



A newsletter by Dairy Management, Inc.[™] to provide the dairy industry with current research on nutrition and dairy foods

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May 2010

Vol. 24, No. 5

IOM RECOMMENDS STRATEGIES TO REDUCE AMERICANS' SODIUM INTAKE

On April 20, the Institute of Medicine (IOM) released a report, "[Strategies to Reduce Sodium Intake in the United States](#)", outlining comprehensive recommendations to help Americans consume less sodium in light of the chronic disease risks associated with sodium intake, especially hypertension as a risk factor for cardiovascular disease. The IOM report identifies strategies for multiple stakeholders, including government agencies and the food industry. It is a significant event in the ongoing discussion of sodium and public health; however, the recommendations are not binding and do not carry legislative or regulatory authority.

The report proposes that the government set mandatory national standards for the sodium content of processed and restaurant menu items to help consumers achieve intakes of 2,300 mg/day, consistent with the 2005 Dietary Guidelines for Americans. Most Americans consume 3,400 mg/day of sodium on average, which means IOM is calling for a 30 percent decline over time, in accordance with a "step-wise" reduction strategy. The committee also is calling on the food industry to voluntarily decrease the sodium content of foods.

To gradually reduce the sodium content of the food supply, the committee recommends that FDA modify the existing "Generally Recognized as Safe" (GRAS) status for sodium added to foods. They propose GRAS levels be food category specific and be adjusted in a stepwise fashion over time and in a way that goes unnoticed by most consumers.

According to the report, foods contributing the most to Americans' daily sodium intake are mixed dishes (i.e., sandwiches, pizza with meat, hamburgers, Mexican entrees, and pasta dishes) and meat/meat alternates (i.e., chicken, cheese, eggs, bacon/sausage, beef) contributing 44% and 16%, respectively - while milk contributes only 2.9% [Institute of Medicine, Strategies to Reduce Sodium Intake in the U.S., May 2010]

[Editor's note: According to FDA's [media statement](#), FDA will review the IOM report and continue to work with other federal agencies, public health and consumer groups, and the food industry to support the reduction of sodium levels in the food supply. The Department of Health and Human Services will establish an interagency working group to review options and next steps.]

NDC Research Update

NATIONAL DAIRY COUNCIL PRESENTS SEVERAL ABSTRACTS AT THE EXPERIMENTAL BIOLOGY ANNUAL MEETING

The Experimental Biology annual meeting, held April 24-28, is a multidisciplinary, scientific meeting comprising nearly 13,000 scientists and exhibitors representing universities, government agencies, non-profit organizations, and industry. This year the National Dairy Council (NDC) submitted several abstracts communicating preliminary results from ongoing NDC-funded studies that upon completion will be submitted for publication. Listed here is a selection of abstracts in alphabetical order by principle investigator (bolded).

- **Food sources of calcium, phosphorus, vitamin D, and potassium in the U.S.** Fulgoni III VL, Keast DR, Quann EE, Auestad N

Using data from the National Health and Nutrition Examination Survey (NHANES) 2003-2006, this study determined dietary sources of calcium, phosphorus, vitamin D, and potassium in the U.S. for individuals 2 years and older. Results showed, "Fluid milk was the number one single food source of calcium, phosphorus, vitamin D, and potassium, providing 21.5, 12.3, 42.6, and 9.9%, respectively, of the total dietary intake of these nutrients." The authors conclude, "These data continue to support that dairy products and fluid milk, in particular, are the major sources of important nutrients from food in the U.S. diet." [FASEB J, 24, abstract 325.1]

- **Contributions of milk, dairy products, and other foods to vitamin D intakes in the U.S.: NHANES, 2003-2006.** Keast DR, Fulgoni III VL, Quann EE, Auestad N

Using data from the National Health and Nutrition Examination Survey (NHANES) 2003-2006, this study examined food sources of vitamin D for people 2 years and older. Results showed, "Fluid milk/milk drinks provided 49.7, 65.8, and 43.2% of vitamin D intake in all subjects 2+ years, children 2-18 years, and adults 19+ years, respectively." The authors conclude, "Milk and milk products are the primary sources of vitamin D from food in the U.S. diet." [FASEB J, 24, abstract 745.9]

- **Chocolate milk consumption during recovery from endurance exercise affects intracellular events of skeletal muscle protein synthesis and proteolysis.** Lunn WR, Colletto MR, Karfonta KE, Anderson JM, Carbone JW, and **Rodriguez NR**

This randomized, crossover-design study in 8 active males evaluated the effects of consuming 16 oz. of fat-free chocolate milk during recovery from endurance exercise on intracellular proteins (ICP) influencing skeletal muscle synthesis and proteolysis (muscle protein breakdown). "Findings suggest," say the authors, "that drinking fat-free chocolate milk after endurance exercise attenuates [lessens] ICP activity specific to proteolysis and enhances that of protein synthesis during recovery." [FASEB J, 24, abstract 97.1]

- **Vitamin D status in overweight and obese individuals during a controlled calorie restricted intervention** Piccolo BD, Gertz E, Hall L, Cheema M, Woodhouse L, Souza E, Keim NL, Adams SH, Stephensen CB, and **Van Loan MD**

