

RACIAL BIAS IN FEDERAL NUTRITION POLICY, PART II: WEAK GUIDELINES TAKE A DISPROPORTIONATE TOLL

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Many diet-related chronic diseases take a disproportionate toll among members of racial minorities. Research shows the prevalence of diabetes, hypertension, cancer, and heart disease is higher among various ethnic groups compared with whites. The *Guidelines* and the Food Guide Pyramid, however, promote the use of multiple servings of meats and dairy products each day and do not encourage replacing these foods with vegetables, legumes, fruits, and grains. The *Dietary Guidelines for Americans* encourage a 30% caloric reduction in fat intake and make no provision for further reductions for those who wish to minimize health risks. Abundant evidence has shown that regular exercise combined with diets lower in fat and richer in plant products than is encouraged by the *Dietary Guidelines for Americans* are associated with reduced risk of these chronic conditions. While ineffective *Dietary Guidelines* potentially put all Americans at unnecessary risk, this is particularly true for those groups hardest hit by chronic disease. (*J Natl Med Assoc.* 1999;91:201-208.)

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Hypertension, cancer, overweight, diabetes, and other serious illnesses take an enormous personal toll and account for hundreds of billions of dollars of America's annual health-care costs.¹ Because dietary factors play an important role in these diseases, the *Dietary Guidelines for Americans* make recommendations for reducing the risk of disease. This article examines evidence that current *Guidelines* are too weak. While all demographic groups are ill-served by suboptimal *Dietary Guidelines*, this is particularly true for groups hardest hit by chronic diseases.

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HYPERTENSION AND STROKE

Hypertension is common in the US population, but affects African Americans disproportionately. Hypertension was reported in 24% (43,186,000) of the US adult population in the National Health and Nutrition Examination Surveys (NHANES) III. Of this group, 53% were taking antihypertensive medications. The age-adjusted prevalence rates in non-Hispanic blacks, Mexican Americans, and non-Hispanic whites were 34%, 23.2%, and 25.4%, respectively, for men, and 31%, 21.6%, and 21%, respectively, for women.²

Related to hypertension, stroke also occurs disproportionately in African Americans. The age-adjusted prevalence of stroke among men (1986-1990) was 1.54% for African Americans and 1.14% for whites. For women, the corresponding figures were 1.2% and 0.98%, respectively.³

Dietary factors play a key role in hypertension. While the importance of limiting salt intake is well known, reducing fatty food and meat use to below the recom-

mended levels in the current *Guidelines* is also beneficial.

Researchers have attempted to isolate the effect of diet on blood pressure through randomized, controlled trials by studying populations that are similar except for diet. For example, most Mormons avoid tobacco, alcohol, and caffeine products, are generally health-conscious, and are omnivores. Like Mormons, nearly all Seventh-day Adventists avoid tobacco, alcohol, and caffeine products, but 50% are omnivores and 50% are vegetarians. A comparison of Mormon omnivores and Adventist vegetarians with similar levels of physical activity, all of whom avoided tobacco and alcohol, showed higher blood pressure among omnivores. The differences were 8 mmHg systolic and 6 mmHg diastolic among men, and 8 mmHg systolic and diastolic among women.⁴ Adventist omnivores generally consume diets similar to those recommended by the *Guidelines*, with an average consumption of three to four, three-ounce servings of meat, fish, or poultry per week, <300 mg dietary cholesterol per day, and <34% fat calories.⁵ However, evidence suggests that further reductions in meat consumption are associated with lower average blood pressure and a lower prevalence of hypertension.

