

Vitamin D and Prenatal-Newborn Health

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STORY AT-A-GLANCE

- › Vitamin D deficiency during pregnancy poses serious health risks to both mother and child, including preeclampsia, preterm birth and low birth weight. Optimal vitamin D levels are necessary for a healthy pregnancy
- › Personalized vitamin D recommendations are essential due to individual variations in metabolism and needs. Factors like genetics, body mass index and skin pigmentation influence how your body utilizes vitamin D. Regular testing is needed to determine and maintain optimal levels
- › Conflicting guidelines and controversy surround vitamin D recommendations, particularly for pregnant women. Some organizations downplay the importance of vitamin D due to institutional biases and financial interests
- › Maintaining optimal vitamin D levels is important for overall health throughout life, not just during pregnancy. Vitamin D plays a role in immune function, calcium absorption and chronic disease prevention
- › Sunlight is the most effective way to optimize vitamin D, but supplementation is often necessary. When supplementing, aim for optimal levels between 60 to 80 ng/mL and consider factors like dietary seed oil consumption, which affects sun exposure safety

Vitamin D, often referred to as the "sunshine vitamin," is a nutrient that plays a key role in numerous physiological processes. While it's naturally produced in your skin upon exposure to sunlight, many individuals, particularly those living in northern latitudes,

with darker skin tones, or those who spend a significant amount of time indoors, do not synthesize adequate amounts.

This has led to widespread vitamin D deficiency, a condition with significant health implications, especially for pregnant and lactating women. In the video above, Dr. Mobeen Syed and Jen Aliano of GrassrootsHealth interview Bruce Hollis, professor of pediatrics, biochemistry and molecular biology, and Dr. Carol Wagner, pediatrician and neonatologist, of the Medical University of South Carolina.

The discussion focuses on the topic of vitamin D during pregnancy and early life, highlighting the importance of personalized supplementation, the controversy surrounding current recommendations and practical advice for optimizing vitamin D status – a foundational aspect of optimal health.

Understanding Vitamin D and Its Forms

Vitamin D is not a single compound but rather a group of fat-soluble secosteroids. The two main forms relevant to human health are vitamin D2 (ergocalciferol) and vitamin D3 (cholecalciferol). Vitamin D3, the more potent form, is synthesized in your skin when exposed to UVB radiation from sunlight and is also found in some animal-based foods.

Vitamin D2 is derived from plant sources and is less effective at raising blood levels of the active form. In your body, vitamin D undergoes a series of transformations. The first step occurs in your liver, where vitamin D is converted to 25-hydroxyvitamin D (25(OH)D), also known as calcidiol. This is the primary storage form of vitamin D in your body and the form measured in blood tests to assess your vitamin D status.

25(OH)D is subsequently converted in your kidneys and other tissues to the active hormonal form, 1,25-dihydroxyvitamin D (1,25(OH)₂D), also known as calcitriol. Calcitriol exerts its effects by binding to the vitamin D receptor (VDR), a nuclear receptor present in most cells of your body. This widespread distribution of the VDR underscores the diverse physiological roles of vitamin D, extending far beyond its well-known role in calcium and bone metabolism.

Calcitriol regulates gene expression, influencing many cellular processes, including cell growth and differentiation, immune function and inflammation. While the general public often understands that vitamin D is important for preventing rickets and osteoporosis, its effects are much wider reaching, with research suggesting roles in preventing or managing conditions like cardiovascular disease, certain cancers, autoimmune disorders and even [mental health conditions](#) like depression.¹

The process of converting vitamin D3 into the active hormonal form of vitamin D is a complex biological process that requires certain enzymes and co-factors. Your body maintains tight control over the conversion of 25(OH)D to 1,25(OH)2D, ensuring that adequate levels are available for various physiological needs while preventing excessive buildup, which could lead to toxicity.

Consequences of Vitamin D Deficiency in Pregnancy

Vitamin D deficiency during pregnancy has been linked to a range of adverse outcomes for both the mother and the developing fetus. Hollis and Wagner highlight several significant risks, including preeclampsia, a serious condition characterized by high blood pressure and organ damage, which leads to life-threatening complications for both mother and baby.

