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CPNP NASPGHAN
Council for Pediatric Nutrition Professionals

Executive Committee Message:

Hello and Happy New Year, CPNP members! I hope you had a safe and happy holiday season. I also hope you enjoyed our virtual symposium in December. It will continue to be available to registrants for one full year. I would like to thank Kirsten Jones, our Program Chair, and Abigail Lundin, our President-Elect, as well as their Planning Committee for another great agenda! I also want to thank our CPNP speakers in our symposium and in the main meeting including Venus Kalami, Sophie Burge, Tegan Medico, Bailey Koch, Brock Williams, Natalie Stoner, Rachel Kay, Anna Tuttle and Kirsten Jones.

New this year, CPNP had its own submission path for abstracts. We look forward to continuing to offer that opportunity to our members and hope to see more and more submissions in coming years! Thank you to Sarah Vermilyea for leading a virtual poster tour during the symposium week!

CPNP was able to again offer the annual NASPGHAN Foundation CPNP Nutrition Research Grant in 2021. Congratulations to Matthew Edwards from Children's Hospital of Wisconsin for being the 2021 NASPGHAN Foundation/CPNP Nutrition Grant recipient. As we hope to promote increased participation in research through grant support, we also hope to grow and strengthen our grant mentorship program, where we pair an RD researcher with a NASPGHAN member to review the grant submission. If you are new to research or interested in learning more about the mentorship program, please email us at (cpnp.naspghan@gmail.com).

CPNP has many opportunities to get involved! We are currently looking for members to serve on several committees, including the IBD, Ethics, and Clinical Care and Quality Committees. If you are interested, please let us know at (cpnp.naspghan@gmail.com). A full list of the committees may be found online.

Thank you all for your continued participation and support! We greatly appreciate our members and I know we are all hopeful for the time when we can resume in-person events.

Sincerely,

Carmyn Thompson

Carmyn Thompson, RD, LDN, CSP
CPNP President

secretary treasurer's report

Megan Murphy, RD

CPNP continues to gain new members and we are so happy to have you all here! Please continue spreading the word about CPNP, as we plan to have some exciting opportunities for our members in the new year. As a reminder, membership includes discounts for the NASPGHAN Annual Meeting and CPNP Nutrition Symposium, access to our listserv, newsletters, monthly Nutrition Pearls, research grant opportunities and Nutrition University (N²U). If you have anyone in mind who would benefit from CPNP membership, let them know that they can fill out an application here. Our annual membership fee is $40, with an option for a yearly subscription to *JPGN* for $65.

We are always looking for volunteers for Hot Topics in the newsletters, Nutrition Pearls and, of course, the Annual Meeting (planning, presenting, moderating, posters—you name it). If you've been looking to get more involved with CPNP, please reach out to us at (cpnp.nasphgan@gmail.com).

We hope you enjoyed the Annual Meeting and see you all in 2022!

in this issue

media REPORT

NICOLE MARTIN, RD, CSP, CD

Find CPNP on social media! Use the handles below and follow us for general updates and the latest CPNP info. Contact Nicole at (nmartin@chw.org) if you have information that you would like to share on our social media sites.

- **Facebook: cpnp.naspghan**
- **Instagram: cpnp_naspghan**
- **Twitter: cpnp_naspghan**

CPNP members can also join our private CPNP Members Facebook group for member-specific information. Find our **private CPNP Members group here.**

Join the CPNP Listserv to learn more about upcoming events, participate in discussions about clinical findings and difficult cases, and more! Email (cpnp.naspghan@gmail.com) to join the Listserv.

program chair REPORT

KIRSTEN JONES, RD, CSP, LD

Although it wasn't the original plan for NASPGHAN this year, we had a wonderful virtual CPNP Symposium from Monday December 13th through Friday December 17th. We had many comments on how great the CPNP sessions were this year! I would like to thank the planning committee members as well as all of our speakers for their hard work and dedication to making this a great event! While it may feel like we are "pros" at virtual conferences now, we are hopeful that we can see everyone face to face in Orlando, Florida next year!

clinical practice chair REPORT

BAILEY KOCH, RD, CSP, LD

The Pearls committee is in need of volunteers for new Pearls as well as topics of interest. Creating a Pearl is a quick and easy process. Please reach out to Bailey Koch (bailey@atlantapediatricnutrition.com) if interested in creating a Pearl or if you have any ideas for new topics.

communications chair REPORT

SHARON WESTON, MS, RD, LDN

Continue to keep an eye out for two newsletters per year—Summer and Winter. Thanks to our Hot Topics authors for this newsletter, Michelle Yavenow and Lisa Richardson.

