

# Life Is Your Best Medicine



*Tieraona Low Dog, MD*

Author of *National Geographic's*  
*"Fortify Your Life"*  
*"Healthy At Home"* and  
*"Life Is Your Best Medicine"*

[www.DrLowDog.com](http://www.DrLowDog.com)

*Tieraona Low Dog, M.D.*

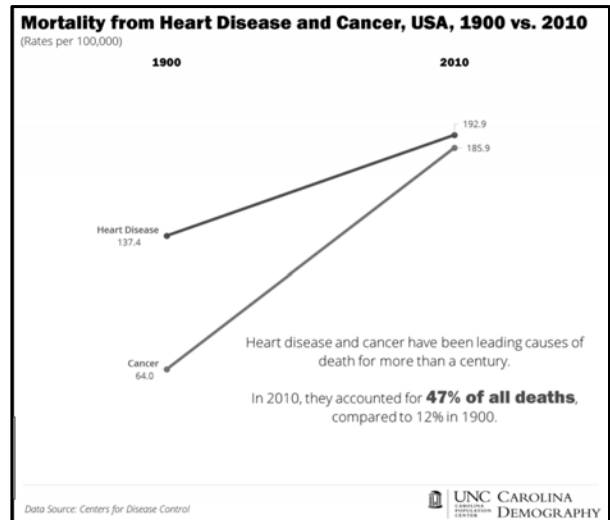
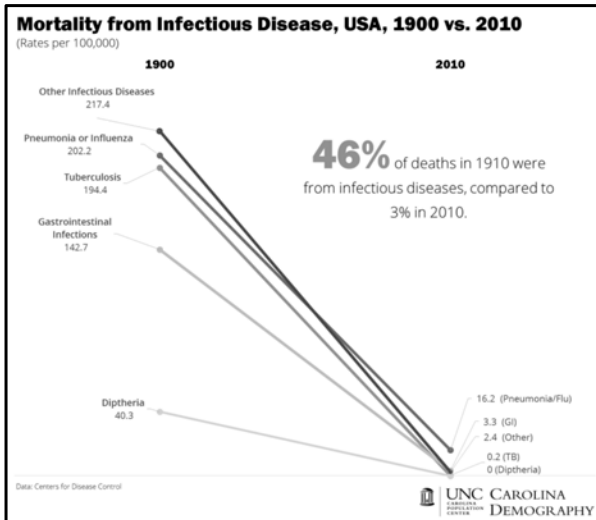
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## The Times They Are A-Changing



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- If the American public embraced a healthier lifestyle:
  - ***no smoking***
  - ***no or moderate alcohol consumption***
  - ***limited or no exposure to toxic chemicals***
  - ***healthy nutrition***
  - ***balance of exercise and rest***
  - ***stress management***
  - ***and healthy social networks***

**93% of diabetes, 81% of heart attacks, 50% of strokes, and 36% of all cancers could be prevented.**

Ford, et al *Arch Intern Med.* 2009; 169(15):1355-62.

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## Epigenetics



- The mapping of **human genome** was one of the greatest scientific undertakings of past century, **detailing with incredible accuracy the blueprint of our species.**
- It also paved the way for field of **epigenetics**, which has shown that when it comes to our genes, ***nurture* is inextricably linked with *nature*.**
- That it is the ***way we live our lives - from the moment of conception to our last breath - that influences the expression of our genes.***

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## Self Reflection

- How would you feel you are doing when it comes to:
  - Managing your stress
  - Nourishing your relationships
  - Creating space for relaxation
  - Getting regular physical activity
  - Eating healthy food regularly
  - Positive self-talk
  - Feeling good about your body



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"THE FOOD YOU EAT  
CAN BE EITHER  
THE SAFEST  
&  
MOST POWERFUL  
FORM OF MEDICINE  
*or*  
THE SLOWEST  
FORM OF POISON."

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## Dietary Inflammatory Index (DII)

- Inflammation often driven by dietary patterns. An anti-inflammatory diet may reduce **sub-chronic inflammation** and improve **cardiovascular, metabolic, and neurologic parameters**.
- The **Dietary Inflammatory Index** is based on measuring inflammation in the body in response to specific foods (many clinical trials).
- You can take the test by **downloading the app for Dietary Inflammatory Index** (Itunes: DII Screener)

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## Inflammatory Food Ratings

200 or higher	Strongly anti-inflammatory
101 to 200	Moderately anti-inflammatory
0 to 100	Mildly anti-inflammatory
-1 to -100	Mildly inflammatory
-101 to 200	Moderately inflammatory
-201 or lower	Strongly inflammatory

FOOD	SERVING SIZE	SERVING SIZE (GRAMS)	IF RATING
AGAVE NECTAR	1 TBSP	21	-74
ALMOND BUTTER	¼ CUP	64	100
CHEESE, CHEDDAR	1 OUNCE	28.35	-20
CHICKEN BREAST, RSTD	3 OUNCES	85	-19
MILK, WHOLE	1 CUP	246	-46
OLIVE OIL	1 TBSP	14	74
ONIONS, COOKED	½ CUP	105	240
RICE, WHITE	1 CUP	158	-153
SPINACH	1 CUP	30	75
SALMON, SOHO BAKED	3 OUNCES	85	450
TURMERIC	½ TSP	1.5	338