A study of Adventist omnivores and vegetarians who did not differ with respect to salt intake, smoking, alcohol use, or exercise habits showed systolic and diastolic blood pressure levels that were 3-9 and 2-3 points lower, respectively, among vegetarians. Physician-diagnosed hypertension was reported by 37% of the omnivores compared with 14% of vegetarians ($P<.001$). The racial composition was reportedly similar between the two groups, but was not specified.⁶

Data from a 1989 study suggest that dietary changes beyond the current *Guidelines* may reduce the risk of hypertension and eliminate the excess hypertension among African Americans. Among African-American Adventists attending a Michigan conference, blood pressure medication was used by 44% of omnivores compared with 18% of vegetarians. The average omnivore's diet derived 34.5% of calories from fat and included 294.2 mg of cholesterol and 2.8 g of sodium per day. The vegetarians' diet derived 31.4% of calories from fat and included 99.4 mg of cholesterol and 2.4 g of sodium.⁵

Controlled intervention trials have shown the use of meatless diets leads to significant blood pressure reduction in 30%-75% of hypertensive subjects, an effect that is not fully accounted for by the presence or absence of any single nutrient or by the reduced prevalence of obesity in vegetarians.^{7,8}

A 21-day study using traditional Hawaiian staples,

particularly starchy root vegetables, drawing <10% of calories from fat without caloric restriction in 10 male and 10 female Native Hawaiians led to reductions in mean systolic and diastolic blood pressure of 11.5 mmHg and 8.9 mmHg, respectively.⁹

These studies suggest that those who choose to make dietary changes beyond those recommended in the current *Guidelines* may reduce their risk of developing hypertension or improve existing hypertension.

CANCER

African-American men and Native Hawaiians have a high cancer incidence. From 1990-1994, the age-adjusted cancer incidence among African-American men was >25% than for whites. Data from the Surveillance, Epidemiology, and End Results (SEER) Cancer Registries indicate that the 1990-1994 incidence rate for all sites combined was 624.7 per 100,000 for African Americans compared with 496.1 per 100,000 for whites.¹⁰

Prostate cancer is the most common form of cancer for both African-American and white males. Incidence rates are strikingly higher among African Americans: 145.8 per 100,000 compared with 107.3 per 100,000 for whites. Lung and bronchi cancer, the second most common form of cancer, occurs with a similar disparity—124.1 versus 81.2 per 100,000 for African-American and white men, respectively. Colon cancer rates are not greatly different among African Americans and whites.¹⁰

Among women, the three most common cancer sites are the breast, colon and rectum, and lung, and overall rates are similar for African Americans and whites. Native Americans, Asian Americans, and Mexican Americans have overall lower cancer rates than whites.³ Among Native Hawaiians, age-adjusted cancer mortality rates were 39% higher than the US population for 1980-1985. Cancers of the esophagus, stomach, lung, and breast had a high incidence. While smoking and alcohol use account for some of the increased risk, the high obesity prevalence in this population also is a likely contributor and is discussed more fully below.¹¹

Dietary factors play a major role in prostate and lung cancer. In epidemiologic studies, prostate cancer is consistently associated with greater consumption of meat and dairy products. It is less common among those who consume more rice, soybean products, and green or yellow vegetables, and among vegetarians.¹²⁻²⁷ One hypothesis for the link between diet and prostate cancer is that high-fat and low-fiber diets increase both the concentration and activity of testosterone, which influences prostate cells.²⁸ In addition, chemical carcinogens, particularly heterocyclic amines, form as red meats, poultry,

or fish are heated to cooking temperatures, although their role in human cancer is not yet clear.²⁹

A prospective study of 47,855 mainly white health professionals revealed that consumption of animal fat, particularly from red meat, was associated with a higher risk of developing advanced prostate cancer.³⁰ In contrast, frequent fruit consumption, particularly fruits rich in lycopene, is associated with reduced prostate cancer risk. Men who had ≥ 10 servings a week of lycopene-rich foods, such as tomatoes, had a 45% reduced risk of prostate cancer.³¹

Lung cancer risk is largely attributable to cigarette use. More African Americans than whites smoke cigarettes. However, studies have shown that African Americans generally begin smoking later in life and smoke about 35% fewer cigarettes compared with whites.³² Smoking patterns do not account for the increased lung cancer risk among African Americans. For those aged 40-54 years, an excess lung cancer risk is found in African Americans within dose categories of smoking and after accounting for overall smoking patterns.³³ Racial differences in lung cancer rates may relate to differences in liver enzymes (particularly cytochrome P450) involved in detoxification of carcinogens including those present in tobacco smoke, different sensitivities to mutagens, or other factors not yet identified.³³

