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# Milk and Milk Products: Their Importance in the American Diet

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Small increases between 1970 and 1994 (the latest year for which nutrient data are available) in per capita availability of dietary calcium and milkfat—up 8 percent and 4 percent, respectively—belie huge shifts in dairy product consumption patterns since 1970. In 1997, Americans, on average, consumed nearly a fourth less beverage milk and two-and-a-half times more cheese than they did in 1970.

A big increase in calcium consumption from cheese more than offset a 21-percent decline in calcium consumption from beverage milks. Similarly, a huge increase in consumption of milkfat from cheese more than offset a 50-percent decline in milkfat consumption associated with declining milk consumption and a pronounced trend toward lower fat milks. Carbonated soft drinks—average consumption of which is now more than double what it was in 1970—are likely displacing beverage milks in the diet. Behind big rises in cheese and soft drink consumption is a big increase in eating away from home, espe-

cially at fast-food places, which favor pizza, cheeseburgers, and soft drinks.

The per capita level of calcium in the current U.S. food supply, after accounting for waste in the food marketing system and at home, is insufficient to meet the population-weighted average required to meet 1989 U.S. Recommended Dietary Allowances (RDA's) for calcium. This is a critical public-health problem, especially in light of impending changes in dietary recommendations to increase calcium consumption.

Milk and milk products make important contributions to the American diet. They provide high-quality protein and are good sources of vitamins A, D, and B-12, and also of riboflavin, calcium, phosphorus, magnesium, potassium, and zinc.

Milk and milk products like cheese, yogurt, and frozen dairy desserts are the main source of calcium—contributing about three-quarters of the calcium in the U.S. food supply.

Calcium is important from a public-health perspective, because current calcium intakes by many consumers are not sufficient for them to attain optimal peak bone mass and to prevent age-related loss of bone, leading to osteoporosis. Bone mass peaks around age 30, usually

remains stable in the 30's, and commonly begins a decline in the 40's that accelerates around age 50.

Recent research also indicates that adequate calcium intake is one key to achieving optimal blood pressure. At particular risk for low calcium intakes are a substantial number of American teenagers, adult women, and the elderly.

In 1997, the Food and Nutrition Board's Institute of Medicine (IOM) issued a report calling for Americans to consume calcium at levels considerably above the 1989 RDA's. The RDA's for calcium intake are 800 milligrams for children ages 1-10 years, men 19 years and above, and women 25 years and above (except those pregnant or lactating); and 1,200 milligrams for males ages 11-18 years and females 11-24 years. The IOM recommends calcium intakes be increased to at least 1,000 milligrams a day (a little more than the amount in three 8-ounce servings of fluid milk) for all Americans over 8 years of age. Even higher calcium intakes are recommended for adults over age 50 (1,200 milligrams per day, or 4 servings), and for teens 9 through 18 years (1,300 milligrams per day, a little over 4 servings). The IOM guidelines include a calcium ceiling of 2,500 milligrams daily to avoid problems associated with

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higher doses, such as kidney stones. The guidelines also boost the recommendation for vitamin D, which is needed for proper calcium absorption, to 400 international units (IU's) for adults between ages 51 and 79, and 600 IU's for those age 80 and over.

The Federal Government identifies low calcium intake as a major nutrition priority. Its dietary guidance encourages most Americans to increase their daily calcium intake, and recommends two to three servings a day from the milk, yogurt, and cheese group. Yet, USDA's food intake survey data indicate that Americans 2 years of age and over consumed an average 1.5 servings a day of dairy foods in 1994-96.

USDA's Economic Research Service (ERS) and Center for Nutrition Policy and Promotion (CNPP) estimate per capita food and nutrient supplies, based on records of commodity flows from production to end uses. These data are used as a proxy to estimate human consumption, even though the data may overstate what is actually eaten because they represent food supplies available in the market and do not account for waste.

### Calcium Critical to the Body's Health

Calcium is the most abundant mineral in the human body and it is essential for life. Over 99 percent of total body calcium is found in the

teeth and bones. The remainder is present in blood, extracellular fluid, muscle, and other tissues, where it helps regulate the heart beat and blood pressure, sends nerve impulses, helps clot blood, stimulates hormone secretions, and activates enzyme systems.

