Nutrition Fact Sheet

Up-to-date nutrition information
for the health care professional

Prevention of Rickets and Vitamin D Deficiency in Infants

Vitamin D and Rickets

The principle function of vitamin D (calciferol) is to maintain serum calcium and phosphorus concentrations in a range that supports cellular processes, neuromuscular function and bone ossification. Vitamin D does this by enhancing the absorption of dietary calcium and phosphorus by the small intestine, and by mobilizing calcium and phosphorus stores from bone. Rickets secondary to vitamin D deficiency occurs as a result of decreased sunlight exposure and low vitamin D intake. The result is poor bone growth, soft and deformed bones, and possible lifelong consequences - such as growth retardation - among severe cases. Some children develop potentially life-threatening hypocalcemia. Nutritional rickets almost disappeared with the recognition of the preventive role of sunlight and fortification of infant formulas and milk. Recently, in Wisconsin, there has been an increase in the number of cases of nutritional rickets, especially among breastfed infants with darker skin color and others with limited exposure to sunlight (i.e., women who cover their bodies for religious reasons).

Sources of Vitamin D

Vitamin D is found in very few foods naturally, such as fish liver oil, fatty fish and egg yolk. It is added to cow's milk, infant formula, some breads and cereals, and some juices. Both infant formula and milk are fortified with 400 IU of vitamin D per quart. Vitamin D is synthesized in the skin by the action of ultraviolet light from the sun on a cholesterol precursor. However, sunlight-mediated synthesis of vitamin D in the skin is profoundly affected by a wide variety of factors including:

- degree of skin pigmentation
- amount of time spent in sunlight
- weather conditions
- time of day
- season of the year and latitude (the sunlight is too weak for vitamin D synthesis from November - February in Wisconsin)
- amount of smog/air pollution
- the amount of body surface covered with clothing or sunscreen.

Contributing Factors of Vitamin D Deficiency

Infants and young children who are at risk for lower vitamin D stores include:

- those who do not get enough sunlight exposure to their skin, stay indoors, or live in smoggy areas
- those who consume little, if any, vitamin D fortified milk
- those who eat a strict vegan diet (avoiding all animal products including milk and eggs)
- those who have deeply pigmented skin, and/or
- are breastfed and do not take vitamin D supplements.

Dermatologists and cancer experts advise caution in exposure to sun (or to sunlight), especially in childhood, and recommend regular use of suncreens. As noted above, sunscreens markedly decrease vitamin D production in the skin. In Northern climates, such as Wisconsin, the sun is too weak to allow the skin to synthesize vitamin D during the winter months.

Breastfeeding and Vitamin D

Breastmilk is the best source of nutrition for infants. Breastmilk contains some highly bio-available vitamin D, but the amount of vitamin

D available in breastmilk varies in individuals. Vitamin D in breastmilk was intended, by nature, to be a supplement to the amount made by the skin of infants who are routinely exposed to adequate sunlight.

Vitamin D Recommendations

The American Academy of Pediatrics released revised guidelines for vitamin D supplementation in April 2003. To prevent rickets and vitamin D deficiency in healthy infants and children and acknowledging that adequate sunlight exposure is difficult to determine, it is recommended that a supplement of 200 IU per day be given for the following:

1. All breastfed infants unless they are receiving at least 500 mL (~17 ounces) per day of vitamin D-fortified formula or milk.
2. All non-breastfed infants who are receiving less that 500 mL per day of vitamin D-fortified formula or milk.
3. Children and adolescents who do not get regular sunlight exposure, do not drink at least 500 mL per day of vitamin D-fortified milk or juice, or do not take a a daily multivitamin supplement containing at least 200 IU of vitamin D.

Supplementation should begin within the first 2 months of life.

The full clinical report is available on the American Academy of Pediatrics website, http://www.aap.org/policy/s010116.html.

Obtaining Vitamin D Supplements

Currently, vitamin D only supplements are not readily available in the United States. A combination vitamin supplement containing vitamins A, C and D is readily available as an over-the-counter vitamin drop for infants at most pharmacies. A 0.5 mL dose of these vitamin drops provides 200 IU of vitamin D (the dropper and dosage instructions currently available are for a 1.0 mL dose or 400 IU of vitamin D).

Vitamins A, C and D is one of the vitamin supplements available without prior authorization by the Wisconsin Medicaid Program under Health Check "Other Services." This coverage requires a prescription from the health care provider that includes verification that the infant/child received a comprehensive Health Check screen within the last 365 days. This can be done by including the date of the Health Check screen on the prescription.

What Parents Need to Know

Parents and caregivers of infants and young children need to know…

- that breastmilk is the best source of nutrition for infants and young children
- that all infants need vitamin D added to the diet for healthy bone growth and development, either as a supplement or that is added to the infant formula
- what the recommendations for vitamin D supplementation are, how to obtain the vitamins and how to give the vitamin to their infant
- that they should stop the vitamin D supplement if their infant is consuming more than ~17 ounces of vitamin D fortified infant formula, milk or juice per day, and
- where to store the vitamins safely out of reach of children.

References:
Gartner Lawrence M; Green Frank R; and the Section on Breastfeeding and Committee on Nutrition: Prevention of Rickets and Vitamin D Deficiency: New Guidelines for Vitamin D Intake. Pediatrics 111(4), April 2003, pp 908-910.

Scanlon Kelley S:Vitamin D. Expert Panel Meeting, October 11-12, 2001. Atlanta, Georgia

Resources:
American Academy of Pediatrics, www.aap.org

Cynthia Good Mojab, MS, IBCLC, RLC,
http://home.comcast.net/~ammawell/vitaminD.html

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