

# NUTRI NEWS



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## An Integrative Approach to Children's Health

by Kyl Smith, DC

### Introduction

Even in our overfed nation, poor nourishment is a major issue. This lack of good nutrition has been linked, in numerous studies, to suboptimal behavior and school performance, as well as to health problems in childhood or those that might not become evident until later in life. And studies find that adding the right nutrients to children's diets may help prevent, or even reverse, these outcomes.

A growing body of research associates poor mental function and health problems with nutritionally inadequate diets. From my own analysis of many hundreds of studies on nutrients, brain function, behavior, mood, and ability to learn, I have reached the point of total certainty that nutritional supplementation is the simplest, most effective strategy to quickly improve a broad set of health outcomes in children. Any in-depth consideration of the research on this topic makes this conclusion incontrovertible.

More specifically: simply adding a few high-quality nutritional supplements to a child's diet produces measurable, significant improvements in mental function. It also improves many other measures of health.

### Modern Diets Are Deficient

Most of the foods children eat in this country are processed – high in refined grains and sugars and depleted of naturally occurring vitamins, minerals, fiber and enzymes. In laboratory experiments, animals that are exclusively fed processed foods either die painfully and prematurely or exhibit radical growth abnormalities. Not surprisingly, a diet high in processed food has been found to directly impact the performance of children's brains and bodies.

For decades, the popular news media has claimed that a "good mixed diet" is all that is needed for nutritional adequacy. Unfortunately, that same diet generally contains plenty of white flour, sugar, French fries, soft drinks, processed and other foods that fall miserably short in brain and health building nutrients.

*Continued on page 2*

## Nutritional Support For Neonates, Infants, and Children

### An Integrative Physician's Perspective

by James Mahoney, DO

### Introduction

Today, consumers are barraged with advertising and hype about nutritional supplements. Magazines, newspapers, television, and the internet are all laden with story after story about supplements. Often, the claims made by unscrupulous manufacturers of those supplements are enough to make physicians cringe. Consumers are informed enough to want to know how to apply nutritional supplementation to better their health and the health of their families, but they need a physician's help, expertise, and support to make the best choices. This is where integrative medicine comes in.

Physicians are a sorely needed missing link between the world of convincing research into nutrient-based therapeutics and to the patients who could hugely benefit if only they could

*Continued on page 8*

## INSIDE THIS ISSUE

### An Integrative Approach to Children's Health

Introduction .....	page 1
Modern Diets Are Deficient .....	page 1
Sub-Clinical Deficiencies Are Common - And Significant - in American Children .....	page 3
The Ultimate Head Start: Studies Support Nutritional Interventions for Children .....	page 4
Children Are At Greatest Risk - And Poised for Maximum Benefit .....	page 4
A 3-Step Pediatric Nutritional Strategy .....	page 5
Summary .....	page 6

### Nutritional Support for Neonates, Infants, and Children: An Integrative Physician's Perspective

Introduction .....	page 1
Pregnancy and Lactation .....	page 8
Newborns .....	page 8
Infants .....	page 9
Children .....	page 10
Children Are Our Future .....	page 11

If there's a good mixed diet that will ensure good nutrition, Americans aren't eating it.

A recent survey found that one in five Americans live on a diet of ten foods or fewer.<sup>1</sup> Among the most common choices were chocolate chip cookies, fried chicken, French fries, and Kraft macaroni and cheese. This figure includes adults and children. Another survey looked at 57 school-based health education programs for children to see whether they were effecting real change in children's diets and health.<sup>2</sup> By and large, they weren't – most of the children kept going back to sodas and chips, and the programs did not alter body weight or other measures of diet-related health.

According to the recently completed third National Health and Nutrition Examination Survey (NHANES III), fewer than 15 percent of U.S. children eat the recommended five servings of fruit and vegetables each day.<sup>3</sup> The same study also found that on any given day, 45 percent of U.S. children aged 6-17 eat no fruit and 20 percent eat less than one serving of vegetables.

The USDA states that less than two percent of the 148 pounds of wheat flour consumed per capita in 1996 was whole-

wheat flour.<sup>4</sup> Potatoes used for fat-laden products like frozen French fries (eaten mostly with a fast-food meal) and potato chips accounted for 11 percent of total U.S. per capita fruit and vegetable supplies in the 1990s.<sup>4</sup> Although government health authorities actually count French fries and potato chips as servings of vegetables, 61 percent of boys and almost 70 percent of girls failed to consume the number of servings of vegetables recommended by the USDA's Food Pyramid. Seventy-one percent of boys and 88 percent of girls failed to consume the recommended amount of dairy foods.<sup>5</sup>

If you look at the recommendations in the USDA Continuing Survey of Food Intakes by Individuals and the latest USDA Dietary Guidelines for Americans, you'll see that food conglomerates must have dampened the USDA's concerns about the drastic nutrient losses that occur in the processing of foods. Otherwise, how could any individual trained in nutrition state with a straight face that vegetable servings may include cooked or canned vegetables, fried vegetables, and canned vegetable juice<sup>5,6</sup>; and that fruit servings may include cooked or canned fruit (including pies) or pasteurized (heated/cooked) fruit juice?<sup>5,6</sup>

Government guidelines to the "good mixed diet" also state that grain servings may include bleached white bread, refined cereal or cooked white rice<sup>6</sup> -- despite the fact that conversion from brown rice to white polished rice results in losses of 80 percent of thiamine, 40 percent of riboflavin, 66 percent of niacin, 94 percent of vitamin B6, 20 percent of folic acid and 58 percent of biotin.<sup>7</sup> Fat and oil servings may include margarine, low-fat mayo, light salad dressing, and refined vegetable oil,<sup>6</sup> and the so-called Discretionary Calorie Allowance may include 267 calories per day from heaping tablespoons of pure refined sugar, jellies, jams, or jelly beans.<sup>6</sup> Good mixed diet? Not really.