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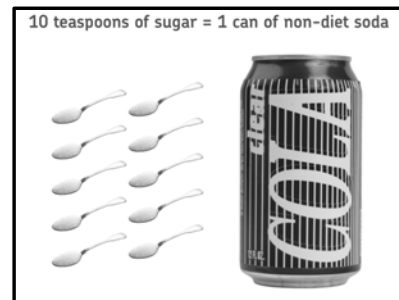
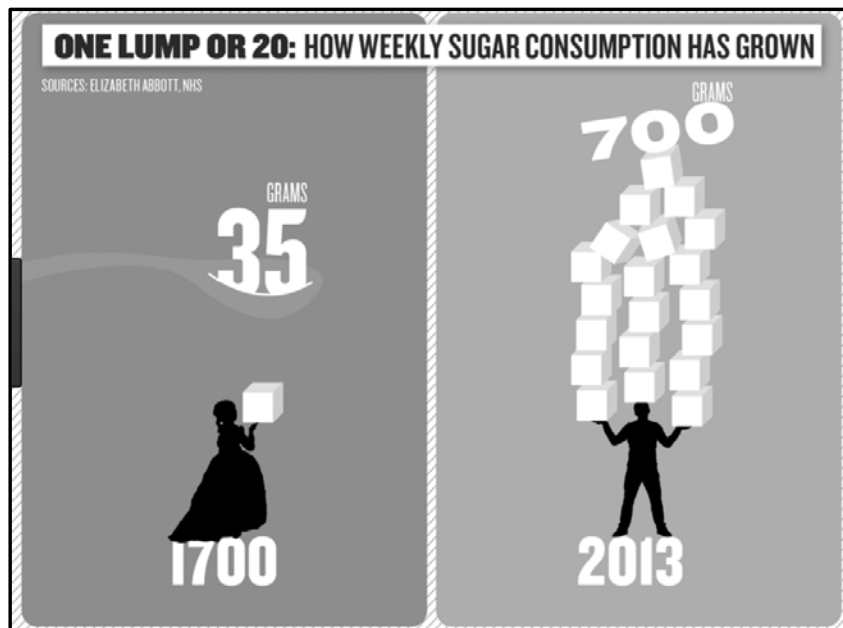
## Mediterranean Dietary Pattern and Memory

- **Mediterranean and DASH diets** have been associated with **lower dementia** risk. Researchers evaluated the **inflammatory potential** of these diets in relation to mild cognitive impairment/dementia risk **using the DII during an average follow up of 9.7 years during Women's Health Initiative Memory Study.**
- Higher inflammatory scores were significantly associated with ***greater cognitive decline and earlier onset of cognitive impairment.***

Hayden KM, et al. The association between an inflammatory diet and global cognitive function and incident dementia in older women: The Women's Health Initiative Memory Study. *Alzheimers Dement* 2017 May 19. pii: S1552-5260(17)30185-1.

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This equals 32 pounds of sugar per year simply from soda

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November 2016

## Sugar Industry and Coronary Heart Disease Research

### A Historical Analysis of Internal Industry Documents

Cristin E. Kearns, DDS, MBA<sup>1,2</sup>; Laura A. Schmidt, PhD, MSW, MPH<sup>1,3,4</sup>; Stanton A. Glantz, PhD<sup>1,5,6,7,8</sup>

&gt; Author Affiliations

JAMA Intern Med. 2016;176(11):1680-1685. doi:10.1001/jamainternmed.2016.5394

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#### Abstract

Early warning signals of the coronary heart disease (CHD) risk of sugar (sucrose) emerged in the 1950s. We examined Sugar Research Foundation (SRF) internal documents, historical reports, and statements relevant to early debates about the dietary causes of CHD and assembled findings chronologically into a narrative case study. The SRF sponsored its first CHD research project in 1965, a literature review published in the *New England Journal of Medicine*, which singled out fat and cholesterol as the dietary causes of CHD and downplayed evidence that sucrose consumption was also a risk factor. The SRF set the review's objective, contributed articles for inclusion, and received drafts. The SRF's funding and role was not disclosed. Together with other recent analyses of sugar industry documents, our findings suggest the industry sponsored a research program in the 1960s and 1970s that successfully cast doubt about the hazards of sucrose while promoting fat as the dietary culprit in CHD. Policy-

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## Sugars



- Americans consume primarily: **table sugar and high-fructose corn syrup.**
- Table sugar (sucrose): bond between **one glucose and one fructose** molecule
- High fructose corn syrup: **55% fructose, 42% glucose** and 3% other sugars.
- Every cell in our body readily converts **glucose into energy.**
- **Liver cells** are one of few types of cells that **can convert fructose to energy.**
- Soda floods liver with large amounts of **free floating fructose** versus the **fiber in an apple** slows down digestion, making the **fructose slowly enter the liver.**
- Large amounts of **“free” fructose taxes the liver** and increases fatty liver disease.
- Fructose raises levels of the hormone **ghrelin, which stimulates hunger, and suppresses leptin, the hormone that makes you feel full.**

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## Glycemic Index/Load

Low GI Diet Tracker  
App: \$3.99

- **Glycemic load** measurement of impact of carbohydrates on blood sugar/insulin.
- International **consensus** conference concluded that given the **consistency of the scientific evidence**, diets **low in glycemic index/load** should be promoted in the **prevention and management of diabetes and coronary heart disease**, and are **particularly important in individuals with insulin resistance**.

Augustin LS, et al. Glycemic index, glycemic load and glycemic response: An International Scientific Consensus Summit from the International Carbohydrate Quality Consortium (ICQC). *Nutr Metab Cardiovasc Dis* 2015 Sep;25(9):795-815.