Hollis cited the Vitamin D Antenatal Asthma Reduction Trial (vDAART) in which none of the pregnant women who entered the study with vitamin D levels of 40 ng/mL or higher developed preeclampsia.² This suggests that maintaining optimal vitamin D levels from early pregnancy, or ideally even before conception, has a profound protective effect against this dangerous condition.

Preeclampsia is associated with an increased risk of preterm birth, low birth weight and other complications, underscoring the importance of preventing this condition through optimal vitamin D status. Preterm birth, defined as delivery before 37 weeks of gestation, is another significant concern associated with vitamin D deficiency. The panel discusses a study where analyzing the data based on vitamin D dosage alone did not show a significant difference in preterm birth rates.

However, when the data was reanalyzed based on achieved vitamin D levels, a clear association emerged, with higher vitamin D levels linked to a lower risk of preterm birth. This highlights the importance of considering individual responses to supplementation rather than relying solely on dosage.

Preterm birth is a leading cause of infant mortality and morbidity, with long-term health consequences for surviving infants, including respiratory problems, developmental delays, cerebral palsy and vision and hearing impairments. By optimizing vitamin D levels during pregnancy, it's possible to significantly reduce the incidence of preterm birth and its associated complications.

Beyond these immediate risks, maternal vitamin D deficiency has also been linked to long-term health consequences for the infants. Studies have suggested an association between low prenatal vitamin D levels and an increased risk of asthma, eczema, Type 1 diabetes and certain cancers later in life for the child.

These findings suggest that vitamin D is involved in fetal programming, influencing the development of the immune system and other physiological processes in ways that have long-lasting effects on health.

While the exact mechanisms underlying these associations are still being investigated, the implications are profound. Optimizing **vitamin D status during pregnancy** not only improves maternal and infant outcomes in the short term but also contributes to the long-term health and well-being of the next generation. This underscores the importance of viewing vitamin D optimization during pregnancy as a key public health intervention with far-reaching benefits.

The Importance of Testing and Personalized Supplementation

The discussion emphasizes the need for individualized vitamin D supplementation based on blood level testing. This is because numerous factors influence how your body metabolizes and utilizes vitamin D. Genetic variations, for example, affect the activity of enzymes involved in vitamin D metabolism or the function of the vitamin D receptor.

Body mass index (BMI) also plays a role, with individuals with higher BMIs often requiring higher doses of vitamin D to achieve optimal levels. This is due to the sequestration of fat-soluble vitamin D in adipose tissue, making it less bioavailable. Additionally, the panel highlights the importance of magnesium as a cofactor for vitamin D metabolism. **Magnesium deficiency** impairs your body's ability to convert vitamin D to its active form, leading to suboptimal levels despite adequate intake.

Skin pigmentation is another factor. Melanin, the pigment that gives skin its color, acts as a natural sunscreen, absorbing UVB radiation and reducing your skin's ability to synthesize vitamin D₃. Individuals with darker skin tones, therefore, require longer sun exposure to produce the same amount of vitamin D as those with lighter skin. This difference contributes to the higher prevalence of vitamin D deficiency among populations with darker skin, even in sunny climates.

The panel stresses that these individual variations make a one-size-fits-all approach to vitamin D supplementation ineffective and inadequate for many individuals. Without testing, it's impossible to know whether you're deficient or have optimal vitamin levels. Furthermore, the panel argues that testing is not just about determining the initial dose but also about monitoring progress and adjusting supplementation as needed.

Vitamin D levels fluctuate over time due to changes in sun exposure, diet, health status and other factors. Regular testing allows for personalized adjustments to ensure that optimal levels are maintained. This personalized approach is especially important during pregnancy, where maintaining sufficient vitamin D levels is important not only for the mother's health but also for the healthy development of the fetus.

Dosage Recommendations vs. Personalized Approach

The experts emphasize that testing vitamin D levels during pregnancy is important to optimize levels, and a one-size-fits-all recommendation without testing likely leaves a significant proportion of women deficient. They cite studies showing that even with a daily dose of 4,000 IU, a substantial percentage of pregnant women fail to reach the desired vitamin D levels by mid-pregnancy.

This underscores the importance of individualized dosing based on blood level testing to ensure that all pregnant women achieve and maintain sufficient vitamin D status. The panel's recommendation that everyone, including pregnant women, maintain a vitamin D level of 50 ng/mL is based on a growing body of evidence linking higher levels to improved pregnancy outcomes.