This study investigated the relationship between obesity and vitamin D status (as measured by serum 25(OH)D) in overweight and obese individuals enrolled in a controlled calorie-restricted intervention. Participants were randomly assigned to either a high-dairy (3-4 servings/day) or a low-dairy (<1 serving/day) calorie-restricted diet for 12 weeks. When controlling for total body fat mass, the high-dairy group had a greater percent increase in vitamin D status than the low-dairy group. The authors

conclude, "The inclusion of 3-4 servings of dairy rich foods in a moderate energy restricted diet may contribute to an increase in vitamin D status." [FASEB J, 24, abstract 537.12]

- **Does inclusion of dairy foods in a moderate energy-restricted diet enhance central fat and weight loss in overweight and obese adults?** Van Loan M, Keim N, Adams S, Souza E, Woodhouse L, Watson J, Stoffel S, Bremer A, Witbracht M, Thomas A, Gertz E, Chandler C, Burnett D, Piccolo B, White E, Holguin E, Decker N, Bonnel E, Campbell C, Gustafson M, Horn W, Schaal K
This study examined the role of dairy foods in a moderate energy-restricted diet to enhance weight and central fat loss in 71 overweight and obese adults who followed either a high-dairy (3-4 servings/day) or low-dairy (≤ 1 servings/day) 12-week controlled diet. All food was supplied by a metabolic kitchen. Results showed no significant difference between treatments in percent change in weight, body fat, or intra-abdominal fat, leading the researchers to conclude, "An energy-restricted diet with 3-4 servings of dairy does not enhance central fat or weight loss over energy restriction alone." [FASEB J, 24, abstract 343.2]
- **Dairy attenuation of oxidative and inflammatory stress in metabolic syndrome** Zemel MB, Stancliffe R
This 12-week study assessed the effects of low (< 0.5 servings/day) vs. adequate (3.5 servings/day) dairy diets on oxidative and inflammatory stress (without calorie restriction) in 40 metabolic syndrome subjects who had habitually low dairy intakes. Results showed that diet had no effect on body weight, but the adequate dairy diet significantly reduced waist circumference, trunk fat, and lessened oxidative stress as demonstrated by a 25% decrease in oxidized LDL at 12 weeks - while the low dairy diet had no effect on these factors. In addition, the adequate dairy diet significantly suppressed inflammatory markers, while the low dairy diet had no effect on these markers. The authors conclude, "Increasing dairy intake results in attenuation of oxidative and inflammatory stress in metabolic syndrome." [FASEB J, 24, abstract 105.3]
- **Effects of leucine and calcitriol on monocyte-vascular endothelial cell adhesion** Curry B, Biggerstaff, Zemel MB
Previously, these researchers demonstrated that calcitriol (active form of vitamin D) and leucine (amino acid found in milk) have the ability to modulate production of cytokines. Cytokines are signaling proteins that act to modulate immune system activity, including the activity of monocytes which are thought to contribute to the atherosclerotic process in the walls of blood vessels. In a laboratory experiment, the researchers tested the hypothesis that calcium (via calcitriol suppression) and leucine can lessen this vascular infiltration (as demonstrated by monocyte adhesion to the endothelium). "These data show," say the authors, "that monocyte adhesion to endothelial cells is decreased in the presence of leucine and increased by calcitriol, suggesting that foods rich in calcium and leucine may be beneficial in reducing monocyte adhesion." [FASEB J, 24, 230.5]

NDC Research Update

WIC PARTICIPANTS FAVOR YOGURT AS A DAIRY OPTION

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is a federal program that provides nutrition education and vouchers for nutritious food to eligible low-income pregnant, breast-feeding, and postpartum women; infants; and children up to age 5. Yogurt is not currently one of the food items allowed, according to the Interim Final WIC Food Package Rule, published in 2007. However, a 2005 Institute of Medicine (IOM) report recommended that yogurt be added to the WIC food package as a substitute for part of the milk allowance. USDA asked states for assistance in exploring how yogurt could be provided. In response, the California WIC program sought to address this issue. This randomized, controlled one-month intervention trial, funded by the National Dairy Council, and conducted at two California WIC local agency sites, examined the impact of providing yogurt to 456 pregnant, breast-feeding, or postpartum women. The women were randomly assigned to either a one-month intervention period or control group. Those in the intervention group received two coupons for one month for free 32-ounce containers of low-fat Yoplait yogurt (plain, vanilla, peach, strawberry, or strawberry/banana). WIC staff provided educational materials to those in the intervention group with information on yogurt's nutritional quality, uses in meals and snacks, purchasing and handling, and use in recipes. The researchers hypothesized that providing yogurt coupons to the intervention group in this pilot study "would increase their preference for yogurt, decrease their perceived barriers, and increase yogurt consumption compared to the control group".

