

Literature Review for the *Mooove to Lowfat or Fat Free Milk Campaign*

Linda B. Bobroff, Ph.D., RD, LD/N
University of Florida

Mooove to Lowfat or Fat Free Milk is a multi-agency, multi-faceted campaign¹ that is designed to encourage milk drinkers two years of age and older to switch to lowfat or fat free milk in order to reduce fat intake and long-term health risks. This paper provides the research base for the *Mooove* campaign, and includes:

- Diet and chronic disease risk
- Federal dietary guidelines
- Role of communities in promoting healthy lifestyles
- Milk consumption patterns
- Rationale for “moooving” to lower fat milk choices
- Special considerations when using lower fat milk
- Description of existing milk campaigns.

Diet and Chronic Disease Risk

Major health conditions that are associated with diet in the U.S. include obesity, diabetes, cancer, heart disease, stroke, and osteoporosis. Most related to the *Mooove* campaign are obesity, diabetes, and heart disease, since they are related to overall fat consumption and, in the case of heart

disease, to consumption of saturated fat and (to a lesser extent) dietary cholesterol.²

Overweight and Obesity

Overweight and obesity are growing health concerns in the U.S., with approximately 300,000 deaths a year associated with these conditions. Risk of death from all causes, cardiovascular disease, and cancer increases with an increase in body mass index (Calle 1999). Overweight and obesity are second only to cigarette smoking as a contributor to overall mortality in this country.

High blood lipids and hypertension have been identified in overweight children and adolescents, as well as in adults (Satcher 2001). These conditions are both risk factors for heart disease, the leading cause of death in the U.S.

Other health effects of obesity include increased risk for gallbladder disease, sleep disturbances, and endometrial, colon, and postmenopausal breast cancer (USDHHS 2000). In addition to the physical effects of obesity, psychosocial impacts, including low self-esteem and depression, can be devastating, particularly among young people (Satcher 2001).

¹The *Mooove to Lowfat or Fat Free Milk* campaign is an initiative of the Florida Interagency Food and Nutrition Committee. The Committee is a coalition that includes representatives from a number of governmental and educational agencies throughout Florida, with the mission of providing effective food and nutrition services to the public.

² If the campaign encourages people to drink more milk, it can also help reduce risk of osteoporosis (Cadogan 1997). Since this is not the primary focus of the *Mooove* campaign, osteoporosis risk is not addressed in this paper.

During the 1990s, there was a 61 percent increase in the percentage of Americans who were obese, from 12.0 percent to 19.8 percent (CDC 2001). Overweight and obesity were identified as leading health concerns in *Healthy People 2010*, the Nation's health objectives for the first decade of the 21st century (USDHHS 2000).

The *Healthy People 2000* goal of reducing overweight to a prevalence of no more than 20 percent was **not** met. In fact, the prevalence of overweight substantially increased rather than decreased, moving away from the target goal by 150 percent (250 percent in men and 143 percent in women) (NCHS 2001).

The monetary cost of overweight and obesity in the U.S. was estimated to be \$117 billion for the year 2000 (Satcher 2001), and the personal costs are inestimable. Members of low-income families, and racial and ethnic minorities (particularly among women), are more likely than others to be overweight or obese (Satcher 2001).

The *Healthy People 2010* goals are to reduce the proportion of children and adolescents who are overweight or obese to 5 percent of the population and reduce adult obesity to 15 percent of the population 20 years and older (USDHHS 2000).

Diabetes

The increasing incidence of overweight and obesity among children and youth, is associated with dramatic increases in type 2 diabetes among young people. The increase in type 2 diabetes in children is alarming since the health complications associated with the disease, including retinopathy, peripheral neuropathy, renal disease, and heart disease, are life-changing and/or life-threatening.

The overall incidence of diabetes in the U.S. increased 49 percent between 1990 and 2000, from 4.9 percent to 7.3 percent (CDC 2001). Approximately 800,000 new cases of diabetes are diagnosed each year (NCHS 2001).

