <b>Methods Used to Determine Whole-Wheat/Grain Pasta</b>                       | <ul style="list-style-type: none"><li>• Read package labels or specifications</li><li>• Take the manufacturer's / broker's word</li><li>• Identify first ingredient as whole grain</li><li>• Look at fiber content</li></ul>  |
| <b>Perceptions about Preparation and Attributes of Whole-Wheat/Grain Pasta</b> | <ul style="list-style-type: none"><li>• Few kitchen staff are experienced in cooking whole-wheat/grain pasta at school-generally whole-wheat/grain pasta is not available</li><li>• Whole-wheat/grain pasta takes longer to cook</li><li>• Whole-wheat/grain pasta has a different water absorption rate than refined</li><li>• Texture is different than refined pasta (e.g. grainy/chewy)</li><li>• Advantage: Whole-wheat/grain pasta will hold on the serving line better</li></ul> |

A few participants who had experience with commodity whole-wheat pasta mentioned issues with quality and consistency, indicating that "the one that we have from the government it is a little bit grainy and that's why we can't use it more for a pasta salad" and " [commodity whole-wheat spaghetti] did not cook up very well." Another interesting observation regarding whole-grain commodity pasta was participants would rather use commodity dollars on higher priced items such as fruits, vegetables, and entrée items. Although participants indicated their preference to purchase pasta via non-commodity channels, they reported that selection was limited.

These challenges to serving whole-grain pasta in school meal programs indicate a need for more in-depth study of the use of whole-grain pasta in the preparation and service of school meal entrées and side dishes.. Greater collaboration between pasta manufacturers and SN personnel will help identify challenges and create solutions so that whole grains can be more easily included in school meals.

## Increasing the Use of Whole-Grain Pasta, in Schools

To help schools meet the requirements for serving whole-grain foods, it is essential to increase the availability of whole-grain pasta that meets taste expectations for varying socio-economic and culturally diverse students in grades K-12. Whole-grain pasta products must also fulfill the expectations of school personnel for quality, cost and ease of purchase through local and national manufacturers and distributors. Schools will need the appropriate equipment and recommended preparation and handling instructions for whole-grain pasta. The cooperative efforts of industry, government, and nonprofit organizations are needed to facilitate communication between stakeholders to develop innovative solutions and educate others within schools and throughout the supply chain.

To help meet children's taste expectations and to address the darker color and grainier texture, whole-grain pasta may be made with finely ground, white whole-wheat flour. White whole-wheat flour is lighter in color and has a milder flavor compared to red whole-wheat (Lukow, Guinard, & Adams, 2004; Syms & Cogswell, 1991). Whole grain-rich pasta made from finely-milled white wheat flour more closely mimics traditional refined-grain pasta in color and texture and is accepted by children (Chan et al., 2005; Cornelius et al., 2010). Since 2005, pizza made with finely-milled white whole wheat has been incorporated successfully into schools. Children's consumption of 51% whole-grain blend pizza (51% white whole-wheat flour out of the total flour weight) did not differ compared to the traditional refined counterpart, which nearly doubled their whole grain intake for the meals in which the whole-grain pizza was served (Chan et al., 2005).

To fulfill the expectations of school personnel for product quality and preparation, clear communication and strong working relationships between manufacturers, distributors, and SN personnel are needed. This includes the manufacturing of whole-grain pasta that is high in quality and packaged in a convenient format and size for use in school nutrition programs. Collaboration on best practices for recommended storage, preparation, service of whole-grain pasta is needed to assure that product quality is maintained. Training may be necessary to assure that whole-grain pasta products are cooked and held according to the manufacturer's recommendations. For example, contrary to the perceptions expressed in the focus groups, whole-grain pasta generally takes less time to fully cook than refined-grain pasta. The recommended cooking time for pasta, refined or whole grain, depends on factors including the pasta shape and thickness, as well as the cooking method used and the final desired pasta texture. Use of the proper ratio of water to dry pasta is also important for consistency of cooking time and pasta quality. The conditions used for holding cooked pasta are also an important factor affecting quality.

If the recommended preparation steps are followed and quality issues still occur, it may be necessary to trouble-shoot with manufacturers to examine the cooking and holding conditions in a school setting. Ongoing communication will be essential to continually improve working relationships and quality of whole-grain pasta products served in schools.

Non-profit organizations such as the School Nutrition Association and the Grains for Health Foundation have initiated collaboration among government, industry, vendors, distributors, chefs, and SN personnel to reduce barriers for incorporating whole grains into the school environment. These organizations have facilitated communication of the needs of SN personnel to manufacturers for developing and marketing products including whole grain pizza, bread, pasta, and tortillas.

One example of successful communication between manufacturers and schools has been achieved with the help of School Food FOCUS. School Food FOCUS is a national initiative designed to enable meal programs in large, urban school districts to redirect food purchasing toward healthy, local, and sustainable vendors. Sara Lee's research and development group worked with a School Food FOCUS school to develop bulk-packed hamburger and hot dog buns made with white whole-wheat flour. This product was found to be acceptable by student testing and incorporated into this school in fall 2010. Based on the success of the test, this product has been marketed to other schools and districts around the Midwest (National Good Food Network (NGFN), 2010). Recent workshops have brought together manufacturers and SFP to discuss the use of whole-grain products in schools. This type of interchange is valuable in establishing a better understanding of each other's business and for setting goals to increase whole-grain product availability and consumption in schools (School Food Focus, 2010; The Grains for Health Foundation, 2008, 2009, 2010). The next step underway is to partner with manufacturers and other stakeholders interested in improving the quality and availability of whole-grain pasta in schools. Ultimately, new product innovations from manufacturers coupled with higher demand from schools will drive product availability and help reduce cost.

## Conclusion

Pasta is a popular grain food used in main entrées and side dishes as a low-cost, versatile option which is consumed at home and in away-from-home eating environments. However, refined- and whole-grain pastas are served infrequently in schools. Results of studies suggest that whole-grain pasta can be successfully served in school meals and successfully consumed by children (Chan et al., 2005; Cornelius et al., 2010).

With the expected release of revised school meal patterns and recommendations, to increase whole grain requirements, inclusion of a whole-grain pasta option in entrées and side dishes may assist children in consuming the recommended intake of whole-grain foods. Focus group responses suggest the need for increased availability of quality, whole-grain pasta products in schools, in addition to the communication of optimal cooking and holding times for whole-grain versus refined-grain pasta products.

If the barriers experienced by SN personnel in the procurement, preparation, and service of whole-grain pasta are addressed, the increased use of whole-grain pasta products in school meals, meeting student's expectations for taste and quality, may become a reality. Whole-grain pasta also provides an opportunity to familiarize students with fruits, vegetables, and legumes through inclusion in a variety of pasta dishes. This may also assist future generations to willingly increase their intake of these nutrient dense, plant-based foods. Continued collaboration and innovation among government, industry, distributors, chefs, and SN personnel is essential to mitigate cost and availability issues, and will increase the availability and use of whole-grain pasta in school menus.

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