Result highlights:

- "Over 86% of the women approached at entrance to the study were interested in substituting yogurt for milk," the authors report. Nearly 70% of the women in both the intervention and control groups were already routinely eating yogurt. Over 90% of study participants reported liking flavored yogurt "a lot" (slightly over 50% reported liking lower-fat milk a lot).
- At baseline few barriers to yogurt consumption were identified. Few had trouble finding yogurt at the store, found that it spoiled too quickly, or reported they had trouble digesting things made with milk (<20%). However, "A majority (62%) thought the cost of yogurt was too high" and 60% reported they did not know how to use yogurt in recipes.
- By the end of the intervention, there was a small (nearly significant) increase in yogurt intake of approximately 1 ounce/day, particularly among Spanish language participants.
- Among women with the lowest yogurt intake at baseline, there was a significant (3 ounce/day) increase in yogurt intake when compared to those in the control group with similarly low intakes.
- Increases in yogurt intake were achieved without reducing the intake of other dairy foods.
- Of those who used the coupons (86%), "91% responded that in the future they would be interested in substituting yogurt for some milk, if that option were available in their WIC food package."

The authors say, "Yogurt may provide an additional option for WIC participants who are either lactose intolerant or are not regular milk consumers. This substitution has the additional

benefit of providing a low-fat or nonfat option that is a rich source of calcium and vitamin D.”
[Fung EB, et al., *J Nutr Educ Behav*, 42: S22-S29, 2010]

REPORT OF PRESIDENT’S TASK FORCE ON CHILDHOOD OBESITY

On May 11, the Task Force on Childhood Obesity released its plan – a report that reflects input from 12 federal agencies, including USDA, DOE and HHS as well as 2,500 public comments and a public meeting. The report focuses on the four priority areas set forth in the Memorandum signed by President Obama on February 9, 2010, which also form the pillars of the public awareness effort led by First Lady Michelle Obama, “Let’s Move!”: (1) empowering parents and caregivers; (2) providing healthy food in schools; (3) improving access to healthy, affordable foods; and (4) increasing physical activity. It provides 70 recommendations for public and private sector action, as well as concrete metrics and benchmarks to measure progress. Below are highlights from the recommendations:

- **Getting children a healthy start on life** – recommendations in this section deal with good prenatal care for their parents; support for breastfeeding; adherence to limits on “screen time”; and quality child care settings with nutritious food and ample opportunity for young children to be physically active.
- **Empower parents and caregivers with simpler, more actionable messages about nutritional choices** – The report outlines recommendations in this section including these simple, actionable messages to educate consumers about the Dietary Guidelines and Food Pyramid:
 - Drink water instead of soda or juice with added sugar;
 - Avoid foods that consist mainly of added sugars or fats;
 - Eat more fruits, vegetables, whole grains, and lean proteins;
 - **Choose low-fat or fat-free dairy products (such as 1% or skim milk); and**
 - When possible, eat dinner together as a family; and improved health care services, including BMI measurement for all children.
- **Providing healthy food in schools, through improvements in federally-supported school lunches and breakfasts** -- Through Child Nutrition Reauthorization and USDA’s regulatory proposal to guide school foods, the report recommends upgrading the nutritional quality of other foods sold in schools; and improving nutrition education and the overall school environment. The report also says, “Food companies should be encouraged to develop new products and reformulate existing products so they meet nutritional standards based on the Dietary Guidelines and appeal to children.” For example, food companies should:
 - Offer whole grain-rich bread and cereal products such as sandwich rolls and pastas;
 - Reformulate entrees, sauces, and condiments to contain less sodium, while incorporating alternative flavorings and seasonings to maintain palatability; and
 - **Reduce the high levels of added sugars in many flavored milks and yogurts**
- **Improving access to healthy, affordable food** – The report recommends a comprehensive approach to eliminate “food deserts” in urban and rural America and lower the relative prices of healthier foods. It also takes into consideration state and local taxes on sugar-sweetened beverages and says, “A higher tax rate would likely have a greater impact on consumption, as evidenced by the effects of the substantial rise in tobacco taxes.”

- **Getting children more physically active** – The report’s recommendations include encouraging state and local educational agencies to promote recess for elementary students and physical activity breaks for older students, and provide support to schools to implement recess in a healthy way that promotes physical activity and social skill development.

Success will be achieved by the measurable goal of returning the childhood obesity rate to 5% by the year 2030. To accomplish this goal there will need to be a 2.5% reduction in each of the current rates of overweight and obese children by 2015, and by 2020, a 5% reduction. The Task Force plans to track progress through the CDC’s annual National Health and Nutrition Examination Survey (NHANES), and plans to monitor the number of children following recommendations in the Dietary Guidelines through USDA’s Healthy Eating Index. The Task Force plans to encourage healthy eating by:

- Establishing targets for reducing added sugars using CDC’s National Center for Health Statistics
- Increasing fruit consumption to 75% of the recommended level by 2015, 85% by 2020, and 100% by 2030
- Increasing vegetable consumption to 60% of recommended levels by 2015, 75% by 2020, and 100% by 2030

[To view the full report: http://www.letsmove.gov/tfco_fullreport_may2010.pdf]

STUDY FINDS ONLY MINOR DIFFERENCES IN FATTY ACID COMPOSITION OF MILKS WITH DIFFERING LABEL CLAIMS

“In recent years,” explain the authors, “grocery stores have expanded their dairy case selection to include milk products with label claims related to agricultural management practices.” Some consumers may perceive milk labeled rbST-free or organic as being higher in quality, nutritional value, or safety. This study of 292 retail milk samples obtained from the contiguous 48 states compared the fatty acid composition of conventional milk (with no specialty labeling) with milk labeled as recombinant bST (rbST)-free or organic. The milkfat content and composition of milk can be markedly affected by the cow’s diet, according to this paper. The authors explain that no test of milk can detect whether rbST was administered to the cow to increase milk production, or whether organic farm practices were followed. Use of the rbST-free label is based on a farmer affidavit indicating that rbST was not used; the organic label is based on verification that the farm was certified as organic.

