

Milk and Dairy: The Forgotten Food Group?

Do you often hear your clients say they are avoiding milk and dairy foods?

Is dairy the first food group eliminated on weight-reduction diets?

Are they pouring more “trendy” dairy alternatives on their cereal?

Do your clients think that “milk is for kids” and since they are not growing, they don’t need it any more?

There is a lot of consumer misinformation about milk and dairy foods. This white paper will clarify the issues and help you better inform your clients of the nutritional benefits that this important food group provides ... for children and adults; men and women; athletes and sedentary individuals; all races and ethnicities; the elderly and everyone in between.

History and Background

People have been consuming milk and dairy foods for thousands of years, across cultures and continents. Milk from the cow can be processed, aged and fermented into hundreds of different food products—lower-fat milks, flavored milks, a variety of cheeses, yogurt, buttermilk, butter, cream and ice cream—making it one of the most versatile food groups and meeting a wide range of lifestyle, taste and health needs.

Due to their long-standing history throughout cultures and populations, dairy products have become an essential part of dietary recommendations across the world for a variety of nutrient needs and health benefits. However, consumers are often confronted with conflicting dietary advice. Misinformation about milk manufacturing practices, perceptions of lactose intolerance and attempts to cut fat and calories to lose weight are challenging our paradigms about the health and safety of dairy products. However, any perceived advantages of avoiding dairy products are in conflict with the potential long-term harmful consequences of dairy avoidance. It remains more important than ever to include dairy as a daily part of healthy dietary patterns.

As health professionals, it is our duty to correct misunderstandings and misinformation, and guide clients toward healthful diets that incorporate all food groups, as per the 2010 Dietary Guidelines¹ nutrient

recommendations. Granted, there may be individual situations in which a particular food or food group may be justifiably excluded—such as for specific allergies—however, this is the exception rather than the norm. Most healthy people can consume the recommended amounts.

Nutrient Contributions of Milk and Dairy Foods

Milk and dairy products’ composition of essential nutrients include significant levels of high-quality protein, calcium, magnesium, potassium, iodine, vitamins D (when fortified) and B₁₂; and important contributions of vitamin B₆, phosphorus, zinc, selenium, folate, niacin, pantothenic acid, riboflavin, vitamin A and choline. Many of these nutrients are lacking in the average American diet.

Milk is one of the most nutrient-dense food sources available relative to the calories it provides. In the United States, milk and milk products contribute only a small proportion of the total calories to the diet, yet in terms of nutrient requirements, they contribute (see Figure 1):²

- * 51 percent of calcium
- * 58 percent of vitamin D*
- * 28 percent of both phosphorus and vitamin A
- * 26 percent of vitamin B₁₂
- * 25 percent of riboflavin
- * 15–30 percent of protein.

* less, if the new, higher RDA for vitamin D is used.



Multiple studies confirm that habitual dairy consumption contributes significantly to the adequate intake of these nutrients. Notably, these are the amounts of nutrients that milk and dairy products provide in the average *current* American diet—which is, in fact, suboptimal in dairy foods. The recommendation for most adults is 3 servings of milk and dairy products per day; the average American consumes only 1.8 servings per day.³ The amount of nutrients contributed would thus be considerably higher if everyone in the United States actually consumed the number of recommended servings.

The 2010 Dietary Guidelines Advisory Committee used consumption models of the food groups, considering their nutrient contributions, in order to develop the recommendation for each group. Through these modeling studies, they showed that 3 servings of milk and dairy foods would provide only 12 percent of the energy in a 2,000 calorie-per-day diet, but more than 70 percent of the needed calcium and vitamin D; 30–40 percent of phosphorus, vitamin A, riboflavin and vitamin B₁₂; and 20–30 percent of protein, potassium, zinc and choline.¹

Unintended Consequences of Dairy-Deficient Diets

Due to their substantial contribution to nutrient intakes across all ages, it is no surprise that diets that are dairy-deficient are often nutrient-deficient. NHANES 2003–06 data of nearly 17,000 individuals showed that decreasing or removing dairy from food choices compromised both the macronutrient and micronutrient profile of the diet,³ and that replacing dairy products with calcium-equivalent foods resulted in decreased intake of several other nutrients such as protein, vitamin A, riboflavin, vitamin B₁₂, vitamin D, potassium, phosphorus and magnesium.