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## Glycemic Load and Mood

- 82 healthy weight and healthy overweight or obese, adults enrolled in randomized, crossover controlled feeding study.
- Compared to a low GL diet, consumption of **high GL diet** resulted in:
  - 38% higher score for **depressive symptoms** ( $P = 0.002$ )
  - 55% higher score for **total mood disorder** ( $P = 0.05$ )
  - 26% higher score for **fatigue/inertia** ( $P = 0.04$ ), compared to low GL diet.



Breymeyer KL, et al. *Appetite* 2016; Dec 1;107:253-259.

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# Glycemic Load

## Individual Food Portion

Low	0-10
Moderate	11-19
High	20+

## Whole Day

Low	< 80
Moderate	80-120
High	>120

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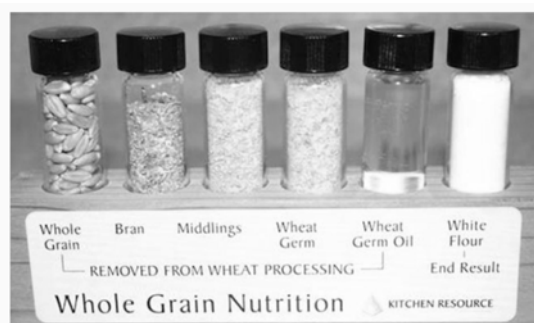
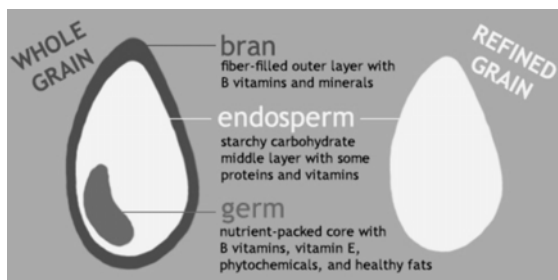
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Food	Serving Size	Glycemic Load
Grapefruit	½ large	3
Apple	1 medium	6
Banana	1 large	14
Raisins	1 small box	20
Watermelon	1 cup	8
Carrots	1 large	5
Orange	1 medium	6
Sweet potato	1 cup	17
Baked potato	1 medium	28
French fries	1 medium serving	26
Snickers	1 bar	35
Reese's cup	1 miniature	2
White table wine	5 ounces	1
Red table wine	5 ounces	1
Grape juice	6 ounces	12

Food	Serving Size	Glycemic Load
Asparagus	½ cup	2
Broccoli	1 cup	4
Green beans	1 cup	3
Tomato	1 medium	2
Subway sandwich Turkey breast	6 inch	17
Butter pecan ice cream	5.5 ounces (small)	22
Vanilla ice cream cone	4.5 ounces (small)	19
Potato chips, fat free	1 bag (8 ounces)	49
Tortilla chips, white corn	3.5 ounces	38
Spaghetti	1 cup	38
Brown rice	1 cup	23
White rice	1 cup	33
Macaroni and cheese	1 cup prepared	31

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[www.celiac.org](http://www.celiac.org)

Lots of info. Recipes provided for 7 day meal plan.

Get an app!

**The Gluten-Free Scanner** (free, more than 500,000 products)



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## Non Celiac Gluten Sensitivity

- Multicenter study of **1,114 children (negative for celiac and wheat allergy) with chronic functional GI symptoms associated with gluten ingestion using a double-blind placebo controlled gluten challenge and crossover.**
- Patients were randomized to gluten (10 g/daily) and placebo (rice starch) for 2 weeks each, separated by a washout week. Out of 1,114 children, **96.7% did not exhibit any correlation with gluten ingestion.**
- **Eleven of 36 children** who did react tested positive for gluten challenge.

Francavilla R, et al. Randomized Double-Blind Placebo-Controlled Crossover Trial for the Diagnosis of Non-Celiac Gluten Sensitivity in Children. *Am J Gastroenterol* 2018 Jan 30. doi: 10.1038/ajg.2017.483

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**Dr. Low Dog's: Nutrition Prescription**

**Supplements:**  
Multi-Vitamin: Basic, Gender & Age Specific  
Vitamin D3: 1,000-2,000 IU/day  
Omega 3s: EPA 400g-800mg  
DHA 200g-500mg

**Lifestyle:**  
Movement  
Meditation  
Community

**Sweets**  
(sparingly)

**Dairy**  
Organic  
(0-2 servings)

**Whole Grains**  
(2 servings)

**Fruit** (2-3 servings)

**Protein** (3-4 servings)

**Vegetables** (4-6 servings)

**Beverages:**  
Water: 4-8 servings (8 oz/serving)  
Tea & Coffee: 0-3 servings (<300 mg Caffeine)  
Alcohol: 0-2 servings

**Healthy Fats & Oils:**  
Olive Oil (Extra Virgin)  
Grape Seed (Cold Pressed)  
Butter (Organic)

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“When we try to pick out anything by itself, we find it hitched to everything else in the universe.”

*John Muir*



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## Endocrine Society Second Scientific Statement

- EDCs contribute to **impaired reproduction, neurodevelopment, thyroid function, metabolism,** and increased propensity for **hormone-sensitive cancers.**
- Unfortunately, it is **difficult to directly relate** chronic disease burden to exposures in humans.
- The increased prevalence of such diseases underscores the need to **invoke precaution** in introducing new (and usually untested) chemicals into the environment.

Gore AC, et al. *Endocr Rev* 2015; 36(6):E1-E150.



