

Lactose Intolerance Among Different Ethnic Groups



Individuals from a variety of ethnic groups who have experienced gastrointestinal problems consuming milk are learning new strategies to enjoy milk and other dairy foods. This means that most people with lactose intolerance can enjoy dairy foods and the essential nutrients they provide.

The health consequences of avoiding dairy foods, a major source of dietary calcium, potassium, and vitamin D as well as a source of other essential nutrients, may be especially serious for African Americans, Hispanics, Asians, and Native American Indians. Many ethnic groups are at high risk of hypertension, stroke, osteoporosis, obesity, diabetes, and colon cancer – diseases in which a low intake of dairy and dairy nutrients (e.g., calcium, vitamin D, potassium) can be a contributing factor.



Contained within are facts about lactose intolerance and what scientific experts say about various issues related to this subject. This information can help put the issue of lactose intolerance into a realistic perspective that includes patient-friendly solutions for dietary management of lactose intolerance.

WHAT IS LACTOSE INTOLERANCE?

There are many misperceptions about what lactose intolerance really is – and what it isn't. The graphics below outline the key differences between, lactose maldigestion, lactose intolerance, and milk allergy.



In many population groups, the activity of lactase, the enzyme necessary to digest lactose, starts to decline sometime between three and

five years of age. This genetically-controlled decline in intestinal lactase activity is called lactose maldigestion or primary lactase deficiency.

Lactose intolerance refers to gastrointestinal symptoms experienced by some individuals who have low levels of lactase. Lactose is the major carbohydrate in milk and some other dairy foods. You may also find small amounts of lactose in non-dairy processed or baked foods. If the activity of the lactase enzyme is low, undigested lactose may reach the large intestine where it is fermented by naturally residing gas-producing bacteria. This can lead to symptoms of lactose intolerance. Symptoms generally are nonspecific and may include: gas/flatulence, bloating, abdominal pain, or diarrhea. For the most part, if symptoms are experienced, they are mild and vary depending on the individual.

There are varying degrees of lactose sensitivity

Lactose Maldigestion

Incomplete digestion of */lactose*, the natural sugar in milk, due to low activity of the */lactase* enzyme; may be asymptomatic

Lactose Intolerance

Gastrointestinal disturbances following the consumption of an amount of lactose greater than the body's ability to digest and absorb

SOURCE: National Digestive Diseases Clearinghouse, National Institutes of Health. NIH Publication no. 09-2751. 2009. <http://digestive.niddk.nih.gov/ddiseases/pubs/lactoseintolerance/>

Lactose intolerance vs. milk allergy: Key differences

Lactose intolerance	Milk allergy
A sensitivity	An allergy
Occurs in gastrointestinal system	Triggered by immune system
A sensitivity to milk carbohydrate (lactose)	A reaction to milk protein
Rare in young children	Generally impacts young children; may be outgrown*
Can enjoy milk and milk products with simple management strategies	Should avoid milk and milk products (unless allergy is outgrown)

SOURCE: National Medical Association. Lactose intolerance and African Americans: Implications for Consumption of Appropriate Intake Levels of Key Nutrients. J Natl Med Assoc. 2009;101:15-245. http://www.nationaldairycouncil.org/SiteCollectionDocuments/education_materials/aa_health_kit/LactoseIntoleranceandAfricanAmericans_ImplicationsfortheConsumptionofAppropriateIntakeLev.pdf

HOW IS LACTOSE MALDIGESTION DIAGNOSED?

Some people may assume that they can't digest milk and other dairy foods. Yet, one can't simply rely on symptoms to self-diagnose lactose maldigestion. Without testing, it's impossible to know if the symptoms are caused by lactose, a learned aversion, or some other gastrointestinal problem. The symptoms that may arise from lactose maldigestion, known as lactose intolerance, are often confused with cow's milk protein allergy, which is an immunological reaction to one or several of milk's proteins. Cow's milk allergy is reported in about two percent of infants and young children and tends to be outgrown by five years of age. Lactose intolerance is less common in young children. Misdiagnosing lactose maldigestion could lead to unnecessary dietary restrictions, expense, and nutritional shortcomings, or failure to diagnose a gastrointestinal disorder.



“A test for lactose maldigestion is widely available but very few people are clinically diagnosed. Many people self-diagnose this condition based on false preconceptions.”



Dennis Savaiano, Ph.D.
Interim Dean of the Honors College
Professor of Nutrition Science
*Purdue University
West Lafayette, IN*

Medical experts recommend an objective test, such as the breath hydrogen test, to diagnose lactose maldigestion.

Undigested lactose is fermented by bacteria in the colon, producing hydrogen gas, a portion of which is absorbed into the blood and exhaled in the breath. The breath hydrogen test, which can be performed on an outpatient basis, involves measuring baseline breath hydrogen levels after an overnight fast and again at regular intervals following intake of a dose of aqueous lactose or milk. The dose can be 50g, 25g, or in the range of usual intakes (10-12g). If breath hydrogen levels increase by 10 to 20ppm above baseline levels (a lower rise is used with a lower dose), a diagnosis of lactose maldigestion is made.

To diagnose lactose maldigestion, the breath hydrogen test generally used today employs a challenge dose of lactose equivalent to the amount in two 8-ounce glasses of milk (i.e., up to 25g). In the past, breath hydrogen tests used a challenge dose of lactose equivalent to that in about one quart of milk (i.e., 50g lactose or more than four times the amount of lactose in 1 cup of milk). Using this very large dose of lactose given in water without other foods overestimates the number of individuals who are intolerant to usual intakes of lactose, such as that found in one cup of milk (i.e., 12.5g lactose).

A positive diagnosis of lactose maldigestion doesn't mean that milk, dairy products, and other lactose-containing foods should be eliminated from the diet. As you'll learn below, a number of factors, including the amount of lactose consumed at any one time, as well as other factors unrelated to lactose, influence whether or not an individual will be lactose intolerant. Information obtained from well controlled, double-blind studies indicates that lactose intolerance may be far less prevalent than commonly believed.

HOW COMMON IS LACTOSE MALDIGESTION AMONG CERTAIN ETHNIC GROUPS?