In the development of the Dietary Guidelines, when dairy products were excluded from the intake models, calcium, magnesium, phosphorus, vitamin A and vitamin D dropped below 100 percent of goals in most of the food patterns analyzed.¹ Incorporating even small amounts of dairy into the American diet can greatly improve intakes of these key nutrients.

The more educated consumer will often seek out alternative sources of nutrients when eliminating a food or food group from his or her diet. When dairy is omitted, however, it is often not feasible to consume the needed nutrients from alternative sources. For example, to obtain 300 mg calcium (equivalent to 1 cup of milk), a person would need to consume 5.3 servings of dark-green leafy vegetables, 6.2 servings of legumes or 12 servings of whole grains⁴—foods often cited as good sources of calcium. The Dietary Guidelines Committee concluded that the amount of milk-group alternatives needed to provide sufficient calcium would “provide too many calories and/or be a large amount to consume daily.”¹ In addition, nutrients beyond calcium are often not considered when seeking out alternatives to milk and dairy foods, compounding the nutritional inadequacies.

Inadequate Dairy and Chronic Disease Risk

Nutrient shortfalls, not always visibly deleterious in the short term, can lead to serious consequences and chronic disease in the long term. Several analyses indicate that suboptimal intakes of dairy are associated with elevated risk for cardiovascular and metabolic disorders such as high blood pressure, metabolic syndrome and diabetes.^{5,6}

★ International studies and meta-analyses in adults have consistently found that the consumption of 3 or more servings a day of dairy products is inversely associated with the risk of elevated **blood pressure**.^{7,8,9}



- * A large body of research shows dairy's role in **bone health**. Recent clinical studies consistently show the consumption of dairy products helps maintain bone mass, through various mechanisms, across the lifespan and in both postmenopausal and premenopausal women.^{10,11,12}

- * A growing body of research indicates that dairy may play a protective role against **type 2 diabetes**, the incidence of which is rising in conjunction with obesity. A recent meta-analysis showed a dose-response inverse relationship between dairy consumption and risk of type 2 diabetes, particularly in those consuming low-fat dairy products.¹³ Components such as whey, calcium, vitamin D, medium-chain fatty acids and/or lactose are thought to play a protective role by improving insulin sensitivity.¹⁴

- * Growing evidence shows that milk and dairy foods are protective against **cardiovascular disease** (CVD), possibly due to components that have positive effects on cholesterol.¹⁵ A study in Japanese women found that consumption of milk and dairy products was inversely associated with death from CVD.¹⁶ A meta-analysis of 17 prospective studies found that milk intake may be inversely associated with overall CVD risk.¹⁷ The 2010 Dietary Guidelines Committee concluded that “intake of milk and milk products is inversely associated with CVD.”¹

- * **Sarcopenia**—the progressive, degenerative decline in muscle mass and strength associated with aging—is becoming a bigger health concern as our population continues to age. Although average protein intakes are adequate in the United States, certain sub-segments can have inadequate intakes—the elderly among them, due to their lower energy intakes. Dairy provides a feasible and high-quality source of protein that can help prevent sarcopenia; in fact, two milk proteins—casein and whey—have shown to be advantageous over other sources of protein at promoting muscle growth.¹⁸

Milk in the Sustainability Equation

All food production brings about some degree of greenhouse gas emission (GHGE)—a summation of the water, soil and energy needed in the growth/production of the food; the processing, packaging and transportation of the product; the retail/food establishment processes; home food preparation and end waste. Global dairy production accounts for 2.7 percent of global GHGE,¹⁹ considerably lower than expected given the many steps involved in the production of a gallon of milk, a pound of cheese or a quart of yogurt. This relatively small contribution toward GHGE is in part due to efforts by the dairy industry over the past 60 years to improve sustainability practices, which have increased efficiency by 63 percent through animal genetics, feeding rations, animal health programs, cow comfort and overall farm management practices.²⁰ The U.S. dairy industry has committed to a voluntary goal of lowering GHGEs of fluid milk by an additional 25 percent by 2020.²¹

Discussions of sustainability and environmental impact would not be complete without considering other factors, such as a food's nutrient density. If there were a food that provided the only source of key nutrients to the consumer, yet was produced at extremely high environmental cost, we would have an ethical dilemma on our hands—do we compromise health to save the environment, or sacrifice the environment to nourish our population? Fortunately, with milk and dairy products this is not a question we need to answer, as **the package of nutrients provided by dairy—a unique package not found in any other food category—comes at a very modest environmental cost.**

