A review of the scientific literature indicates that flavored milk such as chocolate milk consumed in moderation does not cause overweight/obesity, tooth decay, or hyperactivity and other behavioral disorders in children. Also, chocolate milk contains a negligible amount of caffeine and the little amount of oxalic acid in chocolate milk does not impair calcium absorption. Emerging research indicates that chocolate milk may help adults recover from strenuous, energy-depleting resistance exercise.

Several health professional organizations including the American Academy of Pediatrics and the American Academy of Pediatric Dentistry support consumption of flavored milk, a nutrient-rich beverage, in moderation. The 2005 Dietary Guidelines for Americans state that small amounts of sugars added to nutrient-dense foods, such as reduced-fat milk, may increase consumption by enhancing palatability, thus improving nutrient intake without contributing excessive calories.

Flavored milk contains both natural (lactose) and added sugars. On average, flavored milk contains an additional 4 teaspoons of sugar and 60 calories per 8 ounces due to the addition of sucrose and/or other nutritive sweeteners. Flavored milk contains less added sugar than other beverages consumed by children, such as fruit drinks and soft drinks. There is no current consensus on a national school nutrition standard for flavored milk, however, suggestions have been made to reduce the amount of sugar in foods and beverages in schools. The dairy industry, through new product innovation, is developing reduced sugar flavored milk formulations that will appeal to children.
INTRODUCTION

Flavored milk is white cow’s milk (whole, low-fat, fat-free) with added flavoring (e.g., chocolate, strawberry, vanilla, banana, root beer, etc.) and sweetener(s). Among flavored milks, chocolate milk is the most popular (1,2). Despite the wide variety and popularity of flavored milks, some questions about their nutritional and health benefits continue to be raised, especially by some parents/care providers and school nutrition policy makers. This Digest addresses some of the questions related to the consumption of flavored milk, particularly chocolate milk, and presents recommendations offered by health professional organizations.

Q. Is flavored milk as nutritious as unflavored (white) milk?

A. Flavored milk is a nutrient-rich beverage providing the same nine essential nutrients as white milk, including calcium, potassium, phosphorus, protein, vitamin D, vitamin A, vitamin B₁₂, riboflavin, and niacin (niacin equivalents) (3). Milk, flavored and unflavored, provides three of the five nutrients that fall short in children’s diets (i.e., calcium, potassium, and magnesium) and four of the seven nutrients (i.e., vitamin A, calcium, magnesium, and potassium) low in adults’ diets (4). Each 8-ounce serving of flavored or white milk provides 300 mg of calcium, which is 37% of the 800 mg of calcium recommended for children 4 through 8 and 23% of the 1,300 mg of calcium recommended for individuals 9 through 18 years (3,5).

Flavored milk – a nutrient-rich beverage providing the same essential nutrients as unflavored (white) milk – is a well-accepted, nutritious alternative to the wide array of beverages available to children and adolescents.

Q. How does flavored milk impact the quality of children’s and adolescents’ diets?

A. Studies show that consuming low-fat or fat-free flavored milk can help children and adolescents meet the 2005 Dietary Guidelines for Americans’ recommendations for dairy foods and increase their intake of milk nutrients (6-8). The Dietary Guidelines recommend that children ages 2 to 8 years consume 2 cups per day of low-fat or fat-free milk or equivalent milk products (i.e., cheese, yogurt), and that all people 9 years and older consume 3 cups per day of low-fat or fat-free milk or equivalent milk products (4). However, many Americans, both children and adults, are not consuming recommended daily servings of dairy foods (9,10). More than half (53%) of children ages 2 to 8 and more than three-quarters (77%) of adolescents do not consume the recommended daily servings of milk products (9). Approximately 60% to 80% of total dairy servings consumed by children and adolescents are consumed as milk, either as a beverage or as an ingredient in mixtures such as pudding or soup (11). As children enter adolescence their milk consumption often decreases, while their intake of soft drinks increases (12-15).

Children’s diets are low in several essential nutrients such as calcium, potassium, and magnesium (4). Many children also have diets inadequate in vitamin D (16). These nutrients, especially calcium and vitamin D, are necessary for developing strong bones and teeth (17-20). The early years, particularly during adolescence, are a critical time to build bone mass (20). Studies have shown that consuming an adequate intake of milk and other dairy foods during childhood benefits adolescents’ bone health (21) and that low intake of milk during childhood and adolescence is associated with low bone mass and increased risk of fractures in adulthood (19).

Children’s consumption of flavored milk has been shown to increase their milk and nutrient intakes (6-8). Using data from nearly 4,000 school-aged children and adolescents who participated in the 1994-96 and 1998 USDA Continuing Survey of Food Intakes by Individuals, researchers...
found that those who drank flavored milk consumed more total milk and fewer soft drinks and fruit drinks compared with children who did not drink flavored milk (6). In addition, flavored milk consumers had higher calcium and phosphorus intakes, but a similar percent of energy from total fat and added sugars compared with children who did not consume flavored milk (6). A retrospective analysis of diets of more than 3,000 children ages 6 to 17 years found a positive effect on children's overall diets when they chose flavored milks and yogurts instead of sodas and sweetened drinks (7). The researchers suggested that children and adolescents can enhance the quality of their diets by consuming flavored dairy products such as flavored milk in moderation as an alternative to energy-dense, nutrient-poor beverages (7).

A recent study found that children and adolescents who included flavored milk in their diets had significantly higher total milk intakes than those who exclusively consumed white (unflavored) milk (8). Also, energy-adjusted intakes of vitamin A, calcium, phosphorus, magnesium, and potassium were significantly higher for children who drank flavored or white milk than for non-milk drinkers (8). Among females 12-18 years of age, calcium intakes by flavored milk drinkers and exclusively white milk drinkers were nearly double the calcium intakes of non-milk drinkers. Drinking flavored or white milk was not associated with adverse effects on body mass index. This study used data from 7,557 children and adolescents ages 2-18 years who participated in the 1999-2002 National Health and Nutrition Examination Surveys (8). Based on their findings, the researchers concluded that “limiting children and adolescents’ access to flavored milk due to its higher added sugars or energy content may only have the undesirable effect of further reducing intakes of many essential nutrients provided by milk,” while having no impact on body fat (8).