However, optimal vitamin D health benefits appear at levels between 60 to 80 ng/mL (150 to 200 nmol/L).

While some health organizations advocate for lower thresholds, the panel argues that these higher levels are necessary to support the unique physiological demands of pregnancy. Hollis points out that the active hormonal form of vitamin D, 1,25(OH)₂D, rises dramatically during pregnancy to levels that would be considered toxic in non-pregnant individuals.

This suggests a specialized role for vitamin D during pregnancy that goes beyond its traditional functions in calcium and bone metabolism.

Research suggests that vitamin D may play a role in placental function,³ immune modulation and fetal development, further emphasizing the need for optimal levels during this vulnerable period. The experts also highlight the limitations of relying solely on randomized controlled trials (RCTs) when evaluating the effects of vitamin D. While RCTs are considered the gold standard for evaluating drug efficacy, they're not ideal for studying nutrients like vitamin D.

Unlike drugs, which are typically absent from the body before intervention, vitamin D is already present at varying levels in individuals. This baseline variability significantly influences the outcomes of RCTs, making it difficult to detect the true effects of supplementation. Additionally, RCTs often struggle with compliance issues, as participants may not consistently take their assigned doses.

In contrast, observational studies, which assess vitamin D status and health outcomes in real-world settings, provide valuable insights into the long-term effects of vitamin D sufficiency. The panel argues that both types of studies should be considered when

formulating recommendations, and that the wealth of observational data supporting the benefits of optimal vitamin D levels should not be disregarded.

Controversy and Conflicting Guidelines

The discussion exposes a significant controversy surrounding vitamin D recommendations, particularly for pregnant women. The panel expresses concern over a recent study published in the Cochrane Database of Systematic Reviews,⁴ which downplayed the importance of vitamin D in pregnancy.

Hollis suggests that this review selectively excluded relevant studies and that their conclusions often contradict a substantial body of evidence from basic science, observational studies and even some RCTs. The experts describe instances where reviewers' concerns about the Cochrane review were seemingly ignored, and the final publication did not reflect the significant revisions that were suggested.

This raises questions about the transparency and rigor of the review process and highlights bias in the interpretation of scientific evidence. The panel suggests that institutional and financial interests are influencing recommendations, with powerful individuals within organizations protecting their own views and research agendas.

Furthermore, Hollis highlights the issue of "gaslighting" when organizations call for more research while simultaneously dismissing existing evidence.

He argues that in the case of vitamin D, there is already a wealth of data that clearly demonstrates the importance of optimal vitamin D status for overall health and particularly for pregnancy outcomes. While more research is always welcome, the panel believes that the current evidence is sufficient to warrant strong recommendations for vitamin D testing and personalized supplementation.

They express concern that the constant call for more studies, without acknowledging the existing evidence, serves to create confusion and delay the implementation of effective public health strategies. This is particularly concerning given the widespread prevalence of vitamin D deficiency and its health consequences.

Practical Advice for Addressing Vitamin D Deficiency

Hollis and Wagner provide practical recommendations for individuals to optimize their vitamin D status. They emphasize that while sun exposure is a natural source of vitamin D, many people do not get sufficient sun exposure to maintain optimal levels, due to factors such as geographical location, lifestyle and the use of sunscreen. Therefore, supplementation with vitamin D3 is often necessary.

They advise against relying solely on multivitamins or prenatal vitamins, as these typically contain relatively low doses of vitamin D (often only 400 IU) that are insufficient to raise blood levels to the optimal range, especially for pregnant women or individuals with risk factors for deficiency. Instead, they recommend separate vitamin D3 supplements, with dosages tailored to individual needs based on blood testing.

For those unable to get regular testing, the panel suggests a starting dose of 5,000 IU per day for adults, including pregnant women. However, they strongly emphasize that this is a general guideline and individual needs vary considerably. They also highlight the importance of adequate magnesium intake, since magnesium is a cofactor for vitamin D metabolism.

Leafy green vegetables are a good dietary source of magnesium, but magnesium supplementation is sometimes necessary to ensure optimal vitamin D utilization.

The panel also addresses the safety of vitamin D supplementation, noting that the dosages they recommend are within the range considered safe by most experts and are intended to achieve levels of vitamin D similar to those obtained through ample sun exposure.