We want to hear from you! Please let us know if you have published research. In addition, reach out if you have ideas for future newsletter topics or important bulletins you would like to share with CPNP members. We are looking for volunteers to help with editing future newsletters. Please contact Sharon Weston if you are interested (Sharon.weston@childrens.harvard.edu).

research chair REPORT

JEN SMITH, MS, RD, CSP, LD, LMT

The study session for grant review was held virtually for the second year. There were two grant applications submitted for the NASPGHAN Foundation CPNP Nutrition Research Grant and the winner was announced during the NASPGHAN virtual Annual Meeting. Congratulations to Matthew Edwards, BS, for his research topic "Comparing Predictive Accuracy of Knee Height Equations in Pediatric Patients". This year marked the first opportunity for members to submit abstracts to CPNP. We had a great response, with 10 submissions being accepted for poster presentations. Poster sessions can be accessed through the virtual meeting link for one year following the Annual Meeting. Please check out the posters to see CPNP members' work.

CPNP committee REPORTS

NASPGHAN Nutrition Committee

CPNP Rep: Carmyn Thompson, RD, LDN

Mead Johnson is providing support for two webinars, podcasts, and interviews with clinical experts or case presentations related to the following subjects: infant and early childhood growth, feeding disorders, growth indicators, micronutrients, microbiome and other influences that have the potential to change long term health outcomes. Please reach out to reach out to Carmyn Thompson (carmyn711@gmail.com) if you are interested!

NASPGHAN Professional Education Committee

CPNP Rep: Abigail Lundin, MS, RD

The Professional Education Committee (PEC) met virtually during the annual conference in December. This year, PEC members reviewed content for the Bowel Sounds podcast, N²U, as well as 13 webinars and slide decks. They hosted the annual Postgraduate Course with a total of 5 modules, including 18 talks. It was a huge success! The committee is actively planning the 2022 Postgraduate Course. Please let us know if you have any ideas or suggestions for topics and/or speakers.

NASPGHAN Public Education Committee

CPNP Reps: Wendy Elverson, RD, LDN
Sharon Weston, MS, RD, LDN

The Public Education Committee has been quite busy updating the educational handouts that are available on the GIKids.org website. Special thanks goes out to the following CPNP members who played an integral part in contributing updated content to this task:

Abigail Lundin (IBD), Vanessa Weisbrod (Celiac), Wendy Elverson (FPIES, Introducing Peanuts), Katherine Bennett and Sharon Weston (Enteral Nutrition), Greta Breskin (Healthy Eating for Infants and Toddlers, Healthy Eating for Children and Adolescents), Patricia Novak and Sharon Weston (Obesity), Lisa Richardson (FODMAP), Megan Van Hoorn (Vegetarian Diets) and Allison Abel (TPN).

Please take advantage of familiarizing yourself with the site and the many wonderful handouts that are available on GIKids.org! Take note that the updated versions are available in English, Spanish and French. The Public Education Committee is also considering developing some short educational videos (similar to the Nutrition Pearls format) for caregivers. If you have any suggestions for additional nutrition related handouts to improve GIKids.org, please reach out to Wendy (Wendy.Elverson@childrens.harvard.edu) or Sharon (Sharon.weston@childrens.harvard.edu).

NASPGHAN Clinical Care and Quality Committee

CPNP Rep: Cassandra Walia, MS, RD, CD, CNSC

The Clinical Care & Quality Committee (CCQ) is looking for a CPNP representative for a 3-year term. The committee's responsibilities include reviewing proposals for NASPGHAN position statements and clinical guidelines, reviewing clinical vignettes for the Annual Meeting, and crafting collaborative projects that improve quality of care provided by NASPGHAN members. If you're interested in being a part of CCQ, please contact (cpnp.naspghan@gmail.com).

NASPGHAN Public Affairs/Advocacy Committee

CPNP Rep: Sally Schwartz, BS, RD, CSP, LDN

CPNP and NASPGHAN members continue to focus on improving access to medical nutrition therapy via the Medical Nutrition Equity Act. CPNP members are urged to contact their members of Congress and to ask them to cosponsor the Medical Nutrition Equity Act (MNEA) (S. 2013, H.R. 3783) which will provide a cost-effective lifeline to Americans with digestive and metabolic diseases.

member PROFILE

MATTHEW EDWARDS

Matthew Edwards is a Clinical Dietitian Specialist at Children's Wisconsin and is the recipient of the CPNP Grant for 2021, investigating the accuracy of predictive knee height equations. Matt is currently a dietitian in the diabetes and endocrine clinics at Children's Wisconsin, and his 7-year tenure that has included working in the gastrointestinal department as well as with the feeding team. He is the outgoing chair of the Anthropometrics and Malnutrition Committee.