Recognizing the importance of adequate vitamin D for bone and overall health and the prevalence of vitamin D deficiency among children and adolescents, the American Academy of Pediatrics (AAP) recently issued a clinical report calling for doubling the amount of vitamin D (i.e., from 200 I.U. per day to 400 I.U. per day) (16). The report recognizes the importance of vitamin D-fortified milk as a source of vitamin D for children and adolescents. While optional, nearly all fluid milk, flavored and plain, marketed in the U.S. is fortified with vitamin D to obtain the standard amount of 400 I.U. per quart (100 I.U. per cup) (5). The Food and Drug Administration recently released a health claim for calcium and vitamin D and osteoporosis that can be used on packages of reduced-fat, low-fat, and fat-free milks (22). Consuming vitamin D-fortified flavored milk could help improve vitamin D status, especially for those who drink little or no white milk.

Q. What about the amount and type of added sweeteners in flavored milk?

A. Flavored milk contains both natural (mostly in the form of lactose) and added sugars, either nutritive (e.g., sucrose, high fructose corn syrup [HFCS]) or non-nutritive, depending on the brand. Because each manufacturer has a unique formula, the ingredients, including the amount and type of added sweetener(s), vary somewhat among flavored milk products. On average, an 8-ounce serving of low-fat chocolate milk contains about 4 teaspoons of added sugar, while an equivalent amount of soft drinks contains 7 teaspoons. Flavored milk has less sugar and more nutrients than soft drinks.

Despite allegations linking HFCS with obesity, scientific evidence indicates that HFCS does not appear to contribute more to obesity or other chronic diseases than other nutritive (caloric) sweeteners (23,24). The American Medical Association (AMA), based on a review of the scientific literature, concluded that, because the composition of HFCS and sucrose is so similar, particularly with regard to absorption by the body, it is unlikely that HFCS contributes more to obesity or other conditions than sucrose (24). However, the AMA calls for additional research on the health effects of HFCS and other sweeteners.

The Food and Drug Administration (FDA) has approved five non-nutritive sweeteners (e.g., saccharin, aspartame, acesulfame-K, sucralose, neotame) (25).
Although extensive testing by the FDA has shown that these sugar-substitutes are safe for adults and children, many consumers who are aware of these sweeteners report that they are trying to consume less of them (26). The School Nutrition Association recommends that beverages containing non-nutritive sweeteners be allowed only in high schools and only after the end of the school day (27).

**Q. Does consumption of flavored milk cause weight gain?**

_A._ A recent study of 7,557 children and adolescents ages 2 to 18 years found that drinking flavored or white milk did not increase body mass index (BMI) (8). Average daily energy intakes of milk drinkers (flavored or white milk) were significantly greater than daily energy intakes of those who did not consume milk for all groups except boys ages 6 to 11 years. Yet despite higher daily energy intakes, the BMI of milk drinkers was either comparable (children 2-5 years and 6-11 years) or lower (males 12-18 years) than that of milk non-drinkers (8). There was no difference in intake of added sugars between flavored milk drinkers and non-milk drinkers.

The key to maintaining a healthy body weight is to balance calories consumed from foods and beverages with calories expended by physical activities (4). Added sugar, when used in moderation and with concern for overall caloric balance, can increase the appeal of nutrient-rich beverages such as flavored milk and provide additional choices for children and adolescents, thus improving nutrient intake without contributing excessive calories (4).

**Q. Does flavored milk consumption cause tooth decay?**

_A._ There is no scientific evidence that consumption of flavored milk such as chocolate milk causes tooth decay. Because flavored milk is a beverage, it is less likely to cause cavities than many other foods such as raisins or candies that adhere to tooth surfaces. Also, studies have demonstrated that several components in chocolate milk such as calcium, phosphorus, protein, and cocoa may protect teeth from decay (28). The author of a paper on milk, flavored milk products, and caries concluded that the cariogenicity (cavity-forming potential) of flavored milks is “negligible to low” and, when consumed in moderation, flavored milks are a preferable alternative to similarly sweetened soft drinks (29). The American Academy of Pediatric Dentistry states that “chocolate milk is OK for children’s teeth” (30).

**Q. What other concerns have been raised about flavored milk?**

_A._ Scientific evidence does not support the suggestion that added sugars in flavored milk cause hyperactivity in children. Reports that sugars cause hyperactivity (i.e., a cluster of symptoms including excitability, learning difficulties, and short attention span), other behavioral disorders, or interfere with academic performance in children have been based on anecdotal observations, not adequately controlled experiments (25,31,32).

With respect to the amount of caffeine in chocolate milk, each cup contains about 2 to 7mg (33). Soft drinks, on the other hand, may contain up to ten times more caffeine than chocolate milk (33). An examination of food sources and intakes of caffeine found that soft drinks are the major source of caffeine in the diets of children ages 2 to 17 years, whereas a negligible amount of caffeine is provided by flavored dairy products (34).

Chocolate milk contains a negligible amount of oxalic acid, a compound occurring naturally in cocoa beans and other plants. Although oxalic acid can combine with calcium to form an insoluble salt, there is no scientific evidence that oxalic acid in chocolate milk impairs calcium absorption. One study found that the absorption of calcium from chocolate milk was similar to that from unflavored milk and other calcium-containing foods (35).
**Q. Do health professional organizations support flavored milk?**

**A.** Several health professional organizations and nutrition experts recognize the importance of flavored milk in helping children and adolescents meet their recommended daily intakes of dairy foods and dairy food nutrients such as calcium. The 2005 Dietary Guidelines for Americans, which identify low-fat and fat-free milk and milk products as one of the “Food Groups to Encourage,” state that small amounts of sugars added to nutrient-dense foods, such as reduced-fat milk, may increase consumption by enhancing palatability, thus improving nutrient intake without contributing excessive calories (4). Although not identifying flavored milk specifically, the American Dietetic Association states that “by increasing the palatability of nutrient-dense foods/beverages, sweeteners can promote diet healthfulness” (25). The AAP, in a policy statement discouraging soft drinks in schools (14) and in its report on optimizing children’s and adolescents’ bone health and calcium intakes (20), encourages consumption of nutritious beverages including low-fat or fat-free flavored milks. The IOM recognizes the nutritional value of flavored milk with modest amounts of sugar for school children (37).

Two members of the AAP Committee on Nutrition state “given the importance of calcium, vitamin D and other key ingredients in the diet of children and adolescents, flavored milks could be a nice alternative [to unflavored milk] since the contribution of added sugars to the overall diet of young children is minimal” (40). Researchers at Pennsylvania State University, recognizing the low dairy and calcium intakes of children ages 4 to 18 years, recommend that nutrition guidance be focused on increasing children’s intake of low-fat dairy products “with special emphasis on increasing calcium intake in school-age children and adolescents through flavored low-fat milk products” (41). Similarly, researchers at the University of Saskatchewan, Canada.
suggest adding chocolate milk to school vending machines as a strategy to increase children’s and adolescents’ milk intake (42). The American Academy of Pediatric Dentistry states that chocolate milk is OK for children’s teeth, is a highly nutritious beverage, is preferable to many popular snacks that provide calories but few nutrients, and because children like flavored milk they drink more of it (30).