Prevalence of Lactose Maldigestion

The estimated prevalence of lactose maldigestion (or lactase non-persistence) varies among different ethnic and racial groups in the U.S. Previous estimates have indicated that among Asian Americans, African Americans, Native American Indians, and Hispanics, an estimated 50% to 100% are reported to be lactose maldigesters, compared to 15% of Caucasians. In all, it is estimated that about 25% of the U.S. population and 75% of the world's population have low lactase levels or are lactose maldigesters. These figures are based on studies conducted in the 1970s using a large challenge dose of lactose in water. As such, they tend to overestimate the practical significance of lactose intolerance as experienced by most people with lactose maldigestion. Although the panel at the 2010 National Institutes of Health (NIH) Consensus Conference on Lactose Intolerance and Health concluded more research is needed on the subject. Lactose intolerance is a real and important clinical syndrome, but its true prevalence is not known. Large-scale surveys of individuals have since provided additional information about self-reported lactose intolerance and links to dietary habits and health outcomes. Additionally, emerging research indicates the prevalence of lactose intolerance may be lower than previously thought – both among ethnic groups and the U.S. population as a whole (Keith, 2011; Nicklas, 2011).

A diagnosis of lactose maldigestion doesn't necessarily mean that the individual will experience intolerance symptoms. Despite the estimated high prevalence of lactose maldigestion in African Americans and Hispanics, far fewer report being lactose intolerant. For example, results published in early 2011 from two consumer-based surveys (Keith, 2011; Nicklas, 2011) found that only 20 to 24% of African Americans considered themselves to be lactose intolerant. Additionally, survey findings indicated less than nine percent of Hispanics considered themselves lactose intolerant. In fact, many Hispanics perceive that dairy foods are central to their culture.

Symptoms Aren't Always Lactose Intolerance

Several ethnic groups have low levels of lactase, but stereo-typing all of these population groups as lactose



“Primary lactase deficiency is common. However, the incidence varies according to ethnicity and is related to the use of dairy products in the diet. In populations consuming a predominantly “dairy” diet, such as Northern Europeans, the incidence of primary lactase deficiency is low compared to that in Hispanic, Asian, or African American children. Even these children should be able to tolerate small amounts of milk or other dairy products, which is important for bone health and development.”



**Jatinder J.S. Bhatia,
M.D., FAAP**

Professor and Chief
Section of Neonatology
Department of Pediatrics
Medical College
of Georgia
Augusta, GA

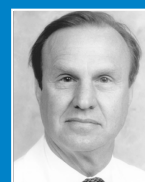
intolerant is inappropriate. Why? Gastrointestinal symptoms that mimic lactose intolerance may be explained by factors unrelated to lactose such as culturally-based attitudes toward milk learned at a young age. Many people who say they have trouble digesting milk have actually never been diagnosed as lactose intolerant by a health professional. When Asian, Hispanic, and Caucasian teenage girls who self-reported milk intolerance completed a breath hydrogen test, more than half (55%) were not lactose maldigesters. A study published in 2011 found that, among African Americans, only 19% who considered themselves lactose intolerant had been diagnosed by a medical professional. Though only 29% of the general population with lactose intolerance had been diagnosed by a medical professional, significantly fewer African Americans (19%) with lactose intolerance had officially been diagnosed.



Studies Confirm that Lactose Intolerance is Overestimated

One-third of 45 African American adolescents and adults with diagnosed lactose intolerance had some minor symptoms of intolerance after consuming both lactose-containing and lactose-hydrolyzed milk under double-blind conditions. Clearly, the symptoms in some of these African Americans were not due to lactose intolerance. Rather, the symptoms were most likely explained by culturally-determined food preferences developed early in life or learned attitudes that affected their ability to tolerate milk.

“Individuals vary immensely in their intake of dairy products depending on personal preference and country of origin. Avoidance of milk usually has nothing to do with lactose intolerance. The bottom line is that certain population groups have a tendency to consume less milk than do Caucasians, but this behavior is not necessarily related to lactose intolerance.”



Michael Levitt, M.D.

Associate Chief of
Staff for Research
Minneapolis VA
Medical Center
Minneapolis, MN

CAN VARIOUS ETHNIC GROUPS INCLUDE MILK AND OTHER DAIRY FOODS IN THEIR DIET?

Lactose intolerance doesn't have to be an obstacle to meeting calcium needs through milk and other dairy foods. Researchers in Minnesota found that lactose maldigesters, some of whom described themselves as lactose intolerant, could consume the amount of lactose in two cups of milk with food, one cup at breakfast and another at dinner, without developing symptoms.



“Lactose maldigestion does not necessarily result in lactose intolerance (symptoms). Our meta-analysis of 21 clinical studies, which included African American, Hispanic, Asian, and Caucasian lactose maldigesters, found that lactose was not a major cause of symptoms following consumption of usual intakes of dairy foods such as 1 cup of milk.”



Dennis Savaiano, Ph.D.
Interim Dean of the Honors College
Professor of Nutrition Science
Purdue University
West Lafayette, IN

The 2010 National Institutes of Health (NIH) Consensus Development Conference on Lactose Intolerance and Health analyzed the results of 36 randomized trials with participants older than age four with presumed lactose intolerance or malabsorption. Twenty-one studies specifically evaluated tolerance to varying amounts of lactose. According to the Expert Panel, research indicated that persons diagnosed with “lactose malabsorption can ingest twelve grams of lactose (the equivalent of 1 cup of milk) without significant symptoms, particularly if ingested with other foods.” The expert panel also concluded that lactose malabsorbers aren't necessarily lactose intolerant – in fact, “the majority of people with lactose malabsorption do not have clinical lactose intolerance.” And, there is no need to eliminate dairy as a first-step following diagnosis of lactose intolerance.

Two cups of milk provide about 600mg calcium. This amount falls far short of the amount of dietary calcium intake recommended for individuals 4 years and older (currently 1,000 - 1,300mg/day). In 1998, researchers conducted another study to determine if lactose maldigesters could tolerate a diet providing 1,500mg calcium/day (the highest recommended calcium intake at that time) primarily from dairy products. In this double-blind cross-over study, 31 women with lactose maldigestion (more than half of whom were minorities) and 31 women who were not lactose maldigesters (all Caucasians) consumed one of two diets for one week and then switched to the other: a dairy-rich diet containing two cups of milk, one cup of yogurt, and 56g cheese daily, or an identical diet containing lactose-reduced versions of milk and yogurt. With the exception of some mild flatulence, no differences in symptoms occurred regardless of whether the women consumed the regular or lactose-reduced dairy products.