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## Reducing Environmental Exposures

1. Eat **fresh** rather than processed food, when possible
2. **Organic** fruits/vegetables, dairy; **grass fed/finished** meats, **free range eggs**, when possible
3. Reduce consumption of foods/beverages in **cans/plastic containers**
4. Minimize use of personal care products containing **fragrances** ([skindeep.org](http://skindeep.org))
5. **Avoid** garden/household/pet pesticides or fungicides. Use **integrated pest management for home/yard.**
6. Use **water** filtration system ([ewgs-water-filter-buying-guide](http://ewgs-water-filter-buying-guide)), consider **HEPA** filters in home



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# The Biological Clock



- The most important regulator of the sleep wake cycle is our biological clock.
- Responsible for the 24 hour fluctuations in hormone secretion, body temperature and other bodily functions.
  - Deepest sleep is generally around 2 AM
  - Lowest body temp around 4:30 AM
  - High alertness 10 AM
  - Highest blood pressure ~6:30 PM
  - Highest body temperature ~ 7 PM
  - Melatonin secretion starts ~8-9 PM

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# Sleep Stages

- **Stage 1:** Lasts a few minutes, the first stage of sleep is light and easy to wake from. Muscle twitching common.
- **Stage 2:** Light sleep, ~20 minutes brain waves begin to slow, blood pressure and body temperature decrease.
- **Stages 3 and 4:** Move into deeper sleep that's harder to wake from. This is when body repairs itself and boosts immune function. Also known as "delta" sleep.
- **Rapid eye movement (REM):** Final stage in sleep cycle, brain becomes more active and dreams occur. Brain is processing information and storing long-term memories. Heart rate and breathing increases. Gets longer and longer through the night - can last up to one hour.
- REM suppressors: alcohol, nicotine, blood pressure and anti-depressant meds

*This cycle repeats ~90 minutes. As sleep progresses, REM cycles increase in length.*

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## Consolidated vs Segmented Sleep

- Roger Ekirch of Virginia Tech published a seminal paper, revealing strong historical evidence that humans used to **sleep in two distinct chunks**.
- *At Day's Close: Night in Times Past*, his book, has more than 500 references to a segmented sleeping pattern - in diaries, court records, medical books and literature.
- It was well described that a **first sleep** began about **two hours after dusk**, followed by **waking period of one or two hours** and then a **second sleep**.
- For many reasons, by the 1920s, the idea of a first and second sleep disappeared from our social lives.



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## Dietary Considerations

- Watch the caffeine, you might be sensitive to its effects. Drink plenty of water and/or herbal teas in the afternoon that have a calming, relaxing effect.
- While one serving of alcohol isn't generally a problem – cut back or eliminate if you are having trouble sleeping. 3-4 drinks can disrupt melatonin secretion and REM sleep. Alcohol may also increase excitatory neurotransmitters.
- Increase magnesium and tryptophan foods (e.g., poultry, eggs, milk, dark green leafy vegetables, pumpkin seeds).
- Consider magnesium supplements (200-300 mg per day at night)



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## Guided Imagery: *Imagine Yourself*.....

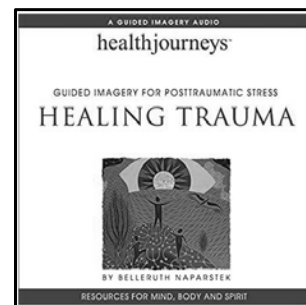
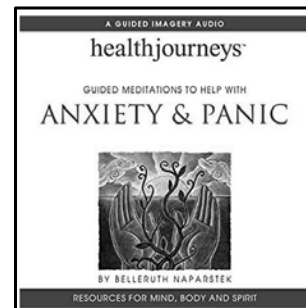
- An immersive, deeply relaxing intervention that uses calming words, soothing music and positive images to structure a healing experience.
- Like meditation, it focuses attention and calms the mind, working on those parts of the brain where the emotional self dwells.
- Imagery has been shown in clinical trials to reduce stress, anxiety, and depression; help with sleep; lower blood pressure, and help with posttraumatic stress.
- I have found guided imagery a fabulous tool for myself, kids and patients. Very helpful for those with ADHD, anxiety, depression, pain, insomnia.

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## Belleruth Naparstek

- Love, love, love her. Something for everyone.
- She has Guided Imagery Meditations for:
  - Anxiety and Panic
  - Anger and Forgiveness
  - Depression
  - Healing Trauma
  - Ease Grief
  - Relieving Stress
  - Undergoing Surgery
  - Chemotherapy and Radiation



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# What To Do



- Research shows that **chronic sleep problems can lead to weight gain, obesity, diabetes (33% increased risk), heart disease, mood disorders.**
- Use all sleep hygiene recommendations (same bedtime, cool/dark room, etc)
- **Control blue light (consider blue light blocking glasses), get early morning light,** use cognitive behavioral therapy, **guided imagery,** stimulus control.
- **Controlled-release melatonin** and doxepin are recommended as first-line agents in older adults. (**2 mg** sustained release for 4-6 weeks and re-evaluate).

Shan Z, et al. *Diabetes Care* 2015;38(3):529–37.

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# To fall, to let go, to open.....

**To fall asleep is an act of faith,** a deep abiding trust that whatever is going on in life, you can let it go, put it on hold for some hours so that you can **sleep** deeply and **awaken with the energy** and resilience to face whatever lies ahead.