Q. Is it true that consuming chocolate milk helps adult athletes recover from strenuous exercise?

A. Preliminary findings from a single-blind, randomized study of nine male endurance-trained cyclists found that those who drank low-fat chocolate milk after an intense bout of exercise (i.e., glycogen-depleting exercise) were able to bike about nine male endurance-trained cyclists (33). Chocolate milk helps adult athletes recover from strenuous exercise (34).

REFERENCES


Q. Is it true that consuming chocolate milk helps adult athletes recover from strenuous exercise?

A. Preliminary findings from a single-blind, randomized study of nine male endurance-trained cyclists found that those who drank low-fat chocolate milk after an intense bout of exercise (i.e., glycogen-depleting exercise) were able to bike about nine male endurance-trained cyclists (33). Chocolate milk helps adult athletes recover from strenuous exercise (34).

REFERENCES


Q. Is it true that consuming chocolate milk helps adult athletes recover from strenuous exercise?

A. Preliminary findings from a single-blind, randomized study of nine male endurance-trained cyclists found that those who drank low-fat chocolate milk after an intense bout of exercise (i.e., glycogen-depleting exercise) were able to bike about nine male endurance-trained cyclists (33). Chocolate milk helps adult athletes recover from strenuous exercise (34).

REFERENCES

Nutrient-rich flavored milk comes in a variety of flavors and offers the same unique nutrient package of nine essential nutrients as unflavored milk. Flavored milk is available in traditional flavors such as chocolate as well as innovative flavors including strawberry, vanilla, mocha and root beer. As the most popular milk choice in schools, flavored milk is a highly palatable, nourishing beverage that can help Americans, particularly children, meet current daily dairy food and calcium intake recommendations. Despite the important nutrient contributions flavored milk makes to the diet, concerns about the potential effects of the added sugar and flavorings in flavored milk have raised questions regarding the role of flavored milk in a healthy diet. This review highlights flavored milk’s valuable contributions to nutrient intake and health, presents recommendations offered by health professional organizations and nutrition experts regarding flavored milk consumption, addresses questions about the consumption of this nutrient-rich beverage and provides data that demonstrates the importance of flavored milk in the school environment.

Flavored Milk’s Nutrients and Health Benefits

The 2005 Dietary Guidelines for Americans (DGA) recommends 2 cups of low-fat or fat-free milk or equivalents (i.e., cheese, yogurt) daily for children aged 2 to 8 years, and 3 cups or equivalents daily for people aged 9 years and older because of milk’s important nutrient contributions to the diet (1). Flavored milk is a nutrient-rich beverage providing the same nine essential nutrients as unflavored milk,
including calcium, potassium, phosphorus, protein, vitamins A, D and B12, riboflavin, and niacin (niacin equivalents) (2). Milk, flavored and unflavored, whole, reduced-fat, low-fat or fat-free, provides three of the five nutrients that fall short in children’s diets (i.e., calcium, potassium, and magnesium) and four of the seven nutrients limiting in adults’ diets (i.e., vitamin A, calcium, magnesium, and potassium) (1). Each 8 ounce (1 cup) serving of flavored or unflavored milk provides 300 mg of calcium or 30% of the Daily Value (1000 mg) for calcium.

Milk’s nutrients play an important role in bone development and maintenance and overall nutrient adequacy throughout childhood and adulthood (1). The U.S. Surgeon General’s Report on Bone Health and Osteoporosis recognizes that milk’s nutrients, including calcium, magnesium, phosphorus, potassium, protein, and vitamin D, work together to help build and strengthen bone and are important for both fracture and osteoporosis prevention (3). The 2005 DGA acknowledges milk and dairy foods’ contribution to bone health and improvement of diet quality (1). In addition to improving bone health, milk and dairy foods, when consumed as part of a healthy diet, may help to reduce the risk of osteoporosis (3-5), hypertension (6-9), obesity (10-14), colon cancer (15-18) and metabolic syndrome (19-22), a cluster of conditions that can lead to heart disease and type 2 diabetes.

Flavored Milk Helps Meet Nutrient Needs
Many Americans, both children and adults, are not consuming recommended daily servings of dairy foods (23). Approximately 60% to 80% of total dairy servings consumed by children and adolescents are consumed as milk, either as a beverage or as an ingredient in mixtures such as pudding or soup (24). As children enter adolescence, their milk consumption often decreases, while their intake of soft drinks increases (25-28).

Studies show that consuming low-fat or fat-free flavored milk can help children and adolescents meet the 2005 DGA recommendations for dairy foods and increase their intake of milk nutrients (29-31). In one study, children who drank flavored milk consumed more total milk and fewer soft drinks and fruit drinks compared with children who did not drink flavored milk, based on data from nearly 4,000 school-aged children and adolescents who participated in the 1994-96 and 1998 USDA Continuing Survey of Food Intakes by Individuals (29). In addition, flavored milk consumers had higher calcium
and phosphorus intakes, but a similar percent of energy from total fat and added sugars compared with children who did not consume flavored milk (29). A retrospective analysis of diets of more than 3,000 children ages 6 to 17 years found a positive effect on children’s overall diets when they chose flavored milks and yogurts instead of sodas and sweetened drinks (30). The researchers suggest that children and adolescents can enhance the quality of their diets by consuming milk such as flavored milk in moderation as an alternative to energy-dense, nutrient poor beverages (30). A more recent study found that children and adolescents who included flavored milk in their diets had significantly higher total milk intakes than those who exclusively consumed unflavored milk (31). Also, energy-adjusted intakes of vitamin A, calcium, phosphorus, magnesium, and potassium were significantly higher for children who drank flavored or unflavored milk than for non-milk drinkers (31). Among females 12-18 years of age, calcium intakes by flavored milk drinkers and exclusively white milk drinkers were nearly double the calcium intakes of non-milk drinkers. This study used data from 7,557 children and adolescents ages 2-18 years who participated in the 1999-2002 National Health and Nutrition Examination Surveys (31). Based on their findings, the researchers conclude that “limiting children and adolescents’ access to flavored milk due to its higher added sugars or energy content may only have the undesirable effect of further reducing intakes of many essential nutrients provided by milk” (31).

