January 21, 2009

Carole Davis  
Co-Executive Secretary of the  
Dietary Guidelines Advisory Committee  
Center for Nutrition Policy and Promotion  
U.S. Department of Agriculture  
3101 Park Center Drive, Room 1034  
Alexandria, VA 22302  

Dear Ms. Davis:

The International Tree Nut Council Nutrition Research & Education Foundation (INC NREF), a non-profit organization located in Davis, California, represents nine tree nut industries (almonds, Brazils, cashews, hazelnuts, macadamias, pecans, pine nuts, pistachios and walnuts) and supports nutrition research and education. INC NREF appreciates the opportunity to provide written comments and data pertinent to review of the Dietary Guidelines for Americans.

In 2003, FDA announced one of the first qualified health claims—a claim for nuts and heart disease. This claim, the result of a petition filed by INC NREF, states, "Scientific evidence suggests but does not prove that eating 1.5 ounces per day of most nuts, as part of a diet low in saturated fat and cholesterol, may reduce the risk of heart disease." Since then there has been a dramatic increase in the number of studies showing not only the positive role of nuts in reducing the risk of cardiovascular disease (CVD), but the potential benefits of nut consumption on diabetes and a healthy body weight. In 2006 the British Journal of Nutrition devoted an entire supplement to the health benefits of nuts (Attachment A). In 2008 the proceedings of the 2nd International Nuts and Health Symposium were published in the September issue of the Journal of Nutrition (Attachment B), and in 2009, Tree Nuts: Composition, Phytochemicals and Health Effects (Attachment C) was published by CRC Press. All three of these publications and more than 100 papers published over the last five years have further substantiated the wide range of health benefits of nuts (Attachments D and E).

The six main points that will be discussed in this letter are:

- Current U.S. nut consumption;
- The role of nuts in reducing the risk of cardiovascular disease;
- Emerging research on the positive effect of nuts on diabetes and a healthy body weight;
- Nuts in healthy diet patterns;
- Current statistics on the prevalence and incidence of tree nut allergy;

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And, the important role of nuts in the American diet.

**U.S. Nut Consumption**
While the USDA ERS food availability data shows that tree nut consumption has increased 45% overall since the mid 1990's, consumption still falls short of current recommendations. The 2003 FDA qualified health claim for nuts and heart disease recommends 1.5 ounces of nuts per day, but few people actually consume this amount on a daily basis. In the 2001-2004 What We Eat in America/NHANES survey, 34% of those surveyed consumed nuts but most only ate about ¾ of an ounce—roughly half of the recommended amount.

**Nuts and Cardiovascular Disease**
Since the release of the 2005 U.S. Dietary Guidelines, a number of new randomized clinical trials have provided further evidence that nuts can help reduce the risk of heart disease by significantly lowering total cholesterol and LDL cholesterol, and in some cases significantly increasing HDL. There have been 31 studies conducted over the last decade or so that have looked at the effect of a single nut on CVD. Twenty-five of those studies showed that nuts significantly lowered total cholesterol; 25 studies showed a significant reduction in LDL cholesterol; and in 13 studies, nuts significantly increased HDL cholesterol (Attachment F, Table 1: Single-Nut Studies).

All epidemiologic studies conducted in the U.S. have shown a positive relationship of nut consumption to coronary heart disease (CHD) incidence. In a pooled analysis of 4 U.S. epidemiologic studies, individuals who ate the most nuts (about 1 oz., ≥5 x/wk) had about a 35% reduced risk of coronary heart disease.

The protective effect of nuts on CVD does not seem to be due only to their fat, vitamin and mineral content; their fiber matrix and wide range of phytonutrients may also play a role. Nuts are a source of phytochemicals such as phytosterols, phenolic compounds and flavonoids. Phytochemicals have been associated with a variety of bioactivities including antioxidant, hypocholesterolemic and anti-inflammatory actions that may affect the initiation and progression of several pathogenic processes that can lead to chronic disease, including CVD.

**Nuts and Diabetes**
When it comes to diabetes, emerging research suggests nut consumption may have a significant impact. The Nurse’s Health Study indicated that frequent nut consumption (≥5 x/wk) was associated with a 27% reduction in relative risk of developing diabetes, compared to those who rarely or never ate nuts. Acute feeding studies have demonstrated the ability of nuts, when eaten with carbohydrate (bread, rice and pasta), to depress postprandial glycemia. A new study with 119 subjects with type 2 diabetes has looked at the impact of nut consumption on HbA1c levels. The results have been submitted for presentation at meetings throughout 2009 and a manuscript is being prepared for publication.

