"Every great advance in science has issued from a new audacity of the imagination."

—John Dewey

INSIDE

3 READ IT AGAIN... FOR THE FIRST TIME

5 Dietary Fat Intake and CHD Risk in American Indian Adults: *Results of the Strong Heart Study*

6 Frequent Egg Intake and CHD Incidence in Japan

7 EDITORIAL How Green Was My Valley

8 Pregnancy Food Guide Offers Health Advice for Moms-to-Be

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Nutrition Close-Up is a quarterly publication of the American Egg Board, written and produced by the Egg Nutrition Center. *Nutrition Close-Up* presents up-to-date reviews, summaries and commentaries on the latest research on the role of diet in health promotion and disease prevention, including the contributions of eggs to a nutritious and healthful diet. Nutrition and healthcare professionals can request a free subscription to the newsletter by visiting the Egg Nutrition Center's website at www.enc-online.org.

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NUTRITION CLOSE-UP

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NHANES Confirms—An Egg a Day is Okay

Relatively recent changes to the American Heart Association's nutrition guidelines (Krauss 2000) state that "saturated fat is the principal dietary determinant of LDL cholesterol levels" and that "cholesterol-rich foods that are relatively low in saturated fatty acid content (notably egg yolks…) have smaller effects on LDL cholesterol levels." Indeed, numerous studies since the 2000 revision have concluded that egg intake has very little effect on blood cholesterol levels...and no effect on the risk of CHD events. A limited number of studies suggest that dietary cholesterol intake increases CHD risk independently of serum cholesterol concentration (Shekelle 1989), but research seems to refute this in the case of eggs. For example, Hu et al. showed that there was no difference in CHD risk between individuals consuming 1 egg per week and those consuming up to one a day. What, then, is the true impact of egg intake on heart disease risk? A recent analysis by Qureshi et al. attempted to answer this question.

Qureshi et al. analyzed data from the First National Health and Nutrition Examination Survey (NHANES-I; 1971-1975) and a subsequent series of follow-up studies (NHEFS) to determine whether egg consumption was related to long-term risk of cardiovascular disease. The NHANES I study group (n=30,000) included individuals between one and seventy-four years of age and was intended to be a nationally representative sample. Participants were interviewed with regard to dietary intake and nutritional status and underwent physical examination and clinical testing. Potential confounding variables such as age, gender, race/ethnicity, systolic blood pressure, serum cholesterol level, body mass index (BMI), known diabetes mellitus, educational level, and smoking status were also recorded. Egg intake was reported as <1 egg per week, 1-6 eggs per week, or >6 eggs per week.

No significant differences in relative risk for stroke,...myocardial infarction, or all-cause mortality were observed between those consuming >6 eggs per week and those consuming less than one egg per week.

The NHANES-I Epidemiologic Followup Study (NHEFS) gathered data on original study participants (those between the ages of 25 and 74 at baseline) during 4 follow-up periods: 1982-1984, 1986, 1987, and 1992. During the first period (1982-1984), participants were interviewed with regard to health information and medical records and anthropometric measurements were taken. Subsequent follow-up surveys collected similar information, but were conducted over the phone instead of in person and did not collect anthropometric measurements. Medical records were reviewed and incidences of stroke (hemmorhagic or ischemic) and coronary artery disease, as well as death from either cause, were recorded over the course of a 20 year follow-up period.

Continued on page 2

NHANES...*continued from page 1*

Data from a total of 9,734 individuals qualified for inclusion in this analysis. Of these, 63% reported consuming 1-6 eggs per week and 20% reported consuming more than 6 eggs per week. Only 17% reported consuming less than 1 egg per week at baseline. No significant differences were observed between egg-intake groups with regard to BMI, total serum cholesterol level, or dietary cholesterol intake. Likewise, there was no significant difference in dietary cholesterol intake between those whose total serum cholesterol levels fell below or above 200 mg/dL (5.17 mmol/L).

