



Nutrition for Family Living

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February, 2005 Topics

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Energy/calorie density

In December 2004 we sent an email to Family Living faculty/staff with information about experts' predicted trends for 2005. Calorie density (energy density) was mentioned as a hot buzzword for 2005.

One of the main headings in the 2005 Dietary Guidelines consumer brochure recommends, "Get the most nutrition out of your calories." The 2004 Dietary Guidelines Advisory committee report states: "Available data are insufficient to determine the contribution of energy dense foods to unhealthy weight gain and obesity. However, consuming energy-dense meals may contribute to excessive caloric intake. Conversely, *eating foods of low energy density may be a helpful strategy to reduce energy intake when trying to maintain or lose weight.*" (emphasis added).

The terms "calorie" and "energy" are often used interchangeably because calories are a measure of energy. In general, foods that are low in calorie/energy density are higher in fiber and water and lower in fat and sugar. (This can be confusing because dieters are also advised to maximize their use of foods that are high in nutrient density. "Nutrient dense" and "nutritionally rich" have roughly the opposite meaning of "calorie dense.")

Following are examples of foods that are low in calorie/energy density:

GRAINS. Whole-grain breads and cereal products are preferred because they tend to be higher in fiber than other grain foods. Breads and cereals made with the least amount of fat and sugar are lower in calorie/energy density than high-fat or high-sugar foods like cookies, cakes and pastries.

FRUITS. Plain fruit is low in caloric density. Dried fruits and fruit juices are not as helpful in making you feel full as whole fruit.

VEGETABLES. All vegetables are low in caloric density. Fresh/raw vegetables that are crispy/crunchy like celery and carrots or leafy like spinach are excellent examples.

LOW-FAT MILK, YOGURT AND CHEESE. You can drink almost two glasses of skim milk for the same calories as one glass of whole milk.

MEAT, POULTRY AND FISH. Choose lower fat forms. Remove the skin before eating chicken. Baking, broiling and roasting are preferred over frying. Drain and discard excess fat whenever possible.

SOUP. Soups with a watery base (e.g., vegetable, chicken noodle) are usually lower in fat and calories than creamy soups.

BEVERAGES. Drinking water or diet soda instead of a sugar-sweetened soft drink is an easy way to cut calories.



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Implications for Extension Educators: Advertisements and popular books often imply that certain foods are desirable because they are high in “energy” while others are bad because they are high in calories. Scientists and informed consumers understand that any food that is high in energy is high in calories. Advice to eat more foods that are low in caloric density (or low in energy density) will be easier to follow if these concepts are clarified in our educational programs and materials.

More information on avoiding excess calorie intake is available in the energy chapter of the 2005 Dietary Guidelines Advisory Committee report

http://www.health.gov/dietaryguidelines/dga2005/report/PDF/D2_Energy.pdf and the “Adequate nutrition with calorie needs” section of the full Dietary Guidelines for Americans 2005 publication (pages 5-10 in chapter 2):

<http://www.health.gov/dietaryguidelines/dga2005/document/pdf/DGA2005.pdf>.



Could Late Nights Lead to Obesity?

A research summary by Leah Whigham and Sherry Tanumihardjo



The problem: We have all heard the recent statistics about obesity. This chronic disease has reached epidemic proportions. According to the 1999-2000 National Health and Nutrition Examination Survey data, nearly two-thirds of U.S. adults are either overweight [defined as a body mass index (BMI) > 25 kilograms/meter²] or obese (BMI > 30 kilograms/meter²). Approximately 300,000 adult deaths in the United States annually are attributable to unhealthy eating and physical inactivity. Obese individuals have a 50-100% increased risk of death from all causes, compared with normal-weight individuals. This epidemic is affecting our children as well. Approximately 15.3% of children (ages 6–11) and 15.5% of adolescents (ages 12–19) were overweight in 2000. An additional 15% of children and 14% of adolescents were at risk for overweight (BMI for age between the 85th and 95th percentile).