Diabetes prevalence has increased in recent years, moving **away** from the *Healthy People 2000* target of 25 per 1,000 by 367 percent; and from the diabetes-related deaths target of 34 per 100,000 by 75 percent. During this same period, end-stage renal disease incidence increased significantly, moving away from the target of 1.4 per 1,000 by 1,800 percent! (NCHS 2001) In 1997, the health care costs associated with diabetes were \$98 billion (CDC 2001).

Cardiovascular Disease

Although deaths from heart disease have been declining during the past few decades, due to improvements in treatment as well as to public health and other outreach programs and media campaigns, heart disease is still the leading cause of death in men and women in this country. More than 950,000 persons die from cardiovascular disease, including heart disease and stroke, each year (NCHS 2001). The disturbing trends in obesity and diabetes mentioned above portend increases in incidence and premature deaths from heart disease in the future.

Federal Dietary Guidelines

Although physical activity is a significant component of a healthy lifestyle that can reduce obesity and associated health risks, long-term eating habits play a significant role (Satcher 2001). When people make positive dietary choices, they can promote their health and reduce risks for the major chronic diseases and associated risk factors.

This is a basic tenet of the *Dietary Guidelines for Americans*, the cornerstone of federal dietary guidance which is endorsed by the U.S. Department of Agriculture and the U.S. Department of Health and Human Services (USDA 2000).

The dietary guideline that most directly supports the *Mooove* Campaign is “Choose a diet that is low in saturated fat and cholesterol and moderate in total fat” (USDA 2000). In addition, by “moooving” to lowfat or fat free milk, consumers will tend to reduce their total fat and calorie intake which can help them “Aim for a healthy weight,” which is another dietary guideline that is critical for good health (USDA 2000).

Role of Communities in Promoting Healthy Lifestyles

Communities can play a significant role in reducing people’s health risks. Although lifestyle choices are ultimately made by individuals, communities can provide an environment conducive to positive lifestyle choices. As a matter of fact, in *Healthy People 2010*, individual and community health are considered to be “virtually inseparable” with both necessary to attain the vision of “Healthy People in Healthy Communities” (USDHHS 2000).

Communities can contribute to reducing health risks related to overweight and obesity in people of all ages by providing safe and accessible places for people to be physically active, and by promoting healthful food choices in schools and other public places.

In a recent “call to action,” the Surgeon General indicated that schools need to ensure that lowfat food options, including

lowfat or fat free milk and milk products, are available on school campuses and at school events (Surgeon General 2001). This stand directly supports the *Mooove* campaign which encourages young people in school settings to select lowfat or fat free milk choices.

What types of milk are school children currently being offered? During the year 2000, 62.8 percent of all milk ordered by public schools in a typical week was either whole or two percent, both considered high in fat. In schools that order their own food, 65.1 percent order at least some lowfat or fat free milk, but only 20.7 percent of schools ordered both types of milk (NCCDPHP 2000).

In a study conducted in the 1970s in Pennsylvania, junior and senior high school students who were offered lowfat and nonfat³ milk choices as part of school lunch increased their milk consumption, especially when nutrition information was included as part of the program. Thirteen percent of the students chose one of the lower fat choices when nutrition information was not included, and 20 percent did when the information was included. Lowfat milk was preferred over nonfat milk which the students thought tasted watery (Martilotta 1980).

Availability of lower fat milk choices in grocery stores may affect milk selection patterns. In a study of lowfat milk

³ Some older studies use different descriptors for milk with varying amounts of fat, for example nonfat or skim milk instead of fat free. Currently for food labels, lowfat means 3 grams or less fat per serving and fat free means less than 0.5 grams of fat per serving.

availability in a variety of counties in New York, researchers found that, on average, 17 percent of milk on the shelves was 1 percent fat or lower, and that 40 percent of households that drank milk used lowfat milk. There was a strong positive relationship between the amount of lowfat milk in stores and consumption of these milks in households studied. Also, there was more lowfat milk found in wealthier, urban, and white areas (Fisher 1999). The study assumed that people purchased milk close to their homes, but this was the case only in about half of those in the study. The effect of milk availability on consumption patterns needs further study.

