

Life is Your Best Medicine



Tieraona Low Dog, MD

Founder: Medicine Lodge Ranch

National Geographic's: "Life Is Your Best Medicine," "Healthy At Home," and "Fortify Your Life"

www.DrLowDog.com

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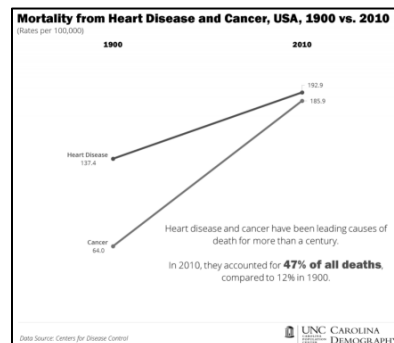
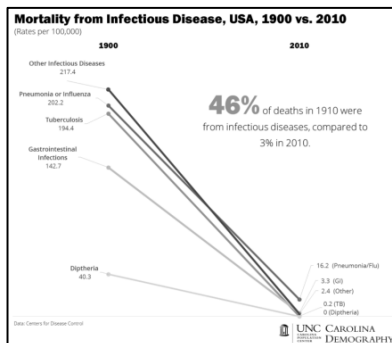
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The Times They Are A-Changing



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Modern Biomedicine

- **Acute disease** is what drove medicine in the 20th century.
- **Infectious disease and injuries** dominated the landscape.
- This reinforced view that **being healthy meant not being sick**.
- We assume most people can be treated in **exactly the same way**.
- While this **works well for appendicitis, collapsed lung, or heart attack**, it is **woefully inadequate for the prevention and management of chronic disease**.
- And it doesn't even begin to address the concept of **health promotion**, a process of enabling people to **increase control over, and to improve, their health**.

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

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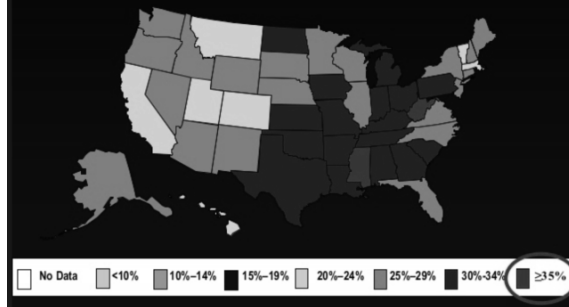
CDC shows <18% of adults consume the recommended amount of **fruit** and <14% consume the recommended amount of **vegetables**.

www.cdc.gov/mmwr/preview/mmwrhtml/mm6426a1.htm Accessed December 20, 2016

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Obesity Trends* Among U.S. Adults CDC, 2013



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SCIENTIFIC
AMERICAN

PUBLIC HEALTH

The Hunger Gains: Extreme Calorie-Restriction Diet Shows Anti-Aging Results

A new study shows five days of hunger a month may reduce risk factors for aging and age-related diseases

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Caloric Restriction?



Canto is 27 year old monkey on CR diet, Owen is 29 year old on unrestricted diet.

news.wisc.edu/monkey-caloric-restriction-study-shows-big-benefit-contradicts-earlier-study/

Ravussin E, et al. : A 2-Year Randomized Controlled Trial of Human Caloric Restriction: Feasibility and Effects on Predictors of Health Span and Longevity. *J Gerontol A Biol Sci Med Sci*. 2015;70(9):1097-104

- 25 year study University of Wisconsin: **76 rhesus monkeys ages 7-14 years**, fed a diet reduced in calories by 30%.
- **Disease was 3 fold greater in control group.** No evidence of diabetes in any caloric-restricted animal.
- NIA **2-year** study randomized 218 non-obese people to current diet or 25% caloric restriction (**11.7%** on average).
 - Statistically significant reduction in inflammatory markers, weight loss, improved mood, sleep duration, etc.

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CALERIE (Comprehensive Assessment of the Long-term Effects of Reducing Intake of Energy)

- National Institute of Aging sponsored controlled study: **218 non-obese individuals, randomized to maintain current diet or 25% caloric restriction for 2 years. (11.7% caloric restriction was actually maintained on average).**
- Study found statistically **significant reduction in cardiometabolic risk factors and inflammatory markers; weight loss, improved mood and sleep duration.**

Ravussin E, et al. : A 2-Year Randomized Controlled Trial of Human Caloric Restriction: Feasibility and Effects on Predictors of Health Span and Longevity. *J Gerontol A Biol Sci Med Sci*. 2015;70(9):1097-104.