Result highlights:

- “Milk fatty acid profiles were remarkably similar among label types.” There was no statistical difference in the fatty acid profiles of conventional and rbST-free milks.
- Compared to either conventional or rbST-free milk, milk labeled organic was significantly higher in saturated fatty acids (65.9 vs. 62.8%) and lower in monounsaturated fatty acids (26.8 vs. 29.7%), and polyunsaturated fatty acids (4.3 vs. 4.8%). Although this pattern is less desirable from a public health perspective, the authors say “the differences were relatively minor” and of “no physiological importance”.
- Organic milk also had a higher content of natural trans fatty acid *trans*-11 18:1 (1.71 vs. 1.46%) than did the other milks. The authors say “there is no scientific evidence to indicate that naturally occurring TFA (trans fatty acids) are detrimental to human

health". As with the other fatty acids, the differences noted between labeled milk types were not physiologically important.

- Conjugated linoleic acid (*cis*-9, *trans*-11 18:2 CLA), a bioactive fatty acid with demonstrated anti-cancer and anti-atherogenic effects in preliminary studies, was found in greater quantity in milk labeled organic when compared to rbST-free or conventional milk. The differences between milk sources were minor. The authors explain that organic producers are required to provide their cows with some access to pasture; pasture grazing may increase the CLA content of milk. However, organic farms vary widely in the amount of pasture grazing they offer, as do conventional farms. When milk from different farms is pooled and sold at retail, grazing's effect on CLA content is diluted.

The authors conclude, "Milk fatty acid profile is mainly affected by dietary components and formulations rather than by production management practices." They found "no meaningful differences" between the labeled milks tested that would affect public health. Therefore, "Results indicate that these specialty labeled milks are similar in nutritional quality and wholesomeness to their conventional counterparts." [O'Donnell AM, et al., *J Dairy Sci*, 93: 1918-1925, 2010]

STUDY SHOWS A DAIRY RICH DIET IS SAFE AND PRACTICAL FOR WEIGHT CONTROL IN YOUNG OVERWEIGHT CHILDREN

This randomized controlled trial evaluated the long-term effect of a dairy-rich diet on generalized and abdominal obesity, as well as on the components of the metabolic syndrome, among 95 obese children (average age 5.6 years) who had been referred to an obesity research clinic in Iran. The children were randomly assigned to 3 groups for a 6-month intervention. All participants attended 6 consecutive monthly family-centered education sessions about healthy lifestyle conducted by a pediatrician and a nutritionist. Group 1 participants were instructed to eat an isocaloric dairy-rich diet (>800 mg calcium/day supplied primarily by low-fat and regular milk, cheese, and yogurt as well as liquid and solid curd); group 2 was instructed to follow a diet calculated to meet the calorie requirement for their height (energy-restricted); group 3 (control group) received no dietary recommendation other than what was presented in the educational sessions. After completion of the 6-month intervention, the 3 groups were followed-up twice a year until 3 years after recruitment.

Result highlights:

- Body mass index (BMI) decreased significantly to a similar degree in all 3 groups after the 6-month trial.
- BMIs rose significantly in all groups throughout the follow-up period to the end of the study. However, in the dairy-rich group "this rise was lower than in the other two groups, and it remained lower than the baseline value until the 12-month follow-up".
- In the energy-restricted and control groups, average waist circumference (WC) increased significantly until the 24-month follow-up. However, the increase in the average WC was somewhat lower in the dairy-rich group (4.1 cm), than in the energy-restricted group (4.8 cm), and the control group (5.2 cm).
- Percent body fat decreased significantly in all groups at the end of the 6-month trial, with no significant difference between groups (average decrease 5.2%). In the dairy-rich group, change in percent body fat remained lower than the baseline values until 12

months after the study, while in the energy restricted and control groups the average change reached 1.2% when compared to baseline values.

- In all groups, serum triglyceride, insulin, and HOMA-R (indicator of insulin resistance) levels decreased significantly after the 6-month trial, and HDL- cholesterol increased – without a significant difference between groups.
- In the dairy-rich group, serum triglyceride, insulin, and HOMA-R remained lower than baseline until the 12-month follow-up. During follow-up there was a significant sustained decline in HDL-cholesterol values in all groups until 24 months after the study. However, “in the dairy-rich group, the HDL-cholesterol level remained higher than the baseline value, and was significantly higher than in the energy-restricted and controls groups (1.2 vs. -1.1 and -1.4, respectively).
- There were no significant changes in blood pressure, fasting blood sugar, or C-reactive protein.