Matthew did his undergraduate degree and his internship at Northern Illinois University and holds a CDR board certification as a specialist in pediatric nutrition. His interests include utilizing anthropometric tools and nutrition focused physical exam to give insight into a patient's nutritional state. He previously studied the relationship between hand grip strength in new onset Type 1 Diabetes patients and received the CPNP grant to determine the accuracy of predictive knee height equations. Matthew loves to get involved with the community and has led dozens of nutrition educations at local schools, provided grocery store tours and instructed family cooking classes.

Matthew's recommendations for CPNP members: "I am blessed to be surrounded by so many incredible dietitians on a day-to-day basis. I've found that having peer role models has not only inspired my professional decision-making but also has provided a level of support through their experience. My advice to other members of CPNP would be to find those around you that are great at what they do, that inspire you to be better and ask them questions, borrow techniques, bounce ideas off of them, etc. If you feel like you're on an island, network or seek out thought leaders, as most are happy to give advice and share about their experience."

Hi members! We're looking for members who want to get more involved with CPNP!

HOT TOPIC ARTICLES

If you have a topic you would like to share in one of the upcoming newsletters, please contact Sharon Weston at (sharon.weston@childrens.harvard.edu)

NUTRITION PEARLS

If you would like to be an author of one of our Nutrition Pearls, please contact Bailey Koch to get started. (bailey@atlantapediatricnutrition.com)

SUMMARY OF OUR 2021 ANNUAL MEETING

KIRSTEN JONES, RD, CSP, LD

Our 2021 CPNP Symposium had a great lineup this year and wonderful talks were provided by all! Thank you to the Planning Committee: Abigail Lundin, Tegan Medico, Sarah Simental, Lauren Storch, Anna Tuttle and Rebecca Wilhelm. Our moderators for sessions were: Meghan Murphy, Nicole Martin, Sarah Simental, Jen Smith, and Lauren Storch. Please see below of our amazing presenters and the topics they presented on. Thank you everyone for a successful CPNP Symposium!

SESSION 1: DIVERSITY AND CULTURAL HUMILITY IN CLINICAL NUTRITION PRACTICE

- A Learners Guide to "Diversity and Cultural Humility in Clinical Nutrition Practice"
  Whitney Trotter, MS, RDN/LDN, RN, RYT
- Diversity in Infant Feeding: Where Convention & Culture Coexist
  Venus Setareh Kalami, MNSP, RD
- How Race and Ethnicity Influence the Severity of NASH in Children
  Ali Mencin, MD

SESSION 2: WEIGHING IN ON WELLNESS

- Culinary Medicine and Integrative Medicine in Peds GI
  Ann Ming Yeh, MD
- Addressing Weight Stigma: Pediatrics & Adolescents
  Sophie Burge, MS, RD

SESSION 3: NUTRITION ADVOCACY INTO THE CLINICAL SETTING

- Addressing Child Food Insecurity in the Clinical Setting
  Tegan J. Medico, MS, MPH, RDN, CNSC
- Improving Access to Medically Necessary Nutrition
  Camille S Bonta

SESSION 4: THERAPEUTIC DIETS: WHEN FOOD IS MEDICINE

- FPIES Nutritional Management
  Bailey Koch, RD, CSP, LD
- A Novel Food Additive Removal Diet for Eosinophilic Esophagitis
  James Franciosi, MD, MS
- Sublingual Immunotherapy for the Treatment of Pediatric Food Allergy:
  Are Whole Food Compounds as Effective as Industrial Glycerinated Extracts?
  Brock Williams, MSc, RD, PhD(c)
- Evaluating Use of Enteral Nutrition Therapy to Improve Disease Outcomes in Cchildren with VEO-IBD
  Natalie L Stoner, RD, CSP, LDN

