New Dietary Guidelines for Americans and Impact on Dairy

J.M. Aldrich
CSA Animal Nutrition

Introduction

Since the first edition was published in 1980, the Dietary Guidelines for Americans (DGA) have provided science-based advice on what to eat and drink to promote health, reduce the risk of chronic disease, and meet nutrient needs. In 1990, the National Nutrition and Monitoring Related Research Act required that at least every 5 years the US Department of Agriculture (USDA) and Health and Human Services (HHS) would publish a report containing nutritional and dietary information and recommendations for the general public. The DGA is used to inform several government funded programs such as the National School Lunch Program (NSLP), Supplemental Nutrition Assistance Program (SNAP) and Women Infant Children (WIC). Meal standards for these programs align with the recommendations in the guidelines and provide an important avenue for dairy product consumption. In 2019, nearly 11 billion pounds of fluid milk, 683 million pounds of cheese, and 662 million pounds of yogurt and other dairy foods moved through these federal food assistance programs (Brown, 2021), representing almost 10% of the U.S. milk production.

The Good News for Dairy In the DGA

- Dairy is included as one of the major food groups that also included vegetables, fruits, grains, protein foods, and oils.
- The guidelines emphasize that American diets should be based on the consumption of nutrient dense foods. Dairy is considered a nutrient dense food that includes milk, yogurt, cheese, low-lactose, and lactose-free dairy products.
- For most life stages 3 servings of milk daily are recommended (Infants <6 months are recommended to be fed exclusively on human milk, toddlers 12 to 23 months; ~ 2 servings, and children 2 to 8 years old; 2 to 2 ½ servings).
- Sugar sweetened beverages and beverages based on nuts or oats (e.g., almond, rice, and coconut “milks”), which often compete with milk, are not recommended because they are not nutrient dense, and their nutrient profile does not fully replicate that of dairy milk. The DGA makes it very clear that these beverages are not adequate substitutes for milk.
- The amount of fruit juice, which also competes with milk, is limited from 4 to 10 ounces daily depending on the energy (kcal) needs of an individual.
- 93 percent of Americans do not consume the recommended servings of dairy products (Fig. 1). Therefore, if more people would adhere to these guidelines, dairy consumption in the United States would increase.

- Besides protein, the guidelines point out that dairy is an excellent source of three other nutrients of public health concern, namely calcium, potassium, and vitamin D.
- Although there was no movement for full-fat dairy products, the DGA states that people should choose low-fat and fat-free dairy “most often”. This new language provides flexibility for people to consume some full-fat dairy without exceeding recommended intakes of saturated fat.

