Calcium

What Is Calcium?

Calcium is a mineral that the human body needs to build and maintain strong bones and teeth. Calcium also plays a role in the proper functioning of the heart, muscles, and nerves. Dairy products, such as milk, yogurt and cheese are good sources of calcium. Other sources include: calcium-fortified foods, fish with bones, legumes and dark green, leafy vegetables.

Unfortunately, most adolescents in the United States do not meet their dietary calcium requirements. According to a 2006 American Academy of Pediatrics publication, only 10% of female adolescents meet the recommended daily intake of calcium for adolescents.[1] The recommended calcium intake for female and male adolescents is 1300 mg, which may be met with three or more servings of calcium-rich foods.

In 2006, the CalTEENS survey in California showed that 54.7% of adolescent girls and 71.6% of adolescent males consumed three or more servings of calcium- rich foods (milk, cheese, yogurt, dairy desserts) in the previous day.[2]

Almost half of lifetime bone mass is added in adolescence, so this is a critical time period for calcium intake. It is also a good time to emphasize regular calcium intake at all life stages.[1]

May 2013

California
Nutrition and Physical Activity
Guidelines for Adolescents

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What are the Consequences of Calcium Deficiency?

Inadequate calcium intake in childhood and adolescence results in low bone density, which can lead to stunted growth. It also increases risk for bone fractures and osteoporosis in later years. Osteoporosis is a condition of gradually weakened and brittle bones.

How Much Calcium is Enough?

For individuals 9 to 18 years of age, the recommended dietary calcium intake is 1,300 milligrams per day. For ages 19-30, the recommendation is lower at 1,000 mg.[3] Four choices (cups) of milk or other calcium-rich foods would meet the recommendation of 1300 mg. Pregnant adolescents should also aim for 4 choices.

What counts as a cup of dairy?

Consumption of sugar-sweetened beverages (e.g. soda, vitamin water, sports drinks, energy drinks, Kool-Aid, etc.) is common in this age group. This is problematic because those choices displace calcium-containing beverages such as milk and are high in sugar and calories.

In the United States, among African-American high school students in 2010, milk consumption was comparatively low (29.3%) in comparison to soda consumption (32.0%).[4 *]

A 12-oz serving of nonfat milk has fewer calories and less sugar than a 12-oz soft drink. Milk provides one-third of an adolescent's daily calcium needs and other important nutrients.

Adolescents may avoid dairy products because they are concerned about calories and weight gain. To address this real concern, suggest nonfat and lowfat dairy products; these have fewer calories and less fat than whole fat versions and generally have the same amount of calcium and vitamins. For barriers related to lactose intolerance, see the section "What is Lactose Intolerance?"

What Foods Have Calcium?

Dairy products, such as nonfat and lowfat milk, yogurt and cheese, are good sources of calcium.

Plant sources of calcium include broccoli, sunflower seeds, nuts, legumes, some greens (e.g. kale, collards, mustard), okra, rutabaga, bok choy, dried figs, and tortillas (made from lime-processed corn) and calcium-set tofu (this means it was prepared with calcium salts).

Fortified sources of calcium are also available. Examples include calcium-fortified orange juice, soy beverages, rice beverages and cereal. Some legumes and fish are also good sources.

See the handout How Much Calcium am I Getting? for more examples.

What is Vitamin D?

The body needs vitamin D to absorb calcium. This vitamin is found in foods such as fortified milk, fish, eggs, and cod liver oil. Sunshine also contributes to vitamin D intake. Vitamin D is important for the body to build strong and healthy bones.[5]

For people aged 1-70 years of age, the Recommended Dietary Allowance is 600 IU of vitamin D per day, regardless of sex, pregnancy, or breastfeeding status.[3] If this recommendation is not met through foods and fortified milk, taking a vitamin D supplement may be recommended by their health care provider. Adolescents, especially those pregnant and breastfeeding should check with their primary healthcare provider before taking a vitamin supplement.