SESSION 5: BEYOND THE BASICS: NUTRITION TOPICS FOR ADVANCED PROVIDERS

- Bone Health
  Ala Shaikhkhalil, MD
- Growth Failure: Some Calories are Good, but More Aren't Always Better
  Stephen Borowitz, MD
- Management of Micronutrients for Home Parenteral Nutrition
  Rachel Kay, MS, RD, CSP, CD, CNSC

hot {topic}

Vitamin D: The Winter Season, COVID-19, and Beyond

Michelle Yavelow, MS, RDN, LDN, CNSC

History

While it may seem like vitamins have been known about for a long time, the discovery of all vitamins was actually just completed within a span of 50 years beginning in the early 1900s! Initial research was based on two theories: the study of substances that prevent deficiency, and the study of accessory factors required by animals fed purified diets.[1] In 1916, Steenbock, found that goats had a negative calcium balance in winter months spent inside and a positive calcium balance in summer months spent outside, connecting sun exposure and calcium balance.[2] Vitamin D, commonly referred to as the "sunshine vitamin", was eventually established in the 1930s after studying rickets in chickens and dogs being treated by sunlight exposure and consumption of cod liver oil.[1]

Sources and absorption

We obtain vitamin D from the sun, our diet, and supplements. Up to 80% of the vitamin D we obtain is absorbed through the skin from the sun's UVB rays. These rays promote the production of pro-vitamin D3 (7-dehydro-cholesterol), the initiating factor in calcidiol (25-OH D3) production. The American Academy of Pediatrics recommends children obtain 10-15 minutes of sun exposure with exposed arms and legs without sunscreen during the summer to obtain vitamin D.[3] Interestingly, Chalcraft et. al. found that just 30 minutes of sun exposure at close to mid-day significantly increased serum 25(OH) D concentrations.[4] While it is good practice to offer sun exposure as an intervention for vitamin D deficiency, other factors must be considered. Melanin in the skin absorbs the UVB rays, preventing the creation of pro-vitamin D3.[5] Therefore, those with more melanin in their skin are at a higher risk of vitamin D deficiency. Additionally, the latitudinal location of each person also limits the amount of exposure to UVB rays, thus those who live closer to the equator have more effective vitamin D absorption from their skin. Winter months also lead to a decrease in exposure to UVB rays as people spend more time inside due to colder weather. During the winter months, prophylactic vitamin D supplementation should be considered.

As one of the main four fat-soluble vitamins, gastrointestinal absorption of vitamin D is dependent on micellar solubilization. This non-saturable passive diffusion occurs in the small intestine (duodenum, ileum). If a person has any level of fat malabsorption or disease impacting these sections of the small intestine, they are at risk of vitamin D malabsorption; along with all other fat-soluble vitamins.[5]

The main storage location of vitamin D is in adipose tissue, not the liver.[1] There is an increased probability that people who are overweight or obese, especially children, will present with insufficient/deficient serum levels of vitamin D. The larger amounts of adipose tissue will act as a tank for vitamin D, causing an increased need of vitamin D to saturate these excess tissue stores. Needs are likely met with supplementation.[6,7,8]

The major circulating form of vitamin D, calcidiol, is created in the liver while the active form of vitamin D, calcitriol, is created in the kidneys.[5] Because these organs are required for vitamin activation, patients with any diseases impacting the kidneys or liver are at risk for vitamin D deficiency. Vitamin D metabolism is additionally impacted by zinc and iron. Zinc deprivation leads to reduced production of calcitriol in the setting of low serum calcium. Iron deficiency may decrease enteric absorption of vitamin D3.[1] It is key to ensure patients actively being treated for vitamin D deficiency either do not have or are already being treated for zinc deficiency, low serum calcium, and/or iron deficiency anemia.

Assessment

Serum 25(OH)D is the gold standard indicator of vitamin D status. This reflects vitamin D produced cutaneously and obtained from food/supplements. This has a long circulating half-life of 15 days, compared to the commonly measured 1,25(OH)D2, which has a short half-life of 15 hours. The serum measurement of 25 (OH)D is not, however, an indicator of body stores., as this is tightly regulated by PTH, calcium, and phosphorus. The value of 1, 25(OH)D2 doesn't typically decrease until vitamin deficiency is severe. Obtaining this serum value may be a useful measurement in the setting of renal disease (low levels indicating renal dysfunction).[9]

Vitamin D Status[10]	Total 25-Hydroxyvitamin D (ng/mL)	Total 25-Hydroxyvitamin D (nmol/mL)
DEFICIENCY	<20 ng/ml	<50 nmol/L
INSUFFICIENCY	20-29 ng/ml	50-74 nmol/L
NORMAL	30 ng/ml	75 nmol/L
OPTIMAL	40-70 ng/ml	100-175 nmol/L

Deficiency and Toxicity

Key populations at risk for vitamin D deficiency include pregnant women, infants/children, the elderly, vegetarians, the food insecure, dieters/those with restrictive diets, and smokers. Secondary causes of deficiency include poor digestion, malabsorption, obesity, impaired metabolic utilization (drug therapies), increased metabolic demand (pregnancy, lactation, growth, infection, nutrient imbalance), and increased vitamin excretion (diuresis, lactation, sweating).[1,11]

Hot Topic continues . . .