When the body is **overstimulated**, the brain is flooded with **neurochemicals that keep us awake**, making it difficult to wind down at end of the day. This leads to **poor sleep, bad dreams, and being tired during day.**

**Letting go can be hard** when you think you are responsible for everything. If you find it hard to delegate to others or things won't get done right. **When one's "faith" is in themselves.**



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## Sleep Evaluation

- There are **numerous medications** that can impair sleep (e.g., beta blockers antidepressants, steroids, ADHD meds, possibly statins, etc.) Do some online research and/or **talk to your pharmacist**. If you are taking medication that disrupts sleep, talk to your health care provider.
- **Restless leg syndrome** impacts many people. Talk to your provider, it could be due to low iron, vitamin D or meds you are taking – though the cause is really not known.
- **Sleep apnea** is a condition where breathing is interrupted during the night. A sleep study can be ordered and treatments are available (e.g., CPAP, dental appliances which reposition lower jaw and tongue)

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## State of Our Nutrition

- 90 million Americans are vitamin D deficient using Endocrine Society Guidelines.
- 30 million are deficient in vitamin B6
- 18 million people have B12 deficiency
- ~16 million have low serum vitamin C
- 13% of Latinas and 16% of African American black women (ages 12-49) are iron deficient
- Women 25-39 borderline iodine insufficiency
- 50% Americans don't meet RDI for magnesium



*CDC: 2<sup>nd</sup> National Report on the Biochemical Indicators of Diet and Nutrition in the U.S. population*

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## Position on Nutrient Supplementation by the Academy of Nutrition and Dietetics

- Among the groups **most vulnerable** to inadequacy of one or more nutrients are:
  - **Older** adults
  - **Pregnant** women
  - People who are **food insecure**
  - **Alcohol** dependent individuals
  - **Strict vegetarians and vegans**
  - Those with **increased needs** due to a **health condition or the chronic use of a medication** that decrease nutrient absorption/increase metabolism or excretion.

Marra and Boyar. *J Am Diet Assoc* 2009

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## Position on Nutrient Supplementation by the Academy of Nutrition and Dietetics

- Nutrient supplementation can be used to help meet a nutrient requirement for those:
  - Restricting energy intake for **weight loss/control**
  - **Not consuming an adequate amount of food** to meet energy requirements as a result of poor appetite or illness
  - **Eliminating one or more food groups** from their diet on a regular basis
  - **Consuming a diet low in nutrient rich foods despite adequate or excessive energy intakes.**

Marra and Boyar. *J Am Diet Assoc* 2009

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## Iron

- Iron deficiency most common nutrient deficiency in world, affecting ~2 billion people.
- Necessary for oxygen transport, DNA synthesis, growth and development and much more.
- Low iron levels *are most common cause of anemia* in adolescent girls and is very detrimental to *mood and cognition*, as well as *physical* well-being.
- Iron deficiency anemia accounts for 20% of all global maternal deaths. If mother is anemic, increases risk baby born prematurely with lower birth weight and poor neurocognitive development.



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Journal of the American College of Nutrition



Product Used was Mega Food Blood Builder

ISSN: 0731-5724 (Print) 1541-1087 (Online) Journal homepage: <http://www.tandfonline.com/loi/uacn20>

### A Food-Derived Dietary Supplement Containing a Low Dose of Iron Improved Markers of Iron Status Among Nonanemic Iron-Deficient Women

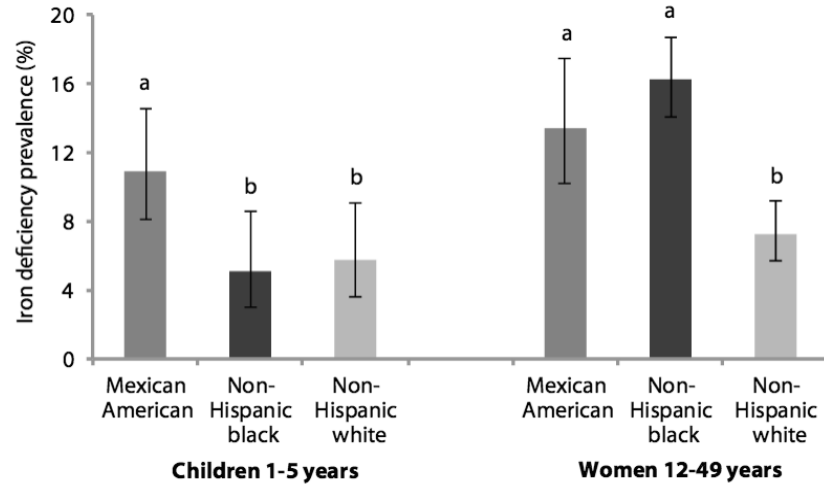
Christopher R. D'Adamo, James S. Novick, Termeh M. Feinberg, Valerie J. Dawson & Larry E. Miller

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To link to this article: <https://doi.org/10.1080/07315724.2018.1427158>

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**Figure H.3.a.** Age-adjusted prevalence estimates of low body iron stores (<0 mg/kg) in U.S. children and women by race/ethnicity, National Health and Nutrition Examination Survey, 2003-2006.

Error bars represent 95% of confidence intervals. Bars are not sharing a common letter differ within children and women ( $p < 0.05$ ). Age adjustment was done using direct standardization.