Although cigarette smoking is the most important risk factor for lung cancer, a majority of smokers never develop the disease, indicating that other factors also play decisive roles. Several research studies have examined dietary factors. A 1979 Japanese study of 265,118 men and women including smokers and nonsmokers found that frequent consumption of green and yellow vegetables was associated with a 20%-60% reduction in lung cancer risk compared with those who consumed these products less often.³⁴ An American Cancer Society cohort study of one million subjects and a prospective study in Norway yielded similar findings.³⁵

While researchers initially hypothesized that the benefits of vegetables and fruit with relation to lung cancer resulted from the antioxidant properties of beta-carotene, studies using beta-carotene supplements in smokers have not shown the same benefit. Other constituents of plant foods may be responsible for the observed risk reduction.³⁵ Recent findings have identified an increasing number of potential contributors to cancer prevention among the numerous antioxidants and other micronutrients in plant-based diets. For example, it is known that certain fruits and vegetables induce phase 2 liver detoxification enzymes.³⁶ These studies suggest that a cautious approach to lung cancer involves not only steps to dis-

courage smoking, but also efforts to encourage fruit and vegetable use as generously as possible.

A 12-year British study found that after adjustment for smoking, body mass index (BMI), and socioeconomic status, cancer death rates were 40% lower among vegetarians than meat eaters.³⁷ The adjustment for body weight leads to an underestimation of the true effect of diet. These results are similar to those of an earlier 11-year German study that found vegetarians' standardized mortality ratios for all cancer to be 0.48 for men and 0.74 for women compared with the general population; smoking did not account for the differences.^{38,39}

OVERWEIGHT

According to NHANES, the prevalence of overweight, defined as a BMI of at least 27.8 kg/m² for men and 27.3 for women, increased among the total adult population from 25% to 33% between 1976 and 1991. Overweight is particularly prevalent among African-American and Mexican-American women and Native Hawaiians of either sex. The NHANES III study showed that 48.6% of non-Hispanic black women and 46.7% of Mexican-American women were overweight compared with 32.9% of non-Hispanic white women. Rates among men were more uniform. The unadjusted prevalence of overweight was 30.9% in non-Hispanic black men, 35.5% for Mexican Americans, and 32.3% in non-Hispanic whites.⁴⁰

The pattern of disparity is evident early in life. Data for 1988-1994 show that for children aged 6-11, the prevalence rates for overweight among African-American, Mexican-American, and white girls were 17.9%, 15.8%, and 11.9%, respectively. Among boys, the corresponding figures were 14.7%, 18.8%, and 13.2%, respectively. For adolescents aged 12-17 years, the prevalence of overweight was 16.3% for African Americans, 14% for Mexican Americans, and 9.6% for whites. For boys, the corresponding rates were 12.5%, 15%, and 11.6%.⁴¹

The Molokai Heart Study of Native Hawaiian adults aged 20-59 years found that 65.5% of men and 62.8% of women were $>20\%$ above their ideal weight. The mean BMI was 30.9 kg/m² for men and 30.3 kg/m² for women, indicating perhaps the most serious problem with obesity of any American population.⁴²

A 1993 study showed the prevalence of overweight in adult Native Americans and Alaska Natives to be 34% in men and 40% in women.⁴³ Young Pima Indian adults have higher BMI values than older adults, suggesting that older adults have had less exposure to factors leading to obesity than younger adults. Those examined in a 1991 study were on average heavier for

their height than those measured at the beginning of the century. In most height categories, weight has continued to increase since 1965.⁴⁴

Epidemiologic studies indicate that populations consuming diets richer in plant products and lower in fat have a much lower prevalence of obesity. A 1989 study of African-American adults showed the BMI of vegetarians was 26.3 kg/m² compared with 31.4 for nonvegetarians. The two groups were similar in age, with means of 54.7 (± 2.3) years for vegetarians and 56.1 (± 1.8) years for nonvegetarians, and other demographic variables other than diet choice.⁵

