



*School Nutrition Director's
Guide to Identifying
Nutrient-Dense Beverages
As Part of Wellness Policies*

Introduction

Purpose of this Report

- Schools throughout the U.S. have developed or are in the process of developing Wellness Plans as required by USDA. Many states have also developed State Nutritional Guidelines for Beverages sold in schools.
- The following report has been put together as a guide and is based on recommendations in the Dietary Guidelines for Americans 2005, a scientific, evidence-based report, which is intended to be the “primary source of dietary health information for policymakers, nutrition educators, and health providers”.¹
- This dietitian reviewed report will highlight the benefits and importance of offering Nutrient-Dense beverages on the school a la carte line.



Challenges Facing Schools

Childhood Obesity

- Approximately 30% of children are overweight and about 15% are considered obese¹
- Over the next few decades, life expectancy could decline by as much as 5 years unless aggressive efforts are made to slow rising rates of obesity²
- Obesity may be a major contributor to type 2 diabetes during childhood and adolescence.
- Diabetes is one of the most common chronic diseases in children and adolescents.³



Source: ¹ American Obesity Association

² National Institutes of Health, Release 3/16/05

³ <http://www.cdc.gov/diabetes/projects/cda2.htm>



Challenges Facing Schools

Nutritional Deficiencies

Many Americans consume more calories than they need without meeting recommended intakes for a number of nutrients. This circumstance means that most people need to choose meals and snacks that are high in nutrients, but low to moderate in energy (calorie) content; that is, meeting nutrient recommendations must go hand in hand with keeping calories under control. Doing so offers important benefits – normal growth and development of children, health promotion for people of all ages, and reduction of risk for a number of chronic diseases that are major public health concerns.¹

Nutrients of Concern

According to the Dietary Guidelines for Americans, dietary intakes of the following nutrients may be low enough for concern:

Children and adolescents: *calcium, potassium, fiber, magnesium and vitamin E*

Source: ¹ Dietary Guidelines for Americans 2005, Chapter 2; 5



Nutritional Deficiencies

Overfed But Undernourished

- Only 20% of children currently consume the recommended servings of fruit and vegetables, an important objective of Healthy People 2010.¹
- Fiber and Potassium are two of the most important nutrients found in fruits and vegetables.
- Although fruits and vegetables should be encouraged, it is unrealistic to expect that children and adolescents will consume enough fruits and vegetables to meet their nutrient needs.
- Other sources of key nutrients are needed.



Nutritional Deficiencies

Overfed But Undernourished

- According to dietary surveys, milk consumption continues to decline for most age-gender categories and milk is the primary source of Calcium.
- In modern society, many age and gender groups need other beverages like milk to supply nutrients they don't get from food.¹
- Studies suggest that a 5% to 10% deficit in peak bone mass may result in a 50% greater lifetime prevalence of hip fracture, a problem certain to worsen if steps are not taken to improve calcium intake among adolescents.²
- For a variety of reasons, including lactose intolerance, milk allergies and palatability, it is not realistic that most children will consume enough milk to meet their calcium requirement, so other sources of Calcium, Vitamins A & D are needed



Nutritional Deficiencies

Calcium

- Most children are consuming less than the recommended amount of Calcium
- At the same time, many children are lactose intolerant or simply refuse to drink milk, so milk is not always a viable option
- Soy milk is available, but soy allergies are also prevalent and many children will not consume soy milk.
- The USDA encourages food component variations for ethnic reasons¹ – other Calcium sources are needed

Percentage of Children in the U.S. Consuming Less Than the Recommended Amount of Calcium

Males & Females 4-8 years old	50%
Males 9-13 years old	75%
Males 14-18 years old	65%
Females 9-13 years old	90%
Females 14-18 years old	95%

Source: Continuing Survey of Food Intake by Individuals (CSFII), National Academy Press, Washington D.C., 1997

Incidence of Lactose Intolerance in the U.S. by Race

Race	% With Lactose Intolerance
Caucasians	21%
Hispanic Americans	51%
African Americans	75%
Native Americans	80%
Asian Americans	90%

Source: National Institutes of Health



Nutritional Deficiencies

Potassium

- A diet rich in Potassium helps to lower blood pressure and blunt the effects of salt on blood pressure in some individuals.¹
- Potassium-rich fruits and vegetables include leafy green vegetables, fruit from vines and root vegetables.¹
- “Because Blacks commonly have a relatively low intake of potassium and a high prevalence of elevated blood pressure and salt sensitivity, this population subgroup may especially benefit from increased dietary intake of Potassium”.¹
- Since only 20% of children are consuming enough fruits and vegetables to meet their dietary needs, other sources of Potassium are needed.