No significant differences in relative risk for stroke (hemmorhagic or ischemic), myocardial infarction, or all-cause mortality were observed between those consuming >6 eggs per week and those consuming less than one egg per week. A trend toward higher rates of CAD and all cause mortality was observed in those who reported consumption of 6 or more eggs per week, but this relationship was not significant after adjustment for age, gender, race/ethnicity, systolic blood pressure, diabetes mellitus, serum cholesterol, cigarette smoking, BMI, and educational status. (Note: Participants who reported consuming 6 or more eggs per week were older and were more likely to be current or former smokers.)

In a separate analysis, rates of myocardial infarction (but not stroke or ischemic stroke) were higher among diabetic participants who reported consuming more than 6 eggs per week (RR 2.0, 95% CI 1.0-3.8). This observation is consistent with other reports (ex. Hu et al.) and warrants further investigation.

In summary, this study found no association between consumption of 6 or more eggs per week and risk of stroke, ischemic stroke, coronary artery disease, or all-cause mortality in this large, nationally representative cohort. ■

Qureshi AI, Suri MF, Ahmed S, et al. Regular egg consumption does not increase the risk of stroke and cardiovascular diseases. *Med Sci Monit* 2007; 13(1):CR1-8.

Krauss RM, Eckel RH, Howard B et al. AHA Dietary Guidelines: revision 2000: A statement for healthcare professionals from the Nutrition Committee of the American Heart Association. *Stroke* 2000;31(11):2751-66.

Shekelle RB, Stamler J. Dietary cholesterol and ischaemic heart disease. *Lancet* 1989;1:1177-1179.

Hu FB, Stampfer MJ, Rimm EB et al. A prospective study of egg consumption and risk of cardiovascular disease in men and women. *JAMA* 1999;281(15):1387-94.

KEY MESSAGES

This study provides important long-term observations with regard to egg consumption and disease risk in a cohort of male and female participants (aged 25-74) from the NHANES 1 study. The key findings are as follows:

- Relative risk for myocardial infarction, stroke, and all-cause mortality did not differ between individuals who reported consuming >6 eggs per week and those who reported consuming <1 egg per week.
- There were no significant differences in dietary cholesterol intake between those whose total serum cholesterol levels fell below or above 200 mg/dL (5.17 mmol/L).
- Rates of myocardial infarction were higher among diabetic participants who reported consuming >6 eggs per week. This finding warrants further research.

1977-1986

Framingham Heart Study—The Protective and Predictive Value of HDL Cholesterol

A few short decades ago, the Framingham Heart Disease Epidemiology Study brought to light an important CHD risk factor that would be instrumental in shaping current CHD risk assessment methods—HDL cholesterol. Data from the Framingham Study showed that HDL cholesterol was a stronger, and possibly more important, predictor of CHD risk than the total cholesterol, which was the only factor used in assessing risk at that time.

The first Framingham study to examine the independent influence of HDL on CHD risk was conducted using a cohort of the original Framingham Study population. This cohort consisted of 2,815 men and women aged 49-82 years. The study administrators measured fasting lipoprotein levels (HDL, total, TAG) between 1969 and 1971 and gathered CHD morbidity and mortality data over 4 years of follow-up. During this period, a total of 142 cases of CHD (including myocardial infarction and angina) had developed in the cohort (79 men and 63 women).

Statistical analysis showed an inverse association between HDL concentrations and the risk of CHD in both men and women (P<0.001). The lower the HDL concentration, the higher the risk for CHD events. In fact, the CHD incidence rate among those with HDL cholesterol levels below 35 mg/dl (0.91 mmol/L) was more than eight times greater than for those with HDL levels >65 mg/dl (1.68 mmol/L).

In this analysis, weak correlations were observed between HDL and total cholesterol levels [0.10 for the men (p<0.01); 0.07 for the women (p<0.05)] and between HDL and LDL cholesterol concentrations [-0.04 for men (NS); -0.16 for women (p<0.001)]. However, strong inverse correlations existed between HDL cholesterol and triacylglycerol (TAG) concentrations [-0.35 for men (P<0.001); -0.43 for women (P<0.001)] and between HDL and relative body weight [-0.28 for men (P<0.001); -0.24 for women (P<0.001)]. Participants with glucose intolerance were also somewhat more likely to have low levels of HDL.