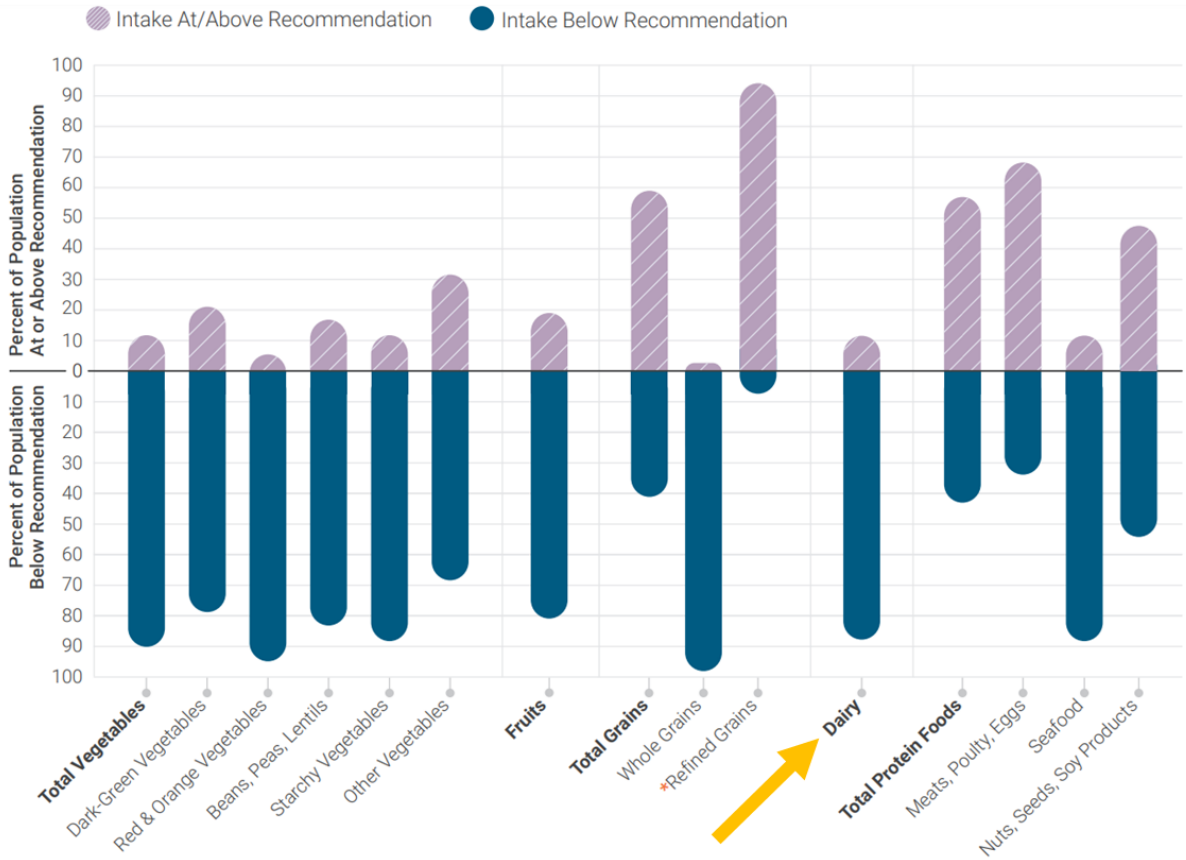

Figure 1. Dietary intakes compared to recommended intakes (USDA/HHS, 2020)

Concerns about the DGA Relative to Dairy

The DGA continues the long-held recommendation to limit saturated fat intake to less than 10% of total energy (kcal) intake. The reason for this limit was born of what became known as the diet/heart hypothesis of coronary heart disease (CHD) developed in the 1950’s and 1960’s with Ancel Keys (Keys 1953; Keys et al., 1966) playing the leading role. Others have written in great detail about the flawed underpinning science, early on (Yerushalmy and Hilleboe, 1957) and more recently (Lock and Bauman, 2011; Elliot, 2014; Teicholz, 2014; Rico and Rico, 2018). Briefly, the theory is based on the belief that dietary saturated fat increases the level of cholesterol in blood, which increases cholesterol deposition in arteries and leads to CHD. While high blood cholesterol is a well-

established risk factor for heart disease, this hypothesis concerning dietary saturated fat to increase blood cholesterol has never been agreed upon by scientists and researchers but continues to be presented as fact (Elliot, 2014). In a review of recent meta-analyses of randomized trials and observational studies (Astrup, et al., 2020), it was reported that there is no clear beneficial effect to reduce saturated fat intake to lower the risk of cardiovascular disease (CVD) and total mortality, whereas a protective effect against stroke was apparent.

The health effects of food in general and dairy in particular cannot be predicted by the content of any single nutrient group. Whole fat dairy and other foods that contain saturated fat in a complex matrix are not associated with increased risk of CVD (Astrup, et al., 2020). In fact, as reviewed by Rico and Rico (2018), recent studies suggest that dairy in general, including full-fat dairy may protect from obesity and associated chronic diseases. Conjugated linoleic acid from milk fat has been shown to have anti-carcinogenic, anti-atherogenic, anti-diabetic and other beneficial health effects in animal models (Bauman, et al., 2001; Ip, et al., 1999). Evidence in humans also support that full-fat dairy promotes satiety to reduce total daily energy consumption and helps to displace other foodstuffs with poor nutritional value (e.g., sugar sweetened beverages) that would otherwise contribute to excess energy consumption.

Nearly 1 in 3 North American children are now overweight or obese and childhood obesity has increased in the last 40 years while consumption of whole milk has been halved (Vanderhout, et al., 2020). A recent analysis suggests that higher cow-milk intake is associated with lower childhood obesity (Vanderhout, et al., 2020).

Many prefer the taste of whole fat over low fat milk. Dietary preferences throughout life are affected by what one eats in childhood (USDA/HHS, 2020). Children and adolescents who are only exposed to low fat dairy, may not continue to drink milk later in life.

When limiting calories from fat, including saturated fat, those calories are likely mostly replaced with carbohydrates. Today, there is strong evidence and growing consensus that over-consumption carbohydrates especially sugar and refined carbohydrates is the dietary factor largely responsible for obesity and risk for chronic diseases (Taubes, 2007; Taubes, 2011; DiNicolantonio et al.,2016).

Finally, due to the DGA recommendation to limit intake of saturated fat, only fat-free or low-fat dairy products are recommended. This means butter, higher fat cheese, heavy cream and other higher fat dairy products are not recommended.

Soy Beverage versus Milk

Even though most plant-based beverages are not recommended substitutes for dairy the DGA states: “…for individuals who choose dairy alternatives, fortified soy beverages (commonly known as “soy milk”) and soy yogurt – which are fortified with

calcium, vitamin A and vitamin D – are included as part of the dairy group because they are similar to milk and yogurt based on nutrient composition and use in meals."