A problem with multiple causes: In addition to unhealthy dietary habits and physical inactivity, there is growing evidence that sleep deprivation may contribute to this obesity epidemic. Recent survey data of about 1000 people indicates that total sleep times tended to decrease as body weight increased, in a near linear pattern. While the authors acknowledge this does not prove a cause and effect relationship, it does contribute to a wider body of evidence supporting a link between sleep deprivation and obesity. For example, in a study of over 450 men and women, sleeping less than 6 hours per night and remaining awake beyond midnight increased the likelihood of obesity. These trends are also prevalent in our children. In more than 8000 children surveyed, an inverse relationship was found between hours of sleep and risk of childhood obesity. Just as the prevalence of obesity is increasing, data indicate that sleep each night is decreasing. According to the National Sleep Foundation's poll conducted in 2000, the average American gets 6.9 hours of sleep on weeknights and 7.5 hours per night on weekends. This compares to an average of 10 hours a night in the early 1900s.

Where is the science? Is there any scientific evidence beyond a relationship to support the association of lack of sleep with obesity prevalence? A number of studies report on the metabolic and hormonal consequences of sleep deprivation. Hormones are substances produced in the body that regulate or stimulate specific effects like metabolism. In a study of young healthy men limited to 4 hours of sleep for 6 consecutive nights, scientists measured reduced glucose tolerance, reduced glucose effectiveness, depressed insulin response to glucose, and elevated levels of cortisol (the hormone associated with stress). The authors compared this to changes that occur in aging or in pregnancy-induced diabetes. Others have shown that 24 hours of sleep deprivation decreased insulin sensitivity, and that sleep deprivation in subjects with high blood pressure was associated with rises in blood pressure and heart rate. Furthermore, sleep restriction reduced the hormone leptin and increased the hormone ghrelin while increasing appetite and hunger, especially for calorie-dense foods. These results support the association that sleep deprivation may contribute to obesity.

The bottom line: While the appropriate intervention studies to increase sleep in subjects attempting to lose weight have not been done, the evidence is building that we need to pay attention to nightly hours of sleep in our battle against the bulge. Engaging in regular physical activity will also improve the quality of sleep and help maintain body weight. The new Dietary



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Guidelines for Americans 2005 state that as much as 60-90 minutes of moderate-intensity physical activity is needed each day to sustain weight loss.

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Highlights of the 2005 *Dietary Guidelines for Americans*

The 2005 revision of the *Dietary Guidelines for Americans* (DGAs) was released on January 12, 2005. The guidelines are revised every 5 years to reflect the most current nutrition science. While the guidelines are the science-based recommendations for how Americans should eat in order to promote health and prevent chronic disease, we are awaiting the new Food Guidance System (currently the Food Guide Pyramid) that will provide the graphic representation of the dietary pattern recommended in the DGA text. The new Food Guidance System graphic is expected to be released in "early spring" of 2005.

The 2005 DGA document is arranged into 10 chapters (or "interrelated focus areas"). Chapter 1 of the document provides a background on the DGAs. Chapters 2-10 (pages 5 to 49) contain the guidelines, which are supported by 19 pages of appendices. The document also includes an executive summary, which gives a quick overview of the guidelines in the form of "key recommendations."

The 2005 DGAs' "key recommendations" are organized into chapters. For example, Chapter 8 is titled "Sodium and Potassium." The key recommendations (guidelines) in that chapter are:

- Consume less than 2,300 mg of sodium per day
- Choose and prepare foods with little salt. At the same time, consume potassium-rich foods, such as fruits and vegetables.

The 2005 DGAs include more tailored recommendations for special populations than previous versions of the guidelines. For example, the "Sodium and Potassium" chapter states:

- *Individuals with hypertension, blacks, and middle-aged and older adults.* Aim to consume no more than 1,500 mg of sodium per day, and meet the potassium recommendation (4,700 mg/day) with food.

The 2005 DGAs include more information about nutrients in foods, with tables of foods that are sources of key nutrients that Americans need (most of these are appendices but some are incorporated into the chapters). The new DGAs are more interrelated with each other and there is more cross-referencing among chapters than in the previous DGAs. The text of the new guidelines' document also includes the Dietary Reference Intakes (DRIs) for a number of nutrients and links to websites with supporting materials. For example, chapter 2 ("Adequate Nutrients within Calorie Needs") includes a link to the Dietary Reference Intake reports from the Institute of Medicine, and chapter 3 ("Weight Management") includes a link to portion size information from the National Institutes of Health.