Flavored Milk’s Nutrients are Important for Bone Health

The nutrients in unflavored and flavored milk including calcium, magnesium, phosphorus, potassium, protein, and vitamin D, are necessary for developing strong bones and teeth as well as for overall health (3, 5, 32-33). Childhood, particularly adolescence, is the most critical time to build bone mass (5). Studies have shown that consuming an adequate intake of milk and other dairy foods during childhood benefits adolescents’ bone health (34) and that low intake of milk during childhood and adolescence is associated with low bone mass and increased risk of fractures in adulthood (33).

In addition to the 2005 DGA “nutrients of concern” that dairy provides including calcium, potassium and magnesium, recent studies suggest that vitamin D is also lacking in the diets of children (35). Recognizing the importance of adequate vitamin D for bone and the prevalence of vitamin D deficiency among children and adolescents, the American Academy of Pediatrics (AAP) issued a clinical report calling for doubling the amount of vitamin D they recommend (i.e., from 200 I.U. per day to 400 I.U. per day) (36). The report recognizes the importance of vitamin D-fortified milk as a source of vitamin D for children and adolescents. Nearly all fluid milk, flavored and unflavored, marketed in the U.S. is fortified with vitamin D to obtain the standard amount of 400 I.U. per quart (100 I.U. per cup) (37). Therefore, consuming vitamin D-fortified flavored milk may help improve children’s and adolescents’ vitamin D status, especially for those who drink little or no unflavored milk. A recent study showed that drinking vitamin D-fortified milk improved the vitamin D status in adults (38).
In addition to the 2005 DGA recommendations of 2 cups or equivalents of low-fat or fat-free milk daily for children aged 2 to 8 years and 3 cups for those aged 9 years and older, the DGA has also highlighted low-fat and fat-free milk and milk products as one of the “Food Groups to Encourage” since most Americans are not consuming enough of these foods and the nutrients they provide (1). The AAP recommends children consume 3 servings of dairy foods and adolescents consume 4 servings daily (5) to meet calcium intake recommendations. Additionally, the American Academy of Family Physicians (AAFP), the American Dietetic Association (ADA), the National Medical Association (NMA), the National Hispanic Medical Association (NHMA) and the School Nutrition Association (SNA) all support and promote 3 daily servings of dairy foods among their members and the public. To help meet recommendations, many health professional organizations and nutrition experts recognize the importance of consuming flavored milk in helping children and adolescents meet their recommended daily intakes of dairy foods and dairy food nutrients such as calcium. The ADA states that “by increasing the palatability of nutrient-dense foods/beverages, sweeteners can promote diet healthfulness” (39). This concept is also supported by the 2005 DGA which states that enhancing the palatability of nutrient-dense foods, such as milk, may improve nutrient intake (1).

The American Dietetic Association states that “by increasing the palatability of nutrient-dense foods/beverages, sweeteners can promote diet healthfulness” (39). This concept is also supported by the 2005 Dietary Guidelines for Americans which states that enhancing the palatability of nutrient-dense foods, such as milk, may improve nutrient intake (1).

Lastly, the American Heart Association (AHA) supports a positive role for added sugars to help increase intakes of nutrient-rich foods including dairy foods. Specifically, in their scientific statement on Dietary Sugar Intake and Cardiovascular Health, the AHA states, “when sugars are added to otherwise nutrient-rich foods, such as sugar-sweetened dairy products like flavored milk and yogurt and sugar-sweetened cereals, the quality of children’s diet..."
and adolescents’ diet improves, and in the case of flavored milks, no adverse effects on weight status were found”(41).

Two members of the AAP’s Committee on Nutrition, in an article on clearing up confusion on the role of dairy products in children’s diets, state “given the importance of calcium, vitamin D and other key ingredients in the diet of children and adolescents, flavored milks could be a nice alternative [to unflavored milk] since the contribution of added sugars to the overall diet of young children is minimal” (42). Researchers at Pennsylvania State University, recognizing the low dairy and calcium intakes of children ages 4 to 18 years, recommend that nutrition guidance be focused on increasing children’s intake of low-fat dairy products “with special emphasis on increasing calcium intake in school-age children and adolescents through flavored low-fat milk products” (43). Similarly, researchers at the University of Saskatchewan, Canada, recommend adding chocolate milk to school vending machines as a strategy to increase children’s and adolescents’ milk intake (44). The American Academy of Pediatric Dentistry states that “chocolate milk is OK for your teeth,” is a highly nutritious beverage, is preferable to many popular snacks that provide calories but few nutrients, and because children like flavored milk, they drink more of it (45).

SWEETENERS IN FLAVORED MILK

Flavored milk — whole, reduced-fat, low-fat or fat-free - provides the nutrients calcium, potassium, phosphorus, protein, vitamins A, D and B12, riboflavin and niacin (niacin equivalents). Flavored milk contains both natural sugar (12 gm of lactose per 8 ounce serving) and added sweeteners. Sweeteners can be nutritive (caloric) such as sucrose, commonly known as table sugar, or high fructose corn syrup (HFCS), or non-nutritive, depending on the brand. Because each manufacturer has a unique formula, including the amount and type of added sweetener(s), added sugar content may vary among flavored milk products. On average, an 8 ounce serving of low-fat chocolate milk contains about 4 teaspoons of added sugar, while an equivalent amount of soft drink contains 7 teaspoons. An 8 ounce serving of low-fat (1%) chocolate milk provides 158 calories, whereas its unflavored counterpart provides 102 calories (2).

HFCS is a type of nutritive sweetener that can be added to flavored milk. The composition of HFCS is very similar to the sweetener sucrose. Sucrose molecules are composed of one molecule of glucose and one of fructose, thus sucrose contains 50% glucose and 50% fructose, while HFCS is composed of 55% glucose and 45% fructose with these two sugar molecules existing separately. The similar content may explain the lack of metabolic differences between the two sweeteners (46). Based on a review of
the scientific literature, the American Medical Association concluded that, because the composition of HFCS and sucrose is so similar, particularly with regard to absorption by the body, it is unlikely that HFCS contributes more to obesity or other conditions than sucrose (47). Therefore, despite some studies linking fructose consumption with obesity, overall, the scientific evidence indicates that HFCS does not appear to contribute more to obesity or other chronic diseases than other nutritive (caloric) sweeteners (47-48).

