SECTION: 4 NUMBER OF CHILDREN BENEFITED BY INCREASED SCHOOL MILK CONSUMPTION

In this Section, we examine the nutritional implications of increased school milk consumption. Increased milk consumption can enhance the quality of the diet, thereby affecting consumer health and heath care costs. But to estimate changes in health care costs, we must determine how many children have improved their dietary intake as a result of increased milk consumption. And before we can determine how many were benefited, we must examine the nature of the changes that occurred in the test schools as a result of the SMPT.

Increased consumption of milk at school affects the nutrient intake of students in two ways. First, there is the direct nutritional effect of additional milk in the diets. Second, and potentially more important, is the impact that results from the adoption of a healthier diet overall, not just the increased consumption of milk. While increased milk consumption contributes importantly to the intake of certain key nutrients, thereby lessening the risk of illnesses like osteoporosis and bone fractures, it is the combination of foods that make-up a healthy diet that has the greatest payoff in risk-reduction for a wide range of health conditions. Thus, we are especially interested in the ramifications of increased milk consumption on the overall dietary patterns of the students in these schools.

4.1 Milk as a Source of Key Nutrients

Fluid milk is a rich source of several key nutrients, vitamins, and minerals including calcium, high quality protein, vitamins A, D, and B-12 and riboflavin, phosphorus, magnesium, and zinc. Milk and milk products are the dominant source of calcium in the Nation's food supply, accounting for about 73 percent of the total. Milk and its products also account for about one-third of the total supply of riboflavin and phosphorous and about one-fifth of the total supply of protein, vitamin B-12, zinc, and potassium, 17 percent of vitamin A and 16 percent of the supply of magnesium. Thus, it is a key source of a wide range of nutrients.

As noted earlier, the diets of many school-age children have shortfalls in one or more of these nutrients. Shortfalls in calcium and fiber and excessive levels of total fat, saturated fat, added sugars, and sodium are especially important. Increasing the consumption of low-fat milk contributes importantly to increased calcium intake and, to the extent it substitutes for higher-fat milk, to a lowering of the intake of fat and saturated fat.

4.2 Converting Requirements to a Per Serving Basis

The Institute of Medicine of the National Academy of Sciences recommends an average daily intake of calcium of 800 mg for children age 4-8 and 1,300 mg for children age 9-

18. Measured in terms of 8-ounce servings of fluid milk, these recommended amounts are equivalent to 2.6 servings and 4.3 servings, respectively. The study of food intake by school-age children based on 1994-96 Continuing Survey of Food Intakes by Individuals (CSFII) data estimated average daily servings of 2.0 for children participating in NSLP and 1.4 for those not participating. Of the 2.0 servings consumed by NSLP participants, 0.8 servings were consumed as part of school lunches while the non-participants in school lunch consumed only one-fourth this level at lunch or 0.2 servings.

In 15 of the 18 school districts taking part in the SMPT, milk sales data were disaggregated by point of sale making it possible to distinguish among sales on the meal line, a la carte sales, and vending machine sales. Again, these are percent changes between the base and test periods. The percent changes in milk sales by point of sale are displayed in Table 6.

Table 6. Percent Change in the Quantity of Milk Sales per 1,000 ADP by Point of Sale in Schools in 15 SMPT School Districts[1]

Panel	Change in milk sales			
	Total	Meal Line	A la carte	Vending
	----------percent----------			
Elementary:				
Control	-1.6	+2.9	-25.3	n.a.
Test 1/3	+13.0*	+16.7*	-24.3	n.a.
Secondary:				
Control	+3.0	+4.1	-11.7	n.a.
Test 2	+18.4*	+21.6*	-4.0	n.a.
Test 4	+9.5*	+7.0	+88.2	n.a.
Test 5	+37.8**	+15.8**	+10.3	[3]
Test 6	+34.5**	+27.9**	+160.4**	n.a.
Test 7	+29.5**	-0.8	23.8**	[3]
Total Test[2]	+26.5**	+17.7**	+51.4*	[3]

[1] Data for Chesapeake, Pittsburgh, and Oakland schools not included due to absence of data by point of sale.
[2] Weighted average.
[3] Percent change not meaningful due to small base.
* Difference in percent change from control schools statistically significant at the 90 percent confidence level.
** Difference in percent change from control schools statistically significant at the 95 percent confidence level.
Source: Roper ASW and Beverage Marketing Corporation

SMPT sales data can be converted to an 8-ounce serving basis by dividing the reported measures (ounces per 1,000 ADP) by 8,000. Since all children going through the meal line are offered an 8-ounce serving of milk, comparing actual sales to possible sales makes it possible to calculate the share of children who accept milk with their meal. The rates for the test period are as follows[1]:

		Meal line
Elementary	Test schools	95%
	Control schools	86%
Secondary	Test schools	65%
	Control schools	58%

The data appearing under the "meal line" column are particularly revealing. They indicate that 95 percent of the students participating in the meals programs in elementary test schools had milk with their meals, compared to 86 percent in elementary control schools. The comparable shares at the secondary level were 65 percent and 58 percent.