After adjusting for systolic blood pressure, left ventricular hypertrophy, relative weight, and diabetes, TAG levels were no longer a significant predictor of CHD incidence and LDL concentrations were classified as only a "marginal risk factor" by the authors. This first analysis made a strong case for the importance of gauging HDL cholesterol levels to assess CHD risk.

A second analysis within the same Framingham cohort provided important prospective observations that would extend these findings and confirm the relative importance of HDL as a predictor of CHD. This study, published in 1986, examined the relationship of total and HDL cholesterol levels to CHD incidence over a 12-year follow-up period. It also took into account the relationship between non-fasting HDL and CHD risk and included adjustments for covariates that were not available in the first study.

Fasting HDL levels had been measured at baseline (between 1969 and 1971) for all participants. A non-fasting HDL level was obtained eight years later (between 1977 and 1979) from surviving members of the original study cohort who were not lost to follow-up (n=1605). CHD incidence included angina, coronary insufficiency, myocardial infarction, and CHD mortality.

For male participants, HDL cholesterol levels decreased by an average of 1.5 mg/dL (0.04 mmol/L) between measurements (a period of 8 years). Female participants' HDL levels were higher than the men's at both time points and decreased to a lesser extent over the same time period. Total cholesterol levels

Continued on page 4

also decreased over time. For both men and women, non-fasting total and HDL cholesterol measurements correlated strongly with fasting measurements recorded eight years earlier, with correlation coefficients >0.60 (P<0.001).

There was a significant, inverse association between HDL cholesterol levels and CHD incidence over both the first and second 4-year follow-up periods (P<0.001) after adjusting for total cholesterol concentrations, systolic blood pressure, cigarette smoking, and BMI. For the second 4-year follow-up, information on alcohol consumption and blood glucose levels was obtained at baseline. After adjusting for alcohol consumption, and blood glucose in addition to the independent variables available for the original analysis, total and HDL cholesterol were significantly related to CHD incidence.

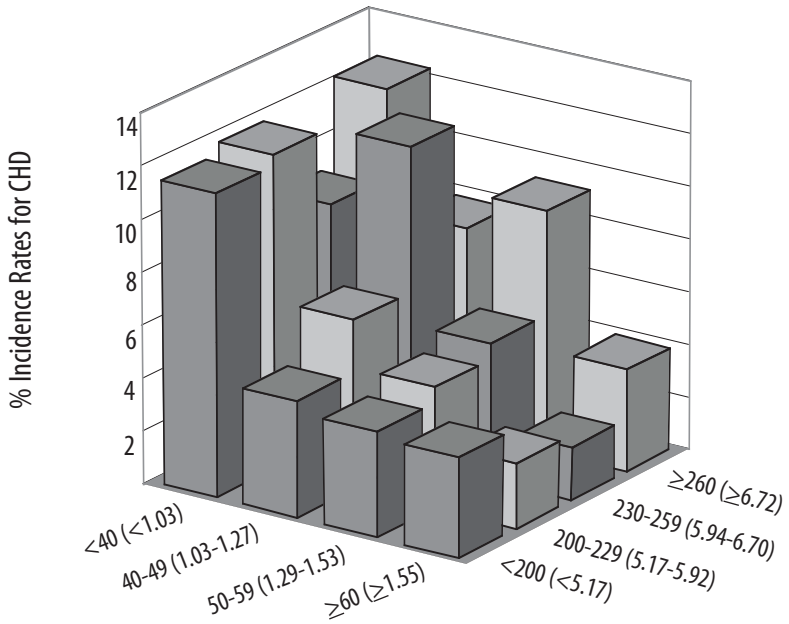
Figure 1 was constructed using the total number of cases from both 4-year follow-up periods combined. Participants were classified by total cholesterol level [stratified into four groups; <200, 200-229, 230-259, or >260 mg/dL (<5.17, 5.17-5.92, 5.94-6.70, or ≥6.72 mmol/L)], HDL cholesterol level [also stratified into four groups; <40, 40-49, 50-59, or ≥60 mg/dL (<1.03, 1.03-1.27, 1.29-1.53, or ≥1.55 mmol/L)], and CHD incidence. The combined analysis clearly illustrates the strong relationship between low HDL cholesterol levels and CHD incidence, even in the groups representing those with the lowest total cholesterol levels. It also shows the cardioprotective influence of high HDL, even in those in the highest quartile of LDL cholesterol concentration.