Bone is a dynamic tissue that is constantly being formed and broken down. This process, called remodeling, is the resorption or breaking down of existing bone and deposition of new bone to replace that which has been broken down. Bone formation exceeds resorption in growing children and teens, is balanced with resorption in healthy adults, and lags behind resorption a little in the 40's and much more

### Risk of Osteoporosis Can Be Lowered

Osteoporosis is a painful, sometimes crippling disease in which bones become so fragile they spontaneously break as a result of a minor fall or even from everyday activities, such as bending over to pick up a newspaper. The incidence of osteoporosis has reached epidemic proportions in the United States and is responsible for considerable death, illness, loss of independence, and associated economic costs. More than 28 million Americans, mostly women and mature adults, are affected by osteoporosis. This disease leads to 1.5 million fractures a year (fractures of the spine, hip, and wrist are the most common) and as many as 50,000 deaths a year from physiological stress resulting from hip fractures. USDA's Economic Research Service estimates complications due to hip fractures to cost \$13 billion to \$18 billion a year in medical charges and lost productivity.

The risk of developing osteoporosis is influenced by both genetic and environmental factors. Genetic factors cannot be controlled, but do

impact on bone health, as does gender, race, and age. Women are four to five times more likely to develop osteoporosis than are men. Caucasian women, particularly those of northern European ancestry, and Asian women are at higher risk of developing osteoporosis than are African Americans and other groups. Osteoporosis is most likely to develop in the fourth and fifth decades of life.

On the other hand, lifestyle risk factors can be controlled. These include the inadequate dietary intake of calcium and vitamin D; excessive intake of sodium, protein, caffeine, and fiber; lack of physical exercise and strength training; cigarette smoking; and excessive alcohol intake.

The key to preventing osteoporosis is to maximize the peak bone mass reached by about age 30 and to reduce the rate of bone loss in later years. This is best done with optimal intake of calcium throughout life—from early childhood and adolescence through the postmenopausal and later adult years.

While calcium-rich foods or calcium-fortified foods are the preferred choice, for those who cannot achieve a high calcium intake (1,000 to 1,500 milligrams daily) through diet, supplements are recommended—ideally as calcium citrate or calcium carbonate. Absorption of calcium supplements is the most efficient in doses of 500 milligrams or less, and when taken between meals in the case of calcium citrate and with meals in the case of calcium carbonate.

Lifestyle changes other than dietary ones need to focus on avoiding cigarette smoking and on participating in regular physical activity. Smokers generally have lower bone densities and are more likely to suffer osteoporotic fractures than are nonsmokers. Regular physical activity benefits bone health at all stages of the life cycle. Weight-bearing exercise like walking, running, and weight-lifting in conjunction with adequate calcium intake from foods will reduce the risk of osteoporosis for most people.

after menopause and with aging in both men and women.

Adequate dietary calcium is essential for building denser, stronger bones in the first three decades of life and for slowing the rate of bone loss in later years. Optimal calcium intake varies according to a person's age, sex, and ethnicity, but the accumulation of

bone mineral achieved in early life influences the occurrence of osteoporosis, the major underlying cause of bone fractures in postmenopausal women and the elderly (see box on osteoporosis). A calcium-deficient diet before age 30 may limit a person's ability to reach optimal peak bone mass, while one after age 30 fails to slow the rate of bone loss

and maintain bone density. Both events increase the risk of osteoporosis later in life. Also, the elderly need to maintain optimal intakes of calcium to minimize the age-related decrease in calcium absorption and the increased risk of osteoporotic fractures with advancing age.