Warning: Unsafe Milk Practices

Pasteurization is the method used to kill many microorganisms present in raw milk, some of which are deadly. Raw (unpasteurized) milk products, such as raw cheese or raw milk, should be avoided at all times and are especially harmful in pregnancy.

Be mindful that the practice of eating/drinking raw milk products may be more common in certain cultures or subgroups. For example,

[*] According to the National Youth Physical Activity and Nutrition Study, percentage of high school students who drank a serving of the beverage one or more times per day during the 7 days before the survey

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unpasteurized cheeses like Queso Fresco or Panela may be popular among Hispanic families.

Milk Products to Avoid in Pregnancy
Raw milk products, certain cheeses and some other foods can be contaminated by bacteria called *Listeria*. If a mother eats contaminated foods, these bacteria can be passed from her to her unborn baby. *Listeria* can cause complications for the pregnancy and health problems in the baby.

To prevent infection from dairy sources, soft cheeses such as feta, Brie, and Camembert, blue-veined cheeses, or Mexican-style cheeses such as queso blanco, queso fresco, and Panela should not be eaten, unless they have labels that clearly state they are made from pasteurized milk. Hard cheeses, semi-soft cheeses such as mozzarella, cream cheese, cottage cheese, and pasteurized processed cheese slices/ spreads are generally safe.

Other foods to avoid to help prevent Listeria infection

What is Lactose Intolerance?

Some individuals produce too little lactase, an enzyme the body uses to break down lactose (the type of sugar in milk). When lactose is not digested, it cannot be absorbed by the body. As it moves through the intestine, lactose can cause uncomfortable symptoms such as nausea, cramping, gas, bloating, abdominal pain and diarrhea.

The amount of lactose that can be tolerated without side effects varies by the individual with lactose intolerance. The type of dairy product consumed also makes a difference. Most individuals with lactose intolerance can have small amounts of dairy products throughout the day, especially when consumed with other foods.

Individuals who suspect lactose intolerance should not cut out all dairy from their diet without exploring other options. Often, people with lactose intolerance find that their symptoms are not so bad when they have dairy in smaller amounts throughout the day or try different dairy products.

Ideas to try if lactose intolerance is suspected:

- Different types of dairy products, for example yogurt, and smaller portion sizes
- Dairy products mixed with other foods, for example, eating cereal with milk
- Lactose-free/low-lactose dairy, which have the enzyme lactase to digest lactose. Lactose-free milk is available from WIC.
- Adding lactase drops to milk or taking lactase pills before consuming dairy items
- Soy, almond, or rice drink/milk with at least 300 mg of calcium, often listed as 30% of the daily value, on the nutrition label. Soy milk is available from WIC.

"Lactose intolerance" is an inability to digest lactose. It is not an allergy. A milk allergy is a different type of reaction to milk and can be serious. **Individuals with a milk allergy must avoid all dairy products and any foods containing them–even in very small amounts.** Common symptoms of a food allergy include hives, a hoarse voice and wheezing. Rarely, individuals with a food allergy will go into anaphylaxis, a life-threatening whole-body allergic reaction **(call 9-11 if this happens)**.[6]

Children diagnosed with a milk allergy by a physician usually outgrow them.

What about Calcium Supplements?

Calcium supplements can be used to provide part, or all, of the daily requirement. However, it is often more effective to include more calcium-rich foods and beverages in the diet. For best absorption of iron, calcium supplements should not be taken at the same time as an iron supplement or a multivitamin that contains iron.

Adolescents with severe lactose intolerance who are unwilling to use lactose-reduced products may need to rely on a supplement and non-dairy sources of calcium to meet their calcium needs.

Calcium Supplements to Avoid
Avoid calcium supplements made from unrefined oyster shell, bone meal, or dolomite that do not have the USP symbol. They may contain high levels of lead or other toxic metals. Consuming lead is dangerous, but it is even more dangerous for children and for women who are pregnant or nursing.[7]

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Screening

Screen for lactose intolerance by asking the following questions:

- Does drinking milk upset your stomach?
- Do you have gas, bloating, or diarrhea after drinking or eating any dairy products?