As stated by the authors, "…a conspicuous message from this display is that [for] all levels of total cholesterol including those below 200 mg/dL [5.17 mmol/L]…HDL-C shows a strong inverse association with incidence of CHD…A low total cholesterol level per se does not necessarily indicate a low risk of developing CHD." These observations confirm and add credibility to the findings of the original study. The data were adjusted for multiple covariates that were not available for the previous analysis. In conclusion, analysis of the influence of lipid levels on CHD risk over 12 years of follow-up indicates that there is a consistent inverse long-term association between HDL cholesterol levels and CHD incidence. ■

Gordon T, Castelli WP, Hjortland MC, Kannel WB, Dawber TR. High density lipoprotein as a protective factor against coronary heart disease. *Am J Med* 1977;62:707-714.

Castelli WP, Garrison RJ, Wilson PWF, Abbott RD, Kalousdian S, Kannel WB. Incidence of coronary heart disease and lipoprotein cholesterol levels. *JAMA* 1986;256:2835-2838.

Figure 1: Four-Year Risk of CHD by HDL and Total Cholesterol Levels



Dietary Fats and CHD Incidence in American Indian Adults: *Results of the Strong Heart Study*

Research examining the association between dietary intake and chronic conditions such as coronary heart disease (CHD) has largely focused on the general US population. However, new research is extending to ethnic sub-populations within the US whose diets have evolved, somewhat, over time to become more like that of their "mainstream" US counterparts. This, researchers hope, will help determine which dietary components might have the greatest impact on CHD risk. In 1999, results of the Strong Heart Study (SHS), conducted in a population of American Indian men and women in North Dakota, South Dakota, Oklahoma, and Arizona, confirmed that the risk of heart disease—once considered rare in native American Indians—is actually higher in this population than in other groups in the US. The study also found that this group's dietary intakes of total fat, saturated fat (SFA), monounsaturated fat (MUFA), and cholesterol were higher than that of the general US population. To find out whether differences in dietary intake were related to these findings, researchers compared results from the Strong Heart Study with data from NHANES III.

The Strong Heart Study followed 2,938 American Indian men and women aged 47-79 years for an average of 7.2 ± 2.3 years, tracking fatal and nonfatal CHD events. Nutrition information was collected at baseline using a 24-hour dietary recall and was analyzed for energy and nutrient intake. Demographic information, medical history, family history of cardiovascular disease and diabetes, blood pressure, BMI, and information about smoking status and alcohol consumption were also obtained at baseline.

By the end of follow-up, a total of 436 CHD events had been documented among participants (138 fatal and 298 nonfatal). Participants were divided into two groups based on age at study initiation (47-59 or 60-79 y). In both groups, those who had experienced a CHD event were more likely to be male and to have diabetes and hypertension. Men in this category were also more likely to have lower HDL cholesterol levels and higher triacylglycerol concentrations.

When compared with NHANES III participants, American Indians in the SHS consumed fewer calories, but had higher intakes of total fat, SFA, MUFA, and cholesterol ($P<0.01$). After controlling for confounding factors (such as age, sex, location of the study center, diabetes status, hypertension, BMI, HDL, LDL, triacylglycerol levels, smoking status, alcohol consumption, total calorie intake, and percentage of calories from protein), dietary fat intake was not associated with total CHD incidence. In fact, there were no detectable differences in dietary intake between those who did and did not develop CHD over the course of follow-up within either age group.

Within the 47-59 y age group, however, the researchers did find significant associations between CHD mortality and the highest intake levels of total fat (>42.6% of energy), SFA (>14.6%), and MUFA (>16.6%). Adjusted hazard ratios (HR) for those in the highest quartiles of intake for these nutrients were 3.57 (95% CI: 1.21, 10.49) for total fat, 5.17 (95% CI: 1.64, 16.36) for SFA, and 3.43 (95% CI: 1.17, 10.04) for MUFA. Although SFA and MUFA were both found to be significant predictors of death from CHD in this younger age group, they were not independent of each other. Neither PUFA, nor trans-fat (TFA), nor cholesterol intake were associated with CHD death. The findings were similar when the components of dietary fat intake were modeled as continuous variables.

