Reducing Meat Consumption Has Multiple Benefits for the World's Health

In this issue of the *Archives*, the authors of the excellent study of the effects of meat consumption on mortality among participants of the large National Institutes of Health–AARP (formerly known as the American Association of Retired Persons) Diet and Health Study cohort reiterate the concerns echoed in other major reviews and studies on the adverse effects of excessive meat intake.[1] However, I am taking a different tact and am focusing on the way the implications of reducing excessive meat consumption would relate to a number of major global concerns.[1] This study closely follows a recent, exceptional, and thorough review on the effects of excessive consumption of red meats, processed meats, and fish on cancer[2] by the American Institute for Cancer Research–World Cancer Research Fund.

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The publication by Sinha et al[1] is timely. It occurs in a period when obesity, heart disease, and cancer are acknowledged to be reaching epidemic levels across the globe, food prices are rapidly increasing, and looming crises exist related to energy, climate change, and water.[3] As a scholar who has worked in the agricultural, economics, food, and nutrition worlds, I discuss herein current red meat intake and all animal source food intake and describe the current consensus on the roles that shifts in the food price, energy, climate change, and water have on global concerns.

RED MEATS: A NUTRITIONAL PERSPECTIVE

As background, there are major nutritional benefits to consuming some red meat and some white meat but almost no reason—aside from tastes—to consume most processed meats. The heme iron content of red meat and the plethora of other critical nutrients represent a major element in our diet. Numerous studies have shown that adding small amounts of red meat to the diets of most populations consuming a vegetarian or very low meat diet provide nutritional benefits.[4,5] Furthermore, they played a very important role in the evolution of our species.[6,7] There are some countries (eg, China) where increases in the intake of red meats are linked with increasing overweight prevalence. However, a large number of recent clinical trials show either a low-fat, low-fat and high–complex carbohydrate diet, or a high-protein–low-carbohydrate diet are equally healthy.[8-10] Thus, the consensus is not that we should all become vegans or vegetarians—though there are many scholars who would argue for the strong nutritional benefits of such a diet[11] or at least a major shift toward more of a Mediterranean diet with minimal red meat intake,[12] with clear evidence supporting their arguments. Rather, the need is for a major reduction in total meat intake, an even larger reduction in processed meat and other highly processed and salted animal source food products, and a reduction in total saturated fat.[2,12,13]

RED MEAT AND PROCESSED MEAT CONSUMPTION IN A GLOBAL PERSPECTIVE

Over the last decade, a number of scholars identified the rapid increases in animal source foods—particularly red meats but also dairy, white meats, and processed meats. Marked increases in the proportion of global consumption of animal foods is occurring in the developing world, led by China and India.[14] As has been shown by many international comparisons, total gross consumption of meat and dairy products in the higher-income countries compared with lower-income countries is double and triple the daily intake, respectively.[15] At the same time, per capita intake is much greater in high-income countries while growth of per capita intake is essentially found only in the lower-income countries. Also, 2005 statistics on production show that India, China, and Brazil dominated the meat and milk intake among the developing countries, with China having 48.8% of the total meat production and India having 33.5% of the milk production.[14,15]

These trends are accelerating in China and India in the past few years with their booming economies, and the predominant proportion of global meat and dairy increases are now occurring. For instance, in China—using 3 days of detailed dietary data—the number of adults with more than 10% of their caloric intake from these animal foods increased from 38.8% in 1989 to 67.0% in 2006 with a 17.6 percentage point increase between 2000 and 2006.[16] However, the per capita amounts are vastly lower than in the United States and Europe.

A critical point is that all projections and estimates about global food demand have underestimated the shifts in demand for animal foods, particularly meat, in China. These economic and food demand shifts in China are actually accelerating as it relates to meat and dairy products.[17,18]

Nevertheless, for prevention of cancer and heart disease, our general recommendations are to limit the intake of saturated fats significantly to less than 7% of the

total daily calories (Lichtenstein et al; American Heart Association Nutrition Committee[19]) and to less than 10% of the total daily calories (Dietary Guidelines Advisory Committee Report, 2005[20]). This requires higher-income countries to significantly cut their animal source food intake, shift to leaner meats, and shift to reduced-fat dairy products. In terms of red and processed meats, excessive consumption is only found in the West and is generally far below norms in the low- and middle-income world. Subpopulations of Indians consume excessive amounts of dairy, whereas China is rapidly increasing its dairy production but is presently less than 10% of the developing world's production.