If the client answered "yes," to these questions, it is possible that she has lactose intolerance. Common symptoms include abdominal pain, bloating, gas, diarrhea and nausea, usually 30 minutes to two hours after eating or drinking milk products. Symptoms may be mild or severe depending on the amount consumed and how much each person can tolerate.[8]

Use the How Much Calcium Am I Getting? handout to help your client assess how much calcium she is getting from food and/or supplements.

Ask the client if she eats raw (unpasteurized) dairy foods, such as yogurt and cheese. If so, she should avoid eating them. If pregnant, she should not eat the products listed on page C-3.

Interventions

- Use the How Much Calcium Am I Getting? handout to teach which foods are good sources of calcium, including the lesser known non-dairy sources.
- Use the Action Plan for Calcium handout to assist the client to develop her action plan for the behavior changes she is willing to make to achieve the recommended optimal calcium intake. See "Common Barriers to Drinking Milk and Solutions" to the right.
- Review the Best Bones Forever website on bone health with the client or provide the web address: www.bestbonesforever.gov/.

Common Barriers to Drinking Milk and Solutions

"Only children need milk."
Everyone needs enough calcium and vitamin D. Adolescents especially need calcium for growth.

Adolescents often have a "live for today" frame of mind and may not care about future health benefits of calcium (e.g. strong bones when one is old). Explain the benefits of calcium that are most appealing **now**, such as for being stronger.

"Milk makes me feel sick" or "I don't like milk."
Feeling ill after drinking milk may be a sign of lactose intolerance. See page C-3 for information and tips.

Non-milk options include soy, almond or rice drink/milk that have calcium added to them. Look for at least 300 mg (often listed as 30% of the daily value) on the nutrition label.

Cheeses, yogurt, canned fish with bones and some tofu and greens can contribute calcium to the diet. For more examples, see the handout, How Much Calcium Am I Getting?

"I do not have milk at home."
Many adults do not drink milk themselves and may not have it at home. Drinking milk may not be a common cultural/dietary practice.

Help adolescents identify small, realistic ideas, such as choosing dairy products at school, drinking milk instead of soda, or preparing a calcium-rich recipe (e.g. yogurt smoothie) for herself and/or family members.

To help with costs, dairy and other foods with calcium are available through the California WIC program. Approved items usually have the WIC logo next to them at the store.

Some examples of non-milk items are described above.

"Milk is fattening."
Calcium-rich foods are an important part of a healthy diet. Nonfat and lowfat milk, yogurt and cheese have fewer calories and less fat than whole-fat versions but normally have the same amount of calcium and vitamins.

Help adolescents identify healthy foods and beverages with calcium that they are willing to try.

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Follow-Up

Review the Action Plan for Calcium handout with the client to determine if goal(s) for behavior change were met.

If the client did not make any changes, ask what may have prevented them from doing so. Validate their feelings. Review the importance of calcium and ask about which benefits (if any) are important to the client. Together, identify strategies for removing or reducing barriers.

If the client made changes but still falls short of the recommended intake, provide praise and encouragement for the changes that were made. Together, revise their action plan (change or add goals).

If the client has made changes and achieved the recommended intake, provide praise and encouragement for the changes that were made. Help the client choose a new action plan from another section in the Guidelines.

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Web Links Referenced/Additional Resources

