

Vitamin D in Paediatric Nutrition

Vitamin D is important in general growth, bone health, and immunomodulation during infancy and early childhood¹.

How much is needed?

According to the Chinese Nutrition Society (2013), 10 mcg/day is recommended for 0 – 12 months (adequate intake, AI) and > 12 months (reference nutrient intake, RNI)².

Note: 10 mcg is equivalent to 400 IU vitamin D³

Risk factors for vitamin D insufficiency during early infancy^{4*}

A local study on infants aged two to six months ($n = 208$) found the below as strongest risk factors:

⇒ Breastfed ⇒ Female ⇒ Multiparous mother ⇒ Use of infant sun cream

Local landscape

➔ **Prevalence of vitamin D deficiency* from 2018 pilot study ($n = 155$)⁵**
Deficiency was present in 33.5% of healthy infants at three months of age (21.9% of these infants had severe deficiency[^]), while prevalence of deficiency was 97.4% among the 38 exclusively breastfed infants.

➔ **Dietary intake of vitamin D in preschool children aged 30-60 months⁶**
Mean intake in subjects ($n = 302$) was significantly lower than the Chinese RNI (5.84 mcg/day, $p < 0.05$).

➔ **Impact of the COVID-19 pandemic on vitamin D status¹**
Social distancing measures led to low sun exposure and poor eating habits, where a progressive significant decline in serum 25(OH)D was found in subjects aged two to six months ($n = 140$) in the “post-outbreak” period (June to November 2020), at a monthly decline rate of -6.32 nmol/L.



*As defined by serum 25(OH)D concentration < 50 nmol/L; ^As defined by serum 25(OH)D concentration < 25 nmol/L

International expert and authority recommendations on vitamin D supplementation

	Infants			Toddlers and older children
	Exclusively breastfed	Mixed-fed	Exclusively formula-fed	
AAP, 2009 ⁷	400 IU/day	400 IU/day, until weaned to ≥ 1 L/day fortified formula		400 IU/day, when having < 1 L/day fortified formula or cow's milk
ESPGHAN, 2013 ⁸	All infants should receive 400 IU/day during the first year of life			Needed for at-risk groups, e.g. with dark skin, inadequate sun exposure or obese
CNS, 2016 ⁹	400 IU/day, start a few days after birth	Choose appropriate formula with vitamin D fortified ¹⁰		N/A
UK NHS, 2021 ¹¹	8.5-10 mcg/day	8.5-10 mcg/day, if having < 500 mL/day infant formula		10 mcg/day for 1-4 years old, also if at-risk when older

AAP = American Academy of Pediatrics; ESPGHAN = European Society for Paediatric Gastroenterology, Hepatology, and Nutrition; CNS = Chinese Nutrition Society; NHS = National Health Service

Vitamin D Intake Nutrient Calculator



Use this tool to help estimate dietary intake and adequacy of vitamin D!

Vitamin D sources? Most of the vitamin D in the body is made when the skin is exposed to sunlight¹². Few foods contain vitamin D naturally, including salmon, sardines, tuna and egg, while other sources include fortified cow's milk and plant milk (such as soy, almond and oat)³.

References: 1. Wong RS et al. *Nutrients*. 2021;13:1270. 2. Chinese Nutrition Society. *Chinese dietary reference intakes*. 2013. 3. National Health Service. *Vitamin D*. Available at: <https://www.nhs.uk/conditions/vitamins-and-minerals/vitamin-d/>, Accessed on 15Jun2021. 4. Tung K et al. *Nutrients*. 2021;13:1068. 5. Chan KCC et al. *Hong Kong Med J*. 2018;24(Suppl 3):S32-35. 6. Yip PS et al. *Asia Pac J Clin Nutr*. 2017;26(2):298-307. 7. American Academy of Pediatrics. *Pediatrics*. 2008;122:1142-1152. 8. Braegger C et al. *J Pediatr Gastroenterol Nutr*. 2013;56:693-701. 9. Chinese Nutrition Society. *Chinese Dietary Guidelines Summary* (2016). 2016. 10. Chinese Nutrition Society. *Chinese Dietary Guidelines Summary* (2008). 2008. 11. U.S. National Institutes of Health. *Vitamin D*. Available at: <https://ods.od.nih.gov/factsheets/VitaminD-HealthProfessional/>, Accessed on 15Jun2021. 12. Family Health Service. *Parent information: Vitamin D*. Available at: https://www.fhs.gov.hk/english/health_info/child/30078.html, Accessed on 15Jun2021. For healthcare professionals' reference and distribution. WYETH® is a registered trademark of Wyeth LLC. Used under license. WYE-PM-087-JUN-21