Based on their findings, the researchers concluded that lactose maldigestion need not be a major barrier to

“The African American participants in the DASH study had no problems consuming three servings of dairy foods/day. Recognizing that some may be lactose intolerant, we used simple dietary strategies to minimize any symptoms. These included offering fluid milk in small portions with meals, cheese, and yogurt. Also, lactose digestive aids were available, if needed.”



Marlene Most, Ph.D., R.D., L.D.N., F.A.D.A.

Associate Professor of Research
Pennington Biomedical Research
Center, Baton Rouge, LA

consuming 1,500mg calcium/day from dairy products. Therefore, individuals diagnosed as lactose intolerant can meet the highest current recommendations for calcium from dairy foods. Interestingly, 66% of the women with lactose maldigestion were surprised that their symptoms following intake of dairy foods were “less than expected.”

In the landmark DASH (Dietary Approaches to Stop Hypertension) study, African Americans who consumed three servings/day of dairy foods as part of the DASH diet experienced blood pressure benefits without any symptoms of lactose intolerance. The DASH study demonstrates that a low-fat diet rich in low-fat dairy foods, fruits, and vegetables can reduce blood pressure in individuals with high-normal blood pressure. Further, the blood pressure reduction is similar to that achieved with currently available blood pressure medications. In this study, 62% of the participants were African Americans. The blood pressure lowering effect of the DASH diet was twice as great in African Americans as in Caucasians. This finding is important given that African Americans suffer from hypertension in greater numbers, develop the condition earlier in life, and have more serious complications than do Caucasians.

Most people with lactose intolerance say they are open to consuming dairy foods – as long as they can avoid the discomfort associated with consuming them – and that they like the taste of lactose-free milk more than several non-dairy alternatives (Palacios, 2009). Additionally, research suggests the vast majority of African Americans with self-reported lactose intolerance said they would be willing to consume dairy products if they could avoid lactose intolerance symptoms (Keith, 2011).

DIETARY CALCIUM RECOMMENDATIONS	
Life-Stage Group	RDA (mg/day)
1-3 years	700
4-8 years	1,000
9-18 years	1,300
19-50 years	1,000
51+ years*	1,200
Pregnancy/Lactation	
≤ 18 years	1,300
19-50 years	1,200
*For males 51-70 years, the RDA is 1,000 mg/day	
Committee to Review Dietary Reference Intakes for Vitamin D and Calcium, Food and Nutrition Board, Institute of Medicine, National Academy of Sciences. Dietary Reference Intakes for Vitamin D and Calcium. The National Academies Press, 2010.	

WHY IS IT IMPORTANT THAT CERTAIN ETHNIC GROUPS INCLUDE DAIRY FOODS IN THEIR DIETS?

Reducing consumption of dairy foods due to concerns about lactose intolerance can result in a lower intake of milk's nutrients, especially calcium, which increases the risk of several chronic diseases. This is of particular concern for ethnic groups whose intakes of several nutrients fall below recommended levels. According to one study, African Americans in all age groups have lower than average intakes of calcium, magnesium, and phosphorus than non-African Americans and consume fewer than three servings of low-fat and fat-free milk and milk products daily, as recommended by the 2010 *Dietary Guidelines for Americans* for most people. According to the consensus statement developed by the 2010 NIH Consensus Development Conference: Lactose Intolerance and Health expert panel on lactose, "Many individuals with real or perceived lactose intolerance avoid dairy and ingest inadequate amounts of calcium and vitamin D, which may predispose them to decreased bone accrual, osteoporosis, and other adverse health outcomes. In most cases, individuals do not need to eliminate dairy consumption completely." The NIH's expert panel on lactose

"It's important that certain ethnic groups, particularly African Americans, include calcium-rich milk and other dairy foods in their diet to reduce their risk of high blood pressure. This was clearly shown in the DASH study. The DASH diet offers an option, without the use of medications, for lowering blood pressure and possibly preventing hypertension. For those who currently avoid dairy foods, effective and simple dietary strategies are available to help include these foods in the diet."



Marlene Most, Ph.D., R.D., L.D.N., F.A.D.A.

Associate Professor of Research
Pennington Biomedical Research Center
Baton Rouge, LA



"Certain ethnic groups don't come close to meeting recommended servings of dairy foods or dietary intakes of calcium. Further, these groups tend to consume less dairy products and dairy nutrients such as calcium than Caucasians. This could increase the risk in this population of major chronic diseases including osteoporosis, hypertension, colon cancer, stroke, and obesity."



Connie M. Weaver, Ph.D.

Distinguished Professor
and Head^a
Department of Foods
and Nutrition
Purdue University
West Lafayette, IN
Purdue University
West Lafayette, IN





intolerance suggests health professionals counsel patients with lactose intolerance or lactose malabsorption on strategies for including dairy (and other dietary sources of the many nutrients found in dairy foods) to prevent nutrient shortfalls due to dairy avoidance.

Avoiding or limiting consumption of dairy foods reduces intake of several key nutrients and low calcium intake is likely. Dairy foods are a major source of calcium, providing about 70% of the calcium available in the U.S. food supply (USDA, 2011). Milk is the number one food source of three of four nutrients the 2010 *Dietary Guidelines* identified as lacking in the diets of Americans – vitamin D, calcium and potassium – and the

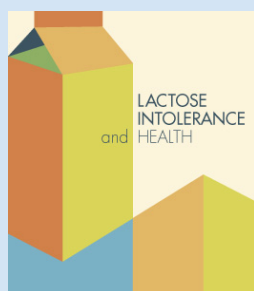
Dietary Guidelines recommends increasing intakes of low-fat and fat-free milk and milk products, such as milk, yogurt and cheese, to help fill these nutrient gaps. In addition to calcium, milk and other dairy foods provide appreciable amounts of other essential nutrients such as potassium, phosphorus, protein, vitamins A, D, and B12, riboflavin, and niacin (niacin equivalents). Intake of a calcium-rich diet through milk and other dairy foods improves the overall nutritional quality of the diet (Ballew, 2000; Weinberg, 2004; Ranganathan, 2004).

Many people are not meeting the calcium Recommended Dietary Allowances (RDAs) – the amount needed to cover 98% of the population's requirement and used for individual guidance in making recommendations, though most life stage groups are close to meeting median intakes (Estimated Average Requirements). Currently, there are subsets of the population that are at risk for insufficient intakes of both vitamin D and calcium. Females 9–18 years are not getting enough calcium, and the elderly may fall short of meeting vitamin D and calcium requirements. Additionally, some individuals—particularly those who are older and living in institutions or who have dark skin pigmentation—may be at increased risk for getting too little vitamin D. For those who use supplements as a strategy, “care should be taken not to over-supplement” (IOM, Chapter 8, 2011). Many individuals may not be meeting the RDAs for calcium and vitamin D, the values that ensure that nearly everyone gets adequate amounts of these nutrients (Institute of Medicine, 2011). Not only is the U.S. facing a calcium crisis, but many ethnic groups are at high risk of chronic diseases in which calcium deficiency can play a contributing role.