Title	Resource Type	URL
USDA: What Counts as a Cup of Dairy? webpage	Webpage	www.choosemyplate.gov/foodgroups/dairy_counts.html
FDA: Background Information for Educators What You Need To Know (About Listeriosis) Includes information about soft cheeses tailored for Hispanics.	Document (PDF)	http://www.fda.gov/downloads/Food/FoodborneIllnessContaminants/ucm106713.pdf
CDC: Listeriosis (Listeria) and Pregnancy Information on which foods to avoid in pregnancy	Webpage	www.cdc.gov/pregnancy/infections-Listeria.html
Medline Plus: Food Allergy	Webpage	http://www.nlm.nih.gov/medlineplus/ency/article/000817.htm
WIC approved foods list	Webpage	http://www.cdph.ca.gov/programs/wicworks/Pages/WIC-AuthorizedFoodListWAFL.aspx
How Much Calcium Am I Getting?	Document (PDF)	www.cdph.ca.gov/programs/NutiritionandPhysicalActivity/Documents/MO-NUPA-HowMuchCalciumAmIGetting.pdf
My Action Plan for Calcium	Document (PDF)	www.cdph.ca.gov/programs/NutiritionandPhysicalActivity/Documents/MO-NUPA-CalciumActionPlan.pdf
Best Bones Forever Teen-friendly website with quizzes and videos. Promotes bone health through calcium intake and bone-strengthening physical activity.	Website	www.bestbonesforever.gov/
California MCAH Calcium webpage Includes resources for professionals and handouts on calcium foods and lactose intolerance in English and Spanish.	Webpage	www.cdph.ca.gov/programs/NutiritionandPhysicalActivity/Pages/Calcium.aspx
California MCAH Vitamin D webpage	Webpage	http://www.cdph.ca.gov/healthinfo/healthyliving/nutrition/Pages/VitaminDResourcesandInformation.aspx
California WIC handout: Calcium	Document (PDF)	**English** www.cdph.ca.gov/programs/wicworks/Documents/NE/WIC-NE-EdMaterials-Calcium.pdf **Spanish** www.cdph.ca.gov/programs/wicworks/Documents/NE/WIC-NE-EdMaterials-CalciumSpanish.pdf
California WIC	Document	**English**

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handout: Which Milk is Healthiest?	(PDF)	www.cdph.ca.gov/programs/wicworks/Documents/HealthyHabits/WIC-HHED-LowfatMilk-WhichMilkIsHealthiestHandout.pdf **Spanish** www.cdph.ca.gov/programs/wicworks/Documents/HealthyHabits/WIC-HHED-LowfatMilk-WhichMilkIsHealthiestHandoutSpanish.pdf
California WIC handouts Available in multiple languages. Includes handouts about lactose intolerance and choosing soy products and cheese.	Webpage	www.cdph.ca.gov/programs/wicworks/Pages/WICEducationMaterialsHealthyEating.aspx
United States Department of Agriculture dairy handout This handout has tips to improve dairy intake.	Document (PDF)	www.choosemyplate.gov/food-groups/downloads/TenTips/DGTipsheet5GotYourDairyToday.pdf
National WIC calcium resources Includes Dietary Reference Intakes and relevant websites.	Webpage	http://wicworks.nal.usda.gov/topics-z/calcium
Milk Matters	Website	www.nichd.nih.gov/milk/pages/milk.aspx

References

1. Greer FR, Krebs NF. Optimizing bone health and calcium intakes of infants, children, and adolescents. *PEDIATRICS.* Feb 2006;117(2):578-585.
2. California Department of Public Health, *Network for a Healthy California*. California Teen Eating, Exercise and Nutrition Survey, 2006. Available from: http://www.cdph.ca.gov/programs/cpns/Documents/CalTEENS2006CMilkProducts.pdf
3. Institute of Medicine, Committee to Review Dietary Reference Intakes for Vitamin D and Calcium. *Dietary Reference Intakes for Calcium and Vitamin D*: The National Academies Press;2011.
4. Centers for Disease Control and Prevention. Beverage Consumption Among High School Students--United States, 2010. http://www.cdc.gov/mmwr/pdf/wk/mm6023.pdf.
5. Higdon J. Vitamin D. *Micronutrient Information Center* 2011; http://lpi.oregonstate.edu/infocenter/vitamins/vitaminD/, 2011.
6. Food Allergy. *MedlinePlus: Trusted Health Information for You* http://www.nlm.nih.gov/medlineplus/ency/article/000817.htm, 2013.
7. NIH Osteoporosis and Related Bone Diseases National Resource Center. Calcium Supplements: What to Look For2011.
8. National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), National Institutes of Health. Lactose Intolerance. *Digestive Diseases A-Z List of Topics and Titles* 2009; http://digestive.niddk.nih.gov/ddiseases/pubs/lactoseintolerance/#risk.