In summary, among American Indians aged 47-59 y, those in the highest quartiles of total fat, SFA, and MUFA intake were more likely to have a fatal CHD event than those in the lowest quartiles. There were no significant associations between dietary fat intake and CHD death or incidence among those aged 60-79 y, neither were any associations found between TFA, PUFA, or cholesterol intake and total CHD incidence in either age group in this American Indian population.

Several of these observations were unexpected, one being that higher intakes of MUFA were associated with CHD death. Although some animal studies indicate that MUFA intake might be associated with atherosclerosis, the authors note that their observation regarding MUFA intake among this younger group of American Indians is more likely the result of confounding with SFA intake—in other words, "guilt by association." They point out that in this population, the most important sources of MUFA were not olives or olive oil, but meat, poultry, and fish, which provided 45% of all MUFA intake. These same foods provided 45% of total SFA intake. MUFA and SFA intake were strongly and significantly correlated ($r=0.77$, $P<0.0001$).

Another unexpected finding was that TFA intake was not associated with fatal or nonfatal CHD events in either age group. Several recent reports indicate that TFAs from different sources can have varying effects on CHD risk. The findings of the study by Xu et al. emphasize the importance of continued research in this area. ■

Xu J, Eilat-Adar S, Loria C, et al. Dietary fat intake and risk of coronary heart disease: the Strong Heart Study. *Am J Clin Nutr* 2006;84:894-902.

Frequent Egg Intake and CHD Risk in Japan

It has been documented that the intake of up to 1 egg per day in healthy US adults does not increase the risk of coronary heart disease (CHD) (Hu, et al. 1999, and review of Qureshi et al. in this issue). Indeed, epidemiological studies examining the impact of egg consumption on CHD risk have failed to find any association between the two. It is also well-documented that the impact of changes in consumption of dietary cholesterol is dependent (among other factors) on genetic predisposition, body weight, and on baseline cholesterol intake. In comparison to the US, eggs contribute a much higher proportion of total dietary cholesterol in Japan. A recent Japanese study including over 10,000 Japanese participants (Nakamura et al. 2004) concluded that total serum cholesterol levels were positively associated with egg consumption in women (but not in men). The same authors subsequently undertook a larger study in Japan to further investigate this association in this unique population.

The Japan Public Health Center-based prospective study on cancer and CVD began in 1990. Over 90,000 Japanese adults, aged 40-69 years, were recruited from 1990-1994 and followed through 2001. Through a self-administered questionnaire, the researchers gathered information on medical histories, smoking status, alcohol consumption, dietary intake (including egg consumption), and other lifestyle factors. Potential participants who reported having a history of ischemic heart disease, stroke, cancer, or myocardial infarction were excluded from the study. Those reporting no egg intake were also excluded. Total serum cholesterol levels were available for about 36% of participants and hypercholesterolemia was defined as >220 mg/dl (>5.70 mmol/L).

Frequency of egg consumption was reported in four categories—"less than 1 day/week," "1-2 days/week," "3-4 days/week," and "almost every day." At baseline, Japanese participants reporting higher frequency of egg intake reported more frequent consumption of beef, pork, fish, vegetables, and fruits (significant trend; $P<0.0001$). Those who reported avoiding a cholesterol-rich diet were (not surprisingly) more likely to report less frequent consumption of eggs ($P<0.0001$). In the 36% of participants for whom serum cholesterol levels were available, more frequent egg consumption was associated with lower mean total cholesterol concentrations (and fewer participants in the hypercholesterolemic category) and lower mean systolic blood pressure ($P<0.0001$ for all).