In general, the mean BMI of vegetarian groups has been 1-5 kg/m² lower than for omnivores in studies controlled for smoking and exercise.^{4-6,45} A comparison of 5728 British vegetarians (mean age: 38.7 years) and 5015 omnivores (mean age: 39.3 years) found that 27% of omnivores but only 14% of vegetarians had BMIs >24 kg/m². Smoking rates were low and similar in the two groups.³⁷

A comparison of 25,698 omnivorous and vegetarian Adventists who were similar with respect to smoking, exercise, and alcohol consumption found the age-adjusted prevalence ratio of overweight, defined as $\geq 30\%$ above desirable weight, was 1.9 among omnivorous men (95% CI, 1.6-2.1) and 1.6 among omnivorous women (95% CI, 1.4-1.7) compared with vegetarians.⁴⁶

Dietary changes beyond those recommended in the *Guidelines* can help reduce weight problems. Although Native Hawaiians have a high rate of obesity, a diet of traditional Hawaiian staples, particularly starchy root vegetables, drawing $<10\%$ of calories from fat with no caloric restriction in a 21-day intervention study in Native Hawaiians whose mean preintervention weight was 120 kg and mean preintervention BMI was 39.6 kg/m² led to a mean weight loss of 7.8 kg and a 2.6 kg/m² reduction in BMI.⁹

The current *Guidelines* encourage only a modest reduction in fat intake, to 30% of calories, and do not encourage more substantial changes among those who might choose to follow them.

DIABETES

Noninsulin-dependent diabetes mellitus (NIDDM) affects minorities more frequently than whites. The National Health Interview Survey (1986-1990) found the age-adjusted prevalence of diabetes for African-American, Hispanic, Asian-American, and white men to be 4.13%, 3.74%, 3.37%, and 2.45%, respectively. Among women, the corresponding figures were 4.89%, 3.53%, 2.38%, and 2.36%, respectively.⁴⁷

Native Americans have high rates of diabetes. The Behavioral Risk Factor Surveillance System from 1991-1992 showed a prevalence of 4.2% among men and 9% among women. Among adult Pima Indians, the prevalence is near 50%.⁴⁷ Among Native Hawaiians, glucose intolerance prevalence and diabetes-related mortality are approximately double those of Americans in general.⁴⁸

Studies of second-generation Japanese Americans in Seattle, WA, have revealed a higher prevalence of diabetes than in Japan and higher than for US whites. Among those aged 45-74, the diabetes prevalence in second-generation Japanese-American men and women was 20% and 16%, respectively, four times higher than in Tokyo (5% and 4%, respectively), and higher than in white Americans of the same age (12% and 14%, respectively). Diabetic end-stage renal disease (ESRD) is more prevalent in all minority groups compared with whites. African Americans have a 2.6-fold greater rate of diabetic ESRD than whites, after adjustment for the underlying increased prevalence of diabetes.⁴⁹ According to the US Renal Data Systems Report (using Medicare data), the prevalence of ESRD per 1000 was 2.968 for African Americans, 2.222 for Native Americans, 1.119 for Asian/Pacific Islanders, and 0.666 for whites.⁵⁰

Numerous studies link diabetes risk to dietary factors. In particular, high-fat diets and the increase in adiposity that often accompanies them, along with decreased physical activity, permit insulin-resistant genetic susceptibilities to manifest.⁵¹⁻⁵⁵ Higher risk of diabetes among Japanese Americans was associated with greater intake of animal fat from meat, poultry, and dairy products.⁵⁶ Traditional Japanese diets use rice as a staple, consume less meat, generally avoid dairy products, and derive only 10% of calories from fat.⁵⁷ Second-generation Japanese-Americans' diets have been partially Westernized, incorporating more animal protein and deriving 31%-34% of calories from fat.⁵⁶ The transition from a traditional Japanese diet to a Western diet in accord with the *Dietary Guidelines for Americans* and the Food Guide Pyramid would typically mean increased consumption of meats and dairy products, and a higher intake of animal fat and protein.