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## To Get 18mg of Iron in Food

- 4 cups of raisins
- 3-5 cups instant oatmeal
- 3 cups Special K cereal\*\*
- 3 cups cooked lentils
- 2.2 cups canned white beans
- 10 ounce beef liver
- 45 ounce chicken breasts
- 15 cups broccoli OR
- 3 cups cooked spinach



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## Iodine in Pregnancy

- Many reproductive aged women in US have marginal iodine status; **salt in processed foods is not iodized.**
- Deficiency associated with **pregnancy loss and prematurity, and neurocognitive defects in baby.**
- Iodine deficiency now accepted as the most common cause of **preventable brain damage** in the world.
- Mild to moderate iodine deficiency associated with higher incidence of **ADHD** and **lower IQ** in the baby.
- American Thyroid Association recommends pregnant/lactating women supplement: **150 mcg/d potassium iodide.**



Council on Environmental Health, et al. *Pediatrics* 2014; 133(6):1163-6  
 Perrine CG, et al. NHANES data: Some subgroups of reproductive age women in the United States may be at risk for iodine deficiency. *J Nutr* 2010; 140:1489-1494, 2010. PMID: 20554903

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## Iodine Intake Pregnancy and Breastfeeding

- Data from National Health and Nutrition Examination Survey 2011-2014 found that the **use of iodine containing dietary supplements among pregnant and lactating women remains low** in contrast with current recommendations.
  - Among **pregnant** women, 72.2% used any dietary supplement; however, **only 17.8% used a dietary supplement with iodine.**
  - Among **lactating** women, 75.0% used a dietary supplement; however, **only 19.0% used a dietary supplement with iodine.**

Gupta PM, et al. Use of Iodine-Containing Dietary Supplements Remains Low among Women of Reproductive Age in the United States: NHANES 2011-2014. *Nutrients* 2018 Mar 29;10(4). pii: E422

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Choline  
Matters in  
Pregnancy

THE **FASEB** JOURNAL

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Research

## Maternal choline supplementation during the third trimester of pregnancy improves infant information processing speed: a randomized, double-blind, controlled feeding study

Marie A. Caudill, Barbara J. Strupp, Laura Muscalu, Julie E. H. Nevins, and Richard L. Canfield ✉

Published Online: 29 Mar 2018 | <https://doi.org/10.1096/fj.201700692RR>

*Victoria Low Dog, M.D.*

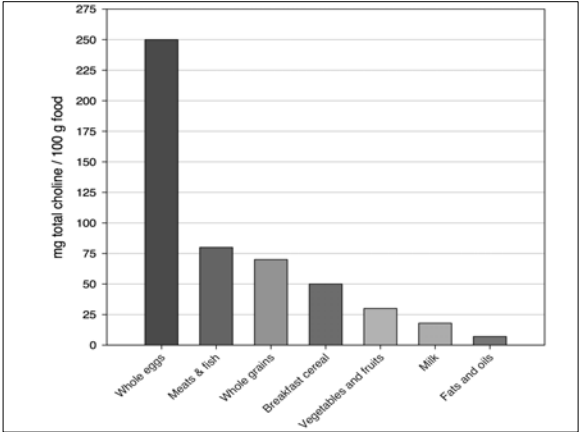
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## Choline

- Choline critical during fetal development, influencing mood regulation, cognitive development, stress regulation and lifelong memory function.
- Suboptimal intakes present across many gender and life-stage subpopulations, as well as pregnant women in the U.S. Only 8-10% of adults or pregnant women meet AI. Those eating eggs had highest levels.
- Look for prenatal with 200-300 mg.

Blusztajn JK, et al. Neuroprotective actions of dietary choline *Nutrients* 2017; Jul 28;9(8). pii: E815.

Wallace TC, et al. *Nutrients* 2017 Aug 5;9(8). pii: E839.



Food Category	mg total choline / 100 g food
Whole eggs	~250
Meats & fish	~80
Whole grains	~70
Breakfast cereal	~50
Vegetables and fruits	~30
Milk	~20
Fats and oils	~10

Choline in Foods: <http://nalcd.nal.usda.gov/download/47335/PDF>

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- Vitamin D deficiency can lead to **musculoskeletal pain**, usually in the pelvis, shoulders, low back, and proximal muscles.
- Low vitamin D increases risk of **falls** and **gait instability**. Exercise, calcium and vitamin D supplementation all shown to **decrease falling in elders**.
- Review by National Osteoporosis Foundation concluded **calcium plus vitamin D supplementation reduced risk total fractures by 15% and hip fracture by 30%.**

## Vitamin D



Tricco AC, et al. *JAMA* 2017; Nov 7;318(17):1687-1699.  
Weaver CM. *Osteoporosis Int* 2016 Jan;27(1):367-76

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## Vitamin D and Respiratory Infection



Martineau AR, et al. Vitamin D supplementation to prevent acute respiratory tract infections: systematic review and meta-analysis of individual participant data. *BMJ* 2017; 356: i6583.

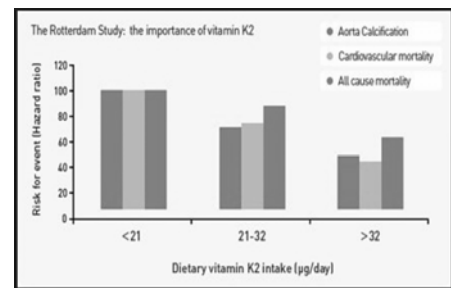
- Acute respiratory infection kills ~2.65 million people/year.
- A review of 25 randomized controlled trials found that vitamin D supplementation **reduced risk of acute respiratory infection** among all participants and **those who were vitamin D deficient experienced the most benefit (NNT=4).**
- Get your level checked in autumn.
- **Most of us should take 1000-2000 IU per day.**

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## Vitamin K

- **Calcium, magnesium, vitamins D and K** contribute independently and collectively to bone health.
- Beneficial role of vitamin K, particularly **vitamin K2 as MK-7, in bone and cardiovascular health is reasonably well supported scientifically**, with several preclinical, epidemiological, and clinical studies published over the last decade.



Karpinski M, et al. Roles of Vitamins D and K, Nutrition, and Lifestyle in Low-Energy Bone Fractures in Children and Young Adults. *J Am Coll Nutr* 2017 Jul;36(5):399-412.