### Body weight

The key to maintaining a healthy body weight is to balance calories consumed from foods and beverages with calories expended by physical activities (1). Added sugar, when used in moderation and with concern for overall caloric balance, can increase the appeal of nutrient-rich beverages such as flavored milk and provide additional choices for children and adolescents, thus improving nutrient intake without contributing excessive calories (1). Although flavored milk contains some added calories from sugar, there is no evidence that milk, flavored or unflavored, adversely affects body mass index (BMI) in youth. A study by Murphy et al. found that the BMI of milk drinkers was comparable to or lower than that of non-milk drinkers, in children 2-5 years and 6-11 years, and in males 12-18 years, respectively (31). There was no difference in total intake of added sugars between flavored milk drinkers and non-milk drinkers. Similarly, an earlier study found that flavored milk drinkers had higher calcium and nutrient intakes compared to nondrinkers but did not have higher added sugar or total fat intakes, both important considerations for weight control (29).

### Dental Caries

It is known that sugar consumption can contribute to tooth decay, however experts agree that flavored milk is a good choice for healthy teeth. Studies have demonstrated that several components in chocolate milk such as calcium, phosphorus, protein, and cocoa may protect teeth from decay (32). Because flavored milk is a liquid, it may be less likely to cause cavities than other foods such as raisins or candies that adhere to tooth surfaces. A briefing paper on milk, flavored milk products, and dental caries concluded that the cariogenicity (cavity-forming potential) of flavored milks is “negligible to low” and, when consumed in moderation, flavored milks are a preferable alternative to similarly sweetened soft drinks (49). The American Academy of Pediatric Dentistry states that “chocolate milk is OK for your teeth” (45).

Studies found that flavored milk drinkers had higher calcium and nutrient intakes compared to nondrinkers but did not have higher added sugar or total fat intakes.
Hyperactivity

Hyperactivity is defined as a cluster of symptoms including excitability, learning difficulties, and short attention span. Claims that sugar consumption can lead to hyperactivity or interfere with academic performance in children were popular during the 1990s but several reviews on the subject state that this notion is scientifically unsubstantiated (39, 50). For example, a meta-analysis of 23 studies performed over a 12-year period concluded that sugar intake does not affect children’s behavior (51).

OTHER QUESTIONS ABOUT FLAVORED MILK

Caffeine in Chocolate Milk

Chocolate milk contains a small amount of caffeine per serving compared to many other caffeinated beverages (52). The 2 to 7 mg of caffeine in an 8 ounce serving of chocolate milk is similar to that in one cup of decaffeinated coffee and 5 times less than an equal amount of iced tea or some regular soft drinks (52). The amount of caffeine in a serving of chocolate milk is relatively small compared to the average total daily caffeine intake by children of 14-22 mg or about 0.8 - 0.85 mg/kg body weight (52-53).

Caffeine’s effects on behavior depend on an individual’s usual intake and tolerance or sensitivity to caffeine (53). At lower doses, caffeine is associated with positive subjective effects such as mild stimulation, whereas at higher intakes, negative effects are reported such as a delay of sleep onset (53). A meta-analysis of double blind, placebo-controlled studies of dietary caffeine and/or supplementary caffeine treatment and behavior in children and adolescents led to the conclusion that caffeine has no adverse cognitive or behavioral effects in children (54). However, very high caffeine intakes (>3mg/kg) in children whose usual caffeine intake is low led to negative subjective reports of nervousness, stomach aches, and nausea (54). While possible adverse behavioral effects of caffeine have been cited as a reason for restricting or eliminating chocolate milk from children’s diets, there is no persuasive scientific evidence to justify this concern (52, 54). Consuming the recommended amount of daily servings of low-fat or fat-free dairy foods, including flavored milk, can help children meet nutrient needs without contributing to excessive caffeine intake.

Calcium Absorption

Chocolate milk contains a small amount of oxalic acid (0.5-0.6%), a compound occurring naturally in cocoa beans and other plants. In some instances, oxalic acid can combine with calcium in the intestine to form calcium oxalate, which is fairly insoluble. Scientific evidence indicates that the oxalic acid in chocolate milk does not impair calcium absorption, and calcium absorption from chocolate milk has been found to be similar to that from unflavored milk and other calcium-containing foods (55-56).
Lactose Intolerance

People with lactose maldigestion may tolerate chocolate milk more easily than unflavored milk (57-58). Lactose maldigestion is the limited ability to digest lactose, the main carbohydrate in milk, due to insufficient levels of the intestinal enzyme lactase. Lactose maldigestion may manifest into gastrointestinal symptoms, known as lactose intolerance, with excess lactose intake. Most individuals with lactose maldigestion can comfortably drink 2 cups of any type of milk a day when consumed in small servings with foods at separate meals (e.g., breakfast and dinner) (59-60). Because most individuals drink flavored milk such as chocolate milk with meals (61), this beverage is likely to be well tolerated by lactose maldigesters. Also, the cocoa in chocolate milk may slow gastric emptying (58-59). In one study of 16 individuals with lactose maldigestion who consumed chocolate and other milks, chocolate milk significantly reduced breath hydrogen production compared to fat-free unflavored milk (58).

FLAVORED MILK IN SCHOOLS

Flavored milk is an important part of school nutrition programs and its inclusion can help children meet nutrient needs to support bone development during peak bone building years. Flavored milk is the most popular milk choice among school children and accounts for 66% of all milk sold in schools according to a recent report based on the U.S. Department of Agriculture’s School Nutrition Dietary Assessment Studies I and III (28, 62). A study among northern Texas elementary school students aged 6 to 11 years found that milk’s flavor was the most important factor influencing children’s milk drinking, with the majority of children choosing chocolate milk at school (63). A credit to its popularity, the study reported that children’s typical advice to new students included “get chocolate milk” (63).

Capitalizing on flavored milk’s popularity and encouraging availability of flavored milk in schools is an important way to help children meet daily calcium and other essential nutrient recommendations at a time when milk intake typically declines. The percentage of students consuming milk (flavored and unflavored) at lunch progressively decreases from elementary school to middle school to high school (28). As milk intake decreases, particularly between the ages of 10 to 18 years which overlaps with the peak bone building years, intake of
carbonated beverages dramatically rises with total daily consumption more than three times higher than total daily milk consumption by age 18 (64). The consequences of not consuming adequate amounts of milk or milk products can be detrimental to bone development and overall health (5, 32).