Key Conclusions from the 2010 NIH Consensus Development Conference: Lactose Intolerance and Health



U.S. Department of Health & Human Services • National Institutes of Health
NIH Consensus Development Program



The Consensus suggested overall that health professionals counsel patients with lactose intolerance or lactose malabsorption on strategies to help include dairy (and other dietary sources of the many nutrients found in dairy foods) to prevent nutrition shortfalls due to dairy avoidance. The following are conclusions from the Conference:

- *Lactose intolerance is a real and important clinical syndrome, but its true prevalence is not known.*
- *The majority of people with lactose malabsorption do not have clinical lactose intolerance. Many individuals who think they are lactose intolerant are not lactose malabsorbers.*
- *Many individuals with real or perceived lactose intolerance avoid dairy and ingest inadequate amounts of calcium and vitamin D, which may predispose them to decreased bone accrual, osteoporosis, and other adverse health outcomes. In most cases, individuals do not need to eliminate dairy consumption completely.*
- *Even in persons with lactose intolerance, small amounts of milk, yogurt, hard cheeses, and reduced-lactose foods may respond to effective management approaches ... Lactase-treated products may be tolerated better than non-treated products, but more research is needed.*
- *Evidence-based dietary approaches with and without dairy foods and supplementation strategies are needed to ensure appropriate consumption of calcium and other nutrients in lactose intolerant individuals.*
- *Educational programs and behavioral approaches for individuals and their healthcare providers should be developed and validated to improve the nutrition and symptoms of individuals with lactose intolerance and dairy avoidance. (NIH, 2010)*

Adapted from “Unintended Consequences of Dairy Avoidance” (Heaney, 2011) and Current Statistics:

- **Diet Quality:** It is difficult to create a diet from foods available today that both excludes dairy and is nutritionally adequate. For example, in a study of 272 healthy premenopausal women, cited in the book *Calcium and Human Health* (Weaver et al, 2006), more than 50% with low-dairy diets had poor diet quality, while only 10% of those with high-dairy diets had poor overall diets. The Report of the 2010 Dietary Guidelines Advisory Committee (2010) notes that moderate evidence indicates the intake of milk and milk products is linked to improved bone health, especially in children and teens. The dairy food group is a substantial contributor of many nutrients in the diet important for health. Milk contains nine essential nutrients and provides three of four “nutrients of concern” to the diet identified by the 2010 Dietary Guidelines for Americans: calcium, vitamin D and potassium. Low-fat and fat-free dairy foods have high nutrient-to-calorie ratio.
- **Bone Health:** As stressed by the U.S. Surgeon General’s Report on Bone Health (2004), calcium is critically important for bone health and it is well-established that people who avoid dairy foods have reduced bone mass and increased risk of fractures (Obermayer-Pietschy, 2004; Honkanen, 1997; Honkanen, 1996; Segal, 2003; Enattah, 2005; Lehtimäki, 2006; Corazza, 1995; Laaksonen, 2009; Kull, 2009; Laaksonen, 2009), including in childhood (Goulding, 2004). Low-dairy diets are often calcium deficient. Unfortunately, calcium supplements are not by themselves adequate substitutes for dairy foods.

Osteoporosis is very common among African Americans and Hispanics, although it is less prevalent than among Caucasians and Asians. According to the National Osteoporosis Foundation, 40% of African American women, 59% of Hispanic women, and 72% of Caucasian or Asian women older than 50 have osteoporosis or low bone mass (a risk factor for osteoporosis). A similar pattern is seen among men aged 50 and older. Twenty-three percent of African American, 26% of Hispanic, and 42% of Caucasian or Asian men have osteoporosis or low bone mass. Hip fractures among Hispanics in the U.S. appear to be on the rise.

- **Weight Management:** Children with low dairy intakes are at an increased risk of being overweight or obese than those with adequate dairy intakes (Black, 2002; Rockell, 2005). Although dairy intake certainly will not cure obesity, some research suggests adults with low dairy intakes tend to have higher levels of body weight (Heaney, 2008).

Overweight and Obesity: African American and Mexican American adults have a higher prevalence of overweight and obesity than Caucasians. Excess weight can increase the strain on the heart, raise blood cholesterol and triglyceride levels, and lower HDL (good) cholesterol levels. It can also make diabetes more likely to develop.

“Milk and milk products are the primary source of dietary calcium and provide other nutrients important for bone health. Self-described ‘lactose intolerant’ individuals often restrict their intake of dairy foods which limits maximum bone density and may lead to increased risk of osteoporosis and bone fractures.”



Dennis Savaiano, Ph.D.

Interim Dean of the Honors College
Professor of Nutrition Science
Purdue University
West Lafayette, IN

- **Cardiovascular Disease:** High dairy intakes have also been associated with lower risks of hypertension (Pereira, 2002; Elwood, 2007; Jorde, 2000). In fact, dairy's role in blood pressure regulation was emphasized in the Dietary Approaches to Stop Hypertension (DASH) trial, which included an eating plan high in potassium, calcium and magnesium. The eating plan included about three servings of low-fat or fat-free dairy each day and resulted in lower systolic and diastolic blood pressures, particularly among hypertensive and African American patients. Several studies since have confirmed these findings. Additionally, dairy fat does not seem to produce the same negative changes in blood lipids that other saturated fats do (Bendsen, 2011; Lorenzen, 2011; Sjogren, 2004; Smit, 2010).

Hypertension and Stroke: Compared to Caucasians, African Americans develop high blood pressure at an earlier age and it is more severe at any decade of life. More than 40% of African Americans have high blood pressure. Consequently, African Americans have a 1.3 times greater risk of nonfatal stroke, a two times greater rate of fatal stroke, are 2.4 times more likely to have a stroke among those aged 20 to 44 than Caucasians a 1.5 times greater risk of heart disease death, and 4.2 times greater risk of end-stage kidney disease than Caucasians. The prevalence of hypertension in Hispanics is similar to that in Caucasians. Heart disease risk is also higher among Mexican Americans, American Indians, native Hawaiians and some Asian Americans. Additionally, results of a nationally representative survey published by Dr. Theresa Nicklas and colleagues in 2011 noted that respondents with self-perceived lactose intolerance were significantly more likely to have physician-diagnosed hypertension; for every 1,000mg increase in calcium intake from dairy foods each day, odds were 40% lower for hypertension.