During the mean follow-up of 10.2 years, 462 incidences of CHD were reported (120 fatal and 342 non-fatal cases). There was no significant association between frequency of egg intake and CHD incidence. Secondary analyses that took into account existing diabetes, intention to restrict dietary cholesterol, hypercholesterolemia, and use of cholesterol-lowering drugs resulted in the same conclusion—that frequency of egg intake was not significantly associated with CHD incidence. However, total cholesterol concentration was associated with CHD risk. The hazard ratio for those with cholesterol levels >240 mg/dl (>6.22 mmol/L) was 2.17 compared with those whose levels were below 180 mg/dl (4.66 mmol/L); $P=0.0018$. The percentage of men decreased with increasing quintiles of serum cholesterol concentrations.

This study suggests that in a population in which egg intake contributes a relatively large portion of total dietary cholesterol intake, frequent egg consumption—up to "almost every day"—does not contribute to CHD risk. Researchers in this study also observed an inverse relationship between reported egg intake and total cholesterol concentrations, noting that hypercholesterolemic participants were fewer among those who reported greater frequency of egg intake. This latter observation might be explained by the assumption that those with higher serum cholesterol levels were more likely to be watching their cholesterol intake, and thus, avoiding cholesterol-rich foods such as eggs. It also suggests, however, that for normocholesterolemic participants, consuming eggs almost daily did not increase the risk of a CHD event over the course of a 10-year follow-up period. ■

Nakamura Y, Iso H, Kita Y, et al. Egg consumption, serum total cholesterol concentrations and coronary heart disease incidence: Japan Public Health Center-based prospective study. *British Journal of Nutrition* 2006; 96:921-928.

Hu FB, Stampfer MJ, Rimm EB, et al. A prospective study of egg consumption and risk of cardiovascular disease in men and women. *JAMA* 1999;281:1387-1394.

Qureshi AI, Suri MF, Ahmed S, et al. Regular egg consumption does not increase the risk of stroke and cardiovascular diseases. *Med Sci Monit* 2007; 13(1):CR1-8.

Nakamura Y, Okamura T, Tamaki S, et al. Egg consumption, serum cholesterol, and cause-specific and all-cause mortality: NIPPON DATA80. *Am J Clin Nutr* 2004;80:58-63.

EDITORIAL

How Green Was My Valley

I read once that every year the US population grows by 3 million, while 3 million acres of farm land are lost to production. The scope of these numbers should have an impact on many of the decisions we will have to make as a society. For example, the growing demand for organic foods—which require more land for production due to a lower yield—becomes an issue with the decreasing space available for agriculture. No doubt, organic foods will simply increase in price as consumer demand increases beyond supply. At least here the consumer has a choice…Pay the price or don't buy it. But what are the impacts of some of the other social changes we are implementing due to pressure from special-interest groups? As vegetarianism grows, in part as a response to the propaganda from animal rights groups, so does the plight of ever-decreasing availability of farmland. Where will all the vegetables be grown? Montana, Wyoming, Nebraska and Idaho might be great for soybeans, feed corn, wheat, etc., but they are probably not so great for tomatoes, eggplants, peas, beans, squash, etc. Feed soybeans and corn to a chicken and you get eggs with high quality protein. Unfortunately humans aren't as efficient in their metabolism. How will we feed an ever-increasing number of people with an ever-decreasing amount of farmland for production? Well, you would think that increased production efficiency would be part of the answer; unfortunately, social pressures are pushing us toward less efficient production methods and public fear is moving us further away from those "risky" GMO products.

Let me try to give you some sense of the impact the cage-free movement will have on the commercial egg industry in the US. There are 300 million layers in production. Using standards from the British Free Range Egg Association, free range production requires an acre for every 400 hens. So if all US egg producers were to adopt free range production methods, we would need…Rhode Island. Yes, a whole state with 750,000 acres just for production (which doesn't include space for breeding, hatcheries, growing pullets, etc…). Of course this production system is more expensive…no efficient 24/7 inline operation taking eggs from hen to packing plant. For example, the average cost for a dozen regular large eggs is 97 cents while a dozen organic eggs cost about $3.15.

What does this mean to the consumer? At 97 cents per dozen and an average intake of 257 eggs per year, the cost to our 300 million consumers is $6.23 billion. Now, at $3.15 per dozen the overall cost to consumers is $20.24 billion. Now that's a bite out of the food budget. Of course all food products will cost more since there will be free-range chicken, cattle and hogs. And of course with less land, more need for vegetables, corn and soybean process will also increase, leading to even higher prices. One positive thought—with food costs way up, maybe body weights will come way down (although not necessarily by choice)!