Nutritional Deficiencies

Fiber

- Diets rich in dietary fiber have been shown to have a number of beneficial effects, including decreased risk of coronary heart disease.¹
- There is also a potential relationship between diets containing fiber-rich foods and lower risk of type 2 diabetes.¹
- Fiber may enhance satiety (fullness) and reduce energy intake.²
- Other mechanisms, beyond satiety, may be responsible for fiber's purported protection against weight gain.³
- Top sources of Fiber include fruits and vegetables.
- Since only 20% of children are consuming enough fruits and vegetables to meet their dietary needs, other sources of Fiber are needed



Nutritional Deficiencies

Magnesium

- Top sources of Magnesium include pumpkin and squash seed kernels, brazil nuts, bran ready to eat cereal, halibut, spinach and almonds.¹
- It is difficult to fortify beverages significantly with this nutrient due to its negative impact on taste.



Nutritional Deficiencies

Vitamin E

- Significant Sources of Vitamin E include fortified breakfast cereals, seeds, nuts and various oils¹
- Nuts provide Vitamin E, but many schools do not offer nuts due to peanut allergies.
- Vitamin E is an antioxidant that helps to boost the immune system and fight heart disease.²
- Other than ready to eat fortified breakfast cereals, there are very few foods sold in schools that provide a significant amount of Vitamin E, so other sources of Vitamin E are needed.



Source: ¹ Dietary Guidelines for Americans 2005; 57

² The Vitamin Sourcebook, Tonia Reinhard, M.S., 1998, Chapter 7; 112, 116, 121

Nutritional Deficiencies

Vitamin A

- Vitamin A is an important nutrient required by FDA to be added to milk.
- Lack of Vitamin A can lead to poor eyesight or blindness
- Sources of Vitamin A include carrots, spinach and canned mixed vegetables¹
- Since only 20% of children currently consume the recommended amount of fruits and vegetables and many children either can't or won't drink milk, other sources of Vitamin A are needed.



Nutritional Deficiencies

Vitamin D

- Vitamin D is an important nutrient required by FDA to be added to milk.
- The main function of Vitamin D is in building bone, and more specifically in getting minerals to bone.¹
- Lack of Vitamin D causes the bones to lose minerals and become soft and pliable. This softening is called rickets in children and it causes legs to bend when carrying the child's weight, leading to permanently bowed legs and can also lead to osteoporosis.¹
- Vitamin D deficiency increases the risk of many common and serious diseases, including some common cancers, type 1 diabetes, cardiovascular disease and osteoporosis²
- Observations in both morbidly obese individuals and healthy people support a general association between adiposity and Vitamin D status.³
- Studies suggest that high circulating levels of Vitamin D are associated with a lower risk of multiple sclerosis and that this inverse relationship is particularly strong before age 20 years.⁴
- Since the primary source of Vitamin D is milk and many children either can't or won't drink milk, other sources of Vitamin D are needed.



Other Issues

Carbonation and Calcium Depletion

- A Creighton University study found no calcium loss from the consumption of caffeine-free carbonated beverages and only a small temporary calcium loss due the consumption of caffeinated carbonated beverages.¹
- The study concluded that the net effect of carbonated beverage consumption on calcium loss is negligible.¹
- Although many carbonated beverages are high in sugar, carbonation itself is not linked to obesity
- There are new carbonated beverages on the market containing nutrients that may help reduce the risk of disease in children.
- There are also lightly carbonated beverages on the market that are USDA Exempt from the soda water category, so they are not considered Foods of Minimal Nutritional Value.
- Carbonated beverages should be evaluated based on their nutrient-density, not whether they are carbonated or not.



Other Issues

Juices from Concentrate

- There is a significant difference in the nutritional value of 100% juices “from concentrate” and 100% juices ‘not from concentrate” due to losses during concentration and processing.
- Some 100% Juices have little or no nutritional value. Harvard Medical School states: “When fruits are squeezed into juices, they become the equivalent of sugar water”. “Most fruit juices contain too little fruit, too much sugar and too many empty calories”.¹
- The American Academy of Pediatrics is recommending limiting the consumption of juice to one 4oz to 12oz serving per day. They say “kids drink too much Juice”² Experts say pudgy children should avoid juice altogether.³