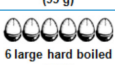








VARIOUS ETHNIC GROUPS CAN USE DAIRY TO HELP MEET CALCIUM AND OTHER NUTRIENT NEEDS

Milk and other dairy foods are the preferred source of calcium. This opinion is supported by the 2010 *Dietary Guidelines for Americans*, the consensus statement from the NIH Consensus Development Conference: Lactose Intolerance and Health expert panel, the American Academy of Pediatrics (AAP), The Special Supplemental Nutrition Program for Women, Infants and Children (WIC) and the National Medical Association (NMA), as well as leading nutrition and medical experts.

Intake of foods such as salmon with bones, legumes, and some green leafy vegetables may help meet calcium needs. However, these foods generally contain less calcium per serving or in some cases the calcium may be less bioavailable than from milk and milk products. Additionally, these foods do not replace the other nutrients found in dairy foods, such as potassium and vitamin D, so these nutrients will need to be obtained from other sources.

A number of calcium-fortified foods including juices, fruit drinks, soy beverages, breads, cereals, and snack foods are

FIGURE 2: Milk Packs a Nutrient Punch

Nutrient	Amount of nutrients found in 3 cups of fat-free milk (Percent Daily Value**)	Approx. amount of non-dairy food source to get about the same nutrient level
Calcium	 = 90% DV	 30 cups raw spinach
Potassium	 = 33% DV	 3 small bananas
Phosphorus	 = 74% DV	 3 1/4 cups canned kidney beans
Protein	 = 50% DV	 1/2 chicken breast (95 g)
Vitamin A	 = 30% DV	 6 large hard boiled eggs
Vitamin D	 = 86% DV	 1.5 ounces canned salmon with bone
Vitamin B12	 = 61% DV	 4.5 ounces canned tuna
Riboflavin	 = 79% DV	 1 cup whole almonds
Magnesium	 = 20% DV	 1/2 cup cooked soybeans

U.S. Department of Agriculture, Agricultural Research Service. 2010. USDA National Nutrient Database for Standard Reference, Release 23. Nutrient Data Laboratory Home Page

available to help meet calcium needs. Although all of these sources provide calcium, they are not nutritionally equivalent to dairy foods. Milk provides nine essential nutrients important for optimal health: calcium, potassium, phosphorus, protein, vitamins A, D and B12, riboflavin and niacin (niacin equivalents). MyPlate (www.ChooseMyPlate.gov), a food guidance system to help people implement the 2010 *Dietary Guidelines*, indicates the relative amounts of food to eat from each of the five major food groups. Because each of these food groups provides some, but not all, of the nutrients needed for health, foods in one group (e.g., vegetables) can't replace those in another group (e.g., dairy foods). Specifically, for the dairy group, MyPlate notes that "calcium-fortified foods and beverages such as cereals, orange juice or rice or almond beverages may not provide the other nutrients found in dairy products," and encourages those with lactose intolerance to try simple strategies for including dairy foods in their diets. Health experts regard calcium supplements as a supplement to, not a substitute for, a nutritionally-adequate diet.

LEADING HEALTH AUTHORITIES SUPPORT DAIRY'S BENEFITS FOR VARIOUS ETHNIC GROUPS

Several health professional organizations support the health benefits of dairy foods for various ethnic groups. Below is a highlight of leading health authority recommendations on the topic. **National Medical Association (NMA):** The nation's oldest and largest organization representing African American physicians, recommends that African Americans, many of whom may be lactose maldigesters, consume three to four servings a day of low-fat milk, cheese, or yogurt to improve their health. For people with lactose intolerance, NMA recommends making efforts to keep dairy foods in their diets to help meet nutrient recommendations. For individuals who cannot tolerate conventional milk, the NMA recommends lactose-free milk.

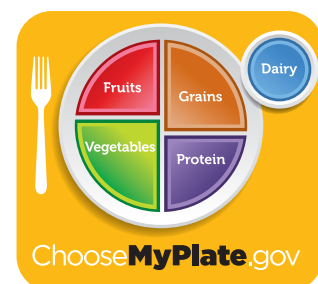
- **2010 Dietary Guidelines for Americans and ChooseMyPlate.gov:** Recognizing the low intake of dairy products across the U.S. population, especially in certain ethnic groups, the *Dietary Guidelines* identifies milk and other dairy products as a food group to increase and, along with ChooseMyPlate.gov, recommends three cups of low-fat or fat-free milk or equivalent milk products (e.g., cheese, yogurt) a day for most people. ChooseMyPlate.gov notes that people with lactose intolerance may be able to consume smaller portions of dairy foods, choose lactose-free and lower-lactose products, or use enzyme preparations to lower the lactose content. It states, "Calcium-fortified foods and beverages such as cereals, orange juice, or rice or almond

"African Americans suffer disproportionately from both hypertension and obesity, as they experience both increased risk and severity of these diseases. Our research shows that consuming recommended servings of dairy products is effective in helping African Americans achieve a healthy blood pressure and healthy weight."



Michael B. Zemel, Ph.D.

Professor of Nutrition
and Medicine
Director,
The Nutrition Institute
Department of Nutrition
The University of Tennessee
Knoxville, TN



beverages may provide calcium, but may not provide the other nutrients found in dairy products.”

