

**Reconnect & Rediscover:**  
A Convening Pediatric Experts  
and Advocates  
Oct. 2-4, 2021

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Pediatric Nurse Practitioners  
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Experts in pediatrics, Advocates for children. 1

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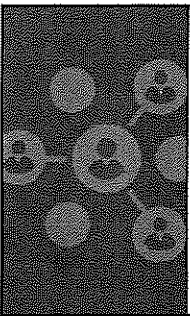

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**A Primer on Nutraceuticals:™™™**  
What do I need to know?

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**Disclosure**

- Debbie Shockey has nothing to disclose
- Pictures of products within this presentation do not indicate endorsement rather are designed as visual representation of the topic discussed



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## Learning Objectives

Following this presentation the learner will be able to:

- Define nutraceuticals
- Identify commonly used nutraceuticals in pediatrics
- Review current evidence for integration into pediatric care
- Discuss recommendations and resources for patients and families



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## Outline

- What are Nutraceuticals?
  - Definition
  - History
- Commonly used Nutraceuticals
  - Current patterns of use
  - Pediatric use
- Helps or Harms...what is the data?
  - Helps
  - Harms
- Choosing Products
  - What to look for in a product
  - Resources for Providers and Patients



www.upcdlearning.com



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## What are Nutraceuticals?



- A nutraceutical is defined as "a substance that is a food or part of food and provides medical and health benefits, including prevention and treatment of disease." (DeFelice 2007)
- "Nutraceutical is the term used to describe a medicinal or nutritional component that includes a food, plant, or naturally occurring material which may have been purified or concentrated, and that is used for the improvement of health, by preventing or treating a disease." (Lockwood 2007)
- Term first coined by Dr. Stephen DeFelice in 1989-his focus was to promote better designed and human clinical trials to support the medicinal potential of bodily nutritional interventions. He is currently the founder and chairman of the Foundation for Innovation in



drdefelice.org



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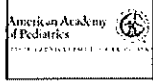
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## AAP recommendations

- The American Academy of Pediatrics (AAP) believes that healthy children receiving a normal, well balanced diet do not need vitamin supplementation. (AAP)
- Vitamin D is the exception to this and it is recommended that infants, children and adolescents need 400 IU daily. (Wagner & Greer 2008)
- The AAP created a handout regarding "Nutrition and Supplement use" for the young athlete and it confirmed the fact that a balanced diet meets the athletic needs more effectively than nutritional supplements, based on the non-stimulant nature of supplements. (AAP)



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## Are kids really using nutraceutical



### 2013-2014

- 1/3 of children and adolescents (<19 years) reported using a dietary supplement in the past 30 days

### 2017-2018

- 34% of children and adolescents used a dietary supplement

Use of 2 or more dietary supplements increased from 4.3% (2009-2010) to 7.1% (2017-2018)



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## What are they using?

TABLE 3. Prevalence of use of most frequently used dietary supplement product types in the past 30 days among children and adolescents (general population) by age group - United States, 2017-2018

Product type	Age group (years) & % (95% CI)					Total for children and adolescents
	0-5	6-11	12-17	18-24	25-34	
Multivitamins	21.2 (17.7-24.7)	17.2 (14.7-19.7)	16.2 (13.7-18.7)	15.2 (12.7-17.7)	14.2 (11.7-16.7)	16.7
Vitamin D supplements	11.2 (8.7-13.7)	10.2 (7.7-12.7)	9.2 (6.7-11.7)	8.2 (5.7-10.7)	7.2 (4.7-9.7)	9.2
Vitamin/mineral combination supplements	10.2 (7.7-12.7)	9.2 (6.7-11.7)	8.2 (5.7-10.7)	7.2 (4.7-9.7)	6.2 (3.7-8.7)	8.2
Protein	10.2 (7.7-12.7)	9.2 (6.7-11.7)	8.2 (5.7-10.7)	7.2 (4.7-9.7)	6.2 (3.7-8.7)	8.2
Herbal	10.2 (7.7-12.7)	9.2 (6.7-11.7)	8.2 (5.7-10.7)	7.2 (4.7-9.7)	6.2 (3.7-8.7)	8.2
Essential fatty acids	10.2 (7.7-12.7)	9.2 (6.7-11.7)	8.2 (5.7-10.7)	7.2 (4.7-9.7)	6.2 (3.7-8.7)	8.2
Other	10.2 (7.7-12.7)	9.2 (6.7-11.7)	8.2 (5.7-10.7)	7.2 (4.7-9.7)	6.2 (3.7-8.7)	8.2