To be fair, let's admit that the USDA has a big job. Providing nutrition and dietary education for every American from all socioeconomic and educational backgrounds is a tall task indeed. And they do recommend "eating a variety of nutrient-packed foods every day" as well as emphasize the daily consumption of a "variety of fruits, vegetables, and whole grains."<sup>8</sup> But despite the USDA's recommendations, Americans are not measuring up to that "good mixed diet:"

- 85 percent of the grain products we consume are not whole grain.<sup>5</sup>
- Dark-green leafy vegetables comprise only three percent of our vegetable servings.<sup>5</sup>
- Potatoes, including french-fries, potato chips or potato sticks, make up 1/3 of our total vegetable servings.<sup>5</sup>
- Less than 50 percent of the population consumes just one serving of garden vegetables per day.<sup>9,10</sup> Ninety-one percent of the U.S. population failed to meet the minimum USDA recommendation for fruit and vegetable consumption.<sup>9</sup>
- Almost half (48 percent) of all Americans failed to consume even one serving of fruit per day.<sup>5</sup>

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Even when children (and their parents) eat a superlative diet compared to most of North America, they can still come up short on important nutrients. “Fresh” produce has been shown to lose 50 to 70 percent of some nutrients before reaching grocery stores. Even worse, canned and frozen vegetables lose between 50 and 90 percent of some key nutrients. Some of those foods may be years old before they finally arrive at a family’s dinner table.

## Storing and Processing Deplete Nutrients in Healthful Foods

Compounding the problems of Americans’ refusal to consume fruits and vegetables: the fact that storage and food processing take their toll on produce.

- Spinach stored at room temperature loses 70 percent of its vitamin C content within just twenty-four hours after picking.<sup>11</sup>
- Refrigerated spinach loses half of its vitamin C content in just two days.<sup>11</sup>
- Broccoli and asparagus lose 35 to 50 percent of their vitamin C in cold storage before they get to the greengrocers.<sup>12</sup>
- Cooking vegetables destroys another 30 percent of the vitamin C and up to 70 percent of the thiamin and 50 percent of the riboflavin.<sup>12</sup>
- Canning vegetables destroys up to 77 percent of vitamin B5 and B6, while canned fruit juice loses up to 50 percent of its vitamin B5.<sup>13</sup>
- Canning of tomatoes removes 80 percent of their zinc; spinach suffers losses of up to 81.7 percent of its manganese, 70.6 percent of its cobalt, and 40.1 percent of its zinc, compared to raw spinach.<sup>13</sup>
- Freezing meat destroys up to 70 percent of the vitamin B5, and 50 to 70 percent of vitamin B6 is lost in processing luncheon meats.<sup>13,14</sup>

More recently, researchers have published similar studies indicating even greater nutrient losses.<sup>7-16</sup> For example, canning vegetables creates losses of up to 90 percent of the vitamin content of some vegetables, and fruit doesn’t fare any better. Peaches lose from 40 percent to 70 percent of niacin, riboflavin, thiamin, and vitamins A and C during processing when compared to raw peaches.<sup>7</sup> If the raw peaches are simply cooked and not processed further, they lose 80 percent of their naturally occurring niacin and 70 percent of their vitamin C.<sup>7</sup>

By and large, American adults don’t seem to be setting a very good example for their children. And although health education programs – as well as individual doctors in their one-on-one dealings with patients – have tried to move more people towards a truly good mixed diet, these programs have not been successful.

## Sub-Clinical Deficiencies Are Common - And Significant - in American Children

Even in America, one of the best-fed nations on the planet, nutritional deficiencies are remarkably common. We have access to a virtually unlimited number of calories, but vitamins, minerals, accessory nutrients, and healthful fats are far harder to come by in our modern food supply.