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## Endocrine Society Guidelines

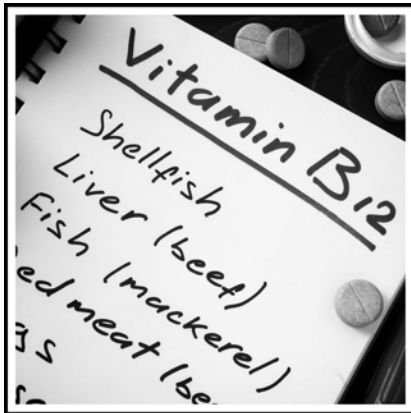
- Serum 25(OH)D level is used to determine vitamin D status
  - **Sufficiency** is 30 ng/mL (75 nmol/L) and above
  - **Insufficiency** defined as 21-29 ng/mL
  - **Deficiency** defined as <20 ng/mL
- **66.8 million Americans** 1 year and older had levels between **12-20 ng/ml**
- **23 million Americans** 1 year and older had levels **less than 12 ng/ml**
- **WHY isn't there more routine screening in high risk individuals?**

CDC 2<sup>nd</sup> National Report on Biochemical Indicators of Diet and Nutrition in the U.S. Population  
Holick MF, et al. *J Clin Endocrinol Metab* 2011; 96(7):1911-30

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Bird JK, et al. Risk of Deficiency in Multiple Concurrent Micronutrients in Children and Adults in the United States. *Nutrients* 2017; doi: 10.3390/nu9070655

Conzade R, et al. Prevalence and Predictors of Subclinical Micronutrient Deficiency in German Older Adults: Results from the Population-Based KOR-Age Study. *Nutrients* 2017; doi: 10.3390/nu9121276

## Vitamin B12 Deficiency

- **Risk for vitamin B12 deficiency increases with age.** Using NHANES data, 6.9% ages 51–70 years and 15% >70 years are B12 deficient.
- In Germany, **27.3% of people aged 65-93** have **deficient** serum B12 levels.
- Risks include: **inadequate intake, vegan, malabsorption, medications (PPI, metformin), obesity, and aging.**
- **Decline in gastric acid secretion** occurs with advancing age can make it difficult to absorb food-bound B12, **supplementation is recommended.**

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## Vitamin B12

- A 2015 meta-analysis found an **80% increased risk of B12 deficiency after ten months of regular PPI use.**
- **Metformin**, a medication commonly prescribed for the treatment of type-2 diabetes, **reduces serum B12 levels and worsens diabetic neuropathy.**
- B12 deficiency can lead to **difficulty walking, tingling/numbness** in hands and feet, **fatigue**, shortness of breath, **loss of appetite, joint pain, depression, loss of taste and smell, cognitive impairment, and dementia.**
- YET, vitamin B12 levels are **not commonly monitored with these drugs.**

Jung SB, et al. Association between vitamin B12 deficiency and long-term use of acid-lowering agents: a systematic review and meta-analysis. *Intern Med J* 2015; 45(4):409-16.

Out M, et al. Long-term treatment with metformin in type 2 diabetes and methylmalonic acid: Post hoc analysis of a randomized controlled 4.3year trial. *J Diabetes Complications* 2018; 32(2):171-178.

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## Magnesium

- Low magnesium intakes and serum levels associated with **type 2 diabetes, metabolic syndrome, chronic inflammation, high blood pressure, atherosclerotic vascular disease, sudden cardiac death, osteoporosis, migraine headache, asthma, and colon cancer.**
- Canadian Health Measures Survey cycle 3 (2012-2013), study of serum magnesium concentrations (ages 3-79) **9.5–16.6% of adults and 15.8–21.8% of adolescents aged 12–19 years had a serum Mg concentration below the lower cut-off of the reference interval.**
- Mag level < 0.75 mmol/L relatively severe Mg deficiency, results raise strong suspicions of **significant Mg deficiency in the Canadian population.**
- **Diabetes** strong predictor of lower magnesium levels.



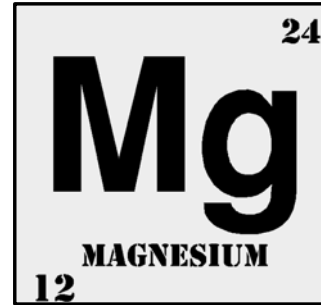
Rosano A, Weaver CM, Rude RK (2012) Suboptimal magnesium status in the United States: are the health consequences underestimated? *Nutr Rev*, 70(3): 153–64.  
Bertinato J, et al. *Nutrients* 2017 Mar; 9(3): 296

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## Magnesium and Diabetes

- **Insulin resistance** repeatedly shown to **decrease magnesium** levels and **diabetics** with low magnesium show a **more rapid disease progression** and an increased risk for **diabetes-related complications**.
- A vicious forward feeding cycle is created. **Magnesium supplementation** has been shown to **improve glucose metabolism and insulin sensitivity** in those with type-2 diabetes.



Gommers LM, Hoenderop JG, Bindels RJ, de Baaij JH (2016) Hypomagnesemia in Type 2 Diabetes: A Vicious Circle? *Diabetes*, 65(1):3-1

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## Magnesium and Heart Disease



- 2013 **meta-analysis** of 16 studies with more than **313,000 participants** found:
  - Higher blood levels associated with a **30% lower risk of cardiovascular disease**.
  - Dietary magnesium (per 200-mg/d increment) associated with a **22% lower risk of fatal ischemic heart disease**.
- Magnesium important in maintaining blood pressure and **supplementation (365 to 450 mg/d)** shown to **significantly lower blood pressure** in those with **insulin resistance, prediabetes, and other chronic diseases**.