Does the nutritional equivalency implied hold up to a more detailed evaluation? Both contain similar calories, the total fat content is similar, but the fatty acid profile differs between beverages, and total protein is also similar. Calcium is higher in soy beverage, but it is in the form of calcium carbonate which has lower bioavailability than the calcium in milk. Both are fortified with vitamins A and D. Soy beverage is fortified with a few B vitamins riboflavin (vitamin B2) and vitamin B12, whereas milk provides these as part of its native nutrient matrix. Sugar is lower in soy beverage, but the source is added cane sugar, whereas milk sugar is from lactose.

Although the total protein content between dairy milk and soy beverage is the same, the biological quality of the protein is quite different. Protein quality can be defined by the essential amino acid (EAA) composition (relative to the human requirement pattern) and the intestinal digestibility of the protein and amino acids (FAO, 2013; CVB 2016). The comparison of milk and soy protein in terms of amino acid digestibility in the small intestine (relative to the human requirement pattern) is shown in Figure 2.

Compared to requirements, note that soy meets the EAA requirement pattern, except that it is very limited in methionine (Met) in fact, it covers only 50% of the requirement. Milk, on the other hand meets or exceeds the requirement pattern for all EAA. Compared to soy, the EAA of milk proteins range from equal (tryptophan and phenylalanine) to 1.5-times higher in lysine and 2-times higher in Met. The lower level of Met in soy beverage can be compensated by consumption of other foods that have higher levels of Met, such as grains (e.g., corn or rice) but then care must be taken not to exceed total energy intake.

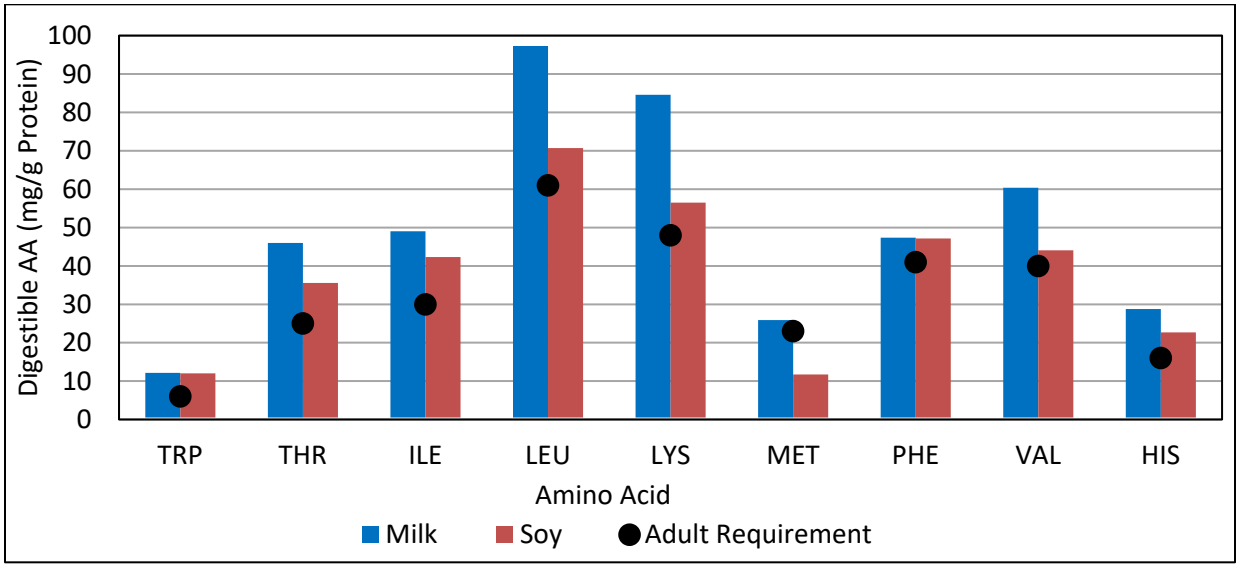

Figure 2. Comparison of milk and soy protein in terms of digestible amino acids (AA) in the small intestine relative to the adult requirement

Another item that needs to be factored into this assessment is affordability. The DGA acknowledges that a healthy dietary pattern needs to fit within budgetary constraints. Comparing costs of milk versus soy beverage using recent prices from a major Midwest supermarket showed that milk is $2.99/gallon (128 oz) whereas soy beverage costs $2.99 for 64 oz (the largest package size available). Importantly, this is only a simple comparison by volume and does not account for the greater costs that would be incurred if one aimed to match the additional EAA that would be needed from soy beverage or from the purchase of foods to achieve similar intakes of EAA. The bottom line is that soy beverage fails the test as a nutritional alternative to milk and is twice the cost of milk per serving and even more costly if one aims to match daily nutritional intakes.