- * Recently, a “Nutrient Density to Climate Impact” (NDCI) index was developed that quantifies a composite nutrient density of 21 essential nutrients in relation to GHGE. Due to its very high nutrient density, the NDCI index for milk was much higher than for water, soft drinks, beer, orange juice and soy beverages.²²



* A modeling study in France that quantified GHGE for various foods and food groups showed that, per 100 kcal, dairy products had lower GHGE than fruits and vegetables ... and only starches and snack products had still lower GHGE values.²³ Thus, plant-based diets are not necessarily better for the environment than diets that include animal products, when one considers the quantities a person needs to consume.

As such research evolves, it will be important to continue including factors such as nutrient contributions and calorie consumption in this 'bigger picture' of sustainability discussions.

Economics of Milk and Dairy Consumption

In tough economic times, consumers—particularly low-income consumers with families to feed—look to reduce food costs. In their 2010 Food and Health Survey, International Food Information Council (IFIC) determined that price is behind only taste as a factor in determining food choices.²⁴ Although the cost of dairy products varies somewhat from year to year and throughout the United States, it remains a very affordable food solution. At as little as \$0.25 per cup, milk is the most economical item in this food group, followed by cheese at \$0.30 – \$0.60 per 1-oz. serving and yogurt at \$0.50 – \$1.00 per 6-oz. serving.

Given the high levels of various nutrients provided by milk, cheese and yogurt, not many food products compare. In a study looking at nutrient contributions per dollar, milk and milk products were by far the lowest-cost source of dietary calcium and were among the lowest-cost sources of riboflavin and vitamin B12.²⁵

On a larger economic scale, adequate milk and dairy consumption can greatly reduce nationwide healthcare costs associated with chronic diseases such as osteoporosis, obesity, hypertension, heart disease, diabetes and metabolic syndrome. Drawing from prospective longitudinal studies and randomized controlled trials, one analysis estimated that if American adults increased their intake of dairy foods

to the recommended 3 to 4 servings a day, savings in the first year due to the ensuing health benefits would conservatively be \$26 billion; 5-year savings would be in excess of \$200 billion.⁶ A recent analysis in Australian adults estimates that approximately \$2.1 billion in healthcare costs per year is attributable to low dairy product consumption,⁵ primarily due to cardiovascular and metabolic disorders.

In short, both on an individual as well as a population basis, adequate consumption of dairy products makes great economic sense.

Conclusions

Scientific evidence confirms the many health benefits that dairy products provide. Dairy is an essential component in a healthy, balanced diet, contributing significant amounts of nutrients. Modeling studies have demonstrated the hardship in achieving nutrient adequacy when one falls short of the 2010 Dietary Guidelines dairy recommendations.

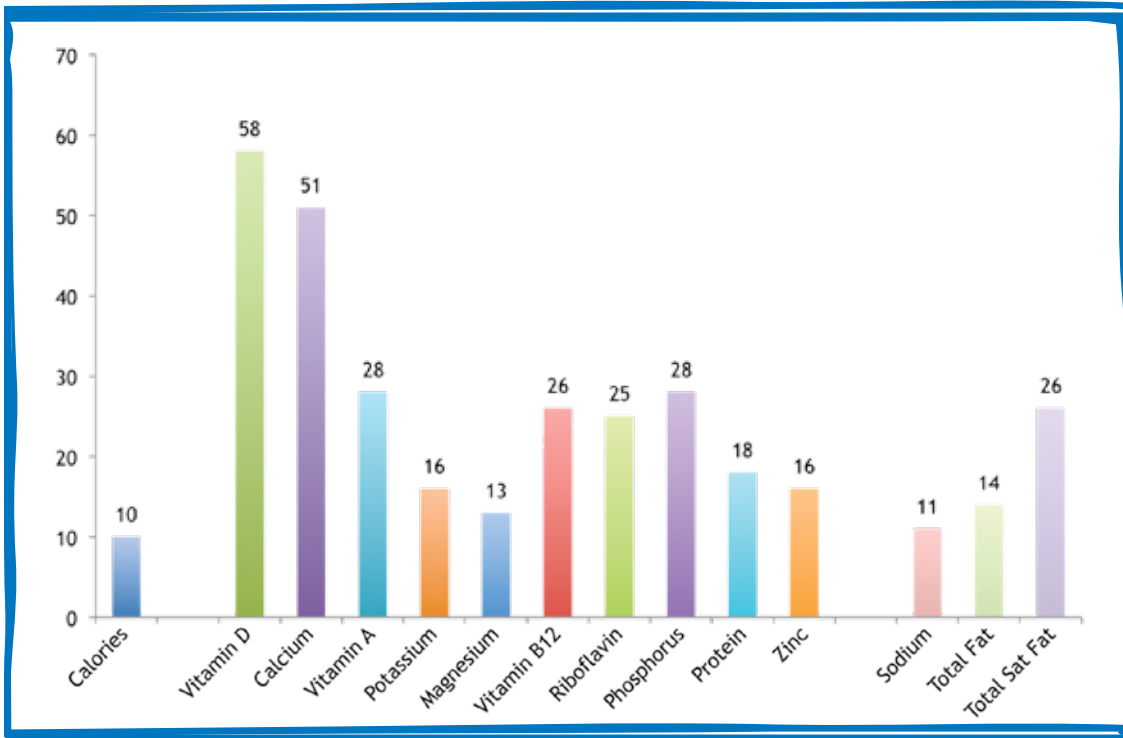
Given the severe consequences of nutrient deficiencies—both short term and long term—it is the responsibility of health professionals to assess nutrient and food-group adequacy, explore reasons behind shortfalls and encourage appropriate consumption of all food groups.

