

# Vitamin D Deficiency

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## What is Vitamin D?

Vitamin D is a fat soluble vitamin that is present in very few foods. The most common way in obtaining vitamin D is through sunlight exposure. The ultraviolet rays trigger our body to synthesize vitamin D, and it undergoes two hydroxylations in our body for activation. First, our liver converts vitamin D to 25-hydroxyvitamin D, also known as calcidiol. The second hydroxylation occurs in our kidney. It produces the active form of vitamin D 1,25 dihydroxyvitamin D, also known as calcitriol.

## Why Do We Need Vitamin D?

Vitamin D is essential for promoting calcium absorption, as well as maintaining adequate calcium and phosphate concentration levels in our body. It is also needed for bone growth and remodeling. Without sufficient vitamin D, our bones may become thin or brittle. Vitamin D protects infants and children from rickets, a condition marked by softening of bones leading to fractures and deformities. Breastfed infants require vitamin D supplementation since human milk does not supply babies with the adequate amounts needed. Together with calcium, vitamin D also protects older adults from osteoporosis. Adequate intake requirements for vitamin D are listed in Table 1.

## What is Vitamin D Deficiency and What Causes It?

Vitamin D deficiency is highest among people who are elderly, institutionalized or hospitalized. In the United States, 60 percent of nursing home residents and 57 percent of hospitalized patients were found to be vitamin D deficient. However, studies have shown that over the years, there are an increased number of healthy, young adults with vitamin D deficiency.

The most common cause for vitamin D deficiency is inadequate sunlight exposure. However, vitamin D synthesis in response to sunlight may be decreased in certain populations. These populations include individuals with obesity, dark skin and older adults. Another common cause for vitamin D deficiency is when the body cannot absorb sufficient

Age	Children	Men	Women	Pregnancy	Lactation
Birth to 13 yrs	5 mcg (200 IU)				
14-18 yrs		5 mcg (200 IU)	5 mcg (200 IU)	5 mcg (200 IU)	5 mcg (200 IU)
19-50 yrs		5 mcg (200 IU)	5 mcg (200 IU)	5 mcg (200 IU)	5 mcg (200 IU)
51-70 yrs		10 mcg (400 IU)	10 mcg (400 IU)		
>71 yrs		15 mcg (600 IU)	15 mcg (600 IU)		

vitamin D from foods, a disorder known as malabsorption. Individuals with malabsorption disorder cannot absorb fats normally and thus are unable to absorb vitamin D to be utilized in the body. People with liver or kidney disease are also prone to vitamin D deficiency. This occurs when the body is unable to convert vitamin D to its active form.

## How Do We Treat Vitamin D Deficiency?

The treatment of vitamin D deficiency involves taking high doses of vitamin D daily or weekly for one to two months or longer. Ergocalciferol (Vitamin D2) and Cholecalciferol (Vitamin D3) are two different forms of vitamin D that need to be converted by the kidney to an active form. Ergocalciferol and Cholecalciferol both exist in multiple brands and are available over the counter. There are no vitamins for infants that only contain vitamin D in the United States. Thus, multivitamins in liquid formulations such as Gerber Vitamin Drops®, Poly-Vi-Sol Drops®, Tri-Vi-Sol Drops®, Vi-Daylin ADC® or Multivitamin Drops® will be good choices for

supplementing vitamin D for infants. Calcitriol is the most active form of vitamin D. It works by regulating the amount of calcium and phosphorus circulating in the bloodstream by enhancing their absorption from the gastrointestinal tract and promoting their release from bone. Two formulations are currently available. Rocaltrol® is an oral formulation and is taken by mouth. Calcijex® is an IV formulation and is taken through intravenous injections. Other available vitamin D analogs include paricalcitol, also known as Zemplar®, and doxercalciferol, also known as Hectorol®. However, calcitriol or one of the vitamin D analogs is most often used in patients with severe kidney disease, since these agents do not require conversion by the kidney to the active form.

The key in preventing bone disease is adequate intake of vitamin D through sunlight exposure, diet and vitamin D supplementation. Talk to your pharmacist to see if vitamin D is right for you. Your pharmacist will be able to provide you with more information and recommend the right product that best suits your needs.

**For more information, ask your pharmacist!**

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