Recent research has shown untreated vitamin D deficiency is correlated with many downstream negative metabolic and pathophysiologic consequences including but not limited to: elevated PTH causing cardiac dysfunction, increased inflammation, and hypertension.[12] Patients with vitamin D deficiency may also meet criteria for a diagnosis of calcipenic rickets including laboratory (low calcium, phosphorus, and elevated PTH and alkaline phosphatase) and physical (swollen wrists and ankles, delayed tooth eruption, leg deformity, rachitic rosary, and muscle weakness) findings.[11] If patients present with any risk factors for deficiency, it is recommended to initiate vitamin D3 supplementation, even without baseline labs.[6]

Vitamin D toxicity can come from unintentional poisoning (over fortification of milk products), accidental overdose, idiopathic infantile hypercalcemia, and excessive production (granulation disorders).[11,13]

Supplementation

In our diet and supplements, two forms of vitamin D exist: ergocalciferol (D2, plant sources) and cholecalciferol (D3, animal sources).[14] One study found both D2 and D3 were effective in increasing serum 25(OH)D levels in breastfed infants <4 months old, however, significantly fewer infants on D2 achieved serum levels of 50 nmol/L when compared with those on D3.[15] In a recent systematic review and meta-analysis including 24 studies and 1,277 healthy participants, Balachanard et. al found D3 supplementation to be most effective at increasing serum 25(OH)D concentrations.[16] While structurally similar, cholecalciferol (D3) should be the form of vitamin D recommended for supplementation.

The RDA should be used in pediatrics for baseline needs estimations for vitamin D. Providers should treat deficiency in infants up to 12 months of age with up to 2000 IU vitamin D3 (upper limit), whereas 2000 to 4000 IU vitamin D3 daily should be used to treat deficiency in children up to 18 years. Variables impacting dosing include obesity, medications, and treatment course and response. Stoss therapy, or weekly mega-dosing of up to 50,000 IU, can also be considered for children over 1 year of age.[10,11]

Functions, Immunity, and COVID-19

Eventually binding to a retinoid-dependent Vitamin-D Receptor (VDR) complex in the nucleus, vitamin D impacts the transcription of tens to hundreds of target cells regulating multiple functions in the human body. This includes but is not limited to calcium-phosphorus homeostasis (bone mineralization and parathyroid hormone function), cell differentiation, membrane structure, muscular function, pancreatic function, and neural function.[1,5] More recently, the role of vitamin D in immunity has been investigated due to the COVID-19 pandemic.[17-24]

Prior to the pandemic, it had been determined that vitamin D supplementation/treatment of vitamin D deficiency reduces the rates of respiratory tract infections, many of which are viral in nature. VDRs are present on most immune cells including epithelial cells, antigen-presenting cells (macrophages and dendritic cells), CD4+, CD8+, and T-lymphocytes. This VDR binding and immunoregulation enhances innate immunity by promoting the release of antimicrobial and immunomodulating proteins: defensins and cathelicidins.[17,18]

Vitamin D deficiency can be associated with COVID-19 severity. Studies conducted in the United Kingdom, Italy, and China revealed high COVID-19 mortality rates in those older than 65, a population at greater risk of vitamin D deficiency.[19,20] Pereira M, et. al. concluded vitamin D is related to controlling the progression of COVID-19 and with the evolution of mortality due to COVID-19.[19] Castillo et.al in Spain found that calcifediol dosing significantly decreased the need for ICU admission in COVID-19 patients however baseline serum vitamin D concentrations were not obtained in these patients.[21] It is unknown if the effects of supplementation were from the treatment of deficiency or direct immunomodulating consequences of vitamin D dosing. Ali N. found that as the mean concentration of vitamin D increased (vitamin D sufficiency), cases of COVID-19 per one million persons significantly decreased (most significant at 75 ng/ml serum concentration).[22] Despite all the current findings, correlation does not equal causation. While vitamin D supplementation and/or treatment of deficiency may play a role in the severity and progression of COVID-19, it cannot be extrapolated that these are causative relationships.[23,24]

While research is still being conducted on vitamin D, it is known to be an essential vitamin impacting many physiologic processes. It is important for the clinician to evaluate for potential vitamin D deficiencies and treat them accordingly. The known and unknown risks of untreated deficiency are far greater than the benefits of obtaining plasma levels and supplementing in patients.