4.3 Linking Increased Milk Consumption to a Healthy Diet

As indicated above, from the standpoint of achieving improved prospects for good health, the relationship of increased low-fat and non-fat milk consumption to the overall diet is critical. Lasting effects require dietary practices that go beyond the increased consumption of a single food, even one as important and nutritious as milk. Thus, before we can make judgments regarding the future health conditions of children as a result of increased milk consumption, it is necessary to consider their overall dietary practices and the implications that increased milk consumption might have for a change in these practices.

[1] As with the overall meal line comparisons displayed in Table 5, differences among the elementary schools are significant at the 90 percent level while differences at the secondary level are significant at the 95 percent level.

Participation in the NSLP and/or the SBP is indicative, though no guarantee, that students are eating a healthy diet. It is no guarantee because, as noted above, most participants have the option to refuse food they don't want. Even when accepted, foods are sometimes not eaten. And meals eaten outside school can be totally unaffected. Nonetheless, there is strong evidence that school meals are nutritious in their offerings and are becoming more so (2). Furthermore, it would appear that students who participate in school meals also consume healthier diets outside school (3, 11, 21). Thus, participation in the school meals program will serve as an indicator of a healthy diet or, at the least, the opportunity to achieve a healthy diet, for purposes of this analysis.

What, then, is the relationship between increased milk consumption and the adoption of a healthy diet? There are two ways to measure changes in this regard. The most direct is to determine what happens to participation in the school meals program. The findings reported earlier (Table 4) indicate a small (-0.8 percent) net decline in participation among elementary school students and a somewhat larger (+4.4 percent) net increase at the secondary level. When changes in participation in just the lunch program were examined, ADP in the test elementary schools increased 1.5 percent while ADP in secondary schools rose by 4.8% (46). While the difference in ADP rates of the test and control schools at the secondary level (including both lunch and breakfast) was statistically significant at the .95 confidence level, differences at the elementary level were not statistically significant. On the basis of these findings, we conclude that little, if any, change in participation could be expected to occur in elementary schools as a result of the measures implemented in the SMPT. This is not surprising given the already high rate of program participation in most elementary schools. Among secondary schools, however, an increase of 4 to 5 percent is expected. Given that about 36 percent of all school meals are served in secondary schools, an overall increase in ADP of 1.5 to 2.0 percent is forecast.

However, increased participation accounted for only a portion of the additional milk sales measured in the pilot. A much larger share of the increase in sales was due to either increased consumption by students already participating in the meals programs or to increased sales outside the program, i.e. through a la carte or vending machine sales. To the extent this increase in sales is attributable to children already participating in the meals programs, it is likely to have resulted in a further upgrading of their diets.

At the elementary school level, the SMPT findings for those schools reporting by point of sale indicate that around 84 percent of the net increase in sales occurred in the meal lines as part of the sale of reimbursable meals with the remaining 16 percent accounted for by increased a la carte sales. Flavored milk accounted for all of the increased usage. Thus most of the increased consumption of fluid milk in the test elementary schools contributed to the further improvement in the diets of children who were already benefiting from participation in the meals programs. To the extent meal participants bought additional milk a la carte, the share was even higher.

An additional improvement in the dietary intake of elementary students is due to a shift away from whole milk and toward low-fat milk. While whole milk sales accounted for only 18 percent of total sales in the test schools in the base period, whole milk sales fell 20 percent during the test. This presumably occurred because flavored milks were only offered in low-fat form. Thus, all additional sales in the elementary schools were of low- or reduced-fat milk, further improving the nutritional profile of the affected students.

At the secondary school level, approximately half (49 percent) of the relative increase in milk sales in the test schools occurred in the meal line with slightly more than half (56 percent) of the additional meal line sales due to an increase in the volume of sales per meal participant. As in the elementary schools, this contributed to a more complete meal on the part of those participating in the meals programs. Unlike the elementary schools, however, most of the increased volume of milk sales in the meal line of the secondary school was of whole milk (due primarily to the influence of one panel of schools that offered their flavored milk in whole milk form). As a result, the additional sales did not contribute to a reduction in the fat content of the milk served in these schools, though low-fat milk was still the milk beverage of choice, accounting for more than two-thirds of total milk sales.