Table 1  
Americans Are Drinking Less Milk, Eating More Cheese

Item	Unit	1970	1994 <sup>1</sup>	1997
Beverage milk <sup>2</sup>	<i>gallons</i>	31.3	24.8	24.0
Plain	"	29.6	23.3	22.5
Whole	"	24.8	8.8	8.2
Reduced fat (2%)	"	3.2	8.7	7.7
Lowfat (1% and 0.5%)	"	.2	2.4	2.6
Fat-free (skim)	"	1.3	3.3	4.0
Yogurt <sup>3</sup>	<i>½ pint</i>	1.5	8.6	9.5
Fluid cream products	"	9.8	15.2	17.0
Half and half	"	5.4	5.9	6.2
Light cream	"	.7	.6	.8
Heavy cream	"	1.0	2.7	3.6
Sour cream	"	2.0	5.2	5.6
Eggnog	"	.6	.8	.7
Cheese <sup>4</sup>	<i>pounds</i>	11.4	26.8	28.0
Cheddar	"	5.8	9.1	9.6
Mozzarella	"	1.2	7.9	8.4
Cream and Neufchatel	"	.6	2.2	2.3
Cottage cheese	"	5.2	2.8	2.7
Lowfat	"	.3	1.2	1.3
Frozen dairy products <sup>5</sup>	"	28.5	29.9	28.7
Ice cream	"	17.8	16.1	16.2
Lowfat ice cream <sup>6</sup>	"	7.7	7.6	7.9
Sherbet	"	1.6	1.4	1.3
Frozen yogurt	"	NA	3.5	2.1
Evaporated and condensed milk	"	12.0	8.1	6.6
Whole	"	7.0	2.6	2.6
Skim	"	5.0	5.5	4.0
Dry milk	"	5.8	4.1	4.0
Dried whey	"	1.4	3.8	3.4
Butter	"	5.4	4.8	4.2
All dairy products, milk-equivalent, milkfat basis	"	563.8	586.0	579.8

Notes: NA = not available. <sup>1</sup>Latest year for which data on the nutrient content of the food supply are available. <sup>2</sup>Includes flavored milk and buttermilk. <sup>3</sup>Excludes frozen yogurt. <sup>4</sup>Excludes full-skim American, cottage, pot, and baker's cheese. <sup>5</sup>Includes mellorine until 1990 and other nonstandardized frozen dairy products not listed separately. <sup>6</sup>Formerly known as ice milk.

## Less Milk, More Cheese Slightly Increase Levels of Calcium and Saturated Fat

In 1997, Americans, on average, drank nearly a fourth less milk as in 1970 (table 1). Between 1970 and 1997, annual supplies of beverage milks declined 7 gallons per person, to 24 gallons per person. The trend in beverage milks is toward lower fat drinks, such as reduced-fat, low-fat, and fat-free milks. Plain milk (excluding flavored milk and butter-milk) accounted for 94 percent of total beverage milk in 1997. In 1997, whole milk (about 3.25 percent fat) accounted for 36 percent of all plain beverage milk, reduced-fat milk (2 percent) for 34 percent, and lowfat milks (1 percent and 0.5 percent) and skim milk (less than 0.5 percent) combined for 30 percent. In 1970, the percentages were 84 percent for whole milk, 11 percent for reduced-fat milk, and 5 percent for lowfat milks and skim milk combined. Steady declines in per capita consumption have occurred since 1946 for whole milk and since 1990 for 2-percent milk. Between 1989 and 1997, per capita consumption dropped 25 percent and 16 percent, respectively, for whole milk and 2-percent milk, and increased 53 percent for lowfat milks and skim milk combined.

In 1997, Americans ate nearly two-and-a-half times as much cheese as in 1970. Per capita consumption of cheese shows consistent yearly increases since 1970. Its use increased from 11.4 to 28.0 pounds per person per year between 1970 and 1997.

Per capita levels of calcium in the U.S. food supply rose 8 percent between 1970 and 1994, from 890 milligrams per person per day to 960 milligrams. The increase was due mainly to greater use of cheese.

Table 2  
The 1994 Food Supply Could Not Support the Latest Calcium Intake Recommendations

Measure and life-stage group	Suggested amount of calcium per day
<b>Optimal Calcium Intake values<sup>1</sup></b>	
Population-weighted average (1994)	1,180
Infants:	
Birth to 6 months	400
6 months to 1 year	600
Children:	
1-5 years	800
6-10 years	800-1,200
Adolescents and young adults:	
11-24 years	1,200-1,500
Men:	
25-65 years	1,000
Over 65 years	1,500
Women:	
25-50 years	1,000
51-65 years (on estrogen)	1,200
51-65 years (not on estrogen)	1,500
Over 65 years	1,500
Pregnant and nursing	1,200-1,500
<b>Dietary Reference Intake (DRI) values for calcium<sup>2</sup></b>	
Population-weighted average (1994)	1,040
Infants:	
Birth to 6 months	210
6 months to 1 year	270
Children and adolescents:	
1-3 years	500
4-8 years	800
9-18 years	1,300
Adults:	
19-50 years	1,000
Over 50 years	1,200
Pregnant and nursing:	
Under 19 years	1,300
19-50 years	1,000
	<i>continued—</i>