Today, the association between nutritional deficiency and poor behavioral-test performance in children is well established.<sup>17</sup> Researchers have demonstrated lower standardized math scores among nutrient-deficient school-aged children and adolescents.<sup>18</sup>

According to the Nutrition-Cognition Advisory Committee at Brandeis University:

“Even nutritional deficiencies of a relatively short-term nature influence children’s behavior, ability to concentrate, and to perform complex tasks. Deficiencies in specific nutrients, such as iron, have an immediate effect on the ability to concentrate. Child hunger, defined by inadequate nutrient intake during the early years, is capable of producing progressive handicaps – impairments which can remain throughout life. This evidence suggests that undernutrition costs far more than the diminished well-being of youngsters during childhood. By robbing children of their natural human potential, undernutrition results in lost knowledge, brainpower and productivity for the nation. The longer and more severe the malnutrition, the greater the likely loss and the greater the cost to our country.”<sup>19</sup>

A key reference book popular with many nutritionally oriented physicians is Melvin Werbach, M.D.’s *Nutritional Influences on Mental Illness: A Sourcebook of Clinical Research*. Dr. Werbach is on the faculty of the UCLA School of Medicine. In his exhaustive textbook, he reviews the relationship between nutrition and brain function, writing that:

“[i]t is clear that nutrition can powerfully influence cognition, emotion, and behavior. It is also clear that the effects of classical nutritional deficiency diseases upon mental function constitute only a small part of a rapidly expanding list of interfaces between nutrition and the mind.”<sup>20</sup>

It has long been known that if a nutritional deficiency were discovered through lab testing or overt clinical symptoms affecting cognitive ability or mental health, correcting that deficiency would restore normal mental function. However, advances in the last two decades in the field of nutrition have considerably broadened protocols to include the treatment of sub-clinical deficiencies and nutrient needs that conventional laboratory tests do not discover.

Today, we know that implementing a nutritional supplement plan has remarkable benefits on mental function for both adults and children – **even where no actual nutritional deficiency was previously shown to exist**. There are references to



## U.S. Government Statistics on Children's Health and Well-Being<sup>21-23</sup>

- Percentage of children in the U.S. who have limitations of activity due to chronic health conditions: 7
- Percentage of children in the U.S. who live in food-insecure households, meaning that their diet patterns are often disrupted, they may not get enough to eat, or they have low diet quality: 17
- Percentage of children in the U.S. aged 6-17 who are overweight or obese: 18
- The number of children taking stimulant drugs for ADHD rose threefold between 1990 and 1995; over the past 15 years, the number of teens aged 15-19 who take ADHD medications rose 311 percent
- Percentage of U.S. children with depression: 3
- Percentage of U.S. teens with depression: 8
- Percentage of U.S. children and teens who suffered from an anxiety disorder in a recent year: 13

Author's Note: My book *Brighter Mind*<sup>®</sup> explores the research that strongly suggests these and numerous other issues can be helped, and often remediated, by ensuring nutritional adequacy through supplementation.

this fact in virtually every modern book that discusses the relationship between nutrition and brain function. Dr. Werbach writes that "[e]ven in the absence of laboratory validation of nutritional deficiencies, numerous studies using rigorous scientific designs have demonstrated impressive benefits from nutritional supplementation."<sup>20</sup>

Conventional laboratory tests overlook the realm of sub-clinical nutrient deficiency, despite the sizeable body of research that supports its existence and its impact, and despite the fact that it is easily remedied through nutritional supplementation. Such tests only identify the very extreme end of the deficiency spectrum that directly relates to blatant illness – the obvious signs of "end-stage nutritional deficiency." This means that a good percentage of the pediatric population does, in fact, suffer with nutritional deficiencies that affect brain function, but this information fails to show up on typical lab work and diagnostic tests.

### The Ultimate Head Start: Studies Support Nutritional Interventions for Children

Nutritional deficiencies have been documented in modern, industrialized populations, and numerous studies now detail the benefits of supplementing the diet of children with outright symptoms of nutritional deficiency. What about apparently healthy school children, with no outward signs of deficiency or illness? Would a high-quality multivitamin/multi-mineral supplement improve their health, cognitive function, or resistance to illness?

Investigators sought to answer this question by administering a supplement designed to ensure that healthy schoolchildren received adequate daily amounts of vitamins, minerals, and antioxidants. After eight months, the supplemented schoolchildren experienced a significant improvement in nonverbal intelligence, while children given a placebo or no supplement did not.<sup>24,25</sup> In fact, the group of children who supplemented with the multivitamin/mineral formula gained 7.2 IQ points more than the placebo group.<sup>24,25</sup> The researchers were stunned at these results, but even stronger evidence in favor of this type of intervention was to come.

Specifically: in a review article of 13 clinical trials that evaluated the benefits of nutrients on children's intelligence, the researchers commented that "[t]he most striking finding is that the supplemented subjects performed better, on average, than placebo subjects in non-verbal IQ in all 13 studies, regardless of location, age, gender, race, formula, or research team composition."<sup>25</sup> In addition, the mean net gain in nonverbal IQ across all 13 studies showed a nonverbal IQ increase of 9.8 points among 1041 children whose diets were supplemented with vitamin/mineral formulas.<sup>25</sup>

### Children Are At Greatest Risk - And Poised for Maximum Benefit

This information is especially important for physicians who practice pediatric nutrition. Long-term studies demonstrate that young children provided with a nutritionally enriched and stimulating learning environment are significantly less likely to exhibit anti-social or criminal behavior or mental illness in later life.<sup>26</sup> Similarly, proper nutrition, exercise, and cognitive stimulation in preschool children are very likely to result in better behavior and healthier, more stable mental outcomes one, five, ten, and twenty years later.<sup>26</sup>

Optimal brain nutrition for children means more and better information processing and assimilation, improved learning capacity, and even enjoyment of learning. The preschool years are especially potent in terms of learning ability – and yet, this stage of a child's life is often characterized by a diet consisting mostly of white flour, processed cheese, conventionally produced ultra-pasteurized milk, and refined sugar. Again, the implications here for nutritionally oriented physicians are profound.

