



Health Connections

LINKING NUTRITION RESEARCH TO PRACTICE

NUTRIENT DENSITY:

A Tool to Communicate Healthier Choices

Introduction

“Choose your calories by the company they keep”—sage advice for decades—is relevant especially as the American diet becomes more energy rich at the risk of becoming nutrient poor. With obesity and its co-morbidities “down aging”—occurring earlier in life and burdening our health care system—health professionals are challenged to help consumers make every calorie count. This issue of *Health Connections* describes how health professionals can use nutrient density as a tool to help clients replace some of the foods in their diet with more nutritious alternatives.

Renewed Emphasis on a Key Concept

The concept of nutrient density is experiencing a renaissance. A central but loosely defined and underutilized foundation of nutrition science and education, nutrient density—the ratio of nutrients in foods to calories provided—is being revisited and revitalized as a tool to help consumers get the most nutrition from their calories. The concept of nutrient density has evolved over the past 30 years and has been described by others.^{1,2} Emphasis on nutrient density has recently taken on a sense of urgency as a way to help clients and consumers optimize calories and facilitate weight management in an era of increasing rates of obesity and lower energy expenditure. Some examples of this renewed emphasis include:

- The *Dietary Guidelines for Americans 2005*³ recommend nutrient-dense foods as alternatives to replace less healthful choices, and emphasize the benefits of eating more fruits and vegetables, low-fat dairy foods and whole grains.
- Food Intake Patterns for *MyPyramid's*⁴ Food Guidance System are based on foods in their most nutrient-dense form—those with little or no solid fats or added sugars.
- The 2004 Naturally Nutrient Rich Symposium “Putting More Power on Americans’ Plates”² brought

together university researchers, nutrition professional organizations and food trade organizations to explore the scientific evidence to support the principle of nutrient density in nutrition guidance.

- The Naturally Nutrient Rich Coalition, comprised of commodity groups representing the different food groups, supported the symposium and continues to work to increase the visibility of the concept of nutrient density in various public policy and education arenas.
- The Food and Drug Administration (FDA) has expressed interest in using a nutrient density approach as an alternative to the 10 percent nutrient contribution requirement for health claims.⁵ Currently the *Nutrition Facts* panel provides nutrient content information based on a specified serving size rather than caloric content, and nutrient content claims are based on the food’s contribution to the Daily Value (DV) for nutrients per serving. A nutrient density approach would place emphasis on the package of nutrients in a particular food in relation to its caloric content.

Defining “Nutritious” Foods in a Healthful Diet

Although still lacking a common definition, nutrient density generally is described as the ratio of the amount of a nutrient or nutrients in foods to energy provided by the food. If two foods contained the same number of calories, the more nutrient-dense food would provide a higher level of nutrients such as calcium, vitamins A or C. Nutrient density considers the presence of micronutrients,

continued on page 2



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SIDEBAR:
Naturally Nutrient Rich Score (NNR)
Average of %DV For 14 Key Nutrients

Nutrient	Value
Protein	65g
Vitamin A	5000 IU
Vitamin C	75 mg
Calcium	1300 mg
Iron	18 mg
Zinc	11 mg
Folate	400 µ
Thiamine	1.2 mg
Riboflavin	1.3 mg
Vitamin B12	2.4 µ
Vitamin D	10 µ
Vitamin E	15 mg
MUFA	20 g
Potassium	3500 mg

Source: Drewnowski 2005: Table 5. Key nutrients and recommended daily values based on the dietary reference intakes used to calculate the naturally nutrient rich scores. $NNR = \%DV \times 2000kcal / 14$.

not just the energy yielding macronutrients, and thus emphasizes the presence of beneficial nutrients important for optimal health.

Beyond established definitions of a nutritious or healthy food for labeling and regulatory purposes, what defines a “nutritious” food often is in the eye of the definer.¹ When centered around a health organization’s disease prevention objectives, nutritious foods often are considered those devoid or at least low in nutrients such as fat, saturated fat, cholesterol, sodium and sugar. While there has been little agreement as to the attributes or definition of nutrient-dense foods, there is more agreement on those considered “nutrient poor”—often described as “empty calorie foods” and/or energy-dense snack type foods, or oils, sweets and alcohol. However, messages that focus on foods to avoid do not provide consumers with the skills needed to make healthier food choices.

Although the definition and use of nutrient density is still under development, the concept holds considerable potential in helping clients make healthier food choices to optimize their nutritional health. Health professionals currently use the term “nutrient-dense.” Consumers, however, prefer the term “naturally nutrient-rich” which they interpret as foods having a high content of nutrients, and research has shown that they are willing to make changes in their food choices to “choose naturally nutrient-rich foods first.”⁶

Toward a Standard Nutrient Density Definition – Filling the Gap

An agreed upon definition of nutrient-dense foods is critical if consumers are to implement the

Dietary Guidelines for Americans to meet nutrient requirements within energy requirements and control calorie intake to manage body weight. To make nutritious substitutions both within and among the different food groups, clients need a way to identify more nutrient-rich foods and health professionals need a tool to communicate the concept of nutrient density to consumers.

Several scientifically based quantitative scoring or indexing systems for ranking individual foods on a nutrient density basis have been proposed, described and evaluated.^{1,2} These approaches include a nutrient-to-calorie ratio, calories-per-nutrient ratio, nutrients per 100 gram or per serving, and a ratio of recommended to restricted nutrients based on energy and nutrients listed on the *Nutrition Facts* food label.