Milk Consumption Patterns

The Food Guide Pyramid (HNIS 1992) recommendation for the consumption of milk or milk products (such as yogurt and cheese) is two to three servings per day. Fat free or lowfat milk and milk products are recommended in order for individuals to meet the Dietary Guidelines recommendation for fat intake of 30 percent or less of total calories. Two servings per day of milk or milk products is appropriate for most young children and adults. However, older children and teens (ages 9 to 18 years), and adults over the age of 50 need three daily servings of milk or milk products. During pregnancy and lactation, the recommended number of milk group servings is the same as for nonpregnant women (USDA 2000).

How are Americans doing in their intake of milk and milk products? An Economic Research Service/ USDA food supply survey showed that in 1999, the food supply provided 1.6 daily servings of milk or milk products, about three-quarters of the 2.2 serving target for a 2,200-calorie diet. Although food supply data has its

limitations, this study indicates that Americans may not be consuming the recommended number of daily servings of milk or milk products (Putnam 2000).

There has been a healthy trend in this country toward reduced consumption of whole milk and increased consumption of fat free and lowfat milk. In the late 1960s, Americans consumed four times as much whole milk as lower fat choices, but by the late 1980s, reduced fat milk outsold whole milk (Putnam 1991) and in 1998, whole milk was only 35 percent of annual consumption (Putnam 1998). Between 1987 and 1990 alone, the sales of skim milk rose from 5.7 percent to 10.3 percent of total sales of fluid milk (Lee 1998).

Along with this healthy trend in type of milk consumed, there has been an accompanying increase in cheese and “gourmet type” ice cream consumption in the U.S. which can increase fat intake considerably. Looking back to the 1950s, we’ve seen an increase in annual cheese consumption of 269 percent from 7.7 pounds to 28.4 pounds per person in 1998. The increased trend toward eating out tends to reduce milk intake and increase cheese consumption (Putnam 1998). Although consumption of milk products other than fluid milk is not a primary focus of the *Mooove* campaign, it needs to be noted as a topic of concern to nutrition educators.

Several studies have investigated milk consumption in children, particularly lowfat or fat free milk, since these lower fat milk choices are not recommended for children under two years of age (USDA 2000).

In one study of children enrolled in the WIC program, older Hispanic children were more likely than older white or African-American

children to still be drinking whole milk rather than lowfat or fat free milk. The type of milk consumed did not vary with age among the Hispanic children, indicating that the advice to switch older children to lower fat milk is not reaching the Hispanic community (Dennison *JADA* 2001). Having *Moove* posters available in Spanish and in venues in which Hispanic children and their parents will see them will increase their exposure to this important message.

In another study of WIC clientele, Dennison and associates found that a major predictor of type of milk consumed by children is the type of milk consumed by other family members. Parents or guardians of older children drinking whole milk believed that whole milk is a healthier choice for children, even over age two. In order to change milk consumption patterns in children, it is important to include parents in the intervention to overcome barriers to change (Dennison *Prev Med* 2001). This should be a consideration in the *Moove* campaign.

Why Should People *Moove* to Lower Fat Milk Choices?

Milk and milk products are a major source of fat in the American diet, providing 12 percent of the fat in the U.S. food supply in 1990. The overall trend in recent years toward lower fat consumption in the U.S. is reflected in increased use of lower fat milks (Lee 1998).

Milk is a major source of saturated fat and calories in children's diets (Thompson 1994). Not only can this contribute to obesity in young people, it can promote development of atherosclerosis, the early stages of which have been found in young children (NIH 1991). Making the switch to

lower fat milk can help reverse these trends and promote health in young people.

Whole milk has been found to be a major contributor to a high saturated fat intake among Latino children between 4 and 7 years of age. Those in the highest quintile of intake of high fat milk products (mostly whole milk) consumed more than twice as much saturated fat per day as those in the lowest quintile of intake. The researchers concluded that substituting lowfat milk for whole milk would significantly reduce the saturated fat intake of these young people (Basch 1992).

What are the effects on nutrient intake of using lower fat milk choices? Using USDA's food consumption data base, researchers examined energy, macronutrient, and food intake in persons drinking different types of milk. Persons consuming lowfat milk tended to consume less dietary fat than whole milk drinkers, which is one goal of choosing lower fat milk. Males, but not females, who drank lowfat milk compensated for energy intake by increasing intake of carbohydrates; therefore, the percent calories from fat in their diets was lower. Lowfat milk drinkers tended to consume more fruits and vegetables and less red meat and sweets, indicating an overall healthier approach to eating (Lee 1998).