Finally, even though dairy is recognized as its own food group, it is not referenced as a source of protein in the protein category, even though it is a significant contributor to protein and amino acid requirements. The recommended 3 servings of dairy/day will provide: 8 g/serving x 3 = 24 g of protein per day. Using a conservative recommended intake of 0.8 g protein per kilogram body mass, an average 70 kg adult (154 pounds) would achieve approximately 40% of their daily protein needs.

Summary

There is positive news for dairy in the most recent DGA. Dairy products are recognized as an important component of a healthy eating pattern. About 90% of the U.S. population does not meet recommended dairy consumption. Alternative plant-based and sugary soft drinks that compete with dairy are strongly discouraged by the DGA. Unfortunately, the DGA continues to limit saturated fats so only low-fat or fat-free dairy products are advised. Soy-based products are suggested as milk alternatives despite their nutritional inferiority and higher costs.

References

Astrup, A., F. Magkos, D.M. Bier, J.T. Brenna, M.C. de Oliveria Otto, J.O. Hill, J.C. King, A. Mente, J.M. Ordovas, J.S. Volek, S. Yusuf, and R.M. Krauss. 2020. Saturated fats and health: A reassessment and proposal for food-based recommendations. J. Amer. Col. Card. 76(7): 844-857.

Bauman, D.E. and A.L. Lock. 2012. Update: Milk fat and human health – separating fact from fiction. Proc. Cornell Nutr. Conf. Feed Manf. pp 66-76.

Bauman, D.E., D.G. Peterson, B.A. Corl, L.H. Bauman, and J.W. Perfield II. 2001. Update on conjugated linoleic acids (CLA). Cornell Nutr, Conf. Feed Manf.

CVB Feed Table. 2016. Chemical composition and nutritional values of feedstuffs. Federatie Nederlandse Dievoederketen.

Dinicolantonio, J.J., S.C. Lucan and J.H. O'Keefe. 2016. The evidence for saturated fat and for sugar related to coronary heart disease. Prog. Card. Diseases. 58(5):464-472

Elliot, J. 2014. Flaws, fallacies, and facts: reviewing the early history of the lipid and diet/heart hypothesis. Food Nutr. Sci. 5:1886-1903

FAO. 2013. Dietary protein quality evaluation in human nutrition. Report of an FAO Expert Consultation. Food and Nutrition Paper 92.

Ip, C., S. Banni, E. Angioni, G. Carta, J. McGinley, H. J. Thompson, D. Barbano, and D. Bauman. 1999. Conjugated linoleic acid-enriched butter fat alters mammary gland morphogenesis and reduces cancer risk in rats. Journal of Nutrition 129:2135-2142.

Keys, A. Aravanis, C, Blackburn, H.W., Van Buchem, F.S., Buzina, R., Djordjevic, B.D.,Dontas, A.S,, Fidanza, F., Karvonen, M.J., Kimura, N., and D. Lekos. 1966. Epidemiological studies related to coronary heart disease: characteristics of men aged 40-59 in seven countries. Acta Med. Scand. Suppl. 460:1-392

Keys, A. 1953. Atherosclerosis: a problem in newer public health. Atherosclerosis. 1:19

Lock, A.L. and D.E. Bauman. 2011. Milk fat and human health – separating fats from fiction. Proc. Cornell Nutr. Conf. Feed Manf. pp 126-135.

Rico, J.E. and D.E. Rico. 2018. Of cows and men: reviewing the link between milk fat and human health. Cornell Nutr. Conf. Feed Manf. pp 158-172.

Taubes, G. 2007. Good Calories, Bad Calories. Challenging the Conventional Wisdom on Diet, Weight Control, and Disease. Alfred Knoff, New York.

Taubes, G. 2011. Why We Get Fat and What to do About it. Alfred Knoff, New York.

Teicholz, N. 2014. The Big Fat Surprise. Why Butter, Meat, and Cheese Belong in a Healthy Diet. Simon and Schuster, New York, NY.

U.S. Department of Agriculture and U.S. Department of Health and Human Services. *Dietary Guidelines for Americans, 2020-2025.* 9th Edition. December 2020. Available at DietaryGuidelines.gov.

Vanderhout, S.M., M. Aglipay, N. Torabi, P. Junind, B.R. da Costa, C.S. Birkin, D.L. O'Connor, K.E. Thorpe, and J.L. Maguire. 2020. Whole milk compared with reduced-fat milk and childhood overweight: a systematic review and meta-analysis. J. Clin Nutr. 111:266-279.

Yerushalmy, S.L, and H.E. Hilleboe. 1957. Fat in diet and mortality from heart disease, a methodological note. NY State J. Med. 57:2343-2353