While studies of Japanese Americans are consistent with the premise that reductions in fat and animal product consumption beyond the recommendations of the current *Guidelines* may reduce the disparate toll of diabetes in this group, it is unclear whether the same would hold true for other ethnic groups. However, clinical trials using diets with fat intake limits that are much lower than prescribed in the *Guidelines* and that emphasize whole grains, legumes, vegetables, and fruits, along

with regular exercise, have demonstrated that the need for medication often can be substantially reduced in individuals with diabetes and that the complications of neuropathy and retinal damage also can be greatly reduced.⁵⁸⁻⁶² Such findings resonate with studies showing that diabetes prevalence is 30%-50% lower in vegetarians than nonvegetarians.⁶³

Reductions in protein well below the amount that is typical of diets conforming to the *Guidelines* may slow the progression of mild and moderate renal insufficiency and also may improve insulin sensitivity in diabetics.⁶⁴ Therapeutic diets using plant sources of protein are more effective in delaying the progression of renal insufficiency compared with diets using animal proteins.^{65,66}

Overall, evidence suggests that diets richer in plant products and lower in animal fat than prescribed in current federal nutrition policies may reduce the prevalence of diabetes and its complications.

CORONARY HEART DISEASE

Overall, African Americans have lower age-adjusted ischemic heart disease death rates compared with whites, with a black-white ratio of 0.94 for individuals ≥ 35 years from 1991-1995. However, this overall statistic conceals marked differences in age-specific rates. In the same time period, the black-white ratios of age-specific ischemic heart disease death rates for men and women aged 35-44, were 1.49 and 2.69, respectively. The racial disparity declined with increasing age, but reversed only for African-American men >75 years and women >85 years. The black-white ischemic heart disease mortality ratio has steadily increased between 1981 and 1995.⁶⁷

Coronary heart disease takes a disproportionate toll among Hispanic women residing in the United States and among Native Hawaiians. The age-adjusted prevalence rates among Hispanic and non-Hispanic women for 1986-1990 were 3.53% and 1.78%, respectively.⁶⁸ The prevalence of heart disease among Native Hawaiians is 44% higher than the national average.⁴⁸

The roles of fat and cholesterol in atherosclerotic heart disease were unknown when the federal government first established dietary recommendations, and fat- and cholesterol-rich foods have remained part of all governmental diet guidelines to date. While the Food Guide Pyramid reduced the visual prominence of meat and dairy products, compared with previous graphics, it has not reduced the amount for recommended daily consumption.

Diets in accordance with the *Guidelines* lead only to minimal reductions in cholesterol levels and allow

existing heart disease to progress. A study of the National Cholesterol Education Program Step 2 diet showed reducing fat from 41% of calories to $<30\%$ lowers cholesterol levels only modestly. The reduction in total cholesterol was about 5%, from 7.03 to 6.65 mmol/L (272 to 257 mg/dL).⁶⁹ Similarly, a 1990 study of individuals with heart disease whose daily diets drew 29% of calories from fat and on average included 185 mg of cholesterol experienced a progressive worsening of heart disease as documented by angiogram.^{70,71}

More significant diet changes lead to important clinical improvements, particularly when accompanied by weight loss, increased exercise, and other lifestyle changes. A study of 4587 adults who limited meat consumption to 85 g (3 ounces) per week, far below the 5-7 ounce maximum per day recommended by the Food Guide Pyramid, and limited total fat to 10% of calories had an average reduction of total cholesterol of 23% (from 6.06 to 4.66 mmol/L [234 to 180 mg/dL]).⁷² Moreover, angiographic evidence shows diet and lifestyle changes can reverse atherosclerotic disease. In a 1990 study, a low-fat vegetarian diet limiting dairy product use to no more than one-half cup of skim milk per day, along with exercise, stress management, and smoking cessation, was shown to reverse heart disease in 82% of participants.⁷⁰

Individuals who make substantial diet changes receive no encouragement from the *Dietary Guidelines for Americans*, despite the fact that low-fat, plant-based diets often lead to substantial reductions in serum cholesterol levels and, when combined with other lifestyle changes, can lead to reversal of atherosclerotic lesions.⁷⁰ No studies have addressed the efficacy of such interventions in Hispanic women, although the recently launched Women's Health Initiative may provide some information on this issue.