Del Gobbo LC, et al. Circulating and dietary magnesium and risk of cardiovascular disease: a systematic review and meta-analysis of prospective studies. *Am J Clin Nutr* 2013; 98(1):160-73.

Dibaba DT, et al. The effect of magnesium supplementation on blood pressure in individuals with insulin resistance, prediabetes, or noncommunicable chronic diseases: a meta-analysis of randomized controlled trials. *Am J Clin Nutr* 2017; 106(3):921-929.

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## Magnesium Deficiency

- People with magnesium deficiency can present with **insulin resistance, menstrual cramps, leg cramps, migraines, fatigue, anxiety and mild elevations in blood pressure.**
- In more severe cases of deficiency, **seizures, tingling and numbness in the arms and legs, bizarre muscle movements (especially of the eyes and face), personality changes, and coronary spasms can occur.**
- Many medications can deplete magnesium (e.g., **diuretics, PPIs, OCPs, gout medication, B2-agonists, steroids, etc.**).

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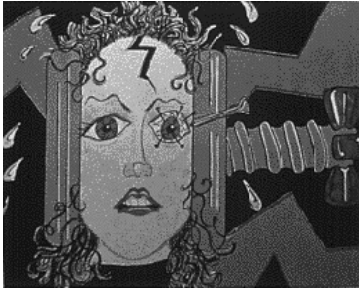
Estimated number of people with diabetes worldwide  
and per region in 2015 and 2040 (20-79 years)



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## Magnesium for Migraines



- Migraine disproportionately affects women. Impacts 1 in 4 households. Studies show migraineurs have low brain magnesium during migraine attacks.
- Canadian Headache Society gave magnesium a strong recommendation for prophylaxis of migraine (also for riboflavin). American Academy of Neurology gave level B – probably effective.
- Dose generally 300-400 mg/d, though some need up to 600 mg per day.
- Diarrhea most common side effect (glycinate and citrate forms less GI complaints than oxide). Caution with supplementation in those with poor kidney function.

Rajapakse T, et al. Nutraceuticals in Migraine: A Summary of Existing Guidelines for Use. Headache 2016; 56(4):808-16.

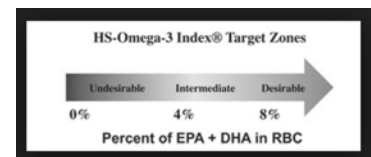
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## American Heart Association

- “Omega-3 fish oil supplements prescribed by a healthcare provider may help prevent death from heart disease in patients who recently had a heart attack and may prevent death and hospitalizations in patients with heart failure.”
- There was insufficient evidence to evaluate the role of fish oil supplements in primary prevention of CVD.
- Do YOU know your “O?”

Siscovick DS, et al. Circulation 2017; Mar 13.



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## Canadians and Omega 3

- The Omega-3 Index indicates the percentage of EPA+DHA in red blood cell fatty acids.
- Canadian government found that the mean Omega-3 Index level of Canadians aged 20-79 was 4.5%.
- Fewer than 3% of adults had levels associated with low CHD risk; 43% had levels associated with high risk.

Langlois K, et al. *Health Rep* 2015; Nov 18;26(11):3-11

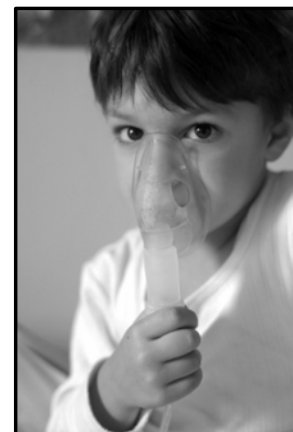


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## Omega 3 During Pregnancy

- Reduced intake of omega-3 fatty acids may be a contributing factor to the increasing prevalence of wheezing disorders.
- Reviewers found omega 3 supplementation in the third trimester of pregnancy **reduced the absolute risk of persistent wheeze/asthma and infections of the lower respiratory tract in offspring by approximately 33%.**
- **DHA: 200-500 mg per day**



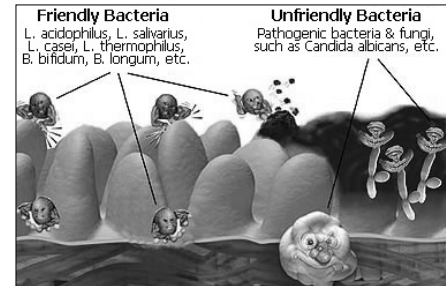
Bisgaard H, et al. *N Engl J Med* 2016; Dec 29;375(26):2530-9

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## Make Friends with Your Microbes!

- Rapidly expanding research on benefits of certain probiotic strains in women's health.
- Gastrointestinal
  - Reduce symptoms of irritable bowel syndrome
  - Reduce incidence of antibiotic associated diarrhea
- Genito-urinary
  - Reduce the risk of recurrent bladder infections
  - Help reduce recurrent yeast infections
- Pregnancy
  - Reduce allergies and eczema in high risk children, especially if born by Cesarean section, if taken last 2 months of pregnancy.



Grin PM, et al. *Can J Urol* 2013 Feb;20(1):6607-14; Ford AC, et al. *Am J Gastroenterol* 2014; 109(10):1547-1561

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Patient: Doctor, I don't feel well and I'm not sure why.



Doctor: I want you to meditate for 20 minutes, twice a day, exercise for at least 30 minutes a day, avoid processed foods, eat plenty of organic fruit and veg, spend more time in nature and less indoors, stop worrying about things you can't control and ditch your T.V. Come back in 3 weeks.

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