References:

1—Combs, Jr., G. and McClung, J., 2017. The Vitamins: Fundamental Aspects In Nutrition And Health. 5th ed. Elsevier Inc. ISBN 978-0-12-802965-7.

2—Deluca HF. History of the discovery of vitamin D and its active metabolites. Bonekey Rep. 2014;3:479. Published 2014 Jan 8. doi:10.1038/bonekey. 2013.

3—Sun exposure: AAP Doubles Recommended Vitamin D Intake in Children - Practice Guidelines - American Family Physician (aafp.org)

4—Chalcraft JR, Cardinal LM, Wechsler PJ, et al. Vitamin D Synthesis Following a Single Bout of Sun Exposure in Older and Younger Men and Women. Nutrients. 2020;12(8):2237. Published 2020 Jul 27. doi:10.3390/nu12082237.

5—Jeon, SM., Shin, EA. Exploring vitamin D metabolism and function in cancer. Exp Mol Med 50, 20 (2018).

6—Carrelli A, Bucovsky M, Horst R, et al. Vitamin D Storage in Adipose Tissue of Obese and Normal Weight Women. *J Bone Miner Res*. 2017;32(2):237-242. doi:10.1002/jbmr.2979.

7—Turer CB, Lin H, Flores G. Prevalence of vitamin D deficiency among overweight and obese US children. Pediatrics December 2012;doi:10.1542/peds2012-1711.

8—American Academy of Pediatrics – Section on Endocrinology. Choosing Wisely. Accessed December 15,2021.

9—Vitamin D: Fact Sheet for Health Professionals. NIH Office of Dietary Supplements. Accessed October 30, 2020.

10—Saggese, G., Vierucci, F., Prodam, F. et al. Vitamin D in pediatric age: consensus of the Italian Pediatric Society and the Italian Society of Preventive and Social Pediatrics, jointly with the Italian Federation of Pediatricians. Ital J Pediatr 44, 51 (2018).

Hot Topic continues . . .

11—Chanchlani R, Nemer P, Sinha R, et al. An Overview of Rickets in Children. Kidney Int Rep. 2020;5(7):980-990. Published 2020 Apr 11. doi:10.1016/j.jekir.2020.03.025.

12—Savastio S, Pozzi E, Tagliaferri F, et al. Vitamin D and Cardiovascular Risk: which Implications in Children?. Int J Mol Sci. 2020;21(10):3536. Published 2020 May 16. doi:10.3390/ijms21103536.

13—Lim K, Thadhani R. Vitamin D Toxicity. J Bras Nefrol. 2020;42(2):238-244. doi:10.1590/2175-8239-JBN-2019-0192.

14—Vitamin D. Wikipedia–Free Encyclopedia. Accessed November 15, 2020.

15—Gallo S, Phan A, Vanstone CA, Rodd C, Weiler HA. The change in plasma 25-hydroxyvitamin D did not differ between breast-fed infants that received a daily supplement of ergocalciferol or cholecalciferol for 3 months. J Nutr. 2013;143(2):148–153.

16—Balachandar R, Pullakhandam R, Kulkarni B, Sachdev HS. Relative Efficacy of Vitamin D2 and Vitamin D3 in Improving Vitamin D Status: Systematic Review and Meta-Analysis. Nutrients. 2021;13(10):3328. Published 2021 Sep 23. doi:10.3390/nu13103328.

17—Mailhot G, White JH. Vitamin D and Immunity in Infants and Children. Nutrients. 2020;12(5):1233. Published 2020 Apr 27. doi:10.3390/nu12051233.

18—Jovic TH, Ali SR, Ibrahim N, et al. Could Vitamins Help in the Fight Against COVID-19?. Nutrients. 2020;12(9):2550. Published 2020 Aug 23. doi:10.3390/nu12092550.

19—Pereira M, Dantas Damascena A, Galvão Azevedo LM, de Almeida Oliveira T, da Mota Santana J. Vitamin D deficiency aggravates COVID-19: systematic review and meta-analysis. Crit Rev Food Sci Nutr. 2020 Nov 4:1-9. doi:10.1080/10408398.2020.1841090. Epub ahead of print. PMID: 33146028.

20—Kumar, D., Gupta, P. and Banerjee, D. (2020), Letter: does vitamin D have a potential role against COVID-19?. Aliment Pharmacol Ther, 52: 409-411.