- **The American Academy of Pediatrics (AAP)**, in its report on lactose intolerance in infants, children, and adolescents, encourages children with lactose intolerance to still consume dairy foods in order to get enough calcium, vitamin D, protein, and other nutrients essential for bone health and overall growth. According to the report, lactose intolerance does not require avoiding dairy foods. Many children sensitive to lactose can drink small amounts of milk without discomfort, especially when consumed with other foods. The report identifies other dairy options which are often well tolerated such as hard cheese, yogurt containing live active cultures, or lactose-free or lactose-reduced milk.
- **Women, Infants, and Children (WIC) Food Packages:** USDA’s WIC program is a supplemental feeding program that provides access to nutritious foods, nutrition counseling, and referrals to health and other social services for eligible low-income pregnant, postpartum and breast-feeding women, infants and children up to age five. In 2010, it provided assistance to more than nine million Americans (USDA, 2011). Regulations for the food packages recommend lactose-reduced and lactose-free milk as a first choice before non-dairy options for those with lactose intolerance. Regular, lactose-reduced and lactose-free milk are allowed without medical documentation. Also, additional cheese is allowed for lactose intolerant individuals who obtain medical documentation.
- **School Breakfast Program & National School Lunch Program:** Lactose-free milk can be offered in school cafeterias as a result of the Healthy, Hunger-Free Kids Act of 2010, and no permission or paperwork is necessary for schools to offer this option. In some circumstances, the current law allows schools to offer a substitute beverage instead of milk. However, for a substitute beverage other than milk to be offered, either a parent’s note or a medical professional’s letter is required, and the student must have a special dietary need (e.g., lactose maldigestion) that justifies the substitution.
- **Academy of Nutrition and Dietetics (AND):** The Academy states “Lactose intolerance isn’t an ‘all or nothing’ condition. Instead, it’s a matter of degree. Most



“In 2009, the National Medical Association (NMA), the voice of physicians of African descent in the U.S., further supported its 2004 Consensus Report on dairy in the diet of African Americans. It upheld its recommendations that people with lactose intolerance make efforts to keep dairy in their diets to help meet nutrient recommendations. The NMA recommends that African Americans consume three to four servings a day of low-fat milk, cheese, or yogurt to help reduce the risk of common chronic diseases such as hypertension, obesity, and osteoporosis. Lactose-free milk is an alternative option for those who have difficulty digesting lactose.”



Carolyn Britton, M.D.

Associate Professor
of Clinical Neurology
*The Neurological
Institute of New York/
At Columbia University
Medical Center*

people with difficulty digesting lactose can still consume foods with lactose. It's just a matter of knowing which foods contain lactose -- and knowing your personal tolerance level ... Needlessly avoiding milk and other dairy foods may pose nutritional risks ... Lactose intolerance is easy to manage. Most people with difficulty digesting lactose can include some dairy and other lactose-containing foods in their meals and snacks. In fact, most people with lower levels of lactase can drink a cup of milk without discomfort.” (Duyff, 2006).

WHAT CAN HEALTH PROFESSIONALS DO TO HELP VARIOUS ETHNIC GROUPS INCLUDE DAIRY FOODS IN THEIR DIETS?

Health professionals can take the following steps to help ethnic groups include dairy foods in their diets and increase their intake of dairy nutrients such as calcium:

- **Correct misperceptions:** Be sensitive to clients' concerns about lactose intolerance while increasing familiarity with dairy foods and dispelling misconceptions that lactose intolerance means needing to avoid dairy foods.
- **Clinical diagnosis:** Encourage clinical diagnosis of lactose intolerance in order to rule out other gastrointestinal causes of symptoms.
- **Communicate strategies for consuming dairy foods:** Consider cultural differences in how dairy foods are consumed, educate about the importance of dairy foods and tailor advice to each individual.

“The American Academy of Pediatrics supports the use of dairy products as an important source of calcium and other nutrients to facilitate bone mineral health and growth in children and adolescents. If dairy products are eliminated, other dietary sources of calcium need to be sought.”



Jatinder J.S. Bhatia, M.D., FAAP

Professor and Chief
Section of Neonatology
Department of
Pediatrics
Medical College
of Georgia,
Augusta, GA



“For individuals who are lactose intolerant, the 2010 Dietary Guidelines for Americans provides strategies to help keep dairy in the diet for those with lactose intolerance. It suggests strategies such as drinking smaller amounts of milk at a time or choosing other dairy food options. It notes that certain milk substitutes may not provide the other important nutrients found in dairy products.”



Theresa Nicklas, DrPH

Professor of Pediatrics
Baylor College of Medicine



TIPS TO IMPROVE TOLERANCE TO DAIRY FOODS

In many cases, lactose intolerant individuals do not have to give up milk and other dairy foods. Here are some easy tips to help people with lactose intolerance manage their condition, include dairy foods in

their diet, and meet their needs for dairy nutrients such as calcium, vitamin D, and potassium:

- **Sip It.** *Start with a small amount of milk daily and increase slowly over several days or weeks to build your tolerance.*
- **Try It.** *Opt for low-lactose or lactose-free milk and milk products. They are real milk products—just with lower amounts or zero lactose—and provide the same nutrients as regular dairy foods, and taste great.*
- **Stir It.** *Mix milk with other foods, such as soups and cereal; blend with fruit or drink milk with meals. Solid foods help slow digestion and allow the body more time to digest lactose.*
- **Slice It.** *Top sandwiches or crackers with natural cheeses such as Cheddar, Colby, Monterey Jack, Mozzarella and Swiss. These cheeses are low in lactose.*
- **Spoon It.** *Enjoy easy-to-digest yogurt. The live and active cultures in yogurt help to digest lactose.*

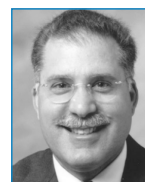
“It is essential to reach African Americans, Hispanics, and other minority groups about the benefits of nutrient-rich dairy foods, as well as the differences between lactose maldigestion and lactose intolerance. Strategies to reach these populations must include educational materials that are culturally sensitive and formatted to effectively connect with each group.”



Wilma J. Wooten, M.D., M.P.H.

Chair, Women's Health
University of California, San Diego
San Diego, CA

“Good medicine for lactose intolerance is a little milk with a meal. Drinking a small serving of milk with a meal helps the digestive system learn to digest dairy foods without unpleasant side effects. If you only consume dairy foods once in a while, you are more likely to have symptoms from them. Here's some advice to improve tolerance to lactose. Drink 1/4 to 1/2 cup of milk two to three times a day and gradually increase the amount. Avoid eating dairy foods in large quantities at one sitting, and eat dairy foods as part of a meal. Also, yogurt with live, active cultures and hard cheeses are well tolerated.”



Dennis Savaiano, Ph.D.

Interim Dean of the Honors College
Professor of Nutrition Science
Purdue University
West Lafayette, IN

THE BOTTOM LINE

Many ethnic groups avoid milk and other dairy foods because of lactose intolerance. As a result, they may be depriving themselves of milk's nutrients, such as calcium, vitamin D, and potassium, and increasing their risk of chronic diseases such as hypertension, stroke, osteoporosis, obesity, diabetes, and colon cancer.