Lower fat intake has been associated with decreased health risks. A recent meta-analysis of 27 controlled, randomized trials designed to reduce fat or cholesterol intake demonstrated that lower fat diets resulted in reduction of serum cholesterol by an average of 11 percent. Those whose cholesterol was lowered had a lower risk of cardiovascular events and mortality (Hooper 2001).

Reducing dietary fat and saturated fat can also reduce risk of diabetes. In an intervention study in Finland, incidence of type 2 diabetes was reduced by 58 percent among those who reduced dietary fat and saturated fat, and increased dietary fiber and physical activity. One of the changes recommended was a switch to lowfat milk. Those who made these lifestyle changes and lost weight were less likely to have diabetes than those who did not (Tuomilehto 2001).

Children (ages two to 19) who drink fat free milk have been found to come close to the recommended 30 percent of calories from fat **while maintaining adequate intake of calories and critical vitamins and minerals.** This important fact may need to be emphasized in *Mooove* literature directed to parents and caregivers (Peterson 1997).

Special Considerations When Using Lower Fat Milk

The vitamin E content of milk products decreases as the fat is removed, with fat free milk containing the least amount of the fat-soluble vitamin (Kaushik 2001). Persons who consume fat free milk as their primary dairy source should be sure to obtain adequate vitamin E from other food sources or from a vitamin supplement. It should be noted that in one study, children who consumed fat free milk had adequate intake of vitamin E, while those who substituted lean meats for higher fat meats tended to have a lower intake of this fat-soluble vitamin. The children who consumed fat free milk tended to be from households in which the head had a higher education, which may have played a role in their more adequate diet. Pertinent to the *Mooove* campaign, the authors conclude:

“Use of skim milk is an economical single-food strategy that facilitates

achievement of contemporary dietary guidelines while maintaining nutrient adequacy.” (Peterson 1997)

A component of milk that is lost when all of the fat is removed is conjugated linoleic acid (CLA), a substance that is being studied for its potential role as an anti-cancer agent (Belury 1995). People at high risk for cancer (and others) may prefer to choose lowfat rather than fat free milk so that they will have CLA in their diets from this food source. Meats are another source of CLA, which is found only in foods of animal origin.

Milk Campaigns

Similar to the *Mooove* campaign, the *1% or Less* campaign was designed to reduce saturated fat consumption to the recommended 10 percent or less of calories. It is a community-based campaign designed by the Center for Science in the Public Interest in 1994. Results of a pilot study found an increase in overall milk sales of 16 percent at supermarkets in the intervention cities. The market share of lowfat milks (1 percent, ½ percent and fat free) increased from 18 to 41 percent in the intervention cities, a change that was sustained after six months. Thirty-eight percent of people who said that they drank whole or 2 percent milk at the start of the study said that they switched to lowfat milk (Reger 1998).

In a follow-up study of the *1% or Less* campaign, the researchers found that a community-based educational intervention had longer-lasting impacts than a media-only campaign. Although both interventions resulted in changes in milk consumption patterns, paid advertising was effective only as long as the ads aired (Reger 2000).

A school-based intervention, that was part of a community-based cardiovascular disease risk reduction program, was implemented in six schools (three controls) in predominantly Latino areas of New York City (Wechsler 1998). The program used “Lowfat Lucy” described as “a Disney-like anthropomorphic cow” to encourage the children to select lowfat milk. Lowfat milk was promoted in the campaign as the good tasting and “cool” choice. This promotion was dynamic, exciting for the students, and well evaluated.

In taste tests, most children who tried the lowfat milk liked it. Children in the intervention schools more than doubled their selection of lowfat milk, from 25 to 57 percent. The impact of the intervention was greater for children in first and second grade than for those in third and fourth grade. An important component of the program’s success was the cooperation of school cafeteria staff. They had to keep the lowfat milk stocked in order for the students to select it. It is significant that overall milk consumption did not change in this study (Wechsler 1998).