21—Entrenas Castillo M, Entrenas Costa LM, Vaquero Barrios JM, et al. "Effect of calcifediol treatment and best available therapy versus best available therapy on intensive care unit admission and mortality among patients hospitalized for COVID-19: A pilot randomized clinical study". J Steroid Biochem Mol Biol. 2020;203:105751. doi:10.1016/j.jsbmb.2020.105751.

22—Ali N. Role of vitamin D in preventing of COVID-19 infection, progression and severity. J Infect Public Health. 2020;13(10):1373-1380. doi:10.1016/j.jiph.2020.06.021.

23—Mercola J, Grant WB, Wagner CL. Evidence Regarding Vitamin D and Risk of COVID-19 and Its Severity. Nutrients. 2020;12(11):3361. Published 2020 Oct 31. doi:10.3390/nu12113361.

24—van Eijk LE, Binkhorst M, Bourgonje AR, et al. COVID-19: immunopathology, pathophysiological mechanisms, and treatment options. J Pathol. 2021; 254 (4):307-331. doi:10.1002/path.5642.

hot {topic}

Working with Families Who Choose to Use European Formulas

Lisa Richardson

That human milk provides optimal and superior nutrition is indisputable. Yet, over 75% of infants will use infant formula, also known as breast-milk substitutes, by six months of age[1].

Choosing a formula can be daunting for families because of the bountiful alternatives available. In summer 2021, there were around 68 name-brand infant formulas on the US market, over 65 store brands, several boutique brands, and over 25 European formulas available, albeit illegally, from third-party online sellers[2].

European formulas are inescapable in some parenting circles[3] and, according to two informal surveys of pediatric dietitians (2021), barely present in others. Dietitians' experiences suggest that families turn to European formulas for an assortment of reasons, including personal concerns about the wholesomeness of US formula ingredients or as a solution to persistent gastrointestinal concerns. Yet other dietitians point to the frequent use of EU formulas by mothers who breastfeed.

Global infant feeding research may provide context to these anecdotal reports. A concerning trend among formula-feeding mothers is being reported—some, perhaps many, feel judged and unsupported for their decision to use formula[4,5]. Feelings of guilt, shame, and anxiety are also common[6].

Correcting Misinformation

Pomeranz and colleagues[7] pointed out that online infant formula marketing is disguised as feeding advice and support. Nutrition professionals can support families by correcting misinformation. A comprehensive review of EU infant formulas is beyond the scope of this article; however, several key points follow.

Nutrient Requirements

The EU sets the minimum and maximum nutrient levels[8] for two categories of formula—*infant formulas* for use "in the first months of life", and *follow-on formulas* designed for infants over six months old.

In contrast, US regulations[9] define formulas as foods for infants from birth to age 12 months. Minimum nutrient levels are set for 22 nutrients with maximum nutrient levels set for only two macronutrients and eight micronutrients. While maximums are not set, analysis of commonly used US and EU formula labels shows tremendous overlap in nutrient levels except for iron.

Online translators make it possible for parents and health professionals to decipher nutrient names on formula labels. EU and US infant formula labels cannot simply be directly compared because reference volumes are inconsistent. EU formulas are listed per 100 mL prepared formula while US formula nutrients are listed per 100 calories prepared formula (5.3 ounces or 156 mL). US infant formula nutrient values represent the amount guaranteed when the product expires. European formulas detail the average nutrient value over the life of the product thus the actual nutrient level may be less than what is listed.

Carbohydrate Sources

Corn syrup solids, sucrose, and other lactose alternatives are ingredients used in reduced and lactose-free infant formulas, which are commonplace in the United States. About 40% of the infant formulas sold in the US market contain lactose alternatives. EU regulations also allow lactose alternatives, including maltose, sucrose, glucose, glucose syrup (or dried syrup). Pre-cooked and gelatinized starches are also allowed.

Ingredient Lists

Unlike the United States, EU formulas ingredient lists use the common name for most nutrients. For example, vitamin D is listed rather than cholecalciferol. The scientific moniker may be

Hot Topic continues . . .

interpreted by caregivers as a "chemical" rather than an everyday, necessary nutrient.

Reducing Risks for Undernutrition & Food Borne Illness

The use of EU formulas outside their intended market exposes infants to unnecessary risks. Nutrition professionals can help reduce these risks in several ways.

Confirm Formula Brand & Country of Origin

Ask to see pictures or containers to verify the formula and its age appropriateness. EU formulas usually have "stages" (e.g., pre, 1, 2, 3) as part of the name, which is helpful when recognizing infant formulas when the label is not in English. Caloric density will vary by brand, stage, and country of origin (even among the same brand), which may influence how much formula an infant may eat. Formulas labeled as "HA" or hypoallergenic contain partially hydrolyzed proteins and are not appropriate for infants with cow's milk protein allergies.