Martin CK, et al. Effect of Caloric Restriction on Mood, Quality of Life, Sleep, and Sexual Function in Healthy Nonobese Adults: The CALERIE 2 Randomized Clinical Trial. *JAMA Intern Med* 2016 Jun 1;176(6):743-52.

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Fasting-Mimicking Diets (FMD)?



Wei M, et al. Fasting-mimicking diet and markers/risk factors for aging, diabetes, cancer, and cardiovascular disease. *Sci Transl Med* 2017; 9(377).

- USC study of **100 healthy participants** randomized into 2 study arms and tested the effects of FMD done 5 consecutive days each month for 3 months.
 - **1100 calorie first day, 700 calories for 4 days (plant based, multivitamin).** Ate whatever they wanted rest of the month.
- Three FMD cycles reduced **body weight and total body fat; lowered blood pressure, cholesterol, triglycerides and IGF-1.** Lean muscle mass remained unchanged.
- Note: **25% drop-out rate**
- **Effects still noted 3 months AFTER study ended.**

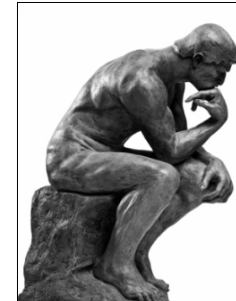
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Personalized Diets

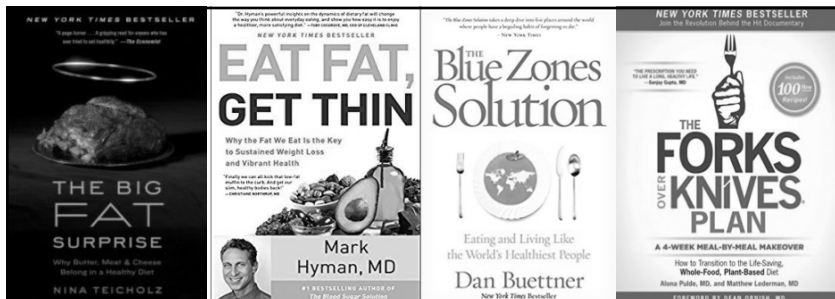
- Personalized diets based on individual's genome to optimize dietary intervention and reduce genetic cardiovascular disease (CVD) risk or to prevent or treat cancer is one of the challenges frequently discussed in scientific community.

Corella D, et al. Utilizing nutritional genomics to tailor diets for the prevention of cardiovascular disease: a guide for upcoming studies and implementations. *Expert Rev Mol Diagn* 2017 May;17(5):495-513.



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Is it any wonder that people are confused?

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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)

Screen 9: DII APP
Cancel Question #1 Next

1 of 25
What was your average intake of bananas over the last year?

Frequency: Constant eating

Small eating Medium eating Large eating

Never
1 Per Month
2-3 Per Month
1 Per Week
2 Per Week
3-4 Per Week
5-6 Per Week
1 Per Day
2+ Per Day

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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	¼ 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

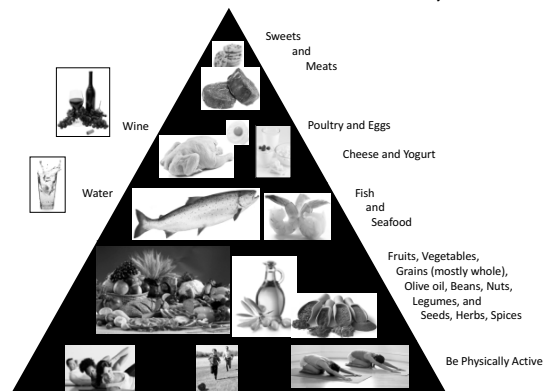
- **Mediterranean and DASH diets** have been associated with lower **dementia** risk. Researchers evaluated the inflammatory potential of these diets in relation to mild cognitive impairment/dementia risk using the **DII** during an **average follow up of 9.7 years** during **Women's Health Initiative 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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Mediterranean Diet Pattern: Anti-Inflammatory



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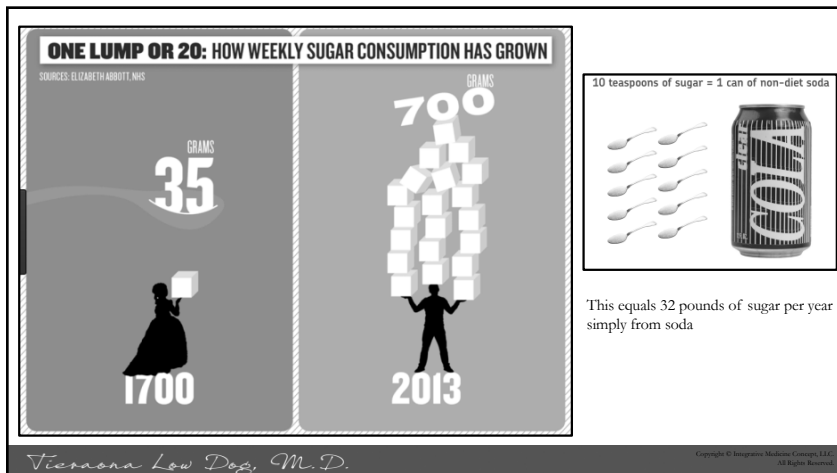
Mediterranean Dietary Pattern