While more research is needed on the effect of nut consumption on blood glucose levels (i.e., HbA1c), the possible beneficial impact of nuts on coronary heart disease (CHD) in diabetics is better understood. This alone may be enough justification to include nuts in the diets of diabetics, to potentially decrease their risk of CHD.

**Nuts and a Healthy Body Weight**
When it comes to nuts and weight, six epidemiological and six clinical studies show that nut consumption is not associated with higher body weight. In fact, the epidemiological data have been
consistent in indicating that nut consumers have lower BMIs than non-nut consumers. And, a recent NHANES analysis (see attached report: “Nutritional Contribution and Health Impact of Tree Nut/Tree Nut Butters to the U.S. Population: An Analysis of National Health and Nutrition Examination Survey (NHANES)” further substantiated that nut consumers had lower BMIs than non-nut consumers. Moreover, clinical trials have revealed little or no weight change in those consuming nuts over one-to-six months. Possible reasons? (1) Satiety value of nuts from unsaturated fats, fiber and protein and the spontaneous reduction in food intake; (2) incomplete fat absorption: loss of fat in the feces; and (3) a potential increase in resting expenditure with chronic nut consumption may contribute to the less than predicted weight gain.

Nuts in Healthy Diet Patterns
In recent years there has been much attention on the Mediterranean diet and the health benefits that various types of plant-based meal patterns provide (i.e., fruits, vegetables, nuts, whole grains). Epidemiological studies have shown a positive association between the Mediterranean diet and reduced mortality and morbidity for CVD and a longer life span. The beneficial effects of the Mediterranean diet in the prognosis of CHD have been demonstrated in a large randomized, secondary prevention trial—the Lyon Heart Study. This trial, which compared a Mediterranean-type diet to a prudent Western-type diet, showed a dramatic decrease in the overall mortality and cardiac mortality (70% and 81% respectively) in the intervention group.

The Spanish have conducted a significant amount of research examining the effects of tree nuts on health promotion and disease prevention and have the distinction of conducting the first primary prevention, large scale, long-term clinical trial that incorporates tree nuts. In the PREDIMED study, in late 2003, 9,000 high risk people 55-80 years of age with no history of heart disease were randomized into a control group or intervention group with 1 L of olive oil weekly or 30 g nuts daily (walnuts, hazelnuts and almonds). Participants were assigned to a low-fat diet or to one of two Mediterranean diets. After 3 months, compared to the low-fat diet, the two Mediterranean diets produced beneficial changes in most outcomes including blood glucose, systolic blood pressure and total cholesterol: high density lipoprotein (HDL) ratio.

Epidemiological studies have also suggested that the Mediterranean diet may help reduce the risk of developing metabolic syndrome. In a recent study using subjects from the PREDIMED study, researchers concluded that a traditional Mediterranean diet enriched with nuts could be a useful tool in managing metabolic syndrome.

Like the Mediterranean-style diets, several U.S. studies featuring increased consumption of plant foods, including the Portfolio, OMNIHeart and Prudent diets, have shown that combining a range of cholesterol-lowering plant foods may benefit cardiovascular disease risk both by reducing serum lipids and blood pressure, and may help lower the risk for type 2 diabetes. All of these meal patterns, like the DASH diet, found significant beneficial effects from a plant-based diet that included nuts in particular.

The Prevalence and Incidence of Tree Nut Allergy
Despite all of the potential health benefits from nuts, some people do have nut allergies. Tree nuts are included in the list of more common foods known to provoke an allergic response in predisposed individuals, but the prevalence of tree nut allergy is very low in the US and in other countries. The estimated prevalence of allergy to the most common allergenic foods in the US is listed in Table 2. Since the passage of the Food Allergen Labeling and Consumer Protection Act (FALCPA) in 2004, the Food and Drug Administration’s Threshold Working Group explored in depth the state of the science behind food allergy as a prerequisite for
developing labeling regulations for foods containing allergenic ingredients, and strategies for developing biological thresholds for allergenic proteins.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>All Allergens</th>
<th>Milk</th>
<th>Egg</th>
<th>Peanuts</th>
<th>Tree Nuts</th>
<th>Fish</th>
<th>Shellfish&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Wheat</th>
<th>Soy</th>
</tr>
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<tbody>
<tr>
<td>Children</td>
<td>6.0</td>
<td>2.5</td>
<td>1.3</td>
<td>0.8</td>
<td>0.2</td>
<td>0.1</td>
<td>0.0</td>
<td>Unk&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.2</td>
</tr>
<tr>
<td>Adults</td>
<td>3.7</td>
<td>0.3</td>
<td>0.2</td>
<td>0.6</td>
<td>0.5</td>
<td>0.4</td>
<td>2.0</td>
<td>Unk</td>
<td>Unk</td>
</tr>
</tbody>
</table>