The nutrient-to-calorie ratio expressed as the Naturally Nutrient Rich score (NNR score) by Drewnowski appears to have momentum at this time. The NNR score looks at the presence of health-promoting nutrients, does not subtract for nutrients such as fat, sugar or sodium, and is based on the mean percent daily value (%DV) for 14 key nutrients (see Sidebar). Some foods that consumers typically consider high in calories such as cheese, meat and nuts, have a high NNR score because they provide a significant amount of key nutrients per calorie. Because the NNR score assigns a score or value to an individual food, it can assist clients to see which foods provide the most nutrients for the calories provided and make more nutrient-rich selections within and among the food groups of *MyPyramid*.

PRACTICE POINTS FOR THE HEALTH PROFESSIONAL

- Stay current on the research and science defining and communicating nutrient density.
 - Articles by Drewnowski,¹ Zelman² and Darmon⁷ include tables and graphics that illustrate how foods within food groups can be compared and prioritized based on nutrient content to meet a client’s needs.
 - Research has been published on nutrient-to-price ratios⁷ to help address affordability of a nutrient-rich diet.
 - The American Dietetic Association is developing a practice paper that presents the scientific underpinnings of nutrient-dense foods and its use with consumers.
- Although specific tools have yet to be developed to use with clients, discuss the importance of choosing nutrient-rich foods as the basis for their diets. Less nutrient-rich foods can then be incorporated into the diet as calories and activity levels permit.
- Use the *Nutrition Facts* label to point out the presence or absence of key nutrients that form the basis of the NNR score.
- Using the naturally nutrient-rich concept with clients encourages them to actively choose foods that meet their health goals—rather than to avoid foods. Positive messages that include the joy and pleasure of eating are important for successful behavior change.
- Even for clients whose primary goal is weight loss or management, the concept of nutrient-rich foods can be beneficial. Although the focus of naturally nutrient-rich foods is on health rather than weight control, clients who focus on nutrient-rich foods first are more likely to stay within reasonable calorie recommendations.

Ms. Zelman, a participant and panel moderator during the 2004 Naturally Nutrient Rich Symposium, co-authored "Naturally Nutrient Rich...Putting More Power on Americans' Plates."² She is Director of Nutrition at WebMD.



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Q. How can health professionals use the science behind the concepts of nutrient density to help clients make healthier substitutions?

A. Consumers do not need to know the details, derivations or calculations involved in determining a food's individual nutrient density score — a concept that is still evolving. They do need to understand that it is based on a composite evaluation of the food's "nutritional goodness." Health professionals can encourage clients to focus first on foods that are natural and less processed, rich sources of vitamins and minerals, protein, healthy complex carbohydrates and healthy fats. This means including more colorful fruits and vegetables, low-fat dairy products, whole grains, lean protein sources, eggs, beans, and nuts.

Q. How can the concepts of energy density and nutrient density work together to support improved food choices?

A. Both concepts enable health professionals to individualize nutrition guidance based on client needs and goals. Monitoring the energy density of foods is important for weight management, yet understanding and implementing the concept of nutrient density is important for everyone to help lower the risk of chronic disease. Although nutrient density was not developed as a tool to manage body weight, it can help toward that end. Clients often focus first on calories because of weight management concerns—and because they see calories listed on food labels. We can use this interest as a bridge to introduce the need to look beyond calories and to choose foods loaded with nutritional value yet lower in calories.

Q. What are some additional considerations about defining and using a nutrient density score while the concept is still evolving?

A. The concept of nutrient density is based on a food's overall composition. Food selection, however, involves other factors including taste, cultural food preferences, availability and certainly economics.

"Traditional" nutrients for which there is an established DV or RDI are the key nutrients

used to determine nutrient density scores. However, foods contain other phytonutrients and bioactive compounds important for total health. Some of the issues and questions that need to be considered include:

- How do we account for the many other nutrients or compounds, and their bioavailability, which might be important to meet an individual's specific health needs or goals?
- How should fortified foods be scored?
- Should certain nutrients be assigned a higher (or lower) importance in developing a scoring system?

We need research on the types of tools and formats that resonate with consumers and that work for health professionals. For example, while health professionals might understand the scientific concept of nutrient density, consumers relate to other terms such as nutrient-rich. Should we move forward with a nutrient density score in the marketplace that directs consumers' purchase decisions? While we continue to explore these issues, health professionals can nevertheless teach clients the concept of choosing nutrient-rich foods first.

Q. As health professionals, we've worked hard to communicate the health-promoting benefits of dietary patterns over time. Will nutrition profiling of individual foods through the assignment of a score contribute to consumers' classifying foods as "good" or "bad"?

A. The intent of communicating nutrient and energy density—even implementing a scoring system—is to provide clients with education and additional options that enable them to identify and choose foods that help them meet their individual nutritional goals. Rather than focus only on individual nutrients or calories, nutrient density looks at the total nutrient package of the food. Nutrient density encourages consumers to choose foods that are naturally rich in nutrients over foods that offer mostly calories with fewer nutrients. With obesity a growing public health concern, we need to help consumers make the best choices which are the ones that have the most nutrients with the least number of calories.

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