In 1994, milk and milk products contributed 73 percent of the calcium available in the food supply, compared with 75 percent in 1970. Mirroring product consumption, calcium contributions from lower fat milks and cheese more than doubled between 1970 and 1994, but dropped two thirds for whole milk (fig. 1). Other contributors to total calcium in the 1994 food supply

were vegetables and legumes (10 percent), grains (5 percent), and other sources (12 percent). While grains are not particularly rich in calcium, they are often consumed in large quantities and thus can account for a substantial proportion of dietary calcium.

Table 2  
**The 1994 Food Supply Could Not Support the Latest Calcium Intake Recommendations—continued**

Measure and life-stage group	Suggested amount of calcium per day
<b>Recommended Dietary Allowances (RDA) for calcium<sup>3</sup></b>	<i>Milligrams</i>
Population-weighted average (1994)	870
Infants and children:	
Birth to 6 months	360
6 months to 1 year	540
1-10 years	800
Males:	
11-18 years	1,200
Over 18 years	800
Females:	
11-24 years	1,200
Over 24 years	800
Pregnant and nursing	1,200
<b>1994 U.S. per capita food supply<sup>4</sup></b>	
All ages, total food supply	960
All ages, net food supply (excluding estimated losses from food spoilage and waste)	680

Notes: <sup>1</sup>National Institutes of Health, 1994. <sup>2</sup>Institute of Medicine, Food and Nutrition Board, 1997. <sup>3</sup>National Research Council, 1989. <sup>4</sup>The 1994 food supply provided 960 milligrams of calcium per person per day. Of that 960 milligrams, ERS estimates that 280 were lost to milk spill, plate waste, and spoilage. The net/residual amount (total minus spoilage and waste) would put dietary intake of calcium in 1994 at about 680 milligrams per person per day, well below the 1994 population-weighted averages that would have been required to meet the Optimal Calcium Intake values, the Dietary Reference Intake values, or the 1989 RDA's.

Milk and milk products are good sources of a number of other nutrients in the food supply, providing about one-third of the total supply of riboflavin and phosphorus in 1994; about one-fifth of the total supply of protein, vitamin B-12, zinc, and potassium; 17 percent of the total supply of vitamin A; and 16 percent of the total supply of magnesium.

Milk and milk products also provided almost one-fourth of the total saturated fat in the food supply from 1970 to 1994. With the shift to reduced-fat, lowfat, and fat-free

milks, the consistency in the contribution of saturated fat from dairy foods over the period results from the increased use of cheeses (especially in pizza, cheeseburgers, and other fast foods) and cream products.

### Many Diets Calcium-Deficient

A significant expansion of the research base and an increased understanding of nutrient requirements and food components in the 1990's have prompted increases in recommended intakes for calcium to levels greater than the 1989 RDA's and the level currently provided in

the U.S. per capita per day food supply.