<sup>a</sup>Shellfish includes both crustaceans and mollusks; <sup>b</sup>Unk = unknown

Table Sources: Cordle 2004<sup>xviii</sup>; Sampson 1997<sup>xxi</sup>, 2004<sup>xx</sup>, 2005<sup>xxii</sup>; Sicherer et al 2003<sup>xxii</sup>; Sicherer et al 2004<sup>xxiii</sup>

As shown in Table 2, the prevalence of tree nut allergy in the US is small, estimated at 0.2% of children and 0.5% of adults. The telephone survey used to estimate the prevalence of nut allergy (both peanut and tree nut) analyzed responses of almost 13,500 people (N = 13,493), in which only 166 had an allergy to some type of nut (either peanut or tree nut).<sup>xxiv</sup> No peer-reviewed report that estimates allergy prevalence to individual tree nuts in the US has been identified to date.

A closer look at the two studies that estimated the US prevalence of allergy of nuts of any type (both peanuts and tree nuts) by means of nationwide telephone surveys<sup>xxv, xxvi</sup> are of interest. The first survey included 12,032 individuals from a total sampling of 4,374 households. The investigators concluded that peanut and/or tree nut allergy affects about 1.1% of the US population, or, about 3 million people.

The follow-up telephone survey was reported in 2003, in which 13,493 individuals participated from 4,855 households. The overall rate of allergy to tree nuts, peanuts, or both were not different between the two studies, however the rate of nut allergy prevalence in children had doubled from the survey conducted in 1999, primarily from an increase in self-reported allergy to peanut *0.4% in 1997, and 0.8% in 2002, (P = 0.05). No such finding occurred for tree nuts.

Knowledge of the health benefits of tree nuts in human diets has increased in recent years, and the data are sufficiently consistent and positive to encourage tree nut consumption in the US population.

Though tree nut allergy exists in sensitive individuals, prevalence estimates in the US fall well below 1% of the US population, and international estimates suggest that tree nut allergy prevalence is low in other countries as well.

The Important Role of Nuts in the American Diet

The real challenge is to encourage Americans to consume more nuts. According to the 2001-2004 What We Eat in America/NHANES survey, approximately 60% of the nuts consumed are as snacks. Data show that many people obtain ~25% of their calories from snacks. And for those who consumed nuts as snacks, nuts provided 25-35% of their: total fat, poly-and mono-unsaturated fats, linoleic acid, magnesium, copper and vitamin E.<sup>xxvii</sup> Moreover, in a recent NHANES analysis, tree nut consumption was associated with increased (p<0.01) consumption of fruit, whole grains, meat equivalents, and oils, and with a decrease (p<0.01) in solid fats and added sugars<sup>xxviii</sup>. (Attachment G)

“Replacing snacks high in refined carbohydrates with nuts could have a positive impact on nutrient density and risk of chronic disease.”<sup>xxix</sup> For example, just ¼ to ½ cup of nuts per day would provide protein, unsaturated fatty acids, fiber, vitamin E, folate, magnesium and potassium—many of which
are shortfalls in the American diet. Knowledge of the health benefits of tree nuts in human diets has increased significantly in recent years, and the data are sufficiently consistent and positive to encourage nut consumption in the U.S. population.

Thank you for considering these comments. If I can provide you with any additional information please feel free to contact me at 530-297-5895 or via email at: mternus@pacbell.net.

Sincerely,

Maureen Ternus, M.S., R.D.
Executive Director
INC Nutrition Research & Education Foundation
Encl.

cc: Doug Youngdahl
Chair, INC Nutrition Research & Education Foundation

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viii Fulgoni, V., January 2009. Nutritional contribution and health impact of tree nut/tree nut butters to the U.S. population: An analysis of national health and nutrition examination survey (NHANES). (An unpublished report for INC NREF; manuscript being prepared for publication.)


LIST OF ATTACHMENTS

Attachment A  British Journal of Nutrition, Nuts: Nutrition and Health Outcomes
Attachment C  Tree Nuts: Composition, Phytochemicals and Health Effects
Attachment D  Tree Nut Research Reference List
Attachment E  Tree Nut Fact Sheet
Attachment F  Table 1: Single-nut Studies
Attachment G  Nutritional Contribution and Health Impact of Tree Nut/Tree Nut Butters to the U.S. Population: An Analysis of the National Health and Nutrition Examination Survey (NHANES)