

KidsMV™

Introduction

Vitamins and Minerals in Developing Youth

All humans require the same vitamins and essential minerals (VM) to create, develop and maintain life.¹ The differences are the amounts necessary for proper health and development during different life phases² (see Appendix and Table 1), which varies little after ages 14-18years.^{2,3} However from the beginning of life (including prenatal) through the “early adolescent” growth and development period, there are significant differences in the required amounts of VM with the greatest adjustments taking place from birth through approximately age 12 years.^{2,3*} Prenatal multivitamin and mineral supplementation (now a standard health and medical professional recommendation^{4,5}) demonstrated the importance of proper VM intake during fetal development by eliminating over 30% of major birth defects including 46%⁶ of neural tube/spina bifida^{4,7,8,9,10,11,12,13,14,15} and now associated with a 55% reduction in stillborn births.¹⁶ Only the continuing synergistic act of the vitamins, essential minerals, amino acids, essential fats, etc., can create our bones, muscles, brain, etc., and thus health and life.^{1,3} As the prenatal taught us about preventing evolving structural failure caused by insufficient maternal VM intake during fetal development, so should filling VM gaps, left from food intake, to achieve the Recommended Dietary Allowances (RDAs) throughout all life phases post birth to continue the potential for proper structural and functional development, growth and healthy tissue maintenance.^{2,17,18,19,20,21,22,23,24,25,26,27,28} This controllable act of delivering a constant nutrient supply of what’s recommended to develop throughout all life phases, rather than the unknown/irregular VM content coming only from foods we typically consume, might help extend the work of the prenatal VM supplementation and synergistically with our foods offer the potential to support a solid lasting structure.^{4,6,7,8,9,10,11,24,25,26,27,28,29,30,31,32,33,34,35} For the most part, you can’t go back to your different phases of life and change what has already occurred by filling nutrient gaps after the fact; meaning those developmental opportunities have passed and the insufficient intake of VMs may have resulted in a weaker overall structure (e.g. brain, bone, cardiovascular) heading into adulthood.^{30,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51}

Sadly, this beginning of life example of nutrition (specifically VMs working together) helping to avoid developmental flaws is a stark validation of the inability to make up for what you didn’t get in the womb when a particular development phase has passed.^{4,7,8,9,10,11,14,15} Research suggests this continues throughout life, albeit subtly/insidiously until often too late, in not just development years but during everyday maintenance since our trillions of cells are constantly rebuilding/renewing using VMs to accomplish this phenomenon.^{1,3} In this sense, a human’s physical structure’s next day of life is as good as its recovery from the previous, thus the rationale for continuity in VM supplementation.⁵² The developmental years through puberty may be the most important years to secure maximum VM activities in all tissues so that the individual’s structural potential is realized. Recognizing this need, combined with the failure of typical children diets in achieving their age group VM RDAs along with the general youth immortality mentality and surrounding food influences,^{2,19,20,21,22,23,34,36,37,38,42,45,53} parents or guardians should be advised to make continuous daily complete vitamin and mineral supplementation a lifestyle practice.^{24,54} For more on vitamins and minerals including supplementation in human health from the beginning of life through youth development, the reader is referred to pages 21-29 from the article titled “*Vitamin and Mineral Supplementation in Human Health – A Case for Public Policy.*”⁵²

All dotFIT vitamin and mineral supplementation (formulas) consider: 1) recommended total VM intake (RDA/Adequate Intake[AI]) for the designated life stage established by the Dietary Guidelines for Americans (DGA); 2) RDA/AI VM gaps when intake is from food alone (including fortified); 3) vitamin and essential mineral supplement safety range (mean food intake to Tolerable Upper Limit [UL]) considering food intake; 4) proposed VM safe and appropriate supplement range to close the micronutrient gaps between the RDA/AI and food to achieve the scientific consensus of VM intakes to complement most any western food diet regardless of gender or age.

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* A complete listing of Dietary Reference Intakes (DRIs) known for all gender and age groups including Recommended Dietary Allowances (RDAs) is available [here](#).

Goal

(Formula and dosing recommendation carry on from where the prenatal and subsequent child formula VM powder/liquid supplementation leaves off, starting when the child has teeth at ~age 2 yrs with one (1) chewable through age 4 yrs and continues the VM supplementation properly adjusted by using two (2) chewables at age 5 yrs through age 11 yrs).