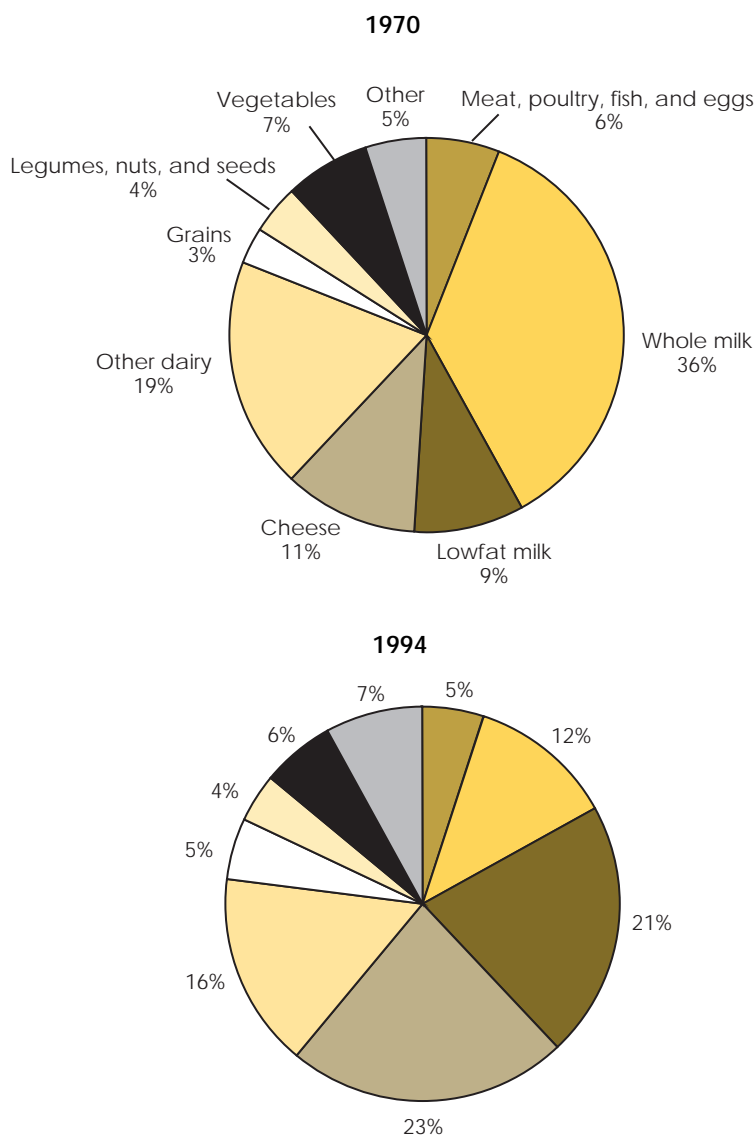
In 1994, a National Institutes of Health (NIH) Consensus Development Conference on Optimal Calcium Intake recommended that the RDA for calcium—currently 800 milligrams daily for most adults 25 years of age and over—be upgraded to between 1,000 and 1,500 milligrams, depending on age and other health factors, to help reduce the risk of osteoporosis (table 2).

The RDA's, first developed in 1941 and periodically updated, are being replaced by the IOM's new recommendations, called Dietary Reference Intakes (DRI's). Unlike the RDA's, which were initially established to protect against diseases, like rickets, caused by nutrient deficiencies, the DRI's aim to optimize health by also minimizing the risk of major chronic diseases, such as osteoporosis.

Calcium intakes recommended by the IOM are increased to at least 1,000 milligrams a day (that is the approximate amount in three-and-a-third servings of milk or other dairy foods) for all Americans over 8 years of age. Higher calcium intakes are recommended for adults over 50 years (1,200 milligrams per day, or 4 servings) and for preteens and teenagers ages 9 through 18 years (1,300 milligrams per day, or a little more than 4 servings).

The 1994 food supply provided an average 960 milligrams of calcium per person per day. Of that 960 milligrams, ERS estimates that 280 were lost to milk spill, plate waste, and discard of soured milk, moldy cheese, yellowed broccoli, calcium-rich edible bones in canned salmon, and the like. The net/residual amount (total minus spoilage and waste) would put dietary intake of calcium in 1994 at about 680 milligrams per person per day, a level well below the population-weighted

Figure 1  
Sources of Calcium in the U.S. Food Supply, 1970 and 1994



respective DRI values. Calcium intakes for men were 63 percent of the DRI for men over 65 years, 88 percent of the DRI for men ages 18 to 65 years, and 90 percent of the DRI for those ages 12 to 17 years. Women’s calcium intakes fell even further below their DRI values. Their calcium intakes were 48 percent of the DRI for women over 65 years, 61 percent for women ages 18 to 65 years, and 63 percent for those ages 12 to 17 years.