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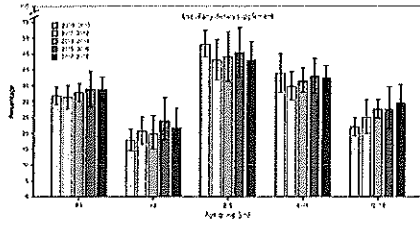
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## NHANES Studies

FIGURE. Prevalence of use of any dietary supplement\* and use of two or more dietary supplements\* in the past 30 days among children and adolescents aged <19 years, by age group — United States, 2007–2016



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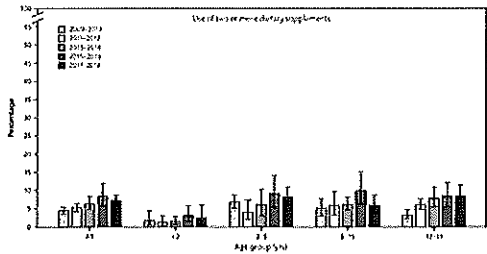
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## NHANES Studies



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## Why are they using Nutraceuticals?

Motivation	NVNM dietary supplement users (n=785)	VN only dietary supplement users (n=654)	P value
To maintain health	23.1	38.7	<.0001
To improve overall health	22.6	33.1	<.0001
To prevent health problems	13.1	14.4	.52
For relaxation, stress, sleep	12.7	0.8	<.001
To boost immunity, prevent colds	10.9	16.5	.01

Prevalence of reported motivations for use of NVNM and VN only dietary supplements over 30 days among US children <19 yrs NHANES 2007-2016. *Journal of Pediatrics* Volume 231 April 2021

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## Commonly used Nutraceuticals

- Current patterns of use (NHANES Study)
- Pediatric use
  - Omega 3 preparations
  - Melatonin
  - Multivitamins
  - Magnesium




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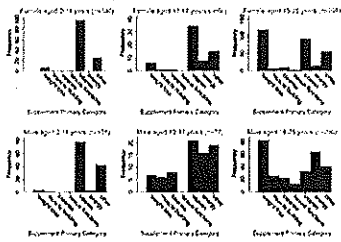
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## Are kids really using nutraceuticals?



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## Helps or Harms...What are the data?

- Helps
  - Some evidence of improvement in migraines
  - Repletion of low levels of vitamins (Vitamin D)
  - Some evidence of sleep improvement with melatonin
- Harms
  - *No evidence of harm does not equal evidence of no harm*
  - Some supplement-drug interactions occur
  - Some alterations in homeostasis



Joint Study  
WordPress.com



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## Vitamin D

### OSTEOMALACIA

<https://www.epainassist.com/bones/osteomalacia>

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## Dosing Recommendations

**\*\*The AAP changed their recommendations from 200 to 400 IU daily for infants < 12 months in 2008 with the primary goal being to prevent rickets.\*\***

Age	Male	Female	Pregnancy	Lactation
0-12 months	10 IU*	10 IU*		
1-13 years	15 IU*	15 IU*		
14-18 years	15 IU*	15 IU*	15 IU*	15 IU*
19-50 years	15 IU*	15 IU*	15 IU*	15 IU*
51-70 years	15 IU*	15 IU*	15 IU*	15 IU*
>70 years	20 IU*	20 IU*		

\*RDA are in IU (1 IU = 25 ng)  
<https://ods.od.nih.gov/factsheets/VitaminD-HealthProfessional.asp>

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## Magnesium

### NEW! FIVE CRUCIAL TYPES OF MAGNESIUM

- DIETARY** - Found in leafy greens, nuts, and seeds.
- ALUMINUM** - Found in antacids and laxatives.
- DIETARY** - Found in leafy greens, nuts, and seeds.
- DIETARY** - Found in leafy greens, nuts, and seeds.
- DIETARY** - Found in leafy greens, nuts, and seeds.
- DIETARY** - Found in leafy greens, nuts, and seeds.

verywellhealth.com  
 yoursupplements.com

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## Dosing Recommendations

**MAGNESIUM FOR KIDS - THE MAGIC MINERAL FOR SLEEP AND MOOD**  
<https://naturalouperkids.com/>



**Table 1: Recommended Dietary Allowance (RDA) for Magnesium (1)**

Age	Male	Female	Pregnancy	Lactation
Infants/Children	30mg	30mg		
7-12 months	75mg	75mg		
1-3 years	80mg	80mg		
4-8 years	130mg	130mg		
9-13 years	240mg	240mg		
14-18 years	410mg	360mg	400mg	360mg
19-30 years	400mg	310mg	360mg	310mg
31-50 years	420mg	320mg	360mg	320mg
51+ years	420mg	320mg		