To facilitate testing, the panel mentions the availability of home blood spot tests, such as those offered by GrassrootsHealth. These tests involve a simple finger prick to collect a small blood sample, which is then mailed to a laboratory for analysis. This method provides a convenient and relatively affordable way for individuals to monitor their vitamin D levels and adjust supplementation as needed.

Vitamin D for Overall Health Beyond Pregnancy

The interview extends beyond pregnancy and lactation, emphasizing the importance of vitamin D for overall health throughout your lifespan. For instance, vitamin D's role in immune function is emphasized, with studies suggesting that it may play a role in reducing the risk and severity of respiratory infections, including COVID-19.⁵

So, maintaining optimal vitamin D levels is not just about preventing deficiency-related diseases like rickets and osteomalacia but also about promoting overall health and preventing chronic disease. They encourage individuals of all ages to get their vitamin D levels tested and to work toward achieving and maintaining levels within the optimal range.

The discussion also touches upon the benefits of vitamin D for children and adolescents. Studies have suggested that vitamin D deficiency during childhood is linked to an increased risk of developing conditions such as asthma, allergies and autoimmune diseases later in life.

The panel highlights the importance of ensuring adequate vitamin D intake during these formative years, as the body's needs for vitamin D increase with growth.⁶ By prioritizing vitamin D optimization from an early age, it's possible to promote healthy development and reduce the risk of chronic diseases later in life.

Tips to Optimize Your Vitamin D Levels

While vitamin D supplements are readily available, sunlight remains the most effective way to optimize your vitamin D levels. Interestingly, the benefits we associate with vitamin D might actually stem from healthy sun exposure itself, with vitamin D levels serving as a marker of that exposure.

However, there's an important factor to consider: dietary seed oils. These oils, abundant in processed foods and fast food, are high in [linoleic acid](#) (LA). When LA interacts with UV radiation from the sun, it triggers inflammation and DNA damage in your skin. If you

consume these oils regularly, as most Americans do, you need to be more cautious about sun exposure.

Limiting time in the sun to early morning or late afternoon is recommended. Ideally, reduce consumption of these oils for four to six months before increasing sun exposure. As mentioned, individual factors like skin pigmentation and body composition also influence safe sun exposure. Those with darker skin tones require longer exposure to generate the same amount of vitamin D as those with lighter skin.

Since body fat stores LA, individuals with higher body fat percentages should also exercise additional caution, as those stored oils prolong the risk period even after dietary changes. To determine safe sun exposure, use the "sunburn test." Monitor your skin for any redness. Staying below the threshold of even slight pinkness indicates you're within safe limits. Avoid sunburn at all costs.

As your body reduces its LA stores, your susceptibility to sunburn and skin cancer decreases. However, for the first six months after eliminating seed oils, avoid direct sunlight during peak hours (10 a.m. to 4 p.m.). While complete clearance of these oils from your system takes approximately two years, reaching the six-month milestone generally allows for safer sun exposure during peak hours.

If you need to be in the sun before your body has adequately cleared stored seed oils, consider these protective strategies:

- Apply topical niacinamide cream before sun exposure to protect against UV-induced DNA damage
- Take a baby [aspirin](#) before sun exposure to help prevent LA from converting into harmful oxidized metabolites

When regular sun exposure isn't feasible, vitamin D supplementation is often necessary, especially during pregnancy. Aim for optimal levels between 60 to 80 ng/mL (150 to 200 nmol/L). To achieve this, test your levels twice a year, adjust sun exposure or supplementation based on the results and continue regular monitoring.

Adopting a proactive approach to vitamin D is an important step toward improving your health and avoiding chronic disease. The panel's message is clear: vitamin D is a nutrient that deserves far more attention than it currently receives, and optimizing vitamin D status should be a priority for everyone, not just pregnant women.

Sources and References

- ¹ [Biomedicines](#). 2023 Mar 23;11(4):994
- ² [J Clin Invest](#). 2016 Nov 14;126(12):4702–4715
- ³ [Nutrients](#). 2022 Oct 11;14(20):4230
- ⁴ [Cochrane Database of Systematic Reviews](#) July 30, 2024
- ⁵ [Inflammopharmacology](#). 2023 Nov 13;32(1):249–271
- ⁶ [Youtube, VitaminDaction](#). Vitamin D and Prenatal-Newborn Health: A Vitamin D Expert Interview, September 29, 2024