Even small increases in consumption of milk and dairy products can lead to big strides toward nutrient adequacy, especially among those whose baseline intakes are low.

Individual factors such as dietary preferences, lifestyle, economic situation, cultural habits and traditions need to be considered in developing dietary plans that incorporate appropriate amounts of all food groups. The diversity, variety, range of calorie and fat options and availability of specialty products such as lactose-free, organic and artisan dairy products make it quite feasible to find acceptable solutions to overcome any real or perceived barriers to adequate dairy consumption.



Figure 1: Percent of Calories and Nutrients from Dairy to the Diet of the U.S. Population 2+ Years²



References

- ¹ Dietary Guidelines for Americans, 2010. In: USDA, USDHHS, eds. 7th ed. Washington, DC: U.S. Government Printing Office; 2010.
- ² Dairy Research Institute – NHANES 2003-06; age 2+ years. From: World Dairy Summit 2012 Presentation: Dairy Nutrition and Environmental Sustainability: Setting the Record Straight. Original source: <http://www.cdc.gov/nchs.nhanes.htm>
- ³ Fulgoni VL et al. *Nutr Res* 2011; 31:759-765.
- ⁴ Johnson RK et al. *J Am Diet Assoc* 2002;102(6):853-856.
- ⁵ Doidge JC et al. *J Nutr* 2012;142:1772-1780.
- ⁶ McCarron DA et al. *Am J Hypertens* 2004; 17(1):88-97.
- ⁷ Toledo E et al. *Br J Nutr* 2009 Jan;101(1):59-67.
- ⁸ Ralston RA et al. *J Hum Hypertens* 2012, 26:3-13.
- ⁹ Kris-Etherton PM et al. *J Am Coll Nutr* 2009 Feb;28 Suppl 1:103S-19S.
- ¹⁰ Uenishi K et al. *Asia Pac J Clin Nutr* 2010;19(3):432-9.
- ¹¹ Moschonis G et al. *Br J Nutr* 2010;104(1):100-107.
- ¹² Thomas DT et al. *J Am Coll Nutr* 2010; 29:6:604-611.
- ¹³ Tong X et al. *Eur J Clin Nutr* 2011;65(9):1027-31.
- ¹⁴ Tremblay A, Gilbert JA. *J Am Coll Nutr* 2009 Feb;28 Suppl 1:91S-102S.
- ¹⁵ FAO/WHO Expert Consultation on Fats, 2008.
- ¹⁶ Kondo I et al. *J Epidemiol* 2013 Jan 5;23(1):47-54.
- ¹⁷ Soedamah-Muthu SS et al. *Am J Clin Nutr* 2011 Jan;93(1):158-71.
- ¹⁸ Tang JE, Phillips SM. *Curr Opin Clin Nutr Metab Care* Jan 2009;12(1):66-71.
- ¹⁹ FAO report Greenhouse Gas Emissions from the Dairy Sector, 2010.
- ²⁰ Capper JL et al. *J Anim Sci* 2009 Jun;87(6):2160-7.
- ²¹ <http://www.usdairy.com/Sustainability/OurCommitment/Pages/Home.aspx> Accessed 2/24/ 2013.
- ²² Smedman A et al. *Food Nutr Res* 2010;54-61.
- ²³ Vieux F. et al. *Am J Clin Nutr* 2013;97(3):569-83.
- ²⁴ 2010 Food & Health Survey: Consumer Attitudes Toward Food Safety, Nutrition & Health. International Food and Information Council, 2010. http://www.foodinsight.org/Resources/Detail.aspx?topic=2010_Food_Health_Survey_Consumer_Attitudes_Toward_Food_Safety_Nutrition_Health Accessed 1/29/2013.
- ²⁵ Drewnowski A. *J Am Coll Nutr* 2011;30 (5 Suppl 1):422S-428S.
- ²⁶ Appel LJ et al. *N Engl J Med* 1997;336(16):1117-24.
- ²⁷ Fung TT, et al. *Arch Intern Med* 2008;168(7):713-20.
- ²⁸ Abargouei AS et al. *Int J Obes (Lond)* 2012 Dec;36(12):1485-93.
- ²⁹ <http://www.choosemyplate.gov/food-groups/dairy.html> Accessed 2/11/2013.