Even a marginal nutritional boost makes a difference. This is evidenced by the fact that some studies evaluating nutrient supplementation in children have utilized RDA levels of nutrients – levels far below those amounts utilized in the original study that produced the more impressive 7.2-point average improvement.<sup>24,25</sup> For example, a study that evaluated 245 Arizona school children for just four months (half the time of the original study) utilized a relatively weak nutritional formula. Although the length of time for which the supplement was given was shorter and the doses of nutrients were lower, the group of children taking the nutritional formula had a significant 2.5-point greater gain in nonverbal IQ than the placebo group.<sup>24,25</sup>

## Processed Foods

Optimal functioning of the central nervous system requires optimal availability of the following brain support nutrients.<sup>27-34</sup> However, the chemical and mechanical steps currently utilized to process foods through exposure to heat, light, water, milling, or chemicals will significantly reduce a food's content of these same nutrients.<sup>35-40</sup>

- |                    |                         |
|--------------------|-------------------------|
| • Thiamin          | • Vitamin C             |
| • Riboflavin       | • Vitamin E             |
| • Niacin           | • Iron                  |
| • Folate           | • Zinc                  |
| • Pantothenic acid | • Magnesium             |
| • Vitamin B6       | • Essential fatty acids |
| • Vitamin B12      |                         |

Why do vitamins and minerals raise IQ? The science demonstrates that:

- Vitamin and mineral supplementation eliminates the probability of sub-clinical deficiency of any of the brain-supporting nutrients that are so critical for optimal function; and
- Adding a multivitamin/multi-mineral supplement to the diet ensures that optimal intakes of nutrients are always present to support optimal mental performance.

Children and teens think faster and can concentrate longer; thus, they may consolidate even more information with optimal intake of vitamins and minerals.

Another important element of pediatric nutrient supplementation: the omega-3 (n-3) fats such as docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA). DHA and EPA are essential for children's proper neural development. They are necessary building materials for nerve and brain cell membranes, and optimize the neural circuitry that translates into the child's thought, movement, behavior, and learning. Deficiency of these n-3 fats, which is extremely common in both children and adults, will negatively impact a child's focus, concentration and behavior.

In fact, a sizeable body of evidence demonstrates that lowered levels of n-3s like DHA play a significant role in a host of cognitive disturbances that affect children.<sup>41</sup> An excellent case can be made in support of the idea that ADHD in children is a manifestation of either a greater genetic requirement for dietary n-3s and DHA or of chronic under-consumption and a resulting DHA deficiency.<sup>42</sup> More on this below.

## A 3-Step Pediatric Nutritional Study

### 1. Nutritionally Supplement The Diet With A Good Quality Multivitamin/ Multimineral Formula

True, nutritional supplements are only supplements to a healthful diet, but this step is at the top of the priority list. Even with the best intentions and unlimited supermarket dollars, the science on the subject shows that it's nearly impossible for parents to obtain all the nutrients needed for their child through food alone.

In fact: EVERY study that's been performed to date has demonstrated multiple nutritional deficiencies in children who are faithfully consuming the American diet. Setting the foundation for a child's health and mental performance will require nutritional supplementation – even if the child's diet is "better than average." This step will protect against nutrient deficiencies that can emerge with even a relatively healthful diet.

### 2. Supplement The Diet With Omega-3 Fats From Fish Oil

Omega-3 deficiencies have been identified in the scientific literature as a causal factor in ADHD.<sup>43-46</sup> Children with ADHD have been reported to have significantly lower plasma DHA and DHA red blood cell concentrations when compared to normal (control) non-ADHD children.<sup>44</sup> In studies conducted at Purdue University, the lipid profiles of 53 boys with ADHD were compared to a control group of 43 boys without ADHD. Boys six to 12 years old who had below-normal plasma DHA concentrations had a documented greater prevalence of temper tantrums, learning problems, and other behavior and sleep problems, as well as significantly higher levels of anxiety, hyperactivity and impulsivity.<sup>45</sup> The researchers found that subjects with ADHD had significantly lower concentrations of DHA in plasma and red blood cells compared to the control group. The ratio of total n-6 to n-3 in the subjects with ADHD was significantly higher than in control subjects (P<0.002).

In this same study, a higher percentage of subjects with ADHD had essential fatty acid deficiency symptoms: eczema, dermatitis, dry skin, dry hair, excessive thirst, and frequent urination. The ADHD group had a significantly higher incidence of asthma, ear infections, and stomachaches compared to controls. These ADHD boys showed evidence of a negative feedback cycle between inadequate nutrition, chronic inflammatory reactions, and hyperactive behavior.