DIETARY PATTERNS ARE SIMILAR

Macronutrient intakes are similar among non-Hispanic whites, African Americans, and Mexican Americans. Data from NHANES III (Phase 1) for 1988-1991 for ages ≥ 2 months show the percentage of calories from fat was 34.1% for non-Hispanic whites, 35.3% for non-Hispanic blacks, and 33.5% for Mexican Americans.⁷³ Overall mean daily energy intake was 2095 Kcal. For men, energy intake was slightly higher among non-Hispanic whites (2522 calories) than among non-Hispanic blacks (2371 calories) or Mexican Americans (2301 calories). For women, energy intake was similar across ethnic groups: 1732 calories for non-Hispanic whites, 1776 calories for non-Hispanic blacks,

and 1712 calories for Mexican Americans. Mean protein intake also was similar across ethnic groups (88-92 g in men and 63-66 g in women).⁷³

Carbohydrate intake among men was slightly higher for non-Hispanic whites (305 g) than non-Hispanic blacks (278 g) and Mexican Americans (280 g). For women, carbohydrate intake was similar across ethnic groups, ranging from 216-218 g. Cholesterol intake was lower in non-Hispanic whites (312 mg for men and 213 mg for women) than non-Hispanic blacks (358 mg for men and 250 mg for women) and Mexican Americans (378 mg for men and 267 mg for women).⁷³

Alcohol intake was highest in non-Hispanic whites and lowest in Mexican Americans of either sex, ranging from 10-13 g per day for men and 2-5 g per day for women, with a large variability in all sample groups.⁷³

TOWARD GUIDELINES FOR ALL AMERICANS

The current *Guidelines* are intended only for "healthy" Americans, because of the need to tailor specific diets to the needs of individuals with diseases. However, the high prevalence of obesity, hypertension, diabetes, coronary disease, cancer, and other chronic diseases that disproportionately affect minority populations indicates that a large percentage of Americans are not healthy or are at risk of serious disease. However, the *Guidelines* form the basis for all public and most private nutrition programs, including school lunches and assistance programs for women, infants, and children. The evidence presented above suggests that the *Guidelines* are less than optimal for disease prevention and may encourage a disproportionate toll of chronic disease among minorities. Individuals who wish to reduce their risk of disease by increasing their use of vegetables, fruits, whole grains, and legumes should be encouraged by federal dietary guidelines.

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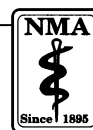
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Prevalence of Disabling Conditions Among African-American Children and Youth

R.C. Saravanabhavan and Sylvia Walker

This article reports on the prevalence of disabling conditions among children and youth in the African-American subpopulation. The health status of the African-American population as a whole is discussed as well as the disabling conditions among African-American children and youth specifically. The unique social, economic, and health conditions relative to African-American children and youth are highlighted. Recommendations for future research, policy, and practice are made to alleviate problems surrounding African-American children and their families.

Migraine Complicated by Brachial Plexopathy as Displayed by MRI and MRA: Aberrant Subclavian Artery and Cervical Ribs

Ernestina H. Saxton, Theodore Q. Miller, and James D. Collins

This article describes migraine without aura since childhood in a patient with bilateral cervical ribs. In addition to usual migraine triggers, symptoms were triggered by neck extension and by arm abduction and external rotation; paresthesias and pain preceded migraine triggered by arm and neck movement. Suspected thoracic outlet syndrome was confirmed by high-resolution bilateral magnetic resonance imaging (MRI) and magnetic resonance angiography (MRA) of the brachial plexus. An unsuspected aberrant right subclavian artery was compressed within the scalene triangle. The aberrant subclavian artery splayed apart the recurrent laryngeal and vagus nerves, displaced the esophagus anteriorly, and effaced the right stellate ganglia and the C8 and T1 nerve roots. Scarring and fibrosis of the left scalene triangle resulted in acute angulation of the neurovascular bundle and diminished blood flow in the subclavian artery and vein. A branch of the left sympathetic ganglia was displaced as it joined the C8-T1 nerve roots. Left scalenectomy and rib resection confirmed the MRI and MRA findings; the scalene triangle contents were decompressed, and migraine symptoms subsequently resolved.