Check Expiration and Use Dates

Another benefit of inspecting containers is assuring an infant is not exposed to an expired product. Europe uses a day/month/year date convention, which can be misinterpreted. For example, a formula marked with 12/01/2022 expires January, not December. EU formulas expire three weeks after the package is opened. It is important to provide education on expiration dates and instruct families to discard all formula which is out-of-date or has an unknown expiration.

Confirm Mixing Instructions

Most EU formulas are mixed with one scoop of powdered formula for every 30 mL water. However, at least one formula instructs users to mix 3 scoops of powder in 100 mL water. Instructions may recommend to lightly pack scoops by pressing the powder flat using the back of a knife. EU formulas instruct to use boiled water that is cooled to 40 – 50° C (104 – 122° F). Following these instructions may be important for avoiding *Cronobacter* infection. However, these instructions are inconsistent with CDC's advice to cool only to 70° C (158° F).

Consider Iron Needs

The EU requires 0.3 – 1.3 mg iron per 100 calories prepared infant formulas and 0.6 – 2.0 mg per 100 calories prepared follow-on formula. The US regulations require 0.15 to 3.0 mg iron per 100 calories prepared formula. US infant formulas are surprisingly consistent in their iron levels. My analysis of formula nutrient labels reveals that all US formulas on the retail market contain 1.8 mg iron per 100 calories prepared formula. In contrast some EU infant formulas contain as little as 0.6 mg per 100 calories prepared formula. (Formula Sense, 2021).

Check Supply Chain

Consumer protections for safe shipping and storage are diminished with illegal importation. Undernutrition can occur due to product degradation from improper shipping and storage during their illegal importation. Encourage families to ask their online retailers about supply chain and safeguards to protect nutrient quality.

Families need access to accurate and reliable information to make informed decisions. Nutrition professionals are well-positioned to be trusted educators who can correct misinformation and guide families along their formula feeding journey.

Supplemental Information:

Popular EU Formulas

Label Comparison of Popular Infant Formulas from EU and US

Comparison of Imported European and U.S. Infant Formulas: Labeling, Nutrient and Safety Concerns

References:

1—Centers for Disease Control and Prevention (2021, August 2). Breastfeeding Among U.S. Children Born 2011–2018, CDC National Immunization Survey.

2—Richardson, LM. Unpublished data. 2021

3—Du N, Williams JK, Shabanova V, et al. The rise of non-FDA Registered Imported European Infant Formula in NYC Private Practice. Poster presented at American College of Gastroenterology (ACG) Annual Scientific Meeting and Postgraduate Course 2018 Conference. Philadelphia, PA. 2018.

4—Almeida R, Alvarez Gutierrez S, Whaley SE, Ventura AK. A Qualitative Study of Breastfeeding and Formula-Feeding Mothers' Perceptions of and Experiences in WIC. *J Nutr Educ Behav.* 2020;52(6):615-625. doi:10.1016/j.jneb.2019.12.006.

5—Fallon V, Komninou S, Bennett KM, Halford JCG, Harrold JA. The emotional and practical experiences of formula-feeding mothers. *Matern Child Nutr.* 2017;13(4):e12392. doi:10.1111/mcn.12392.

6—Jackson, L, De Pascalis, L, Harrold, J, Fallon, V. Guilt, shame, and postpartum infant feeding outcomes: A systematic review. *Matern Child Nutr.* 2021; 17:e13141.

7—Pomeranz JL, Chu X, Groza O, Cohodes M, Harris JL. Breastmilk or infant formula? Content analysis of infant feeding advice on breastmilk substitute manufacturer websites [published online ahead of print, 2021 Sep 14]. Public Health Nutr. 2021;1-9. doi:10.1017/S1368980021003451.

8—Commission Delegated Regulation. (EU) 2016/127. Supplementing Regulation (EU) No 609/2013 of the European Parliament and of the council as regards the specific compositional and information requirements for infant formula and follow-on formula and as regards requirements on information relating to infants and young child feeding. Official Journal of the European Union. 2015.

9—Electronic Code of Federal Regulations. Infant Formula Act (21 U.S.C. 350a) and associated regulations (21 CFR 106 and 107)

10—Cronobactor Prevention & Control. Centers for Disease Control and Prevention. Updated May 3, 2019. Accessed December 17, 2021.