To supply vitamins and minerals (VM) in amounts necessary to complement the VM content from typical food intake of children to reach the established Dietary Guidelines for Americans (DGA) that supports growth, development and good health in children with the dosage altered as needed for the life phases of ages 2-11 years. This formula considers food intake compared to the RDA and AI recommendations for health and supplies corrective amounts so that combined with diet, and other (if necessary*) supplement intake, keeps the user within the safe and recommended VM range. The range is defined as starting close or equal to the VM RDA/AI for each age group and end below the UL or No Observed Adverse Effect Level (NOAEL). This formula notably contains 19 VM, any of which are known to be potentially shorted when food alone is the sole source, so that the human VM needs are shored up within virtually any typical U.S. diet, other than those minerals that cannot fit in an acceptable pill size* such as calcium and potassium. Along with other often shorted VM, the DGA's seven nutrients of concern (dietary fiber, choline, magnesium, calcium, and vitamins A, E, and C), except calcium and fiber due to pill size, are contained within the KidsMV in corrective amounts when added to known U.S. and other western nations food intake VM content.

Rationale

The rationale for lifelong vitamin and mineral supplementation (LCVMS) for all humans is detailed in the article: "Vitamin and Mineral Supplementation in Human Health – A Case for Public Policy."⁵² For an overview of rationale for all ages see article "Introduction" on pages 3-5. LCVMS rationale specific to children, including related multivitamin and mineral (MVM) peer review study discussions, see pages 21-29.⁵² Below is the additional rationale notes specific to children and the dotFIT formulation and recommendation.

KidsMV Formula

The clash of our evolutionary genetic wiring and current western environmental influences is most prevalent in children because the lack of knowledge of consequences from instinctive/desired food choices and ambivalence or ignorance to the nutrients contained in their food effects growth, development and healthy aging.^{55,56,57,58}

Additionally, parents work to please their children's palates so at a minimum they consume enough energy to function.^{58,59,60}

Young children through adolescent years notoriously fall short of dietary recommendations, especially fruits and vegetables, from which a significant amount of nutrients, specifically VMs, are derived.^{2,19,20,22,23,24,36,38,53,61,62,63,64,} Children and young adults are heavily influenced by readily available and highly palatable foods, especially during growth years when there is a lack of knowledge and awareness of the importance of good nutrition practices as it relates to optimal development, health or lack thereof.^{53,55,63,65,66,67} Banfield et al. describes the diets of children ages 4-18 who participated in the National Health and Nutrition Examination Survey (NHANES). The results revealed Total Healthy Eating Index 2010 scores were from 43.59 to 52.11 out of 100, far lower than the minimum score of 80 believed to indicate a diet associated with good health. Their conclusion is our argument: "Overall, children and adolescents are failing to meet the DGA (including VM RDAs) and may be at an increased risk of poor health throughout life."²⁰ Sadly, the vast majority of these kids' diets will get worse, thus missing more VMs, and many were not advised or supervised to at least fill the gaps, which may otherwise favorably affect not just health, but continuing attitudes toward food.

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We Are What We Eat, Also Meaning We Become What We Missed

As summarized above in the introduction that developmental life phases are often “windows” that close and there is no make-up later in life. All structural and functional growth and development is driven by VM dependent activities. If any VMs are regularly missing or too low (below AI), structure, function and development are compromised, and thus rationale for LCVMS to correct the VM food content to the known RDAs. ^{68,69,70,71,72,73,74}

The potential consequences of inadequate and adequate child VM intake are detailed on pages 14-29 of “Vitamin and Mineral Supplementation in Human Health – A Case for Public Policy,”⁵² along with discussions of related studies referenced in the bullet summary below. Just as it’s been shown that low VM intake in low birth-weight infants can cause stunting and MVM use can reduce this inhibition of growth,^{75,76} the reader will find that insufficient VM intakes at any level which virtually all children have when VM from food alone is the delivery (including fortified foods), limits desired VM activities and becomes an associated growth and development risk factor in:

- Height^{77,78,79,80,81,82,83}
- Cardiac structure^{38,84,85,86,87,88}
- Bone development and fracture rates^{36,37,41,42,43,45,50,89,90,91,92,93,94,95,96,97}
- Physical brain structure and function^{28,34,98,99,100,101,102,103,104,105,106,107}
- Social interactions^{28,105,108,109,110,111,112,113,114,115}
- Cognitive functioning ^{28,115,116,117,118,119,120}
- Allergies.¹²¹

Reminder that VMS should be a continuous correction to VM food intake in order to offer the potential to support healthy aging at all life phases since they work synergistically in every second of life.

Specialized/Unique Kid’s Formula Considerations

All ingredients contained in this formula follow the basic rules of filling gaps no matter the general western diet or age.^{2,3,122} Additionally, this formula follows the same VM structural guidelines of all dotFIT MVM formulas (Vegan, Women’s, Over50 and Active), in that the forms and dosage of ingredients are consistent in what has shown to be potentially more beneficial than what’s contained in MVM products commonly found in consumer channels (see previous section “dotFIT Multivitamin & Mineral Formulas Specialty Design Criteria” for more). These improvements over mass produced MVM products include the following:

- Maintain a synergistic relationship with all dotFIT health products and general food intake of children. Therefore, including diet, multiple product use in any combination, allows users to remain in the known safe and recommended VM range, which is from the ~RDA/AI to below the UL or NOAEL as noted above and in the Introduction.
- Both important forms of vitamin K, K1 and K2. ^{123,124,125} K1 and K2 have similar and unique properties. K2 (menaquinone) has recently emerged as serving an important role in vascular and bone health.^{74,126, 127} Low dietary vitamin K2 intake in children is associated with early onset poor bone health.⁹⁴ Calcium and vitamin D from food and supplements are complemented with vitamin K2 supplementation due to its increasingly recognized role as a "calcium chaperone and the facilitator of vitamin K’s cardiovascular system role in cardiac structure and function."^{38,73,84,85,86,87,88,125,127, 128, 129,130}
- Vitamin A (1-chewable,) is present in 500 IUs of preformed Vitamin A (retinyl palmitate) and 2000 IUs of provitamin A (beta-carotene) since they metabolize differently with unique and mutual actions.¹³¹ However, partially attributed to genetics and other uptake factors,^{132,133} there can be large interindividual differences in the ability to convert pro-vitamin A sources (e.g. alpha-carotene, beta-carotene, etc.) to the needed amount of vitamin A activity, known as retinol activity equivalents (RAE), therefore both forms can offset the possibility of too much or too little vitamin A activity and achieve the desired levels.^{134,135,136}

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- Choline bitartrate: rarely found in MVM,¹³⁷ choline is now considered an essential nutrient for proper muscle, liver and brain functions, lipid metabolism and cellular membrane composition and repair.^{2,3,138} Depending on the age group, over 90% of Americans and populations of other modern western nations have been found to be dangerously below the establish Adequate Intake (AI)^{2,139,140,141,142} and therefore choline is now listed as a nutrient of concern by the DGA,² meaning without correction, potential related health problems loom (e.g. shortages negatively impact cell structure, neurotransmitter synthesis/neurological disorders, liver health, cardiovascular system, etc.).^{138,143,144,145} Choline deficiency affects liver health because choline is required to form phosphatidylcholine present in very low-density lipoprotein particles.^{138,145,146} Because of choline's indispensable role in cellular structural development as described above, choline is especially important during pregnancy, lactation, and early child development.^{107,143} Semba et al. demonstrated how low essential amino acid (EAA) intake along with choline (essential for the synthesis of sphingolipids and glycerophospholipids) effect growth.¹⁴⁷
- High vitamin D to help shore up falling vitamin D intake from diets of children^{20,90,148} to meet the new guidelines^{149,150,151} and achieve levels associated with overall health benefits including musculoskeletal benefits related to serum 25(OH)D concentrations >75 nmol/L or 30 ng/mL.^{152,153,154,155,156,157}

Typical Use

- All children ages 2 to 11 years unless a specific medical condition prohibits the proper intake of any nutrient contained in the formula
- Ages 2 to 4 years take one daily
- Ages 5 to 11 years take two daily
- Ages 12 to 17 years use one adult ActiveMV™ multivitamin and mineral tablet instead of the KidsMV

For CVMS contraindications, precautions, etc., see previous section "[dotFIT Multivitamin & Mineral Formulas Specialty Design Criteria.](#)" There are no ingredients in the KidsMV that reach the UL or NOAEL including when added to normal food intake.

Supplement Facts Panel

Supplement Facts		%DV for Children <4 Years of Age	%DV for Adults & Children >4 Years of Age
Serving Size: 1 Tablet			
Servings Per Container: 60			
	Amount Per Serving		
Vitamin A (as beta carotene and as retinyl palmitate)	750 mcg (2500 IU)	250%	83%
Vitamin C (as ascorbic acid)	50 mg	333%	56%
Vitamin D3 (as cholecalciferol)	6.25 mcg (250 IU)	42%	31%
Vitamin E (as d-alpha tocopheryl succinate)	13.4 mg	223%	89%
Vitamin K (as Vitamin K1 [phytonadione] and as Vitamin K2 [menaquinone-7])	30 mcg	100%	25%
Thiamin (as thiamine mononitrate)	1 mg	200%	83%
Riboflavin	1 mg	200%	77%
Niacin (as niacinamide)	6 mg	100%	38%
Vitamin B6 (as pyridoxine hydrochloride)	1 mg	200%	59%
Folate	170 mcg DFE (100 mcg folic acid)	113%	43%
Vitamin B12 (as cyanocobalamin)	3 mcg	333%	125%
Biotin	10 mcg	125%	33%
Pantothenic Acid (as d-calcium pantothenate)	2 mg	100%	40%
Choline (from choline bitartrate)	100 mg	50%	18%
Iron (from ferrous fumarate)	5 mg	71%	28%
Iodine (from potassium iodide)	50 mcg	56%	33%
Magnesium (from magnesium oxide)	20 mg	25%	5%
Zinc (from zinc oxide)	5 mg	167%	45%
Selenium (from L-selenomethionine)	20 mcg	100%	36%

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