**Pediatric Headache: A Review**  
 Heidi K. Blome  
 Pediatrics In Review December  
 2012, 33 (12) 562-576

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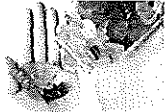
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## Multivitamins

**Reasons to consider Multivitamin intake:**

- Finicky eaters (those not eating enough or a well balanced diet)
- Child with a chronic medical condition that increases risk of nutritional deficit
- Child with a diet high in fast food or processed food
- Child involved in playing physically demanding sports
- Child with a special diet (Vegan or dairy-free)
- Child who is underweight

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## Probiotics

Somewhat effective (RCT) in healthy children in treatment of acute viral gastroenteritis and preventing antibiotic associated diarrhea



**Significant safety concerns with use in immunocompromised or seriously ill children with indwelling medical devices**



pediatrics. Pediatrics, 126(6), 1217-1231.  
<https://doi.org/10.1542/peds.2010-2548>

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## Melatonin

### PINEAL GLAND

Diagram labels: Corpus Callosum, Thalamus, Hypothalamus, Pituitary Gland, Pineal Gland.

Supplement products shown: "Gummies", "SLEEP", "Melatonin Sleep Hormone", "Melatonin Sleep".

<http://www.dawnstody.com/melatonin-sleep-better>

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## Dosing Recommendations

- Lowest dose 0.5 to 1 mg to start
- Consider increasing by 0.5 mg every few days if the child is not falling asleep within an hour of bedtime
- Emphasize and practice good sleep hygiene
  - Consistent bedtime
  - No screens in bedroom
  - Some aspect of exercise or outdoor activity daily

[blog.dinnandchildrens.org](http://blog.dinnandchildrens.org)

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## Glutamine

NC(=O)CC(N)C(=O)O

- Sometimes used in bodybuilding preparations to improve physical performance-no clear evidence that this is true  
<https://www.ncbi.nlm.nih.gov/health/bodybuilding-and-performance-enhancement-supplements>
- Used as a mechanism to promote healing (decrease pain associated with mucositis) in some chemotherapy regimens  
 Ziegler, TR. (2001). Glutamine supplementation in cancer patients receiving bone marrow transplantation and high dose chemotherapy

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## Echinacea

- Promoted as a dietary supplement for the common cold based on the idea that it can stimulate the immune system to more effectively fight infection
- Taking echinacea might reduce your chances of catching a cold and has been shown to shorten the length of a cold
- Some children participating in an echinacea clinical trial developed a rash which may be related to an allergic reaction
- Current evidence indicates that the risk of interactions between Echinacea supplements and most medications are low



<https://www.ncbi.nlm.nih.gov/pubmed/17414141>

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## Sambucol

A small study showed that it had some benefit with fighting the flu (not colds). It was a small study and hasn't been repeated, so really hard to generalize. In the study it said that it kept the flu virus from replicating.<sup>24</sup>

Journal of Alternative and Complementary Medicine, 2004; 10(4): 301-306

Another study was done in Israel that explored the safety of taking elderberry syrup for treatment of the flu. It found that symptoms were relieved approximately 4 days earlier when compared with placebo. (N=60 aged 18-54 years)

Journal of Alternative and Complementary Medicine, 2004; 10(4): 301-306



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## Cautions

Some Nutraceuticals can alter homeostasis:

- Echinacea
- Ephedra
- Fish oil (omega-3 fatty acid) supplements
- Garlic
- Ginger
- Ginkgo biloba
- Ginseng
- Green tea
- Saw palmetto
- St John's wort
- Vitamin E (doses > 800 mg/day)



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## Cautions

- Some Nutraceuticals may contain harmful toxic contaminants.
- There is a small number of studies lacking power and randomization that make it difficult to draw conclusions about efficacy
- Many of the studies concern dosing in adults yet the dosing of children is different



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## ED data related to Supplement ingestions

- According to Data from Poison Control Centers (2002-2012)
  - 275,000 dietary supplement exposures
  - This equates to one call every 24 minutes
- Annual rate of dietary supplement exposures (per 100,000)
  - ↑ 46.1% (2000-2002)
  - ↓ 8.8% (2002-2005)
  - ↑ 49.3% (2005-2012)
- Children < 6 years of age (70%)
  - Acute incidents (94%) & unintentional (82.9%)
- Serious medical outcomes (4.5%)
  - Occurring most often in individuals > 6 years of age



Rao M, et al. JAMA Toxicol 2017

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## Regulation of Natural Products