The authors report low compliance with calorie restriction in this study. They say that low compliance is one of the main barriers for weight loss among children and their families. However, they found it interesting that the children and families in this study had “persistent compliance” in the use of higher amounts of dairy foods. They say increasing the dairy intake of children “could promote a positive dietary behavior rather than using a prohibitive approach.” In conclusion, they say an isocaloric dairy-rich diet “can be recommended as a safe and practical strategy for weight control and improvement of insulin resistance and some components of the metabolic syndrome in young, overweight children.” [Kelishadi R, et al., *J Am College Nutr*, 28(5): 601-610, 2009] [Editor’s note: This journal is behind in their publication schedule. The October 2009 issue was published in May 2010.]

TOTAL MILK AND DAIRY INTAKE AT 2 YEARS WAS NOT ASSOCIATED WITH OVERWEIGHT AT 3 YEARS

Researchers at Harvard Medical School in Boston examined the relationship between milk and dairy intake at age 2 years and overweight at age 3 years in 852 preschool children enrolled in Project Via, a prospective cohort of mothers and their offspring. Dietary intake was assessed using a semi-quantitative child food frequency questionnaire that had been validated among preschool-aged children and was completed by the mother when the child was 2 years old. Of primary interest were daily servings of whole, reduced-fat, or 1%/non-fat milk consumed.

Result highlights:

- “At age 2 years, the mean total milk intake was 2.6 servings per day, and mean total dairy intake was 4.3 servings per day.” More than half (53.1%) of the children drank whole milk, 26.5% drank reduced-fat milk, and 20.4% drank 1%/non-fat milk.
- After adjustment for other factors that could influence weight (i.e., age, sex, race/ethnicity, energy intake, nondairy beverage intake, television viewing, maternal BMI/education, paternal BMI, and BMI z score at 2 years), “whole milk intake at age 2 years was associated with a modest decrease in 3-year BMI z score among whole milk drinkers, with a similar trend among reduced-fat milk drinkers.”
- In the 656 children who were not overweight at age 2, there was no association between milk intake at age 2 and BMI z score at age 3 years. “Thus,” say the authors, “among children with a normal BMI at age 2 years, higher intake of whole milk was not associated with lower adiposity at age 3 years.”

- “Neither total milk nor total dairy intake at age 2 was associated with BMI z score or incident overweight at age 3 years.”

The authors reiterate the American Academy of Pediatrics (AAP) recommendation that children aged 1-3 years drink the equivalent of 2-3 cups of milk daily to meet calcium requirements for optimal bone health. Even though the results of this study suggest that switching from whole to reduced-fat milk at age 2 “may not be effective in preventing the development of overweight at age 3 years”, the authors see no reason to change the AAP and American Heart Association recommendations to that effect. The authors conclude, “Our findings suggest that a higher intake of milk, whether full- or reduced-fat, is unlikely to prevent development of obesity among preschool-aged children. Milk intake, however, may offer other health benefits, including provision of calcium, vitamin D, and other nutrients.” [Huh SY, et al., *J Am Diet Assoc*, 110: 563-570, 2010]

CALCIUM’S INDIRECT EFFECT ON BODY FAT ACCUMULATION IN CHILDREN

This study, conducted among 315 European American (122), African American (107), and Hispanic American (86) children (7-12 years), investigated the relationships between calcium intake, resting energy expenditure (REE), and body fat in peripubertal children, while accounting for differences in body composition as well as using genetic admixture as a control for genetic variability. The study consisted of two clinic visits. On the first visit, pubertal status, body composition, and diet (24-hour recall) were assessed, and anthropometric measurements were taken. The second visit was an overnight stay that included another 24-hour recall and measurement of REE using indirect calorimetry (30 minute measurement of oxygen uptake/carbon dioxide production under a ventilated canopy). Parents classified the race/ethnicity of their children, and the researchers used ancestry informative markers (AIMs) to estimate African American, European American, and Native American admixture. Statistical models tested: 1) if calcium intake significantly affected REE; 2) if calcium intake significantly affected total body fat; 3) if REE had a significant effect on total body fat; and 4) if the relationship of calcium intake and total body fat was mediated by REE indirectly.

Result highlights:

- A higher calcium intake was significantly associated with a higher REE.
- “REE had a direct effect on total body fat” that was statistically significant. “Furthermore,” say the authors, “there was a significant indirect effect of calcium intake on total body fat, suggesting that REE mediated the influence of calcium intake on total body fat.”
- In boys, but not girls, there was strong evidence of an indirect effect of calcium intake on total body fat, indicating mediation by REE.

The authors say, “Theoretically, metabolic alterations that minimize positive energy flux by creating a greater calorie need have the potential to result in less fat accumulation over time. By this theory, the positive association found between dietary calcium and REE could have a positive impact on long-term weight maintenance.” They conclude, “Calcium intake may play a role in body fat accumulation and energy balance through its effects on REE in children.” [Hanks LJ, et al., *The Journal of Pediatrics*, published online April 18, 2010]

A SEMINAR ON CHILDHOOD OBESITY

A seminar on childhood obesity was published online ahead of print in the *Lancet* on May 6. This paper reviews new information and outlines some of the remaining challenges since the

last seminar was published eight years ago. A 2006 review of worldwide trends in childhood obesity predicted a 40% prevalence of childhood obesity in North America (and other regions) by 2010. However, recent data “suggest that the increase in childhood obesity in the USA, the UK, and Sweden might be abating.” Recognizing that “Obesity is a complex disorder that is affected by many interacting genetic and non-genetic factors,” the authors focus mainly on available information for prevention and treatment, and make some recommendations. Here are some of the highlights:

- “Childhood obesity can adversely affect almost every organ system and often has serious consequences, including hypertension, dyslipidaemia, insulin resistance or diabetes, fatty liver disease, and psychosocial complications.”
- “Prevention, especially in young people, is universally viewed as the best approach to reverse the rising global prevalence of obesity. However, evidence about the most effective means of prevention . . . is scarce.”
- One group of researchers calculated that “an energy deficit of more than 250 kcal per day is needed to prevent further weight gain in 90% of overweight children; this deficit is equivalent to a child walking an additional 1-2 hours per day at 1.9 km/hour, or consuming roughly a fifth fewer calories than usual per day.”
- “At a household or family level, encouragement of parents to offer appropriate food portions, foster physical activity, increase activities of daily living, and keep sedentary behaviors to a minimum are viewed as basic measure of prevention.”
- “We recommend that children with BMI higher than the 95th percentile, or higher than the 85th percentile when accompanied by comorbidities, such as hypertension, hyperlipidemia, or impaired glucose tolerance, be considered for treatment. Non-pharmacological approaches should be the foundation of all obesity treatment, especially in children, and should always be considered as first-line therapy.”
- The authors recommend a conservative approach, using drug treatment (orlistat or sibutramine) “only in patients with BMI higher than the 95th percentile who have substantial medical complications of obesity and after a reasonable period of behavioral intervention”. Bariatric surgery “should be reserved for only the most severely obese (BMI ≥ 50 kg/m² or ≥ 40 kg/m² with important comorbidities), and even then, considered with extreme caution.”
- There is little or no evidence of the effectiveness of public policies and mass media campaigns in preventing childhood obesity, including restaurant menu labeling, media campaigns to increase physical activity, taxes on sugared beverages, and mandatory screening of BMI.

The authors say that “efforts to prevent obesity should continue at all levels,” while at the same time increasing the commitment to “more robust research”. [Han JC, Lawlor DA, and Kimm SYS, *The Lancet*, 375:1737-1748, 2010]

REVIEW OF EFFECTIVE MANAGEMENT STRATEGIES FOR LACTOSE INTOLERANCE

This systematic review is a summary of a report commissioned as background material for a National Institutes of Health Consensus Development Conference on lactose intolerance and health. The review addresses 2 questions: 1) What amount of daily lactose intake is tolerable in participants with diagnosed lactose intolerance? and 2) What strategies are effective in managing individuals with diagnosed lactose intolerance? To answer these questions, the

authors analyzed the results of 36 randomized trials (most were double-blind) with participants older than four years of age with presumed lactose intolerance or malabsorption. Twenty-one studies specifically evaluated tolerance to varying amounts of lactose.

Results:

- “Most studies indicated that persons with lactose intolerance or malabsorption could ingest 12 gm of lactose [the amount in one cup of milk] as a single dose with no or minor symptoms” when lactose or milk was given without other nutrients. When lactose or milk was consumed with other nutrients, 15 to 18 gm of lactose appeared to be well tolerated.
- “A few studies suggested that lactose is better tolerated when consumed at multiple times during the day” as opposed to once a day.
- “Twenty-six studies evaluated lactase- or lactose-hydrolyzed milk supplements or lactose-reduced milk.” Most studies did not show a benefit of consuming lactose-reduced products rather than regular milk when the amount of lactose consumed was 12 gm or less. “At lactose doses greater than 12 gm, studies showed inconsistent benefit of lactose-hydrolyzed products.”
- “Evidence on yogurt, probiotics, rifaxim [drug], and colonic adaptation as interventions was insufficient to reliably assess their efficacy.”

Because the available studies were small and differed in population, setting, and system of reporting symptoms, the results could not be pooled, and estimates of treatment effects could not be determined. The authors recommend conducting double-blind, placebo-controlled studies to evaluate treatment effectiveness in persons with well-documented lactose intolerance. [Shaukat A, et al., *Ann Internal Med*, published online April 19, 2010]

REPORTING SYMPTOMS OF LACTOSE INTOLERANCE DOES NOT ALWAYS INDICATE LACTOSE MALABSORPTION

“There is extended belief among patients with abdominal symptoms that these are caused by lactose [milk sugar] in dairy products,” they authors say. This observational, prospective, transverse study of 353 Caucasian patients referred for a lactose hydrogen breath test (HBT) by their doctor due to reported gastrointestinal symptoms. The study determined whether symptoms that patients usually attribute to lactose intolerance are comparable to symptoms provoked by a controlled lactose challenge -- and whether these symptoms are actually related to a person’s capacity to absorb lactose. Patients were asked to complete a validated 5-item symptom questionnaire describing symptoms they experienced after consuming dairy products at home (home symptoms). Participant were then given a HBT using a high-dose 50 gm lactose challenge and completed the same questionnaire about symptoms experienced as a result of the lactose challenge (lactose challenge symptoms). Patients were classified as either an “absorber” or “malabsorber” based on the HBT results - and were classified as either “tolerant” or “intolerant” according to the results of the symptom questionnaire.