Other Issues

% Juice Content

- Percent Juice Content cannot be used exclusively to determine if a beverage is healthy.
- 100% Juices are high in sugar and calories. Some juices have little or no nutritional value unless specifically added. It would be easy to develop a beverage with a small percentage of juice that is more nutrient-dense than 100% juice from concentrate.
- Carbohydrates, including sucrose, fructose, glucose and sorbitol, are the next most prevalent nutrients in juice next to water.¹

Source: ¹ Pediatrics Vol.107 No.5 May 2001



Other Issues

Added Sugar

- The Dietary Guidelines support the addition of small amounts of added sugar for palatability in Nutrient-Dense foods and beverages.¹
- Added sugar can be an effective tool to reduce total sugar content (as compared to using 100% juice as a sweetener) while improving palatability in Nutrient-Dense foods and beverages. Using juice as a sweetener also reduces shelf-life.
- The sweetening ability of a small amount of sugar can encourage people to eat nutrient-rich foods that would otherwise probably not be consumed.²
- With regard to metabolism, in the process of breaking down carbohydrates into glucose, the body is unable to distinguish between sugars that are added to foods and sugars that are naturally occurring, since they are chemically the same.²

Source: ¹ *Dietary Guidelines for Americans 2005*, Chapter 7; 36-37

² *International Food Information Council Foundation, Carbohydrates and Sugars* (<https://www.ific.org/sugars/index.cfm>), 11/06



Other Issues

Calories

- Calories from sugars added to increase palatability may increase a person's intake of Nutrient-Dense beverages, thus improving nutrient intake without contributing excessive calories.¹
- Some nutrients, such as Calcium and Fiber, also add a small amount of calories. A beverage with 30% Calcium and 1g of Fiber per 8oz will contain 10 calories from these nutrients.
- Skim milk contains "lactose" sugar and has between 80 and 90 calories, but these calories are acceptable due to the nutrient-density of skim milk.
- Calories should be evaluated relative to the nutrient-density of the beverage.

Source: ¹ Dietary Guidelines for Americans 2005, Chapter 7; 36-37



Other Issues

Fortification of Foods and Beverages

- Initiated in 1924, the addition of iodine to salt was one of the earliest successful fortification programs.¹
- In the early 1930's, vitamin D was first added to milk to aid in the absorption of calcium and phosphorus, preventing rickets.¹
- In 1938, voluntary enrichment of flours and breads was initiated to prevent the development of deficiency diseases in the general population. Enrichments included thiamin, niacin, riboflavin and iron.¹
- Vitamin A is required to be added to low and nonfat milk and certain other dairy products.¹
- Lysine is required to be added to certain corn products to enhance protein quality.¹
- Even though Vitamin C is naturally occurring in 100% Orange Juice, it is also fortified with Vitamin C to make up for significant losses during concentration and processing.
- Breakfast cereals are fortified with multitude of nutrients.

Fortification is an accepted means of improving nutrient density and helping to prevent disease.



Other Issues

Sources of Nutrients

- “Research indicates that natural sources of nutrients are not always the most biologically effective”. For example, synthetic folic acid is widely considered more bioavailable than natural sources of folate.¹
- “Healthful diets that feature a variety of nutrient-dense foods often include nutrients from both natural and synthetic sources”.¹
- The essential micronutrients in milk products could also be replaced by daily multi-vitamin/mineral and calcium supplements²
- Vitamin D-3 (which is used to fortify milk) delivers far more Vitamin D activity than Vitamin D-2.¹
- A gastrointestinal absorption study concluded that the absorption of calcium from several other sources, including calcium lactate, is similar to that of whole milk in fasting healthy young subjects.³

Source: ¹ American Dietetic Assn, Fortification and Nutr Supplements Position Paper; 5

² Am J Clin Nutr 2006; 83:533

³ New England Journal of Medicine; Volume 317:532-536, Number 9



The Problem

Traditional Beverages Fall Short

- 100% Juices and smoothies are high in sugar and calories (up to 32 grams of sugar and 110 – 150 calories per 8oz).
- Sports Drinks have added Sodium (110mg per 8oz serving) and are not always suitable.
- Water is an essential nutrient, but most children will not exclusively consume plain water. Research has shown that people drink more water when it is flavored vs. unflavored.¹
- Skim Milk is great, but many kids can't or won't drink milk, so other alternatives are needed.

What is the solution?



