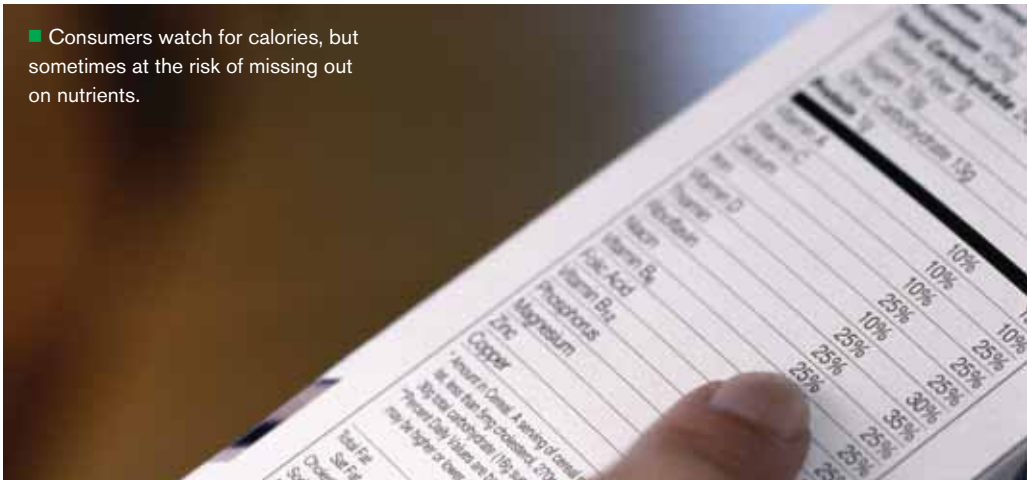
Nutrient Density and Dairy Foods

■ **Contributed by** *Susan Zaripheh and Gregory Miller*



■ Consumers watch for calories, but sometimes at the risk of missing out on nutrients.

In 2005, the USDA Dietary Guidelines Advisory Committee (DGAC) expressed concern that many Americans are consuming excess calories, but they are not meeting their nutrient requirements. The DGAC recommended that individuals "[c]onsume a variety of nutrient-dense foods and beverages within and among the basic food groups while choosing foods that limit the intake of saturated and trans fats, cholesterol, added sugars, salt, and alcohol." Additionally, the DGAC recognized that a standardized science-based definition of nutrient density is needed. As discussed below, before such a standardized definition can be created, the key elements of a nutrient profiling index need to be objectively determined and validated against key health measures. Once established, this profile could be implemented on food labels or by other means to assist individuals in successfully following the 2005 Dietary Guidelines for Americans (DGA). This index also may help guide nutrition policy (e.g., nutrition standards for foods offered in schools).

Nutrient density and energy density

In the absence of agreed-upon standards, several definitions of nutrient density have been offered. Unlike energy (or calorie) density, which refers to the number of calories per gram in a given food, nutrient density refers to the ratio of nutrients (grams) to calories (kcal). The DGAC defines nutrient-dense foods as those foods that provide substantial amounts of vitamins and minerals (micronutrients) and relatively few calories. Others suggest including macronutrients or bioactives in the definition of nutrient density. While the concept of looking at foods in terms of energy density was previously popular among nutritionists, they now recognize that accounting for caloric intake alone is insufficient to build healthy diets. Instead, nutritionists now recognize the importance of selecting the highest quality foods (e.g. nutrient dense foods) within each food group without exceeding an individual's daily caloric intake.

The concept of nutrient density is relevant to all individuals; particularly those who are attempting to lose weight because as caloric intake is reduced, it becomes more difficult to meet nutrient requirements. This makes the selection of high nutrient quality foods within an individual's calorie requirements even more critical. For example, when focusing on caloric intake only when making a beverage choice, you might select an 8oz diet soda (0 kcal) over a glass of low-fat milk (105 kcal), as it is lower in calories. On the other hand, if one were to also consider the nutrients delivered by a beverage, he or she would recognize that milk provides 9 essential nutrients. This nutrient density concept is even more critical because most Americans are overweight and undernourished. Typically, commodity foods are nutrient-dense food choices. Nutrient dense foods include bright colored fruits and vegetables, whole-grains, low-fat and fat-free milk, cheese and yogurt and lean meat, poultry, fish, eggs, beans and nuts. Further when making food choices, the Food Guide Pyramid food groups can be used as guidance to help select foods with a surfeit of healthful nutrients for minimal calories (see http://www.mypyramid.gov/downloads/miniposter.pdf).

Scientific support for the concept

Numerous public health and governmental organizations support the nutrient density approach. The DGA's, in addition to the Institute of Medicine's Food and Nutrition Boards Dietary Reference Intake: Applications in Dietary Planning Report suggests that

■ A nutrient density standard and a nutrient "rich" claim could help.

nutrient density be used to plan diets. Further, the American Dietetic Association, the American Diabetes Association, MyPyramid and the American Heart Association all support the nutrient density approach to selecting a healthy diet. The FDA recently held a hearing to discuss the use of front of pack labels that would help consumers identify the healthier, more nutrient dense foods, within and across food groups. Moreover, the European Union has recently determined that nutrient profiles will be the formal basis for regulating future nutrition and health claims. In the near future, only foods with favorable nutrient profiles will be allowed to assert nutrition and health claims in Europe. Given the heightened interest domestically and abroad, a nutrient profiling system that can be easily incorporated into existing food labels and that can be adjusted for use by government regulatory agencies would be greatly beneficial. Consuming foods of the highest nutrient quality from all food groups within daily energy requirements is critical to the normal growth and development of children, for the health promotion of all age groups, and to the reduced risk of chronic diseases, such as obesity and diabetes.