This time around, the DGA document itself is more technical and aimed specifically at policymakers, nutrition educators, nutritionists, and healthcare providers rather than the general public. Messages for the general public are found in a brief and easy-to-read consumer brochure.

Recommended Servings

See Table 1 on page 10 of the DGA document for the recommended numbers of servings and serving sizes for each food group for the "USDA Food Guide." While the similar DASH eating plan is also provided in this table, Extension programming will use the USDA Food Guide eating pattern as the basis for nutrition education. Note the recommendations in this table are based on a 2,000 calorie diet for a quick reference, but the DGAs include recommendations for 12 calorie



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levels (outlined in Appendix A-2 and Notes for Appendix A-2, pp. 53-54). The calorie levels vary by age, gender, and activity level.

Note: The consumer brochure refers people to the "Healthier US" site <http://www.healthierus.gov/dietaryguidelines> to calculate their own calorie needs by following the first link under "Tools" (scroll down). A table of calorie levels also appears on page 12 of the DGA document.

According to Table 1, (also the 5th page of the consumer brochure), the daily recommendations for a 2,000 calorie diet are:

- 2 cups (4 servings) of fruit
 - 2-1/2 cups (5 servings) of vegetables
 - 6 servings of grains, with half of them as whole grains
 - 5.5 ounces of meat and beans
 - 3 cups from the milk group (2 cups for 4-8 year-olds) - emphasis on fat-free or low-fat
 - 24 grams of oils (note that liquid oils have virtually become a food group – these are liquid oils present in food as well as liquid oils use in cooking or otherwise added before eating)
 - An "allowance" for 18 grams of solid (saturated and trans) fats and 8 tsp of added sugars (this clarifies and gets specific on what "use sparingly" was supposed to convey in the old DGA and Pyramid. The language for this is in footnote "d" at the bottom of the table).
- 4-1/2 cups - or 9 servings - of fruits and vegetables per day (9-A-day)

Serving Sizes

According to Table 1, recommended intakes are stated in terms of familiar measures such as cups and ounces. In addition, some serving sizes have changed. We anticipate more detail about serving sizes in the new Food Guidance System.

- Fruit and vegetable recommendations are now given in total cups, which will make it easier to count servings for fruits and vegetables that are easily measured that way (juice, berries, lettuce, peas) but still tricky for things like carrots, potatoes, and whole pieces of fruit. Thus there are "1/2 cup equivalents," which are servings. So 2 cups of fruit is 4 servings (4 half-cup equivalents) and 2.5 cups of vegetables is 5 servings. **Note:** a serving size of juice is now 1/2 cup, not 3/4 cup as before. The 2005 DGAs emphasize the importance of eating whole fruit rather than drinking juice in order to get the fiber benefit. More specific guidance is given in terms of subgroups of vegetables (dark green orange, legumes, starchy, other).
- Grain recommendations are now given in ounce-equivalents, with each ounce-equivalent counting as one serving. **Note:** 1 cup of dry cereal is now one serving (one ounce-equivalent) from the Grain group – it was 1 ounce before. The DGAs are clear that at least half of all grains should be whole grains. A table on page 27 illustrates why.
- The meat and beans group servings are now given in ounce-equivalents. Note an ounce-equivalent for cooked dry beans is now 1/4 cup (it was 1/2 cup); for peanut butter is now 1 Tbsp (it was 2 Tbsp); for nuts or seeds is now 1/2 ounce (it was 1/3 cup).
- Serving sizes in the milk group are still based on 1 cup of liquid milk, as in previous editions of the DGAs and Pyramid.
- We now have recommended intakes and maximums for fats and sugars.

The 2005 DGAs emphasize the need to balance calorie intakes with calories expended.

Chapter 2 ("Adequate Nutrients within Calorie Needs") stresses the importance of a nutrient-dense diet. That is, Americans are urged to make food choices that provide substantial amounts of vitamins and minerals and relatively fewer calories. This allows Americans to meet their nutrient



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needs without consuming unneeded calories in the form of added sugars, saturated and *trans* fats, and alcohol (these are sources of calories with few nutrients).