A School Milk Pilot Test, co-sponsored by SNA and National Dairy Council (NDC), found that children drank more milk when schools offered ice-cold milk in various flavors (strawberry, chocolate, etc.) and in plastic, re-sealable containers, in different sizes and different merchandising locations (e.g., vending machines, a la carte cafeteria, school stores) (65). Participating schools consisted of 47 elementary and 99 secondary schools in eight states across the country including school districts in Utah, California, Florida Virginia, Pennsylvania, Massachusetts, New York and West Virginia. This pilot study demonstrated that simple improvements to school milk, including offering a variety of flavors served cold and in plastic containers, not only increased milk consumption in primary and secondary schools by an average of 37%, but also increased average daily school lunch participation at the secondary level by 5% (65).

Offering flavored milk in schools as part of the National School Lunch Program (NSLP) and the School Breakfast Program (SBP) can increase milk and nutrient intake and can help children and adolescents meet the DGA recommendations for milk and dairy foods (66-68). Children who participate in the NSLP are more likely than non-participants to consume more total milk (75% vs. 19%) and more flavored milk (50% vs. 9%) at lunch. Moreover, this trend has been shown to persist over 24 hours (28). When approximately 400 elementary school children in Pennsylvania were provided with an option of having chocolate milk included in school meals, more milk was consumed and intake of nutrients such as calcium and riboflavin increased (66). Likewise, when 6th grade students in an elementary school in New York City were provided with low-fat (1%) chocolate milk as part of the NSLP, children’s milk and nutrient (e.g., calcium, riboflavin, phosphorus) intakes increased (68).

The inclusion of flavored milk in school meal programs may help students consume more low-fat or fat-free milk. A report on the U.S. Department of Agriculture’s School Nutrition Dietary Assessment Studies I and III found a significant shift in milk consumption from the early 1990s when approximately three-quarters of students chose whole-fat or reduced-fat (2%) milk in school to the 2004/2005 school year when more than three-quarters of students chose low-
Fat (1%) or fat-free (62). Since 90% of flavored milks sold were low-fat or fat-free (62) and flavored milk was the most popular choice among students (28), its inclusion in the school nutrition programs is likely encouraging the consumption of low-fat and fat-free milk (62), a component of the DGA “Food Groups to Encourage.” The AAP and the IOM Committee on Nutrition Standards for Foods in Schools acknowledge key nutrient contributions that milk, including low-fat and fat-free flavored milk, makes to children’s diets (27, 40).

**FLAVORED MILK IN SCHOOL NUTRITION POLICY**

Increasing rates of childhood and adult obesity have resulted in greater efforts to address the epidemic by changing the school environment. Excess intake of macronutrients such as sugar and fat can lead to increased caloric intake and weight gain. Some groups have called for a reduction of added sugars in sweetened foods and beverages, including flavored milk, particularly within the school environment (40, 69-70). Currently there is no consensus on national school nutrition standards for foods and beverages, including sugar and caloric content of flavored milks. However, Congress is expected to address national school nutrition standards in 2009 when it reauthorizes the 2004 Child Nutrition Act. The SNA has called for the adoption of a uniform national, science-based nutrition standard for all foods served in schools, including no more than 28 grams of sugar per 8 ounce serving of milk and offering only low-fat or fat-free milk (70).

The Alliance for a Healthier Generation recommends that low-fat and fat-free flavored milks contain no more than 150 calories per 8 ounce serving (69). The IOM’s report, *Nutrition Standards for Foods in Schools*, recommended that low-fat and fat-free flavored milks contain up to 22 grams of total sugar (naturally occurring and added) per 8 ounce serving (40). The IOM beverage guidelines recommend that only milk, water and 100% fruit juice be available in schools, and that non-nutritive sweeteners only be allowed in beverages sold in high schools, outside of the school day hours. In debating nutrition policy, some lawmakers have also proposed specific nutrient parameters. For example, U.S. Senator Tom Harkin, chairman of the Senate Committee on Agriculture, Nutrition & Forestry, proposed legislation in the 2008 session of Congress that would mandate national school nutrition standards, including a cap on flavored milk at 170 calories per 8 ounce serving.

The AAP, in their policy statement on soft drinks in schools, recommends reducing intake of sweetened beverages such as soft drinks, and replacing them with healthful offerings such as real fruit and vegetable juices, water, and low-fat white or flavored milk (27).

To help children meet Milk Group recommendations, the acceptability and availability of nutrient-rich flavored milk in schools is critical. When used in moderation and with consideration of overall caloric balance, sugars can increase the appeal of nutrient-dense foods and beverages, thereby providing
additional choices to meet nutritional needs in the context of a healthful diet (1). Flavored milk is the most popular milk choice in schools and may even help children choose low-fat or fat-free milk options more often since 90% of flavored milks consumed are low-fat or fat-free (62). For a product to be acceptable, it must also taste good since no one wins when children throw away their nutrient-rich milk because they don’t enjoy the taste.

NDC recognized that having acceptable and palatable flavored milk formulations containing reduced levels of added sugar to offer in schools is a priority in the school environment. The dairy industry conducted research among children aged 8 to 17 years to determine the palatability of new lower sugar formulations for flavored milk. This research suggests that flavored milk of 150 to 170 calorie range per 8 ounces — depending on brand — meets children’s taste approval (71). However, while these flavored milks may be acceptable, palatable and meet lower-calorie and sugar recommendations, these formulations have limited availability and can cost more to produce. Higher costs may further reduce availability for cost-conscious schools. Limited product availability of the most popular milk choice in school may reduce consumption of milk and the nutrients it contains during the peak bone-building years.

Flavored milk remains an important component of school meals, and all types can help school-aged children meet intake recommendations for the calcium, potassium and other nutrients they need for proper growth and development. The dairy industry is working to continue to expand and diversify milk choices including a range of reduced sugar formulations to help meet the varied needs (including taste, nutrition and overall acceptability) of today’s schools and their milk drinkers.

**ATTITUDES TOWARD FLAVORED MILK**

Parents and health professionals both support offering flavored milk to children. A review of qualitative consumer research conducted in 2005 by NDC suggests both health professionals and parents would encourage their child to drink flavored milk when away from home because the overall goodness of milk simply outweighs any concerns with sugar (72). A quantitative survey of more than 4,000 moms found that 92% are comfortable with their child drinking chocolate or flavored milk with their school lunch (73). Within the same survey, 83% of moms would prefer for their children to drink flavored milk as opposed to soft drinks at school and 84% knew that flavored milk and unflavored milk have approximately the same nutritional value (73). A more recent survey also found that a majority of moms do not feel that the sugar in chocolate milk is excessive (74). In a survey of more than 400 family practitioners, dietitians and pediatricians, a majority thought it was important that children drink more milk, regardless of whether it was flavored or unflavored (75). The positive attitudes of both parents and health professionals toward flavored milk and encouragement of its consumption can be conducive to helping children meet dairy food intake recommendations.
SUMMARY AND CONCLUSIONS

Flavored milks are well liked and health professionals support intake of this beverage. The availability of flavored milk can increase overall milk and nutrient intake in schools. Research indicates that health and behavior concerns about flavored milk and weight gain or hyperactivity are unfounded. This review addresses various nutritional and health topics related to flavored milk and indicates the following:

- The 2005 DGA encourages the consumption of 3 servings of low-fat or fat-free dairy foods each day for those age 9 and older, and flavored milk is a nutrient-rich and appealing beverage choice for children that can help them meet nutrient recommendations.