Scientifically valid definitions

According to Dr. Adam Drewnowski, the key elements of a nutrient profiling system include: selection of index nutrients; selection of reference amounts (e.g. 100 kcal, 2000 kcal, 100g or reference amount customarily consumed, RACC); and finally, validation of the nutrient index against an objective measure of a healthy diet (e.g. Healthy Eating Index, HEI) or health outcome. A science-based definition of nutrient density requires the development of a nutrient density index that will allow consistent scoring of all foods. Statistical and/or quantitative methods should be applied, as possible, to objectively develop this nutrient profiling index. Nutrient profiling systems can be based on beneficial nutrients (micronutrients and macronutrients), nutrients to limit (e.g. fat, sugar, sodium), or a combination of the two.

Selection of index nutrients should be based on nutrients identified by authoritative bodies to be of public health importance. For instance, vitamins A, C and E, calcium, magnesium, potassium and fiber have all been identified by the DG as shortfall nutrients in the North American adult population. Iron, folate, vitamins B12, D and E have also been identified as shortfall nutrients in subgroups of the U.S. population. Further, the National Cancer Institute and the Women, Infants and Children's Supplemental Food (WIC) program have identified other key nutrients of importance to cancer prevention and to low income women, infants and children, respectively. The 2005 DGA state that "[b]ecause each food group provides a wide array of nutrients in substantial amounts, it is important to include all food groups in the daily diet." Therefore, in order to align with the DGs it is important to assure that nutrients representing all food groups are included in the nutrient profiling system.

The list of beneficial nutrients included in different profiling systems is varied and is often hotly debated. In fact, at least 28 different nutrients have been included in one or more nutrient profiling systems. Although nutrients to limit vary among nutrient profiling systems, they generally include one or more of the following: sodium; total sugar; total fat; saturated fat; cholesterol; and added sugar. The FDA defines disqualifying nutrients for a healthy diet as total fat, saturated fat, cholesterol and sodium. Moreover, the DGAC and the USDA's Center for Nutrition Policy and Promotion indicated that solid fat, added sugar or alcohol should be limited. The selection of index nutrients is critical to the development of a science-based definition of nutrient density. In fact, the definition of nutrient density varies greatly depending on whether only beneficial nutrients or only nutrients to limit are included. A nutrient profiling system accounting for both the beneficial nutrients and the nutrients to limit would be a feasible approach to help consumers follow the DGA recommendations (e.g. complete nutrient package approach). There are many differing icons placed on food packages based on different profiling criteria. Because there are so many "on pack" icons there is concern that it may result in consumer confusion. This underscores the need for a standardized nutrient density approach to food labeling which may help consumer understanding and the ability to successfully implement a nutrient-rich diet.

In addition to the selection of index nutrients, another key element of a nutrient profiling system is to identify a reference basis that will be simple to use and applicable to the food label to help with consumer understanding. The reference amount for nutrient profiling systems can be based on weight (grams), calories (kcal) or serving size. The advantage of using weight or calories as a reference amount is that it is simple to use universally but might not be applicable to the food label. The FDA has provided definitions for reference amounts customarily consumed (RACC) for each food (e.g. serving size). The benefit of using serving size (e.g. RACC) as a reference basis is to link the index score to the food label which will help with the application

of the nutrient profiling system. Currently, RACC is not available internationally, and thus, until other countries also develop RACC or a similar government mandated serving size for their population this approach would only be useful domestically.

Finally, a scientifically sound nutrient profiling system should be quantitatively validated against a recognized measure of a healthy diet or a health outcome. A high correlation value between the profiling system and an independent measure of a healthy diet, such as the Healthy Eating Index should be demonstrated. A secondary or tertiary measure of acceptance of a nutrient profiling system by the nutrition community might be completed by asking health professionals their opinions on how foods are ranked using the developed nutrient density index. This approach would provide a subjective measure of acceptance by the nutrition community but would not serve as a method of validation of a nutrient density index.

Application and need for consumer research

Consumer understanding of nutrient density is critical to its successful application and implementation, however there are currently no peer-reviewed publications addressing consumer understanding of nutrient density. Further, the use of a consumer friendly tool or icon that can translate a scientifically validated nutrient density index into a nutrient dense diet is key to the success of this concept. Demonstrating a change in purchase behavior is an important first step but it is important to recognize that a change in purchase behavior does not necessarily translate to a change in dietary patterns. To date, the research performed has been done by the Nutrient Rich Food Coalition, (NRFC) and has been targeted toward health professionals. The NRFC, which is comprised of 12 commodity groups representing all major food groups, has developed a tool kit for health professionals to use when guiding consumers to select nutrient dense foods within the Dietary Guidelines and MyPyramid recommendations (see http://www.nutrientrichfoods.org/for_health_professionals/nutrient_rich_teaching_tools/index.html). Preliminary results from the NRFC indicate that the term nutrient-rich food resonates with consumers more than the term nutrient-dense foods. Health professionals also rely on materials from the MyPyramid website (see http://www.MyPyramid.gov), the MyPyramid e-Catalog (see http://sne.org/mypyramid/) and the USDA Food and Nutrition Service Website (see http://www.fns.usda.gov/fns.nutrition.htm) to help consumers make food choices within food groups.

Conclusion

A proliferation of symbols and icons on food labels and grocer shelves based on differing nutrient profiling criteria have been developed with the intent of helping consumers make healthier food/beverage choices. However this flood of symbols and icons may lead to consumer confusion. The increased interest in nutrient profiling has driven attention to the need for a standardized science-based definition of nutrient density. But first, key elements of a nutrient profiling index need to be objectively determined and validated. With ever-increasing obesity rates and undernourishment, it is critical to educate the public on nutrient density. ■

Zaripheh and Miller are nutritional professionals with the National Dairy Council/Dairy Management Inc.