- FDA?
  - Dietary supplement labels
    - Health claim (Relationship between component and reduction of disease risk)
    - Nutrient content claim (Describes amount of nutrient in product)
    - Structure/function claim (This category doesn't require FDA approval but manufacturer must provide the FDA with text of the claim within 30 days of coming to market)
    - Disclaimer: *This statement has not been evaluated by the FDA. This product is not intended to diagnose, treat, cure, or prevent any disease.*  
<https://ods.od.nih.gov/factsheets/DietarySupplements-Consumer/>



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- Federal law does not require dietary supplements to be proven safe to FDA's satisfaction before they are marketed.
- Dietary supplement manufacturers do not have to get the agency's approval before producing or selling these products.
- It is not legal to market a dietary supplement product as a treatment or cure for a specific disease, or to alleviate the symptoms of a disease.
- Dietary supplement advertising, including ads broadcast on radio and television, falls under the jurisdiction of the Federal Trade Commission.



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### Well if supplements are not regulated how do I know what to do?

#### Check for the USP mark

- Ingredients listed on the label are indicated in the identified amounts
- Does not contain harmful levels of contaminants
- Will break down in the body and release the supplement in a specified amount of time
- The supplement has been created according to the FDA Good Manufacturing Practices using sanitary and well-controlled practices and procedures



<https://www.usp.com/verify>

<https://www.usp.com/verify>



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### There is continued interest and funding...



**NIH Grants Support of Natural Products in American Commerce**  
 NIH Director's Office of Natural Products Research  
 August 2018  
 O. Coonrod, PI  
 NIH Director's Office of Natural Products Research, NIH Science Team  
 2018-2020  
 R01 NS101117



**National Center for Complementary and Integrative Health**



**Supporting FDA Regulatory Programs for Natural Products**  
 August 2018  
 O. Coonrod, PI  
 NIH Director's Office of Natural Products Research, NIH Science Team  
 2018-2020  
 R01 NS101117



**Supporting FDA Regulatory Programs for Natural Products**  
 August 2018  
 O. Coonrod, PI  
 NIH Director's Office of Natural Products Research, NIH Science Team  
 2018-2020  
 R01 NS101117



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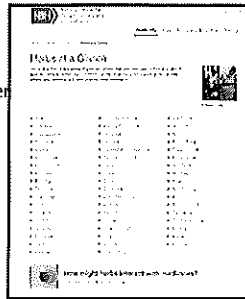
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## Choosing Products

- What to look for in a product
- Resources for Providers and Patients



<https://www.od.nih.gov/healthfacts/supplements>

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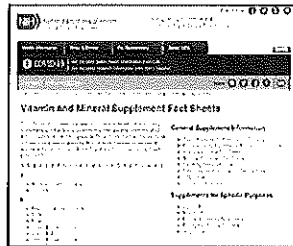
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## Sources of information

<https://ods.od.nih.gov/factsheets/list-VitaminsMinerals/>



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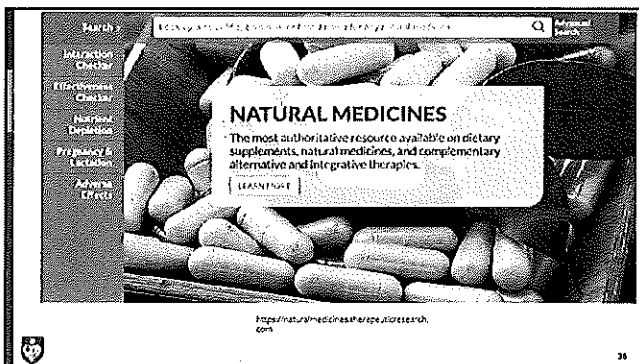
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<https://naturalmedicinesfepi.ssrsearch.com/>

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## Take home message....

- Ask about supplement use as a part of your patient history
- Be open to discussion and dialogue
- Ask what the goals of supplement use are
- Know reliable information sources in order to direct families
- Be alert for potential drug-supplement interactions



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## Questions...