- **13 meta-analyses of observational studies and 16 meta-analyses of randomized controlled trials** investigating association between adherence to Mediterranean diet and 37 different health outcomes, for a total population of over than **12,800,000** subjects, were reviewed.
- Robust evidence (P-value<0.001) and large sample sizes show that greater adherence to the Mediterranean diet is associated with **reduced risk** of **overall mortality, cardiovascular disease, heart attack, overall cancer incidence, diabetes, neuro-degenerative diseases and lower inflammatory markers**.

Dinu M, et al. Mediterranean diet and multiple health outcomes: an umbrella review of meta-analyses of observational studies and randomized trials. *Eur J Clin Nutr* 2017; May 10. doi: 10.1038/ejcn.2017.58.

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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^{1,2}; Laura A. Schmidt, PhD, MSW, MPH^{1,3,4}; Stanton A. Glantz, PhD^{1,5,6,7,8}

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

Editorial Comment Related Articles Author Interview

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 molecule** and **one fructose molecule**
- High fructose corn syrup: **55% fructose**, **42% glucose** and 3% other sugars.
- Every cell readily converts glucose into energy.** Liver cells one of cells that **can convert fructose to energy**.
- Soda floods liver with large amounts of free floating fructose.** Eat an **apple**, the fiber considerably slows down digestion, allowing fructose slowly enter the liver.
- Large amounts of **“free” fructose** taxes the liver and increases **fatty liver disease**.
- Fructose raises levels of the hormone grehlin**, which stimulates hunger, and **suppresses leptin**, the hormone that makes you feel full.

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Glycemic Index/Load

- International consensus conference concluded that diets low in GI and GL were relevant to the **prevention and management of diabetes and coronary heart disease**, and are **particularly important in individuals with insulin resistance**.
- “Given the high prevalence of diabetes and pre-diabetes worldwide and the **consistency of the scientific evidence reviewed**, the expert panel confirmed an urgent need to communicate information on GI and GL to the general public and health professionals, through channels such as national dietary guidelines, food composition tables and food labels.”

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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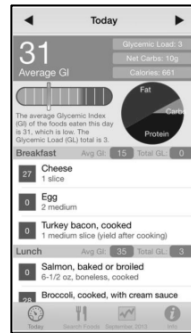
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Glycemic Index/Load

- **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.

Low GI Diet Tracker
App: \$3.99

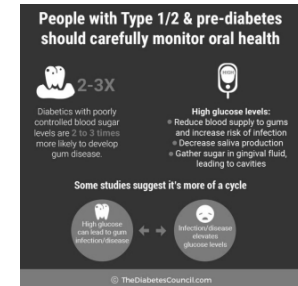


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Diabetes Matters to Us All

- “There is strong evidence that **people with periodontitis have elevated risk for dysglycemia and insulin resistance.**”
- **Periodontitis** is also associated with an **increased risk** of type 2 diabetes.”
- “The European Federation of Periodontology and the International Diabetes Federation report consensus guidelines for **physicians, oral healthcare professionals and patients to improve early diagnosis, prevention and co-management of diabetes and periodontitis.**”



Sanz M, et al. Scientific evidence on the links between periodontal diseases and diabetes: Consensus report and guidelines of the joint workshop on periodontal diseases and diabetes by the International Diabetes Federation and the European Federation of Periodontology. *J Clin Periodontol* 2017 Aug 24; doi: 10.1111/jcpe.12808.

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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.

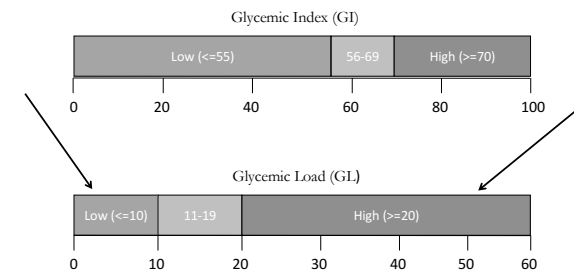


Breymeyer KL, et al. *Appetite* 2016; Dec 1;107:253-259.