- Flavored milks — whole, reduced-fat, low-fat or fat-free — contain the same essential nutrients as unflavored milks. Chocolate milk, for example, provides calcium, potassium, phosphorus, protein, vitamin A, D and B12, riboflavin and niacin (as niacin equivalents) and contains 2 to 4 teaspoons of added sugar that accounts for about 60 more calories per serving than unflavored milk.

- When used in moderation and with concern for overall caloric balance, sugars can increase the appeal of nutrient-rich foods and provide additional choices for children to meet nutritional needs in the context of a healthful diet.

- Research shows that children who drink flavored milk can increase milk and nutrient intake without increasing added sugar or total fat intake and without adversely affecting BMI, a measure of weight status.

- Intake of sugar may contribute to dental caries, but it is unlikely that flavored milks cause this condition. Components in flavored milk including calcium, phosphorus, and cocoa in chocolate milk may protect teeth from decay.

- Flavored milk is a healthful, nutrient-rich product for schools and wellness policies and is the most popular milk choice among school children. Since most of the flavored milk consumed in schools is low-fat or fat-free, its presence in schools may be helping children transition to consuming lower fat milk.

- A variety of reduced sugar formulations may help meet the varied needs of schools, including taste, nutrition, and overall acceptability.
REFERENCES

REFERENCES


REFERENCES

The Removal of Flavored Milk in Schools Results in a Decline in Total Milk Purchases in All Grades, K-12
Margie Saidel, MPH, RD, LDN and Jill Patterson, RD
Chartwells School Dining Services

Background
The Dietary Guidelines for Americans 2005 highlights fat free and low fat milk as a food group to encourage and recommends the consumption of 2-3 cups of fat free or low fat milk or milk equivalent per day in children depending upon age. Furthermore, calcium, potassium, fiber, magnesium and Vitamin E are highlighted as nutrients of concern for children and adolescents and the report concludes that the consumption of milk products is especially important for children and adolescents who are building their peak bone mass and developing lifelong habits. (1)

More than half of children ages 2-3 and three quarters of children ages 9-10 do not get the recommended daily servings of low-fat or fat-free milk or milk products. (2) Milk provides nine essential nutrients including calcium and potassium, two nutrients of concern for children and adolescents, as well as phosphorus, protein, vitamin A, D and B12, riboflavin and niacin.

Sugar as an ingredient in food products is often viewed by some in the lay community as a contributing factor to hyperactivity in children and high fructose corn syrup is labeled as a significant contributor to childhood obesity. As a result of these beliefs many school districts have eliminated serving flavored milk from their school foodservice program due to the high fructose corn syrup utilized in the flavoring.

Setting
This study was conducted in a suburban Connecticut town with a population of 10,261, a median income of $149,057 and an average household income with children of $271,410. The state income rating is in the 97th percentile and the national income rating is in the 99th percentile. The percentage of children who are below poverty level is 1.64%. The number of town residents with a high school diploma is 98.2% and 70.2% are college graduates. Of the college graduates, 33.2% have post graduate degrees. The estimated White population in the community is 95.7%; Hispanic is 2.1%; Asian is 1.9% and Black is 0.9%.

<table>
<thead>
<tr>
<th>School</th>
<th>Grade</th>
<th>Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary</td>
<td>K-2</td>
<td>558</td>
</tr>
<tr>
<td>Intermediate</td>
<td>3-5</td>
<td>579</td>
</tr>
<tr>
<td>Middle</td>
<td>6-8</td>
<td>592</td>
</tr>
<tr>
<td>High School</td>
<td>9-12</td>
<td>807</td>
</tr>
</tbody>
</table>

Objective
In order for the school foodservice program to reflect the priorities of the community, the school district developed a request for proposal for contract foodservices that included a specification that eliminated all foods and beverages containing high fructose corn syrup to be implemented at the start of the 2008-2009 school year. The result was the elimination of flavored milk with meals and sold as a la carte. The purpose of our study was to measure total milk consumption before and after the elimination of flavored milk in order to provide the school district with objective evidence of a possible negative effect on the nutrient intake of their school aged children caused by the elimination of flavored milk.

Method
Invoices of milk purchases were compared by school for a three month period, September through November of 2007 when flavored milk was available to students, to the same three month period, September through November of 2008 when flavored milk was eliminated. Purchased milk by school was used as a proxy for milk consumption. An estimate of milk participation was determined from 2008 district participation data and applied to 2007 and 2008 milk consumption patterns in order to calculate milk consumption by student reflective of students who purchased meals. High School post data per student included for only one month because flavored milk was re-instated after the first month of school in October, 2008. Therefore, high school data for 3 months was not included in post data calculations. It was included for September, 2008 to calculate per student milk consumption levels.

Results
Milk consumption was measured for a three month period before and after flavored milk was available in grades, kindergarten through grade 12.

A weighted average of all grades showed a 60% decline in total milk consumption.

Conclusion
The production of foods containing high fructose corn syrup (HFCS) has been criticized by community coalitions and other groups resulting in public school wellness policies that eliminate HFCS from school foods. A consequence of this policy is the removal of flavored milk from school meals and a la carte offerings. This study measured total milk consumption in a school district for a three month period before and after the elimination of flavored milk. Results showed a decline in total milk consumption in all grades ranging from 20% at the high school level to 67% in grades 3 to 8. In conclusion, it is important for school districts to consider nutrition implications and unintended consequences when developing bid specifications or wellness policies that support common held beliefs that are not grounded in science. The nutritional trade off in this case for the elimination of approximately 40 calories of HFCS is a decline in the consumption of a low fat dairy product that delivers important nutrients for the children and adolescents such as calcium, potassium, both nutrients of concern according to the Dietary Guidelines for Americans 2005. After reviewing consumption patterns by school documented in this study, the school district modified the wellness policy to allow flavored milk in all grades in February 2009.