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## References

- Jyoti, P.M., Schroeder, G. & Stuber, M. (1996). Oral glutamine reduces the duration and severity of stomatitis after epirubicin cancer chemotherapy. *Cancer*, 81, 1833-1838.
- Burns, H.C. (2013). Pediatric Headache: A Review. *Pediatrics in Review*, 33(12), 562-576. <http://doi.org/10.1542/pir.33.12.562>
- Bodmer, M., Jimenez, E., Beyer, S. (2021). Plant-Based Beverages in the Diets of Infants and Young Children. *JAMA Network*, 2021;175(5):555-556. <https://doi.org/10.1001/jama.2021.5552>
- Corina, M.R., Barakat, S.H., de Ferranti, S.D., Golden, M., Kim, J.I., Magge, S.N., and Schwarzenberg, S.J. (2016). Nutrition in Children and Adolescents. *Medical Clinics of North America*, 100, 1217-1235.
- Crout, V., Mateo-Pogoda, M., Arai, Y., Cui, R., & Newsholme, P. (2016). Glutamine Metabolism and Immune Function, Supplementation and Clinical Translation. *Nutrients*, 8(9), 1564. <https://doi.org/10.3390/nu8091564>
- DuBois, J. (2020). Can Melatonin Help You Sleep & Fight COVID-19? *Whole Foods Magazine*. Retrieved from <https://www.wholefoodsmag.com/2020/12/15/can-melatonin-help-you-sleep-and-fight-covid-19/>
- Eguchi, S., Lina, D., Bialostoz, R., et al. Feasible sleep disturbances and treatment with melatonin. *J Travel Med*, 2018; 27(1):77. <https://doi.org/10.1093/jtm/taz014>
- Falahati, R., Mansourni, M., Ghazvini, M., Akbari, E., Mirrezaei, P. (2016). Nutritional status in Hyperlipidemic Children: A Systematic Review and Meta-analysis. *International Journal of Pediatrics*, 4(3), 159-157E.
- Myronyuk, M., Holmes, R., & Hoy, S. (2013). Pharmacologic Treatments for Sleep Disorders in Children: A Systematic Review. *Journal of Child Neurology*, 28(3), 239-247. <https://doi.org/10.1177/0885066612451923>
- Moore, J., McFalls, A., & Hong, M.Y. (2015). Dietary Supplement Use in the United States. *Alcohol Today*, 55(4), 174-181. <https://doi.org/10.1177/0734265115232545>
- Pandey, A., Cowan, A., Jun, S., & Bailey, R. (2019). Trends in Nutritional Supplement Use among US Children from 1999 to 2016. *Journal of Pediatrics*, 211, 131-140.
- Park, G.P., Cheng, G., Cepulonis-Gonzalez, C., Spangher, M., Manti, S., Fajale, M., Orsini, M., et al. (2021). Nutritional Status in the Prevalence of Oral Diseases Including COVID-19 among the Pediatric Population: A Review of the Literature. *International Journal of Molecular Sciences*, 22(9), 2465. <https://doi.org/10.3390/ijms22092465>



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## References

- Cent DA Assessor. (2019, October 17, 2019). *Prevalence of Entry Supplement Use in US D-Sites*. *MAA Research*, 2019-2019-0004. <https://doi.org/10.1007/s11332-019-0004-4>
- Shelton, M., Brashers, A., Shea, B., & Beck, C. (2011). *Misdiagnosis in Pediatrics: Evaluating the Consistency in Evidence Based on Country and Regulatory Reporting Practices*. *Pediatric Pharmacotherapy*, 16(1), 4-12. <https://doi.org/10.1007/s11332-011-0111-5>
- Shelton, M., Shih, J., Goshua, W., & Beck, C. (2012). *Entry Supplement Use in Offshore and Adolescents Aged 18 Years*. *United States*, 2017-2018. *AMA Research*, 2017-2018-0004. <https://doi.org/10.1007/s11332-017-0004-4>
- Wax, H. (2011). *The ABCs of Pediatric Medication Administration: Primary Care*. Retrieved from <http://www.pharmacist.com/News/Needs-of-pediatric-medications-administration-supplements>
- Thomas, D. W., Goss, P. R., American Academy of Pediatrics Committee on Drugs, & American Academy of Pediatrics Section on Geriatrics, Psychiatry, and Services. (2015). *Problems and problems in pediatric Pediatrics*, 126(10), 1217-1219. <https://doi.org/10.1093/peds/126.10.1217>
- CPA. (May 4, 2011). *Real Evidence on Offshore Supplement Use in Vietnam, Korea, and Malaysia*. Retrieved from <http://www.cpahq.com/press-releases/real-evidence>
- Wax, H., & Goss, P. (2010). *Prevalence of Entry and Vietnam D-Sites in Offshore and Adolescents*. *Pediatrics*, 126(10), 1217-1219. <https://doi.org/10.1093/peds/126.10.1217>
- Reger, T. (2011). *Global Supplement Use in Offshore Reporting from Vietnam, Korea, and Malaysia*. *Pediatrics*, 126(10), 1217-1219. <https://doi.org/10.1093/peds/126.10.1217>



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