The term "discretionary calories" is used to describe the calories that are allowed when a person chooses nutrient-dense (lowest in fat and added sugar) foods from each food group throughout the day. According to the DGAs, most Americans are exceeding their total calorie needs without meeting their nutrient needs. One way to increase discretionary calories is to increase physical activity. Another way is to make more food choices that are nutrient dense.

A person who needs 2,000 calories could meet his or her nutrient needs in 1733 calories by choosing low-fat, low added-sugar foods throughout the day (i.e., fat-free milk, fruit with no added sugar, grains without added fat or sugar, lean meats or beans, vegetables without added fat). This would leave 267 discretionary calories for foods of lower nutrient density. The DGAs give examples of discretionary calories in terms of solid fats and added sugars. 18 grams of solid fats (saturated and trans) and 8 teaspoons of sugar would provide 267 discretionary calories in this case. Footnote #1 on page 55 explains what counts toward these discretionary calories – for example, the fat in milk products and the sugar in soda would come out of this discretionary calorie "allowance." (Note: a can of regular soda has about 10 tsp of sugar which is more than this person has available to "spend" in this example.)

Of note is a paragraph about fluid needs on page 9, which states, "The combination of thirst and normal drinking behavior, especially the consumption of fluids with meals, is usually sufficient to maintain normal hydration. Healthy individuals...consume adequate water to meet their needs. Purposeful drinking is warranted for individuals who are exposed to heat stress or perform sustained vigorous activity."

Chapters 3 and 4 continue to emphasize balancing calories in with calories out. The physical activity recommendation is 30-90 minutes of moderate to vigorous intensity, depending on whether you're an adult or child and whether you need to lose weight or maintain a weight loss. See page 20 for details in the "Key Recommendations" box.

Fat, Alcohol, and Food Safety

The total daily fat recommendation is no longer "no more than 30% of calories" - it's 20-35% of calories. Recommendations for saturated fat, cholesterol, and *trans* fats remain the same as in 2000, but there is a special note for those who already have heart disease on pages 31 and 34 (table 12). The new DGAs strongly emphasize that most fats should come from polyunsaturated and monounsaturated fatty acids, such as fish, nuts, and vegetable oils. See the box on page 30 for details.

Alcohol recommendations have not changed very much from previous editions of the DGAs. Benefits of alcohol consumption are stated for "middle-aged and older adults."

The Food Safety chapter has a recommendation to not wash raw meat and poultry because it increases cross-contamination risk and is not necessary.

There is some useful information about reading labels in the shorter consumer piece (4 and 5 pages in from the back). Some of FDA's new information about reading labels made its way into this brochure. There is more detail at the FDA's site <http://www.cfsan.fda.gov/~dms/foodlab.html>.

Nutrition Specialists are preparing for an overview on February 2nd and a Wisline Web series on April 14th, May 5th, and May 19th. The new Dietary Guidelines will be discussed in more



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detail, along with the new Food Guidance System if its release is not delayed. Contact Amy or Susan if you have specific questions or suggestions for that series.

Both the full DGA document and the consumer brochure are available at <http://www.healthierus.gov/dietaryguidelines/>. We have requested information on ordering bulk quantities of these publications for statewide distribution.

Implications for Extension Educators. When DGAs are revised and released, Extension educators need to update their materials and presentations. The anticipated release of a new Food Guidance System to help convey DGA messages will probably require more adjusting than usual. Some recommendations will be relatively easy to incorporate into current teaching. For example, the recommendation that half of the grains a person eats should be whole grains, or the recommendation for 1 to 2-1/2 cups of fruit and 1 to 4 cups of vegetables each day. Other recommendations will be much more complicated. For example, discretionary calories, the distinctions between liquid oils and solid fats, and the different treatment of added sugars vs. sugars in whole foods will need careful explanation. Specialists and team leaders will develop resources to help sort out the practical application of these more difficult concepts. The new Food Guidance System will be a helpful tool for teaching some or all of these principles. Over time, we will be revising our Extension publications and resources to incorporate this new content. In the meantime, we welcome your suggestions and ask you to remember that our fundamental messages continue to advise people to be active and to eat a varied, balanced diet emphasizing fruits, vegetables, whole grains, low-fat milk products, and lean meats.