Milk Matters is a nationwide campaign of the National Institute of Child Health and Human Development (NICHD 2001). *Milk Matters* focuses on increasing calcium consumption among children and teens in the U.S. to help them develop strong and healthy bones and prevent future health problems like osteoporosis. The primary focus of *Milk Matters* is to promote milk consumption, although it does promote lowfat or fat free milk as preferred sources of dietary calcium.

The *Milk Matters* website (see references) provides information for health professionals and the media, and as of December 2001, included information for

young people and their parents. Included on the website are games and a variety of free materials such as brochures, fact sheets, coloring books, stickers, and posters, most available in both English and Spanish.

Summary

Higher fat milks contribute significantly to fat and saturated fat consumption in the U.S. Reducing the amount of fat and saturated fat in the diets of Americans over the age of two years can contribute to a reduction in health risks associated with high fat diets.

Changing milk consumption patterns to lowfat and fat free choices can reduce fat and saturated fat intake while maintaining consumption of critical nutrients such as protein, calcium, and vitamin D. Community-based nutrition education interventions can be successful in promoting healthful dietary changes.

With its multi-agency and multi-faceted approach, the *Mooove* campaign has the potential to be a highly successful intervention that promotes a healthful dietary change for Floridians. It will be critical to evaluate the success of the *Mooove* campaign to show that a low-cost intervention can have a positive impact on this particular food behavior in various age groups.

Prepared by Linda B. Bobroff, Ph.D., RD, LD/N, University of Florida, Gainesville, for the Florida Interagency Food and Nutrition Committee’s *Mooove to Lowfat or Fat Free Milk* campaign. Visit our website at: www.doh.state.fl.us/family/cvh/nutrition/milk.html

©2002 University of Florida

References

- Basch CE, Shea S and Zybert P. Food sources, dietary behavior, and the saturated fat intake of Latino children. *Am J Public Health* 1992;82:810-15.
- Belury MA. Conjugated dienoic linoleate: a polyunsaturated fatty acid with unique chemoprotective properties. *Nutr Rev* 1995;53:83-89.
- Cadogan J, Eastell R, Jones N and Barker ME. Milk intake and bone mineral acquisition in adolescent girls: randomised, controlled intervention trial. *Br Med J* 1997; 315:1255-60.
- Calle EE, Thun MJ, Petrelli JM, Rodriguez C, and Heath CW. Body-mass index and mortality in a prospective cohort of U.S. adults. *N Engl J Med* 1999;341:1097-1105.
- Centers for Disease Control and Prevention (CDC). Press Release, September 11, 2001. Available at: www.cdc.gov/od/oc/media/pressrel/r0010911.htm. Accessed on September 14, 2001.
- Dennison BA, Rockwell HL and Nichols MJ. Use of lowfat milk by children in the New York State WIC varies with parental characteristics. *J Am Diet Assoc* 2001;202:464-66.
- Dennison BA, Erb TA and Jenkins PL. Predictors of dietary milk fat intake by preschool children. *Prev Med* 2001; 33:536-542.
- Fisher BD and Strogatz DS. Community measures of lowfat milk consumption: comparing store shelves with households. *Am J Public Health* 1999;89:235-37.
- Hooper L, Summerbell CD, Higgins JPT, Thompson RL, Capps NE, Smith GD, Riemersma RA and Ebrahim S. Dietary fat intake and prevention of cardiovascular disease: systematic review. *Br Med J* 2001;322:757-763.
- Human Nutrition Information Service (HNIS), U.S. Department of Agriculture. *The Food Guide Pyramid*. Home and Garden Bulletin Number 252, 1992.
- Kaushik S, Wander R, Leonard S, German B and Traber MG. Removal of fat from cow's milk decreases the vitamin E contents of the resulting dairy products. *Lipids* 2001; 36:73-8.
- Lee HLC, Gerrior SA and Smith JA. Energy, macronutrient, and food intakes in relation to energy compensation in consumers who drink different types of milk. *Am J Clin Nutr* 1998;67: 616-23.
- Martilotta M and Guthrie HA. Impact of providing milk options and nutrient information in school lunch programs. *J Am Diet Assoc* 1980;77:439-43.