Further contributing to improved dietary intake was a measured reduction in the amount of milk discarded by students. As part of the SMPT, discarded milk containers were collected and the contents weighed from a sample of students in 47 of the participating schools (21 control schools and 26 test schools). This information was collected at three different times during the study, once before the test began and twice afterward.

Findings from this analysis revealed a reduction in the share of milk wasted in test schools relative to control schools of about 18 percent in elementary schools and 26 percent in those secondary schools serving milk in 8-ounce containers. Both differences were significant at the 95 percent confidence level. The magnitude of reduced waste was greater toward the end of the school year than it had been shortly after the test began. It was also found that the share of unopened milk containers fell in test secondary schools (from 3.6% to 1.7%) while rising in control schools.

4.4 Estimating the Number of Children Benefited

To determine the health effect of improvements in children's diets, it is first necessary to estimate the number of children nationally who would benefit from an improved diet as a result of changes in the milk offered in the schools. There are two components to this calculation. First, the increase in meal program participation is estimated. Second, the number of children who were already participating in the program but elected to include milk with their meal when they hadn't before is determined.

The USDA's May 2002 count of the number of children participating in the NSLP was used as the basis for this calculation. As in the estimates of increased milk sales, we have distinguished between elementary and secondary schools by using participation rates, number of breakfasts and lunches served, and enrollment breakdowns obtained from USDA/FNS administrative records or from findings of USDA/FNS–sponsored research. Using the net percentage changes in ADP measured in the SMPT and the estimated number of participants, we estimate that the number of students participating in the school meals programs will increase by about 430,000 nationwide (Table 7), all occurring in secondary schools. As noted above, this is to be expected given that participation rates are already about half again as high in elementary schools as in secondary schools.

The next step is to estimate the number of children who were already participating in the meals programs but who added milk to their meals. To do this we compared the quantity of milk per 1,000 ADP sold on the meal line to the quantity that could be sold if all participants took milk. Since 8 ounces of milk are required to be offered in both elementary and secondary schools and for both breakfast and lunch, the maximum expected quantity would be 8,000 ounces per 1,000 ADP. (An exception is the one test panel in which 10-ounce containers were used on the meal line. Data for this panel was therefore excluded from the calculation.) Using this measure, we estimate the share of meal participants that included milk with their meal and changes in this share between the base period and the test period for both control schools and test schools.

Applying this methodology, it is estimated that more than 2 million elementary and secondary students who were already participating in school meals programs but not drinking milk would start to do so under national implementation (Table 7). Among the test schools, this is reflected in the share of elementary students participating in the meal programs who included milk with their meals rising from 81 percent to 95 percent. Adjusting for a slight increase in share among the control schools, a net improvement of 11 percent is estimated.

The share of secondary school students including milk is somewhat lower than in elementary schools. In the base period, 44 percent of lunch participants in test schools included milk with their meals. During the pilot, test schools experienced a net improvement of 3 percent in the share including milk with their meals.

Table 7: Estimated Change in the Number of Students Participating in School Meals Programs and Including Milk as Part of Their Meal

Source of change	Elementary schools	Secondary schools	Total
Additional participants	no change	430,000	430,000
Existing participants who started including milk	1,833,000	293,000	2,126,000
Total	1,833,000	723,000	2,556,000

There are two cautions to be noted regarding these estimates. First, in estimating the number of additional participants in the meals programs, it is assumed that an increase in ADP equates to an identical increase in the number of students participating in the meals programs. However, by combining lunch and breakfast in a single measure, as in the reported study findings, there is an opportunity for double-counting. On the basis of a review of additional participation data collected at the time of the study, we have concluded that there was little or no double-counting. Not surprisingly, the data indicate that nearly all of the increased participation occurred at lunch rather than breakfast.

Second, in estimating the number of children who were benefited by these changes, we have excluded a la carte and vending machine sales. Since a la carte sales in elementary schools are relatively small (6 percent) and were unchanged in test schools relative to control schools, it is not much of an issue. In secondary schools, however, it accounts for a larger share of sales (13 percent) and experienced notable growth during the test. Since there is no way of determining who is buying milk from these sources or what contribution it is making to the achievement of a healthy diet, they are excluded from the estimate. In doing so we are underestimating the number of children benefiting from increased milk consumption to some degree.