Furthermore, a recent randomized, placebo-controlled, double-blind intervention over 15 weeks performed in a group of children aged seven to 12 years who exhibited ADHD-related problems with attention, hyperactivity, and impulsivity produced quite favorable results. Researchers found significant medium to strong positive treatment effects in the group given n-3 supplementation.<sup>46</sup>

### 3. Increase Consumption of Nutrient-Rich Foods

If your pediatric patients – like most children – would prefer

to fill up on processed foods, this is certainly understandable, but parents need to be aware of the fact that this could well be interfering with their health in numerous ways. Start by showing parents how to begin making a healthful change by first factoring in some whole, nutritious, unprocessed foods, and then work to completely substitute healthful whole foods for processed junk as often as possible.

For every food a child adores, parents can find or create a less processed version as a replacement. Reference the table in the right column for some ideas you can suggest to parents.

Advise patients that they can find healthy recipes for kids online, in cookbooks, or on the shelves of your favorite bookstore. The aim here is to start substituting less processed foods for their old favorites, and in time, they'll learn to love them just as much.

## Summary

As children are rapidly growing and learning, and since they have even less of the willpower required to make good choices in a world full of processed junk, it is especially crucial that their bodies and brains be supplied with the nutrients they are likely to lack.

Food processing and other aspects of the modern diet have significantly degraded the micronutrient quality and quantity of the average American diet. Today, multiple lines of evidence demonstrate that children and adults frequently consume diets that provide suboptimal nutrient composition. These inadequate diets negatively affect the health outcomes of adults and children.

Nutritionally oriented physicians can significantly improve patients' health outcomes by simply helping patients to better understand the importance of daily supplementation, as well as providing instruction regarding how to select good quality nutritional supplements that will meet the specific needs of each individual.

My book, *Brighter Mind*®, offers detailed information and advice for people of all ages who wish to optimize nutrition, brain function, and overall health. It explores the extent of nutrient depletion in common "kid-friendly foods" in extensive detail. The book also covers individual nutrients beneficial for children in-depth – including research-based recommendations of doses and specific forms of those nutrients. Also in its pages: detailed information on exercise and constructing a diet that helps keep the whole family slender and full of energy. It has a full recipe section and shopping lists that can help to get the whole family eating more healthful, whole-food focused meals. Many physicians have found the book to be a helpful time-saving teaching tool when offering advice to patients about how and what to supplement – and how to change eating habits for the better.

## Alternatives to Processed Foods

Processed Food	Healthier Alternative
Sweetened packaged yogurt	Plain organic yogurt with a drizzle of maple syrup, low-sugar granola, or all-fruit preserves; or, for an ice-creamy treat, chop up frozen fruit and stir in
Fried Chicken Tenders	Chicken tenders brushed with orange marmalade and then breaded with seasoned nut meal, cornmeal, or oats and baked in the oven
PB & J Fluffy white bread	PB and all-fruit preserves on sprouted grain toast or whole-wheat pita
Crackers and cheese	Whole-grain crackers and sliced raw vegetables with healthy yogurt dip
Fish Sticks	Wild-Alaskan Salmon baked with sweet soy and maple syrup glaze
Tuna Salad Sandwich	Wild-Alaskan Salmon or shrimp salad, free-range chicken salad, or egg salad – made in same way as tuna salad; advise parents who want to use tuna to use chunk light skipjack tuna instead of white albacore, which has much higher mercury levels
Sugary breakfast cereal in the mornings	Go high-protein with complex-carbohydrates in the AM to help the child focus in school. Try eggs and whole-grain toast or corn tortillas with sliced fruit; a protein smoothie; or even a turkey burger
Ice cream or sugary popsicles	Fruit pops made with no-sugar-added juices, fresh fruit pureed with a small amount of juice or plain yogurt, or protein smoothie; spirulina or other green food powder can be added if the kids don't mind the color

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## About the Author:

### Dr. Kyl Smith, D.C.

*Dr. Kyl Smith (or, Dr. Kyl, to his colleagues) is a noted researcher, inventor, lecturer, and scientist, and is well-known as the inventor of the number-one selling brain support product in North America. Dr. Kyl is also the author of the book Brighter Mind®, a four-step program addressing brain health and mental performance.*

*Professionally, Dr. Kyl received his doctorate of Chiropractic in 1993, and has since engaged in nutrition and natural medicine research. Most notably, in 2001 – with the help of some of the top scientists in the world, including a former senior scientist for the American Medical Association – Dr. Kyl filed a Health Claim Petition for Phosphatidylserine, which was approved by the FDA in 2002. This is an unprecedented accomplishment; it represents the first Health Claim for cognitive function to be approved in the FDA's history. As a result, Dr. Kyl received the James Lind Scientific Achievement Award, which acknowledges the accomplishments of those who have contributed to the scientific advancement of natural medicine and are helping to reshape the very structure of American health care. [www.BrighterMind.com](http://www.BrighterMind.com)*

get the right nutrient prescription. General practitioners are frequently confronted by parents who want advice and counsel regarding the best practice for supporting normal development and optimal function in their children. Dr. Smith and I hope to inspire you and many other physicians to learn more about what nutritional medicine can do when these questions come up – and as a mainstay of your clinical practice.