Bibliography
When it comes to **nutrition**, not all drinks are created equal!

<table>
<thead>
<tr>
<th>Drink</th>
<th>Calories</th>
<th>% Daily Value</th>
<th>Total Fat</th>
<th>Total Carbohydrates</th>
<th>Protein</th>
<th>Vitamin A</th>
<th>Vitamin C</th>
<th>Vitamin D</th>
<th>Calcium</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Milk Lowfat 1%</strong></td>
<td>100</td>
<td>4%</td>
<td>4%</td>
<td>4%</td>
<td>10%</td>
<td>16%</td>
<td>0%</td>
<td>25%</td>
<td>30%</td>
</tr>
<tr>
<td><strong>Chocolate Milk Lowfat 1%</strong></td>
<td>160</td>
<td>4%</td>
<td>4%</td>
<td>9%</td>
<td>16%</td>
<td>10%</td>
<td>4%</td>
<td>25%</td>
<td>30%</td>
</tr>
<tr>
<td><strong>COLA</strong></td>
<td>90</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Soy Beverage, Plain</strong></td>
<td>100-130</td>
<td>6-7%</td>
<td>3-4%</td>
<td>14-22%</td>
<td>10-30%</td>
<td>0%</td>
<td>0%</td>
<td>10-30%</td>
<td>10-30%</td>
</tr>
<tr>
<td><strong>100% Orange Juice</strong></td>
<td>110</td>
<td>1%</td>
<td>0%</td>
<td>8%</td>
<td>0%</td>
<td>0%</td>
<td>4%</td>
<td>0%</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Fruit Punch</strong></td>
<td>120</td>
<td>0%</td>
<td>0%</td>
<td>10%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Bottled Water</strong></td>
<td>0</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Sports Drink</strong></td>
<td>70</td>
<td>0%</td>
<td>0%</td>
<td>6%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

*Nutrient ranges for soy beverage reflect the differences between unfortified soy beverages as reported by USDA National Nutrient Database for Standard Reference, Release 19 and a large-distribution fortified soy beverage. Unlike milk, there is no federal standard of identity for soy beverages, and nutritional data will vary by brand. Consumers must carefully check the nutrition panel.

Sources: USDA National Nutrient Database for Standard Reference, Release 19; USDA database for the added sugars content of selected foods, Release 1, February, 2006. Percent Daily Values are based on a 2,000 calorie diet. All nutrients quoted for 8 oz. portion.

Copyright © 2007, NATIONAL DAIRY COUNCIL® Rosemont, IL 60018-5616. All rights reserved. Printed in U.S.A.
Milk provides nutrients essential for good health and kids will drink more when it’s flavored.

Flavored milk contains the same nine essential nutrients as white milk and is a healthful alternative to soft drinks.

Drinking low-fat or fat-free white or flavored milk helps kids get the 3 daily servings* of milk recommended by the Dietary Guidelines for Americans, and provides three of the five “nutrients of concern” that children do not get enough of—calcium, potassium and magnesium as well as vitamin D.

Children who drink flavored milk meet more of their nutrient needs; do not consume more added sugar, fat or calories; and are not heavier than non-milk drinkers.

Low-fat chocolate milk is the most popular milk choice in schools and kids drink less milk (and get fewer nutrients) if it’s taken away.

Read about the science behind these reasons on www.NationalDairyCouncil.org

These health and nutrition organizations support 3-Every-Day™ of Dairy, a science-based nutrition education program encouraging Americans to consume the recommended three daily servings of nutrient-rich low-fat or fat-free milk and milk products to improve overall health.
1. **Milk provides nutrients essential for good health and kids will drink more when it's flavored.**
   - Flavored milk drinkers consume more milk than exclusively white milk drinkers. Stating that offering flavored low-fat or fat-free milk can help increase milk consumption and boost overall participation in school meal programs.
   - Two government programs, the National Institute of Child Health and Human Development’s Milk Matters and the U.S. Department of Health and Human Services’ Best Bones Forever, recommend low-fat and fat-free flavored milk as a good option for children.

2. **Flavored milk contains the same nine essential nutrients as white milk and is a healthful alternative to soft drinks.**
   - Low-fat and fat-free flavored milk contains — calcium, potassium, phosphorous, protein, vitamins A, D and B12, riboflavin and niacin (niacin equivalents) — and can help kids meet their calcium recommendations.
   - Flavored milk drinkers have lower intakes of soft drinks compared to those who do not drink flavored milk.
   - The American Academy of Pediatrics policy statement, **Soft Drinks in Schools**, encourages schools to offer low-fat or fat-free white or flavored milk, water or real fruit or vegetable juice as healthful alternatives to soft drinks.

3. **Drinking low-fat or fat-free white or flavored milk helps kids get the 3 daily servings of milk recommended by the Dietary Guidelines for Americans, and provides three of the five “nutrients of concern” that children do not get enough of – calcium, potassium and magnesium as well as vitamin D.**
   - The 2005 Dietary Guidelines for Americans acknowledges milk and dairy foods’ contribution to bone health and improvement of diet quality.

4. **Children who drink flavored milk meet more of their nutrient needs; do not consume more added sugar, fat or calories; and are not heavier than non-milk drinkers.**
   - The American Heart Association states that “when sugars are added to otherwise nutrient-rich foods, such as sugar-sweetened dairy products like flavored milk and yogurt, and sugar-sweetened cereals, the quality of children’s and adolescents’ diets improves, and in the case of flavored milks, no adverse effects on weight status were found.”
   - According to the 2005 Dietary Guidelines for Americans, adding a small amount of sugar to nutrient-dense foods such as reduced-fat milk products helps enhance their palatability and improves nutrient intake without contributing excessive calories.
   - Flavored milk drinkers do not have higher total fat or calorie intakes than non-milk drinkers.
   - Children who drink flavored and white milk don’t have higher body mass index (BMI) than those who do not drink milk.

5. **Low-fat chocolate milk is the most popular milk choice in schools and kids drink less milk (and get fewer nutrients) if it’s taken away.**
   - According to 2005 USDA data, 66% of the milk chosen by children in schools is flavored; most (60%) of which is low-fat (1%) or fat-free.
   - Removing flavored milk from schools has been shown to result in a 62-63 percent reduction in milk consumption by kids in kindergarten through 5th grade, a 50 percent reduction in milk consumption by adolescents in 6th through 8th grades, and a 37 percent reduction in milk consumption in adolescents in 9th through 12th grades.

---

**www.nationaldairycouncil.org/childnutrition**

© National Dairy Council 2010