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How Much Calcium Am I Getting?

Amount of Calcium in Some Good Calcium Foods

Calcium Food	Serving Size	~ Calcium Content (mg)	# Servings I Have per Day	My Calcium Intake (mg)
Dairy Foods				
Plain yogurt, nonfat	1 cup	488		
Milk powder (dry milk), nonfat	1/3 cup	391		
Fruit yogurt, nonfat	1 cup	350		
Ricotta cheese, part skim	1/2 cup	337		
Milk, nonfat or 1%	1 cup	311		
Lactose-free milks, such as Lactaid®	1 cup	300		
Plain Greek yogurt, nonfat	1 container (~6 oz)	187		
Sliced cheese, such as nonfat or lowfat Muenster, Cheddar, Mozzarella, Provolone, or Swiss	1 slice (3/4 oz)	111-173		
American cheese	1 piece (3/4 oz)	144		
Cottage cheese, nonfat or lowfat	1 cup	133		
Frozen yogurt or ice cream, nonfat	1/2 cup	104		
Foods with Added Calcium				
Soy milk with added calcium, such as Silk®	1 cup	450		
Almond milk with added calcium, such as Almond Breeze®	1 cup	450		
Rice drink (milk) with added calcium	1 cup	283		
Tofu with added calcium, soft or firm	1/2 cup	197		
Orange juice with added calcium	1/2 cup	174		
Cereal or cereal bar with added calcium	1 ounce	Label says_____		
Supplement with calcium	1	Label says_____		
Other Foods				
Sardines, canned, drained with bone	1 can (3.75 oz)	351		
Collard greens, cooked	1 cup	313		
Turnip greens, cooked	1 cup	223		
Salmon, canned, drained with bone	1/4 can (3 oz)	208		
Mustard greens, cooked	1 cup	191		
Other cooked greens, such as chard, kale, dandelion, or beet	1 cup	102-164		
Soybeans, green, boiled	1 cup	131		
Navy beans, not sprouted, cooked	1 cup	126		
			Enter total here →	

Calcium Recommendations

Age	9-13 Years	14-18 Years	19-30 Years
Females and Males	1300 mg	1300 mg	1000 mg
If pregnant or breastfeeding		1300 mg	1000 mg

Amount of calcium I need for my age _____ mg

Amount of calcium I am getting now — _____ mg

How much more calcium I need each day _____ mg

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My Action Plan for Calcium

Name: _____

Check the box for each step you are doing now to get enough calcium. Check the boxes for the steps you plan to take. Write down other ways you plan to improve your calcium intake.

Things that I can do to get enough calcium every day	Am Doing	Steps I Will Take
• Include a calcium-rich food or beverage with every meal. Try the *Fruity Delight*, *Macaroni and Cheese,* or *Rice Pudding* recipes, found at www.cdph.ca.gov/programs/NutiritionandPhysicalActivity/Pages/EasyMealsandSnacks.aspx or type "Easy Meals and Snacks: A Healthy Cookbook for Teens" into a web search engine.	☐	☐
• Choose a calcium-rich food or beverage for a snack every day. Ask your case manager to help you fill out the *How Much Calcium Am I Getting?* handout. www.cdph.ca.gov/programs/NutiritionandPhysicalActivity/Documents/MO-NUPA-HowMuchCalciumAmIGetting.pdf	☐	☐
• Use a drink with calcium instead of water in hot cereal, soups, pancake mix, and other recipes. Use nonfat or lowfat milk. Or use soy, almond or rice drink/milk that have added calcium.	☐	☐
• Drink less soda. I will reduce my soda intake by _____ (cans, bottles, glasses) per day.	☐	☐
• Along with eating calcium-rich foods, I will take a supplement with calcium as directed by my medical provider.	☐	☐
• Drink all the milk that I put on my cold cereal.	☐	☐
• My ideas for improving my calcium intake:		
_____	☐	☐
_____	☐	☐

Signature: _____ Date: _____

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