I have been practicing general integrative medicine for over 20 years. One area in which I have extensive experience, and which I find to be quite rewarding, is the nutritional treatment of children from preconception through adolescence and into adulthood. My clinical experience has repeatedly confirmed that rapidly growing bodies and brains of children can benefit enormously from the “insurance plan” that comes from nutrient supplementation; and that the healing of children who are sick can be powerfully promoted with the right nutrients administered at the right times, in the right amounts.

Based on scientific literature and borne out in nutritionally oriented medical practices like my own, the use of nutrients in both prevention and treatment of pediatric illnesses is – in my opinion – a major aspect of the future of pediatrics. It is an area of practice with an enormous amount of scientific validation that has, so far, received much less than its due amount of attention in the medical mainstream.

Dr. Smith has presented a compelling framework for the necessity of nutritional supplementation in children. From his contribution here, you already understand that modern diets are nutrient-deficient, and that the standard American child's diet puts him or her at risk of subclinical deficiencies that affect function at multiple levels. He has also eloquently pointed out that filling in the nutritional blanks left by the typical diet can have profound effects on cognitive function and behavior.

To build on Dr. Smith's experience and recommendations regarding brain support, I would like to present a chronological and practical guide to simple interventions that target specific clinical problems in infants and children. These interventions are best applied in addition to a foundation of daily nutritional support that includes:

- Omega-3 fats from fish and fish liver oils or krill
- Multivitamin/multimineral
- Mixed probiotic formula
- Nutrient-dense diet

These are recommendations that will benefit any child – as well as any adult – seen in your practice.

Traditional medical care is directed at disease management; occasionally, it addresses prevention of deficiency disease and birth defects. Within this context, I will present considerations for

support and treatment from the earliest stages of development to the end of childhood. Each suggestion should be considered within the context of the treating doctor's judgment of the specific situation.

In each section heading, I include specific nutritional medicine indications for the age group discussed; these are in addition to nutrients given to support overall health and resistance to disease.

## **Pregnancy and Lactation**

*Birth defect prevention; support for maternal mental health; provision of adequate nutrients for building of baby's nervous system; treatment of common maternal bowel dysfunctions*

Extensive research corroborates the immediate and generational benefits of supplementation during pregnancy and lactation. Preparation for conception provides the groundwork for reduced birth defects as well as multigenerational reduction in the development of obesity, diabetes and heart disease<sup>1, 2, 3</sup>

Expectant mothers would be well-advised to supplement a healthy, low-toxin diet with a broad spectrum high-potency multivitamin and mineral supplement.<sup>4,5,6</sup> Most over-the-counter supplements are inadequate for optimal support. A more ideal basic supplementation strategy, which does not include considerations for the underlying functional status of the mother, would include supplements from the table on page 9.

Bowel dysfunction with constipation secondary to pregnancy often results in an imbalance of flora. This would be one of the many conditions that require specialized treatment with probiotics, prebiotics, higher doses of magnesium and other nutritional interventions, based on the individual's need.

During pregnancy, women have been found to benefit from fish consumption, and the children of women who consume more fish appear to have lower risk of various health problems. Eating more fish also has been found to protect women against post-partum depression; fish consumption also enhances levels of DHA and EPA in breast milk. A substantial body of research indicates that pregnant women and their children will benefit from krill oil or fish oil supplements to women during gestation and lactation.

## **Newborns**

*Genetic disorders; early gray matter development; protection against potentially painful bowel problems; nutritional support of breastfeeding mother*

Supplementation during the newborn period may be life-saving. A heel-stick is performed at the time of birth to elucidate the presence or absence of metabolic disorders; some such disorders may be remedied by the judicious application of supplemental nutrition.

The American Academy of Pediatrics has recognized the value of screening for biotinidase deficiency, congenital adrenal hyperplasia, congenital hearing loss, congenital hypothyroidism, cystic fibrosis, galactosemia, homocystinuria, maple syrup urine disease, medium-chain acyl-coenzyme A dehydrogenase



## Recommendations for Expectant Mothers

Nutrient	Amount	% RDA
Vitamin A	7500 IU	150%
Vitamin C	200 mg	330%
Vitamin D-3	400 IU	100%
Vitamin E	200 IU	670%
Vitamin K	80 mcg	*
Thiamin	50 mg	3330%
Riboflavin	50 mg	2940%
Niacinamide	50 mg	250%
Vitamin B-6	45 mg	2250%
Folate	1 mg	250%
Vitamin B-12	50 mcg	770%
Biotin	300 mcg	100%
Pantothenic Acid	50 mg	500%
Calcium	600 mg	60%
Iron	31 mg	170%
Iodine	180 mcg	120%
Magnesium	350 mg	90%
Zinc	15 mg	100%
Selenium	60 mcg	80%
Copper	2 mg	100%
Manganese	5 mg	250%
Chromium	200 mcg	170%
Molybdenum	50 mcg	70%
Potassium	100 mg	2%
Choline	450 mg	*
DHA	400 mg	*

\* Daily value not established.

deficiency, phenylketonuria, sickle cell disease and other hemoglobinopathies, and tyrosinemia. Supplementation during this very early period can often prevent life-threatening consequences of a few of these genetic disorders, including seizures, coma and sudden infant death syndrome (SIDS). For example:

**Biotinidase** (B7) deficiency can result in immediate life-threatening symptoms; it can also create developmental delay and sensorineural deafness, among other problems. Supplementing the diet with 5-30 mg/day of this safe, non-toxic B-complex vitamin can avert these problems.<sup>7,8,9</sup> Milder forms of this deficiency exist as well and often go undiagnosed, making a reasonable argument for the ongoing multivitamin treatment of all children. Some states fail to screen for this disorder, giving further support to the concept of universal supplementation. (Note: Many infant vitamins contain less than 1 mg of biotin.)