Result highlights:

- For the overall group, “the total symptom score was significantly higher for home symptoms than for the lactose challenge.”
- Approximately half (46.4%) of the patients were diagnosed with lactose malabsorption based on abnormal results of the lactose-HBT.

- Home symptoms were reported as significantly more intense than symptoms experienced after the lactose challenge whether a person was classified as a lactose absorber or malabsorber, tolerant or intolerant.
- Gender did not influence symptom perception.
- The total score of home symptoms did not correlate significantly with the increase in breath hydrogen during the HBT.

“Our results confirm a discrepancy between symptoms our patients attributed to lactose intolerance and symptoms elicited by a large lactose load in the laboratory,” say the researchers. “Thus, it is generally considered difficult to predict lactose malabsorption from symptoms.” Individuals who think they are lactose intolerant tend to avoid dairy products, the authors say. However, the restriction of “normal amounts” of dairy foods is “unwarranted in most patients”, even those diagnosed with malabsorption after a lactose challenge. “A record of symptoms,” they conclude, “does not suffice to establish lactose malabsorption, specific procedures such as the lactose breath test should be performed to confirm it.” [Casellas F, et al., *Clinical Gastroenterology and Hepatology*, published online April 10, 2010]

In Brief...

Delivery of DASH meals helps older adults comply with dietary recommendations

This one-year, randomized, controlled trial among older adults (≥ 60 years) with abnormal blood lipids or high blood pressure determined the effect of providing home-delivered meals (through the Meals on Wheels program) prepared according to Dietary Approach to Stop Hypertension (DASH) diet guidelines. The 298 participants were randomly assigned to one of four groups: 1) Literature (provided with literature related to management of their disease); 2) Therapeutic meal – 7 meals/week therapeutically designed according to DASH guidelines; 3) MNT (Medical Nutrition Therapy) – 3 educational sessions from registered dietitians on ADA nutrition protocols for hyperlipidemia; 4) MNT plus therapeutic meal. The investigators compared changes in compliance with DASH guidelines and intakes of protein, total fat, saturated fat, cholesterol, fiber, magnesium, calcium potassium, and sodium between those who received therapeutic meals (groups 2 and 4) and those who did not receive meals (groups 1 and 3). Results showed, “Participants who received meals were 20% more likely to reach intermediate DASH accordant at 6 months and were 18% more likely to meet saturated fat accordant at 12 months than were those who did not receive meals.” The authors say that the DASH diet, rich in fruits, vegetables, and low-fat dairy foods can have a positive effect on health outcomes. They conclude that the therapeutic meals improved the probability of an intermediate level of compliance to DASH guidelines. [Troyer JL, et al., *Am J Clin Nutr*, 91: 1204-1212, 2010]

DASH diet with calorie restriction and exercise improves insulin sensitivity and blood lipids

The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure recommends lifestyle modifications including the Dietary Approaches to Stop Hypertension (DASH) diet, a diet rich in fiber, fruits, vegetables, and low-fat dairy products that is also low in fat. This randomized, controlled trial of 144 overweight adults (≥ 35 years) with high blood pressure examined the effects of the DASH diet on insulin sensitivity and blood lipids. Participants were randomly assigned to one of three groups: 1) DASH diet alone; 2) DASH diet with aerobic exercise and caloric restriction; 3) usual diet (control group). At baseline and after 4 months of treatment the researchers measure body composition, fitness, insulin sensitivity, and fasting blood lipids. Results demonstrated “that

adherence to the DASH diet alone, although sufficient to modify blood pressure values, resulted in significant improvements in metabolic indices of cardiovascular risk only when accompanied by aerobic exercise and weight loss." In the DASH diet with exercise and caloric restriction, participants lost an average of 19 pounds over four months, and increased their aerobic capacity by 19% -- while those on the DASH diet alone and the control group maintained their weight. In addition, participants significantly improved glucose tolerance and insulin sensitivity and had lower total cholesterol and triglyceride levels compared with both the DASH diet alone and the control group. They also had lower fasting blood glucose and LDL-cholesterol than the control group. [Blumenthal JA, et al., *Hypertension*, 55: 1199-1205, 2010]

Phosphorus from dairy products is found to be associated with reduced risk for hypertension

This study assessed whether phosphorus from different dietary sources was equally related to high blood pressure in more than 13,000 participants in the Atherosclerosis Risk in Communities (AIRC) and the Multi-Ethnic Study of Atherosclerosis (MESA). At baseline, "higher phosphorus intake was associated with lower levels of systolic and diastolic blood pressures in both cohorts, even after adjustment for potential confounders." After an average 6.2 years of follow-up, "Individuals in the top quintile of phosphorus intake had an ~10% lower risk of hypertension than those in the lowest, after adjustment for potential confounders." According to the paper, dairy products were the main source of phosphorus in both cohorts. "Overall," the authors state, "only higher phosphorus intake from dairy products, but not from other dietary sources, was consistently associated with lower levels of systolic blood pressure and lower risk of hypertension." They know of no biological mechanism that would explain how phosphorus could reduce blood pressure. They say their results "suggest that dairy foods, but not phosphorus, per se, might have a beneficial effect on blood pressure." They site the fact that low-fat dairy foods were a substantive part of the combination diet in the Dietary Approaches to Stop Hypertension Trial (DASH), which was more effective at lowering blood pressure than a fruits/vegetables diet or a control diet. "Our results," the authors conclude, "highlight, once more, the importance of focusing on foods, in addition to nutrients, in nutritional epidemiology and offer additional evidence of the potential beneficial effect of dairy foods on blood pressure." [Alonso A, et al., *Hypertension*, 55: 776-784, 2010]