For questions or comments please contact us at: info@DairyCouncilofCA.org



Call to Action

Specific actions that health professionals can take to ensure adequate intakes of dairy include:

- Assess habitual consumption patterns of dairy products and other food groups, areas of excess and deficiency and reasons behind each.
- Communicate the benefits of consuming recommended amounts of dairy—highlighting specific nutrients and their functions in the body—as well as long-term benefits such as dairy’s role in reducing risk for hypertension, colon cancer, heart disease, metabolic syndrome, sarcopenia and its possible weight-management benefits.
- Make it clear that health benefits come not from a single nutrient or component in dairy foods, rather from the food/food group as a whole, and that there is no singular replacement—supplement or alternative product—for it.

- Prioritize health goals, considering an individual’s risk for chronic disease—for example, if hypertension is a concern, highlight the natural benefits of the DASH (Dietary Approaches to Reduce Hypertension) diet—high in fruits, vegetables and low-fat dairy products—that has been shown to reduce blood pressure by as much as some medications²⁶ ... and may even reduce risk of heart disease and stroke in some populations.²⁷
- Develop a diet plan that reduces excesses and optimizes intake of the dairy group, taking into account personal factors that may interfere with consumption of specific product(s) (see Side Bar).
- Follow up with clients to assess compliance and make any adjustments to their diet, based on their progress toward their recommended goals.

Side Bar: Dealing With Barriers to Adequate Dairy Consumption

| Barrier | Reality |
|-----------------------------------|---|
| Calories/weight management | Omitting dairy products is not a good weight-loss strategy. There are many low-fat and fat-free dairy products that contain all the nutrients but less fat and calories than the regular versions, which are good options for those with weight concerns. Some research suggests, in addition, that people are more successful on weight-loss diets when dairy is included. ²⁸ |
| Lactose intolerance | Many people avoid dairy products with the perception that they have lactose intolerance. According to USDA’s MyPlate food guide system, “If you avoid milk because of lactose intolerance, the most reliable way to get the health benefits of dairy products is to choose lactose-free alternatives within the Dairy Group, such as cheese, yogurt, lactose-free milk or calcium-fortified soymilk (soy beverage) or to consume the enzyme lactase before consuming milk.” ²⁹ |
| Preference for dairy alternatives | Many people are choosing milk ‘substitutes’—soy, almond and rice beverages, among others—for a variety of reasons. Few realize, however, that the nutritional package these alternative beverages deliver is simply not the same as real milk. Levels of calcium, vitamin D, protein and potassium can, in particular, be inferior in these products, which can lead to nutrient deficiencies and unintended health consequences in the long term. |
| Milk allergy | True milk allergies are fairly uncommon—only about 1 to 3 percent of children have a milk allergy—and these are generally outgrown by 2 years of age. Any suspected food allergy should be confirmed by a doctor. |

For answers to other common consumer questions—such as concern over hormones or antibiotics—that may be barriers to adequate dairy consumption, direct clients to: <http://www.HealthyEating.org/Milk-Dairy/Milk-Myth-Busters.aspx>.