National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP), National Institutes of Health. *School Health Policies and Programs Study 2000*. Available at: www.cdc.gov/shpps. Accessed on January 4, 2002.

National Center for Health Statistics (NCHS). *Healthy People 2000 Final Review*. Hyattsville MD: Public Health Service, 2001. Library of Congress Catalog Card Number 76-641496. Available at: www.cdc.gov/hchs/data/hp2k01.pdf. Accessed on December 31, 2001.

National Institute of Child Health and Human Development (NICHD), National Institutes of Health, *Milk Matters*. Available at: <http://www.nichd.nih.gov/milk/milk.cfm>. Accessed on December 21, 2001.

National Institutes of Health (NIH), National Heart, Lung, and Blood Institute, National Cholesterol Education Program. *Report of the Expert Panel on Blood Cholesterol Levels in Children and Adolescents*. Bethesda MD: NIH, 1991. NIH Pub No. 91-2732.

Peterson S and Sigman-Grant M. Impact of adopting lower fat food choices on nutrient intake of American children. *Pediatrics* 1997;100:e4. Available at: <http://www.pediatrics.org/cgi/content/full/100/3/e4>. Accessed on November 27, 2001.

Putnam J. U.S. Food supply providing more food and calories. *FoodReview*. 1998;22:2-12. Available at: www.ers.usda.gov/publications/foodreview/sept1999/FRsept99a.pdf. Accessed on December 31, 2001.

Putnam JJ and Allshouse JE. *Food Consumption, Prices, and Expenditures, 1968-1989*. Washington, DC: Commodity Economics Division, Economic Research Service, U.S. Department of Agriculture; 1991. Statistical Bulletin 825.

Putnam J, Kantor LS, Allshouse J. Per capita food supply trends: progress toward dietary guidelines. *FoodReview* 2000;23:2-14. Available at: www.ers.usda.gov/publications/foodreview/septdec00/FRsept00a.pdf Accessed on December 31, 2001.

Reger B, Wootan MG and Booth-Butterfield S. A comparison of different approaches to promote community-wide dietary change. *Am J Prev Med* 2000;18:271-75.

Reger B, Wootan MG, Booth-Butterfield S and Smith H. 1% or less: a community-based nutrition campaign. *Public Health Reports* 1998;113:410-19.

Satcher D. *Overweight and obesity threaten U.S. Health Gains*. U.S. Department of Health and Human Services Press Release, December 13, 2001. Available at: www.hhs.gov/news. Accessed on December 14, 2001.

Surgeon General of the U.S. *The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity*. 2001. Available at: www.surgeongeneral.gov/topics/obesity. Accessed on December 14, 2001.

Thompson FE, Dennison BA. Dietary sources of fats and cholesterol in U.S. children. *Am J Public Health* 1994;84:799-806.

Tuomilehto J, Lindström J, Eriksson JG, Valle TT, Hämäläinen H, Ilanne-Parikka P, Keinänen-Kiukaanniemi S, Laakso M, Louheranta A, Rastas M, Salminen V and Uusitupa M. Prevention of type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. *N Engl J Med.* 2001; 344: 1343-50.

U.S. Department of Agriculture (USDA) and U.S. Department of Health and Human Services. *Nutrition and Your Health: Dietary Guidelines for Americans, Fifth Edition.* Home and Garden Bulletin No. 232. Washington DC: 2000. For sale by the U.S. Government Printing Office, Superintendent of Documents, Washington DC 20402-9328, ISBN 0-16-050376-0.

U.S. Department of Health and Human Services (USDHHS). *Healthy People 2010* (Conference Edition, in Two Volumes). Washington DC: January 2000. For sale by the U.S. Government Printing Office, Superintendent of Documents, Washington DC 20402-9382, Stock Number 017-001-00543-6, ISBN 0-16-050260-8. Visit: www.health.gov/healthypeople or call 800-367-4725.

Wechsler H, Basch CE, Zybert P and Shea S. Promoting the selection of lowfat milk in elementary school cafeterias in an inner-city Latino community: evaluation of an intervention. *Am J Public Health* 1998;88:427-433.