**Cystic Fibrosis** (CF) is diagnosed through the identification of

two specific genetic markers in the heel-stick blood spot. If only one genetic marker is identified, a sweat test is required to confirm the diagnosis at 7-10 days of life. Fat-soluble vitamins, pancreatic enzymes and salt supplementation all contribute to better growth and overall development in this condition.<sup>10,11</sup>

Several years ago, a 16-year-old boy with CF and respiratory complications was seen in our practice. He was not receiving any supplemental enzyme treatment at the time he came to us. Though his initial respiratory therapy was adequate to maintain life up to this point, his respiratory status was failing rapidly. Once 20 to 30 capsules of pancreatic enzymes were added to his treatment, his respiratory status dramatically improved. He thrived and began to gain weight. Though his genetic testing may have shown a limited role for enzyme therapy, he had resolution of his most problematic issues in several weeks after initiation of pancreatic supplementation.

**Medium-chain acyl-CoA dehydrogenase** (MCAD) deficiency is a disorder of fatty acid oxidation implicated in some cases of sudden infant death syndrome and Reye syndrome. Treatment for MCAD deficiency consists of avoidance of fasting and mildly decreased intake of dietary fat, along with L-carnitine supplementation. At times of stress, L-carnitine supplementation is critical to sustain life in patients with MCAD. Intravenous glucose and carnitine are given in the context of infectious crises.<sup>12,13</sup>

The variability in the appearance of genetic syndromes requires a high level of awareness on the part of pediatricians as well as parents. Nutritional supplementation may be of value in less obvious cases as a prophylactic measure.

Serious consequences can arise with some genetic disorders from absence of key nutrients at the time of birth and over the months that follow. Neonatologists and metabolic and genetic specialists should always be involved in the care of the most severely affected individuals in the first few days of life, if possible.

For neonates without symptoms or an immediate presentation of genetic dysfunction, it behooves physicians to familiarize themselves with the benefits of supplementation. All children may benefit from supplementation, whether those benefits arise from simple improvements in function or from intervention in the earliest course of pathological genetic syndromes.

In addition to a mother's nutritional regimen as above, a reasonable supplement for neonatal support should include a full spectrum of vitamins and minerals as well as choline, DHA and probiotics. High levels of DHA can dramatically enhance grey matter development at this time,<sup>14</sup> and probiotics aid in good digestive function and help to prevent yeast infection. Sprinkling a small amount of probiotic powder on the nipples at the time of feeding is an excellent method for administration in breast-fed children.

Though commercially available vitamin supplements lack many of the optimal levels of nutrients, they are easily and inexpensively obtained. They can be fortified further with brewer's yeast and other nutrients to maximize benefit.

## Infants

*Foundation for proper mental and physical development; protection against diseases of childhood; prevention and treatment of common infections*

The need for basic supplementation as previously discussed provides a foundation for improved development and reduction in the most common diseases of childhood. The Council for Responsible Nutrition has stated that:

“...[s]trong and accumulating scientific evidence shows a link between quantifiable health benefits and consistent, long-term use of nutritional supplements. This offers a compelling reason for parents to get children into the practice of incorporating a multivitamin into their daily routine at an early age.”

Infant nutrition is affected by many variables that result in suboptimal intake of nearly every nutrient at times. Breastfed infants can be affected by nutrient lack or imbalance in the mother's diet (notably, DHA, iron, and vitamin D). Iron is the most common nutritional deficiency in children worldwide. Other common deficiencies include:

- Omega-3 fats (specifically DHA)
- Fat-soluble vitamins A, D, E and K
- Choline
- Calcium
- Magnesium

In the industrialized world deficiency disease is exceedingly rare. More commonly, a relative insufficiency allows for the expression of developmental and behavioral problems, infectious disease, dermatologic conditions and digestive disorders. Effective intervention can frequently be as simple as adding a natural substance to the diet to reverse the functional deficit and restore health.

Although deficiency disease is rare in the U.S., illnesses abound in infants that require the attention of a competent nutritionally-oriented physician. Common problems arise from injudicious use of antibiotics, poor food choices and biochemical demands not met by current levels of nutrition and detoxification. For example:

- A “fussy baby” commonly presents to our office after having received a thorough pediatric gastroenterology evaluation. If the mother or child has received antibiotics during or after delivery or has had a severe diaper rash, it is likely that fungal activity is creating much of the problem. Probiotics can safely be used in this age group with impressive effect.<sup>15,16</sup> As previously mentioned, a small amount sprinkled on the nipples before breastfeeding allows for colonization of the gut and respiratory mucosa of the infant, while limiting the impact of yeast at the site of application. Further intervention can include the addition of L-glutamine, colostrum and magnesium (when constipation is a dominant feature). Diaper rashes often respond to the same approach.