Literature review finds higher dairy consumption is not associated with death, vascular disease, or diabetes

This paper reports results from a meta-analysis of prospective cohort studies of milk and dairy food consumption as predictors of mortality, vascular disease, and diabetes. It also summarizes evidence from relevant retrospective case-control studies. Results of the meta-analysis showed that those with the highest vs. the lowest dairy consumption had a 13% reduced risk for all-cause deaths, a 8% reduced risk of ischemic heart disease, a 21% reduced risk for stroke, and a 15% reduced risk for incident diabetes. Several retrospective case-control studies examined cheese consumption and vascular disease. Results of each are reported separately and the authors note that the evidence on cheese and vascular disease is limited. However, some of the summarized retrospective case-controlled comparisons on cheese intake show that consumption of cheese is associated with reduced risk for heart attack ranging from 23-66%. The authors say, "There appears to be an enormous mis-match between the evidence from long-term prospective studies and perceptions of harm from the consumption of dairy food items." They say, "It seems not unreasonable to conclude that there is no evidence that dairy foods as a total group are associated with harm to health either in terms of death, heart disease, stroke or diabetes, but are probably beneficial in relation to these disease outcomes." They encourage further studies on the biological mechanisms involved in the relationship between dairy foods

and human diseases and whether milk can be modified to further improve health. [Elwood PC, et al., *Lipids*, published online April 16, 2010]

Other Publications of Interest

- *Dairy products and prostate cancer risk.* [Newmark HL and Heaney RP, *Nutrition and Cancer*, 62(3): 297-299, 2010] This short review proposes and provides evidence that high dietary phosphate of dairy products, rather than calcium, may more readily explain possible links between dairy food intake and risk of prostate cancer. The authors hypothesize that higher serum phosphate levels due to high intakes of phosphorus in the Western diet (contributed by dairy foods, meat, colas, and food additives) can rapidly reduce production of the active form of vitamin D which may help inhibit the development of prostate cancer. This provides rationale for the food industry to reduce phosphates added to foods and beverages.
- *Effects of whey protein isolate on body composition, lipids, insulin and glucose in overweight and obese individuals.* [Pal S, Ellis V, and Dhaliwal S, *British Journal of Nutrition*, published online April 9, 2010] This 12-week randomized study evaluated the effects of whey protein supplementation on body composition, lipids, insulin and glucose compared to casein and glucose (control) in 70 overweight/obese adults (18-65 years). Results demonstrated that supplementation with whey protein (54 gm/day) "improves fasting lipids and insulin levels in overweight and obese individuals."
- *Vegetarian diets and childhood obesity prevention.* [Sabate J and Wien M, *Am J Clin Nutr*, 91(suppl): 1525S-1529S, 2010] This review states that "compared to nonvegetarians, vegetarian children are leaner, and their BMI differences become greater during adolescence". The authors say a "plant-based diet seems to be a sensible approach for the prevention of obesity in children."
- *Use of the Nutrition Facts Label in chronic disease management: Results from the National Health and Nutrition Examination Survey.* [Post RE, et al., *J Am Diet Assoc*, 110: 628-632, 2010] This study found that among patients with chronic diseases such as type 2 diabetes, hypertension, and/or hyperlipidemia, "the odds of reading food labels when told by their doctor or another health professional to reduce calories or weight was 50% higher than in those without physician intervention."
- *Trans fats in America: A review of their use, consumption, health implications, and regulation.* [Remig V, et al., *J Am Diet Assoc*, 110: 585-592, 2010] This review states that "although the FDA labeling requirement has led to some reduction in dietary *trans* fats, the labels may mislead many consumers." Labeling rules allow products containing <0.5 gm *trans* fat per serving to claim 0 gm *trans* fat. If multiple products labeled 0 *trans* fat are consumed over the course of a day, the authors say consumers may exceed the maximum 2 gm per day recommended by the American Heart Association.
- *Vitamin D intake needed to maintain target serum 25-hydroxyvitamin D concentrations in participants with low sun exposure and dark skin pigmentation is substantially higher than current recommendations.* [Hall LM, et al., *J Nutr*, 140: 542-550, 2010] Researchers modeled the effects of sun exposure, vitamin D intake, and skin pigmentation on blood levels of 25(OH)D in young adults with a wide range of skin pigmentation and sun exposure. Authors conclude, "To achieve 25(OH)D \geq 75 nmol/L, we estimate that European ancestry individuals with high sun exposure need 1,300 IU/day of vitamin D intake in the winter, and African-American individuals with low sun exposure need 2,100-3,100 IU/day year-round."