So as we take more agricultural land out of production for population growth and for "acceptable" animal production practices, the only choice is to clear more forests and protected lands so that the population can be fed. Since starvation is not a viable option, the animal rights activists and environmentalists are going to have to make some tough choices. For many, this will be an internal conflict since they wear both hats. What to do, what to do? Save a tree, free a chicken, or feed a child? Environmental salvation versus animal rights versus human survival!

Oh, there is also one additional problem. We will need more land to grow biofuels to power cars and generators and manufacturing and the other needs of the growing population. So say goodbye to the parks and the forests and the open space…say goodbye to that McMansion in the suburbs and move back into the city high rise because we need that land for free range birds and cattle grazing and growing corn for ethanol…and if any space is left over, some food for you and me. One of the problems with so many "advocacy" groups is that not one of them looks at the big picture, only their own narrow focused agenda, and eventually the big-picture consequences come back around to bite you in the wallet…or in your quality of life…or both. ■

Donald J. McNamara, Ph.D
Executive Editor, Nutrition Close-Up

PREGNANCY FOOD GUIDE OFFERS HEALTH ADVICE FOR MOMS-TO-BE

Some expectant mothers believe being pregnant is a license to consume whatever they crave. But, the quality of calories consumed is important to ensure the mother's health and the baby's growth and development."Moms-to-be should choose nutrient-rich foods like eggs, low-fat yogurt and fruits and vegetables, which are high in essential nutrients compared to their calorie count," says Claudia Gonzalez, MS, RD, co-author of "Gordito: Doesn't Mean Healthy" and mother of three. "Eggs, for example, provide four of the nutrients pregnant women need most—protein, iron, folate and choline—for just 75 calories per large egg."

March of Dimes Underscores Importance of Choline

Choline, a little-known nutrient, is one of four nutrients that the March of Dimes emphasizes for healthy pregnancies; the other nutrients are protein, calcium and folate. "Choline is an essential nutrient for an expectant mother and her developing baby," said Janis Biermann, Senior Vice President of Education & Health Promotion with the March of Dimes. "Prenatal choline intake may help contribute to a healthy pregnancy and a healthy baby."

What's more, a growing body of science demonstrates the role that choline plays in brain development, as well as in the prevention of birth defects. "Research has shown that sufficient choline consumption during pregnancy is important to prevent birth defects and aid in brain development of the fetus and newborn," said Donald J. McNamara, Ph.D., Executive Director of the Egg Nutrition Center. "Emerging science also suggests that an offspring's memory function later in life may be affected by a mother's consumption of choline and other foods during pregnancy." The National Academy of Sciences recommends increased choline intake for pregnant (450 milligrams per day) and nursing women (550 milligrams per day).(1)

Pregnancy Food Guide Available Online

A panel of experts, organized by the Brigham and Women's Hospital and supported by an Egg Nutrition Center grant, developed the "Pregnancy Food Guide" to help pregnant women understand the importance of staying healthy during pregnancy with a smart balance of nutrition and exercise.

The "Pregnancy Food Guide" is a FREE brochure focusing on a variety of important topics, including weight gain, food safety, vitamins and minerals, and sample snacks and meals. The brochure can be downloaded for FREE at this link: www.pregnancyfoodguide.org

Vitamin & Nutrient Recommendations.

In addition to the guide, the new web site (pregnancyfoodguide.org) offers pregnant women important nutrition and exercise tips, along with healthy AND delicious recipes, such as "Pasta Veggie Scramble" and "Tortilla Quesadilla." Expectant mothers can also receive expert advice and helpful hints from registered dietitian, Claudia Gonzalez.

(1) Institute of Medicine, National Academy of Sciences. Choline. Dietary reference intakes for thiamin, riboflavin, niacin, vitamin B6, folate,vitamin B12, pantothenic acid, biotin, and choline. 1998.

NUTRITION CLOSE-UP

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