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Vitamin D, Your Baby, and You

It is a known fact that human milk is the superior infant food. Human milk is the most complete nutritionally, immunologically, and is the only food designed specifically for your baby. Given that it is expected to be "perfect," you may be confused about why your baby's doctor is encouraging you to give your breastfed baby vitamin D supplements.

In 2008, the American Academy of Pediatrics (AAP) amended its recommendation regarding vitamin D supplementation of infants and children. The current recommendation reads: "A supplement of 400 IU/day of vitamin D should begin within the first few days of life and continue throughout childhood. Any breastfeeding infant, regardless of whether he or she is being supplemented with formula, should be supplemented with 400 IU of vitamin D." (*Pediatrics* 2008; 122(5):1142-52)

Why is vitamin D important?

Vitamin D is a key nutrient in the maintenance of bone health in children and adults. Because vitamin D is essential for promoting calcium absorption in the body, vitamin D deficiency is marked by such conditions as rickets (in children), osteomalacia (in adults), and can lead to osteoporosis if left unchecked long-term. While researchers are still working to prove a cause-and-effect relationship between low levels of vitamin D and other health issues, anecdotal and epidemiological (tracking the occurrence of a disease or condition in a population over time) correlations have been found between vitamin D insufficiency/deficiency and the following:

- Cancers; specifically of the colon, breast, and prostate
- Hypertension (due to calcium's role in the regulation of blood pressure)
- Diabetes (both type I and type II); insulin resistance/pre-diabetes may also be related to vitamin D insufficiency
- Multiple sclerosis, rheumatoid arthritis, and other autoimmune conditions

I spend a lot of time outside. Surely I'm not deficient in vitamin D.

There are a few factors that have an impact on the vitamin D content of a mother's milk. Most significantly, the vitamin D status of the mother during pregnancy and lactation impacts the vitamin D status of the baby at birth, as well as mother's ability to transfer vitamin D via her milk. In 2003, data released by the Thrasher Research Fund/US National Institutes of Health reported that 81% of women of childbearing age have insufficient levels of vitamin D. While there is still some uncertainty about the optimal level of vitamin D for adults, there is recent agreement among the medical community that vitamin D insufficiency is represented by a blood level of less than 32 ng/mL. Those with blood levels below 20 ng/mL are considered deficient in vitamin D. How has vitamin D insufficiency reached epidemic proportions?

We as a population have heeded the warnings of the medical community and limited our unprotected exposure to the sun. The use of sunscreen, while important in the protection against skin cancer, blocks the rays of the sun that are necessary for our bodies to convert sunlight into vitamin D through the skin.

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Additionally, many of us live north of the 35th parallel, where, for most months of the year, the sun's rays are not strong enough to assist our bodies in making enough vitamin D. This is the case even with prolonged, unprotected sun exposure. Those living where clouds often cover the sky or in cities with poor, polluted air quality also will be deprived of optimum sun exposure for the manufacture of vitamin D.

People with darker skin colors will be more likely to have low levels of vitamin D. This is due to the increased pigment in their skin which requires nearly four times the length of sun exposure in order to manufacture vitamin D.

Our bodies are designed to make very large amounts of vitamin D through exposure to the sun (10,000—20,000 IU in 24 hours, after 15—20 minutes of summer-sun exposure in a bathing suit/45—60 minutes of exposure for those with darker skin tones). However, in adults and children, the desire to avoid overexposure and sunburn has eclipsed our ability to absorb adequate amounts of sunlight to keep our vitamin D status at a normal level.

I eat a healthy diet and take vitamins. My vitamin D status is probably fine.

Until very recently, it was unknown that low vitamin D levels in the body could be related to conditions other than overt bone problems, such as rickets in children and osteomalacia in adults. Consequently, vitamin D insufficiency and deficiency goes unnoticed and underdiagnosed. It was also commonly believed that adverse effects could result from too much vitamin D. Current adult Recommended Daily Intakes (RDI) for vitamin D in most of the world are still quite low, and are now believed by many researchers to be inadequate for achieving or sustaining normal vitamin D levels. Most multivitamins only contain 200—400 IU of vitamin D. While this amount does not appear to be sufficient for adults, 400 IU/day is sufficient for babies, beginning in the first few days of life, as recommended by the American Academy of Pediatrics.

There are few dietary sources of vitamin D, but they are not significant enough to provide the amount of vitamin D that most adults really need. These dietary sources include:

- cod liver oil
- fish, such as mackerel, tuna, and salmon
- egg yolk
- beef liver
- fortified dairy products

Recent research emphasizes the need for more than the currently recommended intake of 600 IU/day of vitamin D for adults.

Should I supplement my breastfed baby with vitamin D?

Your baby's doctor probably recommends that you supplement your baby with 400 IU /day of vitamin D, as per the AAP 2008 recommendation. The recommendation is based on the following well-established facts:

- Vitamin D deficiency can occur very early in life, particularly because many pregnant women have deficient blood levels of vitamin D.
- Vitamin D levels (measured by a blood test for 25-OH-D) of unsupplemented breastfed infants are often below 20 ng/mL, particularly in the winter and latitudes farther from the equator, probably as a result of maternal deficiency.
- Adequate sunlight exposure for sufficient manufacture of vitamin D in an infant is difficult to assess and often not achieved.
- Optimal vitamin D levels in breastfed infants can be maintained with supplementation of 400 IU/day of vitamin D.

Most commonly, multivitamins are prescribed for infants. If you choose to supplement your baby and are uncomfortable with supplementation of vitamins other than D (since your milk alone provides optimal amounts of those other nutrients), ask your doctor to recommend a vitamin D-only preparation for your baby. They are available but may be more expensive than the multivitamin. Additionally, doctors may be more comfortable prescribing multivitamin preparations because those have been available for many years, while the vitamin D-only preparation is relatively new.

Even though it is likely, given the above factors, that your baby needs vitamin D supplements, you may opt to have your baby's vitamin D level assessed with a blood test measuring 25-hydroxy vitamin D (25-OH-D). Your baby's doctor can help you determine whether vitamin D supplements are, indeed, warranted.

Should I take vitamin D supplements?

Unless your blood level of 25-OH-D is greater than 60 ng/mL, your milk does not provide enough vitamin D for your baby. Even with large supplemental doses (5000+ IU/day), your vitamin D status may not reach the level required to assure your milk is transferring enough of this nutrient to your baby. Research shows that mothers require a high dose (6400 IU/day) of vitamin D in order for their milk to transfer the recommended 400 IU/day to their babies. While the currently recommended safe upper limit for vitamin D intake is 4000 IU/day, it is very important to check with your doctor and have your own vitamin D status assessed by a blood test before you begin supplementing at levels higher than the current RDI of 600 IU/day. Debates continue over what an optimal level of vitamin D is for an adult, and recent research has indicated that pregnant and lactating women might need more vitamin D than adults who are not bearing children.

It is important to note that a mother's milk is not replete with vitamin D because she, herself, does not have enough in her body. Supplementing the baby takes care of his needs, but does not address the deficiency in the mother, which may lead to long-term, chronic compromises in her health. Researchers are still determining what "optimal" levels of 25-OH-D should be, but the following can serve as a guideline for total 25-OH-D:

• <20 ng/mL	Vitamin D deficiency
• 20–31 ng/mL	Vitamin D insufficiency
• 32 ng/mL	Sufficient vitamin D levels

Reference:
Wagner, C.L., Taylor, S.N., and Hollis, B.W. *New Insights Into Vitamin D During pregnancy, Lactation, & Early Infancy*. Amarillo, TX: Hale Publishing, 2010.