Topical medications can be applied to reduce irritation while the causative factors are removed from the equation.

- Eczema and other dermatologic conditions often result from excessive sugars in the diet as well as fungal overgrowth in the intestinal tract. Probiotic therapies and others addressed above may produce a substantial benefit. Zinc is commonly deficient in eczematous children, and can be successfully introduced through oral or transdermal preparations. More aggressive treatments to attack the “root causes” of skin disorders may require comprehensive stool analysis to identify pathogenic bacteria and fungi. When cultures and sensitivities indicate the presence of specific pathogens, appropriate botanical agents or prescription antibiotics and antifungals can be used to eradicate the organisms. During this time, it is critical to administer probiotic therapies to restore balance. Dietary restrictions are important for mother and baby during this time. Foods to limit or entirely avoid include:

- All sugars and artificial sweeteners
- All fruits except green apples, berries, avocado, grapefruit, lemons and limes
- Breaded or deep-fried meats
- Potatoes, yams, beans and peas
- All highly processed grains (white bread), corn and wheat
- Peanuts and peanut products and pistachios

After a period of 6-8 weeks, dietary restrictions can be relaxed, though probiotics should be considered an essential daily supplement. Recurrences or flares require return to more rigid limitations or addition of more potent antifungals and antibacterials.

In practice, I find it difficult to get babies and small children to take botanicals, with a few exceptions. Olive leaf extract can be hidden fairly well in applesauce and other foods. If the nursing mother can tolerate oregano oil capsules, grapefruit seed extract, caprylic acid and other non-prescription agents, the baby often receives a benefit.

## Children

*Treatment of otitis media and other upper respiratory infections without antibiotics; addressing ADHD, autism spectrum disorders, and pervasive developmental disorders*

Children between the ages of 6 months and 7 years of age have a high incidence of otitis media (external ear infection) and other upper respiratory infections. At this stage of life, children have varying degrees of willingness and ability to take capsules and tablets. For older children, training in swallowing capsules by swishing a mouthful of water or juice around the mouth before swallowing may be helpful. A large caliber straw can also be a helpful tool in getting the nutrients where they belong. In any case, finding alternatives that limit the exposure of children to antibiotics and other medications is a worthy goal. This is the case from very early in life, as research studies

continue to indicate a strong correlation between the number of courses of antibiotic and risk of developing asthma.

In recent months, the “observation option” has taken hold as regards ear infections in children, as studies have conclusively shown that antibiotics may hurt more than help – they do not reduce the duration of infection significantly, and they create fungal problems and resistant “super-bacteria.” Even orthodox physicians are taking a “wait and see” approach to treatment. With nutritional support there is an additional tool to combat infection and shorten the course of illness without the use of antibiotics. Immune stimulation for uncomplicated infections that may shorten illness include:

- Beta 1-3, 1-6 glucan
- Shiitake and maitake mushroom extracts
- Thymic protein
- Colostrum
- Echinacea
- Astragalus
- Aloe vera juice

Specific agents that may inhibit viral replication are important in the treatment of upper respiratory infections. Zinc plays a significant role in immune defense and detoxification as well as many other vitamins and minerals that should be a part of the daily supplementation protocol for children. Botanical agents that exhibit activity against a broad spectrum of pathogens involved in upper respiratory infections include:

- Olive leaf extract (my personal favorite)
- Grapefruit seed extract
- Caprylic acid
- Black Elderberry extract

Many other herbal and natural compounds can assist in the healing process. Reducing milk consumption during acute illness diminishes mucous production and relieves congestion. It is especially important to avoid sugars during infections, as the immune system is taxed by the actions of insulin in response to simple sugar intake. Sleep and rest are often neglected components of a total program for healing, and should be a large part of recovery from any infectious process. Always consult with your healthcare practitioner before beginning any nutritional regimen.

## Children Are Our Future

I have heard it said that “children are our future.” Indeed, we have no future without them. In an increasingly toxic and demanding world, it only makes sense to do all that we can to ensure the healthy development of our children. Nutritional support is an easy way to provide the boost that may well be life-saving.

We are on the brink of understanding, more than ever before, the ways in which the human genome affects our health

and development. In the past 20 years we have discovered ways to change the course of the lives of many “little ones” through the use of nutritional science. Nutritional interventions offer safe and effective ways to address toxic exposures, poor diet, and subtle genetic characteristics that otherwise may create special needs in an individual that lead to autism, eczema, seizures, and even death.

I have built a practice and reputation on looking beyond the traditional medical model and have found the treasure of nutritional medicine. My patients are healthier, happier and more grateful than those of most of my colleagues. I encourage you to discover all that you can about alternatives to treating symptoms. You can get to the root of the biochemistry that affects your patients, and you can use nutrients to make the adjustments that will bring them back towards health.

There is no greater joy than watching a child recover from illness and return to health. It's yours for the taking. Learn about nutrition!

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*Continued on page 12*





***Nutritional Support For Neonates,  
Infants, and Children: An Integrative  
Physician's Perspective***

*- Continued from page 11*

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