### What Americans Can Do To Increase Calcium Intakes

Substantial changes in dietary patterns need to be made to ensure adequate calcium intake and optimal bone health. People should try to get as much calcium from food as possible. Including recommended amounts of calcium-rich foods—especially milk and milk products along with dark-green leafy vegetables—and calcium-fortified juices, cereals, and bread products in a balanced and varied diet is the preferred approach to attaining recommended calcium intake. Supplements are warranted for people who are unable to get the recommended amounts of calcium through diet alone.

Food selection practices in the United States make it difficult to meet calcium needs without milk and milk products in the daily diet. Even though most people know that milk is a leading source of calcium, and that calcium is important for health, they do not get enough—whether they mistakenly believe that they are getting enough calcium or their bodies cannot tolerate milk. Other reasons causing some to fall short of the recommendations for calcium include taste preferences for low-calcium foods, fat and weight

averages that would have been required to meet the intake recommendations of the NIH Consensus Development Conference on Optimal Calcium Intake (1,180 milligrams), the IOM (1,040 milligrams), or even the 1989 RDA’s (870 milligrams).

Many Americans are not consuming calcium in the amounts that are currently being suggested by health experts. According to USDA’s Continuing Survey of Food Intakes

by Individuals (CSFII), Americans 2 years of age and over consumed an average of 1.5 servings a day of dairy foods in 1994-96, instead of the two to three servings a day recommended by USDA’s Food Guide Pyramid. The 1994 CSFII shows that only children ages 2-5 years met their calcium-intake goal, consuming an average of 128 percent of their DRI values for calcium. Men’s calcium intakes fell below their

concerns, family and peer influence, and food choices made while eating away from home (see “Popularity of Dining Out Presents Barrier to Dietary Improvements,” elsewhere in this issue).

Milk and other dairy products are the most concentrated source of calcium. Milk not only provides calcium, but it is also fortified with 100 IU of vitamin D per cup. Vitamin D stimulates calcium absorption. Vitamin D occurs naturally in such animal products as fatty fish like salmon, eggs, liver, and butter. Besides milk, some bread products and cereals are fortified with vitamin D. Milk and yogurt are also good sources of magnesium, a mineral used in building bones. Magnesium intakes tend to be low in relation to recommendations, and there are not that many foods that are really good sources. Not only does calcium-rich milk contain many other important nutrients, the calcium it delivers may be less likely to lead to kidney stones than the calcium obtained from supplements.

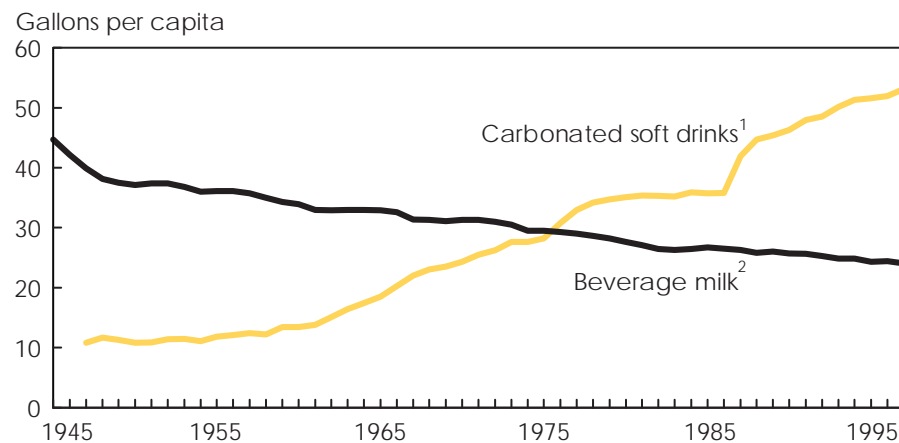
Whole milk products, however, are also concentrated sources of fat, and should be consumed in moderation. The solution is to consume adequate amounts of lowfat dairy products—such as 1-percent or nonfat milk, lowfat or nonfat yogurt, and lower fat cheeses, such as part-skim mozzarella and ricotta—all of which are just as high, if not higher, in calcium than their high-fat versions. Consumers also need to be more concerned about the nutritional value of their selections when eating away from home, especially of the calcium-rich foods on the menu, and make more appropriate food choices.