Source: ¹ International Food Information Council Foundation,
(<http://www.ific.org/publications/ga/sugarscarbsfaq.cfm>), April 2005

The Solution

Nutrient-Dense Beverages

- Dietary Guidelines for Americans 2005 is supposed to be the “primary source of dietary health information for policymakers, nutrition educators, and health providers”.¹
- The document is based on the recommendations put forward by the Dietary Guidelines Advisory Committee. The Committee was composed of scientific experts who were responsible for reviewing and analyzing the most current dietary and nutritional information and incorporating this into a scientific evidence-based report.¹
- The Dietary Guidelines emphasize the need for Nutrient-Dense Foods and Beverages and identify Calcium, Potassium, Fiber, Magnesium and Vitamin E as “Nutrients of Concern” for Children and Adolescents



Nutrient-Dense Beverages

What are Nutrient-Dense Beverages?

- According to the Dietary Guidelines, Nutrient-Dense Beverages are those beverages that contain substantial amounts of vitamins and minerals and relatively few calories.¹
- Nutrient-Dense Beverages address both calorie and nutrient concerns. Nutrient-Dense Beverages can also significantly improve the nutritional value of the a la carte line by providing substantial amounts of “Nutrients of Concern”.



Nutrient-Dense Beverage Criteria

Translation of Dietary Guidelines into Local or State Guidelines

- Dietary Guidelines are general policy – not specific food or nutrition standards.¹
- Dietary Guidelines must be translated into specific guidelines on the local level to have meaningful impact.¹



Nutrient-Dense Beverage Criteria

Taste, Moderation & Nutrition

- Taste: Children will not consume what they don't like. Beverages must be palatable.
- Moderation: Relatively few calories – a reasonable amount of calories for palatability (fewer than skim milk), keeping in mind that some nutrients also provide calories
- Nutrition: Substantial amounts of vitamins and minerals (Nutrients of Concern) – enough to offset the calories (Nutrient-Density)

Restrictions such as “No added sugar”, “No carbonation” or requiring a high juice (sugar) content are counterproductive.



Nutrient-Dense Beverages

Nutrient-Dense Beverages and the a la carte line

- The USDA lunch attempts to provide the recommended amount of nutrients for children and adolescents, but statistics show that several “Nutrients of Concern” are not being met.
- The a la carte line has traditionally been viewed as a profit center for schools, but it can also be a means to bridge nutrient gaps identified by the Dietary Guidelines.
- If a child purchases a Nutrient-Dense beverage from the a la carte line, it can help to provide some of the nutrients that many children are missing in their diets as opposed to nutrient-poor beverages which provide “empty calories”.



Nutrient-Dense Beverage Criteria

A Benchmark for Calories in Nutrient-Dense Beverages

- According to the Dietary Guidelines, small amounts of sugar added to Nutrient-Dense foods and beverages may increase a person's intake by enhancing the palatability of these products, thus improving nutrient intake without contributing excessive calories.¹
- Currently, skim milk has between 80 and 90 calories per 8oz serving and 100% juice has 110 to 150 calories per 8oz serving. Using Skim Milk as a benchmark for a reasonable amount of calories, Nutrient-Dense Beverages could have 80 calories or less per 8oz serving as long as they have the nutritional value to offset the calories (nutrient-density)



Nutrient-Dense Beverage Criteria

Key Nutrients

- “Nutrients of Concern”: Calcium, Potassium, Fiber, Magnesium and Vitamin E
- Other key nutrients required in milk: Vitamin A and Vitamin D
- The FDA permits the health claim that a product is a good source of a nutrient if it contains >10% of the Daily Value (DV) of the nutrient.¹
- Fiber is uncommon in beverages, probably due to the cost. One gram of Fiber (as much as half an orange) in a beverage is significant and should be encouraged.



Conclusion

Recommended Criteria for Nutrient-Dense Beverages

Calorie Criteria:

- Maximum of 80 calories* per 8oz serving

Nutrient Criteria:

Must meet at least three of the following:

- Minimum of 250 mg of Calcium (25% RDI) per 8oz serving
- Minimum of 350 mg of Potassium (10% RDI) per 8oz serving
- Minimum of 1g of Fiber per 8oz serving
- Minimum of 2.25 IU of Vitamin E (10% RDI) per 8oz serving
- Minimum of 40mg of Magnesium (10% RDI) per 8oz serving
- Minimum of 20 IU of Vitamin D (10% RDI) per 8oz serving
- Minimum of 500 IU of Vitamin A (10% RDI) per 8oz serving

Nutrient-Dense beverages should be your #2 option on the a la carte line behind skim or low-fat milk

* Some nutrients add calories



Summary

“If Americans choose foods based on nutrient-density, they will essentially be choosing foods based on quality”¹

Dr. Eileen T. Kennedy, Dean of the Friedman School of Nutrition Science and Policy at Tufts University and former secretary of the USDA.¹

For more information on Nutrient-Dense beverages available in your area, contact:

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