GLOBAL FOOD PRICE INCREASES AND THE ROLE OF INCREASING RED MEAT AND OTHER ANIMAL SOURCE FOOD INTAKE

Since 2003, world wheat and maize prices have nearly doubled, rice prices are at an unprecedented level, and prices of all major other starchy staples, oils, and animal source foods have experienced marked price increases.[21] Clearly, shifts in the structure of food consumption toward more animal foods play a role in global food price increases. Production of any animal source food requires far more feedstock than the production of a legume, grain product, fruit, or vegetable—and thus exacerbates food price increases.

The shift in global food prices has been gradual, and much of it relates to major shifts in consumption—driven by income growth and the rising demand for animal foods. For instance, meat and dairy intake more than doubled in India between 2000 and 2005. Another way is to look at the ratio of 2005 food intake compared with 1990. This ratio for China is 2.4 for meat, 3.0 for milk, and 1.2 for fish.[15]

As an aside, major scholars and institutes have found that increased biofuel demand accounted for only 21% to 22% of the rise in prices of rice and wheat.[21]

GLOBAL WATER, CLIMATE, AND ENERGY CRISES

There are major repercussions created by the rising animal source food intake on several related global crises linked with water, climate, and energy.[15] Few understand the enormity of the global water crisis, but it is already affecting some regions of the world (eg, in 10-20 years the icecaps in the Himalayas will be gone and with it a major source of water for India and China).[22] The major studies on this topic are those by a team of scholars[23] and Hoekstra and Chapagain.[24,25] The critical issue to understand is that since meat is much further up the food chain, the estimates are that water use is 2 to 5 times greater for animal source food than for basic crops (eg, legumes, grains)[25] across the globe. One estimate is that 23% of the world's water goes to livestock use in total; their more conservative marginal additional use for livestock is about 15% of the world's water.[15]

The effects of livestock production on water pollution, however, is far greater. In the United States, livestock production accounts for 55% of the erosion process, 37% of pesticides applied, 50% of antibiotics consumed, and a third of total discharge of nitrogen and phosphorus to surface water.[15]

For fossil fuel use and global climate control, there is much literature on the footprint of agriculture that I will not address in any detail. However, it provides anywhere from 25% to 35% of all carbon emissions. The energy use figures are complex. When all the energy uses of agriculture are combined, agriculture uses between one-half to two-thirds of all nitrogen and chemical pesticides. The recent United Nations report suggests that livestock are responsible for 18% of greenhouse gas emissions, far greater than that of transportation.[15] Overall, scholars first question the sustainability of modern agriculture in general, and second, they question the much higher energy use of producing animal foods.[26]

THE FUTURE: POLICY CHALLENGES

There is a global tsunami brewing, namely, we are seeing the confluence of growing constraints on water, energy, and food supplies combined with the rapid shift toward greater consumption of all animal source foods. Not only are components of the animal-source foods linked to cancer, as shown by Sinha et al,[1] but many other researchers have linked saturated fat and these same foods to higher rates of cardiovascular disease.[1,12] What do we do?

One major concern that has yet to be addressed is the distorted price structure fueled by major global subsidies of animal-source foods. As I have shown, the history of subsidies—both direct and indirect—have created an agricultural system focused on creating cheap beef, pork, and other animal source foods[3] in the United States, Europe, and most developing nations. As these global prices of beef have diminished (now 20%-30% of what they were in the 1950s), the prices of legumes, fruits, vegetables, and many coarse grains have increased or held steady. Elimination of the current system of subsidies and major investments in healthier legumes, vegetables, and other selected crops are needed to undo these massive distortions.

Aside from that, pricing all petroleum products at much higher levels, removing all subsidies from them, and considering water and energy use in taxation and subsidy policies would do a great deal to change the relative costs of different foods compared with animal-source foods.

This is not going to happen quickly, as fights over the removal of such subsidies in the US farm bill and the resistance of both the European Economic Union and the United States to remove subsidies of agriculture in the World Trade Organization Doha Development Agenda have shown. It is a battle we must fight for many reasons, such as for those previously noted and increasingly for those concerned with global warming, environmental degradation, and global public health, which have begun to combine to lobby for the implementation of different policies.

We return to the question: what can the individual practitioner do about these huge topics? Primarily, they have the role of advising their clients to consume small to moderate amounts of red meat and processed meats

as a way to reduce the risk of a large number of chronic diseases. Despite the popularity of the Atkins type of high-protein diet, which favors red meat as a protein source, poultry, fish, and legumes are among the many other high-protein items. The Atkins option works for some to reduce caloric intake; however, it does not benefit the long-term health of individuals, as a vast array of research on the effects of saturated fats on health have shown. Of equal importance is the role of clinicians as public health advocates. Far too few clinicians speak out on topics such as this. What the public hears is the side of the profession that is preaching vegetarian diets and not the side of the profession that is discussing moderation as a healthy option.

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