About 25 percent of adults in this country may have trouble digesting lactose, the most abundant sugar in milk. Lactose intolerance is especially common in African Ameri-

cans, Hispanics, Native Americans, and Asian Americans. Studies reveal that an 8-ounce glass of milk, particularly if taken with a meal, should not cause problems for most people with lactose intolerance. Cheeses aged at least 6 months; yogurt with “live active” cultures; and foods with small amounts of lactose, such as cottage cheese and soft cheeses, are also well tolerated. In addition, lactose-free dairy products are available. There are also good nondairy sources of calcium: white beans, almonds, broccoli, canned salmon and sardines eaten with the bones; dark leafy greens, such as kale and arugula; fortified cereals; clams; tofu (bean curd) made with calcium sulfate; and calcium-fortified orange juice and breakfast cereals. Other foods, while by no means considered good sources, do contribute some calcium to the diet. For example, 1 cup of cooked carrots contains 48 milligrams of calcium, and one orange has 52 milligrams.

Consumers’ preference for carbonated beverages and the concern about extra calories and dietary fat by many women are important factors in the decreased consumption of fluid milk since the 1970’s. On any given day, half of all Americans drank carbonated soft drinks in 1994-96, according to the CSFII. Food intake survey data indicate that the intake of both regular and low-calorie soft drinks has increased dramatically since the 1970’s. The increase is highest among teenagers and younger adults, with women drinking more low-calorie drinks. Annual food supply data show that per capita consumption of regular carbonated soft drinks increased from 22 gallons in 1970 to 40 gallons in 1994 and to 41 gallons in 1997, while that from diet drinks increased from 2 gallons in 1970 to 12 gallons in 1994 and 1997. (If only half the population drinks soda on any given day, as indicated by recent food intake surveys, than soda drinkers would consume more

Figure 2  
**In 1945, Americans Drank More Than Four Times as Much Milk as Carbonated Soft Drinks; In 1997, They Downed Nearly Two and a Half Times More Soda Than Milk**



Notes: <sup>1</sup>1947 is the earliest year for which data on soft drink consumption are available. <sup>2</sup>Per capita consumption of milk reached an all-time high in 1945 (data series dates from 1909).



of the available supply of soda than the per capita food supply data suggest.) By comparison, annual per capita consumption of beverage milks declined from 31 gallons in 1970 to 25 gallons in 1994 and to 24 gallons in 1997.

Excessive alcohol intake can also compromise calcium status by reducing the intestinal absorption of calcium as well as decreasing its dietary intake by replacing fluid milk consumption. "Excessive" alcohol intake is defined in the *Dietary Guidelines for Americans* as more than one drink (12 ounces of regular beer or 5 ounces of wine) a day for women and more than two drinks a day for men.

Although all people should try to meet their calcium needs through their diet, many people (especially older adults) may need a boost from supplements. In fact, a study done at the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRCA) at Tufts University concluded that the NIH consensus panel's calcium recommendations for people over age 50 are probably too hard for most people to meet, and so a daily supplement is recommended for those people. Researchers at the HNRCA at Tufts have devised a Food Guide Pyramid for people ages 70 and over. A flag at the top of this pyramid is a reminder that supplements—calcium, vitamin D, and vitamin B-12—may be necessary. This is especially true for those with low food intake/caloric requirements, low consumption of milk products, poor absorption of those three nutrients, and limited exposure to sunlight.

Calcium carbonate and calcium citrate are the best supplement choices. Calcium carbonate compounds such as Caltrate, Os-Cal, and Tums are generally the most economical and convenient supple-

ments to use. Each pill usually contains at least 200 milligrams of calcium at a cost of as little as \$2 per month for some generic brands. However, about 20 percent of those over age 60 and 40 percent of those over age 80 may not produce enough stomach acid to promote sufficient absorption of calcium carbonate between meals. Therefore, calcium carbonate should always be taken with either food (which stimulates the secretion of stomach acid) or orange juice (which has a high acid content) to be certain that the calcium is absorbed by the body. Calcium citrate (Citracal and others) is easier to absorb than calcium carbonate, but consumers have to take more of it, and it is usually more expensive.