兒童營養 - 維他命 D

維他命 D 於嬰幼兒時期對整體成長、骨骼健康及免疫調節功能尤其重要¹。

需要多少？

根據中國營養學會於2013年的建議，初生至一歲的適宜攝入量 (AI) 及一歲以上的推薦攝入量 (RNI) 均為每天10微克²。

註: 10微克相等於400 IU (國際單位) 維他命D³

引致早期嬰兒維他命 D 不足的風險因素^{4*}

本地研究指出以下是二至六個月大嬰兒中 (n = 208) 最大的風險因素:

⇒ 母乳餵哺 ⇒ 女嬰 ⇒ 非初產的媽媽 ⇒ 使用嬰兒防曬產品

本地情況

➔ **2018年針對維他命D不足*的先導研究 (n = 155)⁵**
33.5%健康嬰兒於三個月大時有維他命D不足的情況 (當中21.9%有嚴重不足)，而不足率於38名全母乳餵哺嬰兒之中則達97.4%。

➔ **學前兒童 (30至60個月) 的維他命D膳食攝入量⁶**
研究對象 (n = 302) 的平均攝入量比中國推薦攝入量顯著較低 (每日5.84微克, p < 0.05)。

➔ **2019冠狀病毒病對維他命D狀況帶來的影響¹**
社交距離措施引致陽光照射時間變短及不良的飲食習慣，而在疫情爆發後 (2020年6至11月)，二至六個月大的嬰兒 (n = 140) 出現25(OH)D血清濃度逐漸顯著下降的情況，每個月下降速度平均為6.32 nmol/L (納摩爾/公升)。



*被定義為25(OH)D血清濃度 < 50 nmol/L ; ^被定義為25(OH)D血清濃度 < 25 nmol/L

國際專家及權威針對維他命 D 的補充建議

	嬰兒			幼兒及較大兒童
	全母乳餵哺	部分母乳餵哺	全配方奶餵哺	
AAP, 2009 ⁷	每天 400 IU	每天 400 IU，直至每天已飲用最少一公升有添加維他命 D 的配方奶		若每天飲用少於一公升有添加維他命 D 的配方奶或牛奶，需補充 400 IU
ESPGHAN, 2013 ⁸	所有嬰兒應每天補充 400 IU 直至一歲			有風險組別需要補充，如有深色皮膚、不足夠的陽光照射及肥胖
CNS, 2016 ⁹	出生後幾日內開始每天補充 400 IU	選擇有添加維他命 D 的配方奶 ¹⁰		不適用
UK NHS, 2021 ¹¹	每天 8.5 至 10 微克	若每天飲用少於 500 毫升嬰兒配方奶，需補充 8.5 至 10 微克		一至四歲兒童每天補充 10 微克 (有風險的較大兒童同樣需要)

AAP = 美國兒科學會; ESPGHAN = 歐洲兒科胃腸病學、肝病學和營養協會; CNS = 中國營養學會; UK NHS = 英國國民保健署



維他命D攝入量計算機
可幫助估計維他命D的膳食攝入量以及是否充足！

維他命D來源? 陽光照射會令皮膚製造大部分體內的維他命D¹²。少量食物含天然維他命D，包括三文魚、沙甸魚、吞拿魚及雞蛋，其他來源包括已添加維他命D的牛奶及植物奶 (如黃豆、杏仁及燕麥奶)³。

資料來源: 1. Wong RS et al. *Nutrients*. 2021;13:1270. 2. Chinese Nutrition Society. *Chinese dietary reference intakes*. 2013. 3. National Health Service. *Vitamin D*. Available at: <https://www.nhs.uk/conditions/vitamins-and-minerals/vitamin-d/>. Accessed on 15Jun2021. 4. Tung K et al. *Nutrients*. 2021;13:1068. 5. Chan KCC et al. *Hong Kong Med J*. 2018;24(Suppl 3):S32-35. 6. Yip PS et al. *Asia Pac J Clin Nutr*. 2017;26(2):298-307. 7. American Academy of Pediatrics. *Pediatrics*. 2008;122:1142-1152. 8. Braegger C et al. *J Pediatr Gastroenterol Nutr*. 2013;56:693-701. 9. Chinese Nutrition Society. *Chinese Dietary Guidelines Summary* (2016). 2016. 10. Chinese Nutrition Society. *Chinese Dietary Guidelines Summary* (2008). 2008. 11. U.S. National Institutes of Health. *Vitamin D*. Available at: <https://ods.od.nih.gov/factsheets/VitaminD-HealthProfessional/>. Accessed on 15Jun2021. 12. Family Health Service. *Parent information: Vitamin D*. Available at: https://www.fhs.gov.hk/english/health_info/child/30078.html. Accessed on 15Jun2021. For healthcare professionals' reference and distribution. WYETH® 為Wyeth LLC.之註冊商標，授權下使用。只供醫護人員參考及派發。WYE-PM-087-JUN-21