While individuals vary, the good news is that many people with lactose intolerance can learn new strategies to help them enjoy the taste and health benefits of consuming three servings a day of dairy foods such as milk, cheese and yogurt, as recommended for most people by the *Dietary Guidelines for Americans*, ChooseMyPlate.gov and MyPyramid.



“By using simple dietary strategies such as modifying the amount and types of dairy products consumed, most minorities (and non-minorities) with lactose maldigestion can comfortably consume three servings of dairy foods (milk, cheese, yogurt) a day, as recommended by the *Dietary Guidelines for Americans*.”



Robert Heaney, M.D.

John A. Creighton University Professor
Creighton University
Omaha, NE

REFERENCES

- Appel, L.J., M.P.H. Thomas, E. Obarzanek, et. al. A clinical trial of the effects of dietary patterns on blood pressure. *N Engl J Med*. 1997;336: 1117-1124.
- Ballew C, Kuester S and Gillespie C. Beverage choices affect adequacy of children's nutrient intakes. *Arch Pediatr Adolesc Med*, 2000; 154: 1148-1152.
- Bendsen NT, Christensen R, Bartels EM, Astrup A. Consumption of industrial and ruminant trans fatty acids and risk of coronary heart disease: a systematic review and meta-analysis of cohort studies. *Eur J Clin Nutr* (Epub ahead of print March 23, 2011).
- Black RE, Williams SM, Jones IE, Goulding A. Children who avoid drinking cow milk have low dietary calcium intakes and poor health. *Am J Clin Nutr* 2002;76:675-680.
- Byers, K.G., and D.A. Savaiano. The myth of increased lactose intolerance in African-Americans. *J Am Coll Nutr*. 2005;24: 569s-573s.
- Corazza GR, Benati G, Di Sario A, Tarozzi C, Strocchi A, Passeri M, Gasbarrini G. Lactose intolerance and bone mass in postmenopausal Italian women. *Br J Nutr*. 1995;73:479-487.
- Duyff, RL. *The American Dietetic Association Complete Food and Nutrition Guide*, Third Edition. New York: John Wiley, 2006.
- Elwood PC, Pickering JE, Fehily AM. Milk and dairy consumption, diabetes and the metabolic syndrome: the Caerphilly prospective study. *J Epidemiol Comm Health*. 2007;61:695-698.
- Enattah N, Pekkarinen T, Välimäki MJ, Löyttyniemi E, Järvelä I. Genetically defined adult-type hypolactasia and self-reported lactose intolerance as risk factors of osteoporosis in Finnish postmenopausal women. *Eur J Clin Nutr*. 2005;59:1105-1111.
- Food and Nutrition Service. U.S. Department of Agriculture. Women, Infants and Children. <http://www.fns.usda.gov/wic/> Accessed: December 15, 2011.
- Fulgoni, V., J. Nicholls, A. Reed, R. Buckley, D. DiRienzo, and G. Miller. Dairy consumption and related nutrient intake in African American adults and children in the United States: Continuing Survey of Food Intakes by Individuals 1994-1996 and the National Health and Nutrition Examination Survey 1999-2000. *J Am Diet Assoc*. 2007;107:256-264.
- Goulding A, Rockell JE, Black RE, et al. Children who avoid drinking cow's milk are at increased risk for prepubertal bone fractures. *J Am Diet Assoc*. 2004;104:250-253.
- Heaney RP, Keith JN, Duyff R. Unintended Consequences of Dairy Avoidance. McNeil, LLC. http://www.nationaldairycouncil.org/SiteCollectionDocuments/health_wellness/lactose_intolerance/Unintended%20Consequences%20of%20Dairy%20Avoidance%20-%202011.pdf. Accessed: December 15, 2011.
- Heaney RP, Rafferty K. The preponderance of the evidence: an example from the issue of calcium intake and body composition. *Nutr Rev*. 2008;67:32-39.
- Heyman, M.B. for the Committee on Nutrition, American Academy of Pediatrics. Lactose intolerance in infants, children, and adolescents. *Pediatrics*. 2006; 118: 1279-1286.
- Hiza H, Bente L. Nutrient Content of the U.S. Food Supply: Developments Between 2000 and 2006. Home Economics Research Report No. 59. Center for Nutrition Policy and Promotion, U.S. Department of Agriculture. http://www.cnpp.usda.gov/Publications/FoodSupply/Final_FoodSupplyReport_2006.pdf. Accessed: December 15, 2011.
- Honkanen R, Kröger H, Alhava E, Turpeinen P, Tuppurainen M, Saarikoski S. Lactose intolerance associated with fractures of weight-bearing bones in Finnish women aged 38-57 years. *Bone*. 1997;21:473-477.
- Honkanen R, Pulkkinen P, Järvinen R, Kröger H, Lindstedt K, Tuppurainen M, Uusitupa M. Does lactose intolerance predispose to low bone density? A population-based study of perimenopausal Finnish women. *Bone*. 1996;19:23-28.
- IOM (Institute of Medicine). 2011. *Dietary Reference Intakes for Calcium and Vitamin D*. Washington, DC: The National Academies Press.
- Jarvis, J.K., and G.D. Miller. Overcoming the barrier of lactose intolerance to reduce health disparities. *J Natl Med Assoc*. 2002;94: 55-66.
- Jorde R, Bønaa KH. Calcium from dairy products, vitamin D intake, and blood pressure: the Tromsø study. *Am J Clin Nutr*. 2000;71:1530-1535.
- Keith JN, Nicholls J, Reed A, Kafer K, Miller GD. The prevalence of self-reported lactose intolerance and the consumption of dairy foods among African American adults less than expected. *J Natl Med Assoc*. 2011;103:36-45.
- Kull M, Kallihorm R, Lember M. Impact of molecularly defined hypolactasia, self-perceived milk intolerance and milk consumption on bone mineral density in a population sample in Northern Europe. *Scand J Gastroenterol*. 2009;44:415-421.
- Laaksonen MM, Mikkilä V, Räsänen L, Rontu R, Lehtimäki TJ, Viikari JS, Raitakari OT. Genetic lactase non-persistence, consumption of milk products and intakes of milk nutrients in Finns from childhood to young adulthood. *Br J Nutr*. 2009;102:8-17.