### Promotions and New Products Buoy Consumption

To help consumers include more dairy products in the diet, a number of promotional campaigns have been developed by the Federal Government, private and public dairy interests, and health professionals. Some of these activities target specific groups of Americans to improve intake of dairy products overall; others are more focused on the nutrient contributions and the link to health. However, the basic goal of each campaign is to promote dairy product consumption. Co-operative advertising efforts by dairy farmers and processors appear to have boosted milk and cheese sales (see "Advertising's Influence: The Case of Dairy Products," elsewhere in this issue).

Recent publicity about how people in this country are not consuming enough calcium and could end up more vulnerable to broken hips and spines has encouraged food marketers to add calcium to dairy

products, even though they are already the main source of calcium. Since release of the IOM report in 1997 calling for Americans to consume more calcium, Dannon stepped up the marketing of its new calcium-fortified yogurt. Kraft Foods' new Light and Lively cottage cheese contains double the amount of calcium normally found in cottage cheese. After falling 15 percent in 1996, sales of Edy's (sold as Dreyer's west of the Rocky Mountains) frozen yogurt in 1997 held steady after the company quintupled the amount of calcium in a serving—and promoted the fact. In 1998, Safeway Stores, Inc., introduced its Lucerne brand Skim Delux Fat Free Milk (a calcium-fortified product with 66 percent more calcium than whole milk). Skim Delux currently (April 1999) sells at a 20-cent-per-half-gallon premium over the price of Lucerne regular skim milk in the Washington, DC, area. One cup of Skim Delux Fat Free Milk provides 80 calories, 0 grams of fat, 8 grams of protein, and 500 milligrams of calcium (50 percent of the recommended calcium intake for adults age 19 through 50 years). Some marketers of breakfast cereals, waffles, and orange juice have also fortified their products with calcium.

### Public Health Strategies To Implement Calcium Intake Recommendations

Optimizing the calcium intake of Americans is of critical importance. Surveys show that a large percentage of Americans fail to meet currently recommended guidelines for calcium intake. The impact of sub-optimal calcium intake on the health of Americans and the health care

cost to the American public is a vital concern. The 1994 NIH Consensus Statement on Optimal Calcium Intake called for a unified public health strategy to ensure optimal calcium intake in the American population. Such a strategy should have a broad outreach and should involve educators, health professionals, and the private and public sectors. Things to look forward to as research and technology advance:

- Development of guidelines for calcium intake that are consistent across all Government agencies, departments, and institutions and that reflect the current state of scientific knowledge;
- Development of effective health-promoting programs to change population behavior with respect to calcium intakes that are tailored to specific age, sex, ethnic, socioeconomic status, and regional needs;
- Food manufacturers and producers continuing to develop and

market a wide variety of calcium-rich foods to meet the needs and tastes of our multi-ethnic population;

- Restaurants, grocery stores, and other food outlets increasing the accessibility and visibility of calcium-rich products for the consumer;
- Development of cost-effective means by which calcium-deficient individuals can be identified at all ages; and
- Continued monitoring and dissemination of data and information on nutrient intakes and food consumption patterns with respect to calcium intake.

## References

Cleveland, L.E., J.D. Goldman, and L.G. Borrud. *Results from USDA's 1994 Continuing Survey of Food Intakes by Individuals and 1994 Diet and Health Knowledge Survey*. USDA's Agricultural Research Service. April 1996.

Gerritor, S., and L. Bente. *Nutrient Content of the U.S. Food Supply, 1909-94*, Home Economics Research Report No. 53. USDA's Center for Nutrition Policy and Promotion. 1997.

National Academy of Sciences, National Research Council, Food and Nutrition Board. *Recommended Dietary Allowances*, 10th edition. Washington, DC: National Academy Press. 1989.

National Institutes of Health, Office of the Director. *Optimal Calcium Intake*, NIH Consensus Statement. June 6-8, Vol. 12, No. 4, pp. 1-31, 1994.

Putnam, J.J., and J.E. Allshouse. *Food Consumption, Prices, and Expenditures, 1970-97*, SB-965. USDA's Economic Research Service. April. 1998.

USDA's Agricultural Research Service. *Results from USDA's 1994-96 Continuing Survey of Food Intakes by Individuals and 1994-96 Diet and Health Knowledge Survey*. Dec. 1997. ■