REFERENCES, *cont'd.*

- Laaksonen MM, Impivaara O, Sievänen H, Viikari JS, Lehtimäki TJ, Lamberg-Allardt CJ, Kärkkäinen MU, Valimäki M, Heikkinen J, Kröger LM, Kröger HP, Jurvelin JS, Kähönen MA, Raitakari OT. Associations of genetic lactase non-persistence and sex with bone loss in young adulthood. *Bone*. 2009;44:1003-1009.
- Lehtimäki T, Hemminki J, Rontu R, Mikkilä V, Räsänen L, Laaksonen M, Hutri-Kähönen N, Kähönen M, Viikari J, Raitakari O. The effects of adult-type hypolactasia on body height growth and dietary calcium intake from childhood into young adulthood: a 21-year follow-up study – The Cardiovascular Risk in Young Finns Study. *Pediatrics*. 2006;118:1553-1559.
- Lorenzen JK, Astrup A. Dairy calcium intake modifies responsiveness of fat metabolism and blood lipids to a high fat diet. *Br J Nutr* Epub ahead of print January 31, 2011.
- Matlik, L., D. Savaiano, G. McCabe, M. VanLoan, C.L. Blue, and C.J. Boushey. Perceived milk intolerance is related to bone mineral content in 10-to 13-year-old female adolescents. *Pediatrics*. 2007; 120: e669-e677.
- Miller, G.D., J.K. Jarvis, and L.D. McBean. *Handbook of Dairy Foods and Nutrition*. 3rd edition. Boca Raton, FL: CRC Press, 2007, pp. 299-338.
- National Institutes of Health Consensus Development Conference: Lactose Intolerance and Health. Final Statement. 2010. <http://consensus.nih.gov/2010/lactosestatement.htm>. Accessed: December 15, 2011.
- Nicklas TA et al. Self-perceived lactose intolerance results in lower intakes of calcium and dairy foods and is associated with hypertension and diabetes in adults. *American Journal of Clinical Nutrition* 2011. Epub ahead of print. Doi:10.3945/ajcn.110.009860.
- Obermayer-Pietsch BM, Bonelli CM, Walter DE, Kuhn RJ, Fahrleitner-Pammer A, Berghold A, Goessler W, Stepan V, Dobnig H, Leeb G, Renner W. Genetic disposition for adult lactose intolerance and relation to diet, bone density, and bone fractures. *J Bone Miner Res*. 2004;19:42-47.
- Palacios OM, et al. Consumer Acceptance of Cow's Milk Versus Soy Beverages: Impact of Ethnicity, Lactose Tolerance And Sensory Preference Segmentation. *Journal of Sensory Studies*, 2009; 24:5.
- Pereira MA, Jacobs DR, Van Horn L, Slattery ML, et al. Dairy consumption, obesity, and the insulin resistance syndrome in young adults. *JAMA* 2002;287:2081-2089.
- Ranganathan R, Nicklas TA, Yang S-J, et al. The nutritional impact of dairy product consumption on dietary intakes of adults (1995-1996): The Bogalusa Heart Study. *J Am Diet Assoc*. 2004;105:1391-1400.
- Savaiano, D.A., C.J. Boushey, and G.P. McCabe. Lactose intolerance symptoms assessed by meta-analysis: a grain of truth that leads to exaggeration. *J. Nutr*. 136: 1107-1113, 2006.
- Segal E, Dvorkin L, Lavy A, Rozen GS, Yaniv I, Raz B, Tamir A, Ish-Shalom S. Bone density in axial and appendicular skeleton in patients with lactose intolerance: influence of calcium intake and vitamin D status. *J Am Coll Nutr*. 2003;22:201-207.
- Sjogren P, Rosell M, Skoglund-Andersson C, et al. Milk-derived fatty acids are associated with a more favorable LDL particle size distribution in healthy men. *J Nutr*. 2004;134:1729-1735.
- Smit LA, Baylin A, Campos H. Conjugated linoleic acid in adipose tissue and risk of myocardial infarction. *Am J Clin Nutr*. 2010.
- Suarez, F.L., J. Adshead, J.K. Furne, and M.D. Levitt. Lactose maldigestion is not an impediment to the intake of 1,500mg calcium daily as dairy products. *Am. J. Clin. Nutr*. 68:1118-1122, 1998.
- Suarez, F.L., D. Savaiano, P. Arbisi, and M.D. Levitt. Tolerance to the daily ingestion of two cups of milk by individuals claiming lactose Intolerance. *Am. J. Clin. Nutr*. 65:1502-1506, 1997.
- Suarez, F.L., D.A. Savaiano, and M.D. Levitt. A comparison of symptoms after the consumption of milk or lactose-hydrolyzed milk by people with self-reported severe lactose intolerance. *N. Engl. J. Med*. 333: 1-4, 1995.
- U.S. Department of Health and Human Services and U.S. Department of Agriculture. Dietary Guidelines for Americans. 2010. 7th Edition. Washington, D.C.: U.S. Government Printing Office, January 2011. <http://www.healthierus.gov/dietaryguidelines>. Accessed: December 15, 2011.
- U.S. Department of Health and Human Services, Public Health Service, Office of the Surgeon General Bone health and osteoporosis: a report of the Surgeon General. U.S. Department of Health and Human Services, Public Health Service, Office of the Surgeon General; Washington, DC, 2004.
- Weaver, C.M., W.R. Proulx, and R. Heaney. Choices for achieving adequate dietary calcium with a vegetarian diet. *Am J Clin Nutr*. 1999;70 (suppl): 543s-548s.
- Weaver CM, Heaney RP. Food sources, supplements, and bioavailability, pp. 129-142. In: Calcium in Human Health. Weaver CM, Heaney RP, eds. Humana Press, Totowa, NJ, 2006.
- Weinberg LG, Berner LA and Groves JE. Nutrient contributions of dairy foods in the United States food supply. *J Am Diet Assoc*, 2004; 104: 895-902.
- Wooten, W.J., and W. Price. Consensus report of the National Medical Association. The role of dairy and dairy nutrients in the diet of African-Americans. *J Natl Med Assoc*. 2005;96:1s-31s.

RESOURCES

Visit these helpful online resources for more information, references, tips, tools and more related to lactose intolerance.

National Dairy Council – Lactose Intolerance Health Education Kit

www.nationaldairycouncil.org

This one-stop resource provides the following information on lactose intolerance, free of charge:

- Educational handouts
- Relevant issues of *Dairy Council Digest*
- Presentations
- Continuing education opportunities
- Science summaries
- Links to supporting science

Dietary Guidelines for Americans and MyPlate

www.ChooseMyPlate.gov

- 2010 Dietary Guidelines: Policy Document, Select Messages for Consumers and more
- The Basics
- Specific Audiences
- For Professionals