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Glycemic Index & Glycemic Load Rating Chart



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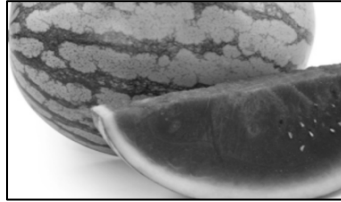
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Which One Would You Choose?

Banana
Glycemic Index = 52
Available Carbs = 24 grams
Glycemic Load = 14



Watermelon
Glycemic Index = 72
Available Carbs = 10 grams
Glycemic Load = 8



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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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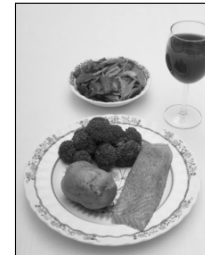
Food	Serving Size	Glycemic Load
Grapefruit	½ large	3
Apple	1 medium	6
Banana	1 large	14
Raisins	1 small box	20
Watermelon	1 cup	8
Carrots	1 large	5
Orange	1 medium	6
Sweet potato	1 cup	17
Baked potato	1 medium	28
French fries	1 medium serving	26
Snickers	1 bar	35
Reese's cup	1 miniature	2
White table 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
White bread	1 slice	10
White rice	1 cup	33
Brown rice	1 cup	23
Spaghetti	1 cup	38

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Low/High GI Meals




GI = 80 GL = 32



GI = 61 GL = 12

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The diagram on the left shows the structure of a whole grain with three layers: the **bran** (outer layer with B vitamins and minerals), the **endosperm** (starchy carbohydrate middle layer with some proteins and vitamins), and the **germ** (nutrient-packed core with B vitamins, vitamin E, phytochemicals, and healthy fats). The refined grain is shown as a hollow shell. The image on the right shows six jars representing the components of whole grain nutrition: Whole Grain, Bran, Middlings, Wheat Germ, Wheat Germ Oil, and White Flour. A label indicates that bran, middlings, and wheat germ are removed from wheat processing, leaving only the end result (white flour).

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The image on the left shows a box of Kellogg's Pop-Tarts, One Serving of 1/2 Whole Grain, Brown Sugar Cinnamon. The box highlights that it contains 20g of fiber and 7g of total fat per serving. The image on the right shows a loaf of whole grain bread, heavily seeded with various grains and nuts.

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Tips on Whole Grains

- **100% Whole Wheat** (first ingredient!)
- **Oats** (skip the instant)
- **Brown Rice** (white has bran/germ removed, LOW in nutrients)
- **Whole Rye** (four times the fiber of whole wheat, most nutritious)
- **Whole Grain Barley** (not pearled: bran and germ have been removed)
- **Buckwheat** (loaded in magnesium, gluten-free)
- **Quinoa** (not a grain, it's a seed loaded in protein and omega 3)
- **Whole Wheat Couscous** (delicious and high in fiber)
- **Corn** (organic, non-GMO – increases healthy gut flora)

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Gluten



- Autoimmune condition **celiac disease**, where immune system interacts negatively with **gluten**, a storage protein in cereal grains. **ONLY** treatment is complete avoidance of gluten. Note: *In children, celiac disease is associated with both enamel defects and aphthous stomatitis.**
 - Celiac symptom checklist: (celiac.org/celiac-disease/resources/checklist/)
- Other individuals may be **allergic to wheat**, not all grains. Symptoms can include GI (indigestion, cramps, diarrhea, nausea), respiratory (stuffy/runny nose) and/or skin (hives or rash). Necessary to **AVOID** wheat.
- And still others appear to have a **gluten sensitivity**, where “symptoms” improve when they eliminate gluten from their diet. This is less clear....

*Nieri M, et al. Enamel defects and aphthous stomatitis in celiac and healthy subjects: Systematic review and meta-analysis of controlled studies. *J Dent* 2017; Oct;65:1-10.

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Saturated Fat Debate

- Three large meta analyses (21 studies, 12 studies, and 76 studies) have all **failed to show any significant evidence that saturated fat increases the risk for heart disease.**
- It also has failed to find any significant evidence that increasing polyunsaturated fats and decreasing saturated fats lowers your heart risk.
- Include a variety of fats in your diet



Siri-Tarimo, *Amer J Clin Nutr* 2010; 91 (3): 535-46.
Schwingshackl L, et al. *BMJ Open* 2014; 4(4):e004487.
Chowdhury R, et al. *Ann Intern Med* 2014; 160(6):398-406.

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- Grass fed/finished beef higher in conjugated linoleic acid, stearic acid, vitamins A and E.
- *Organic* pastured dairy and meats are up to ~50% higher in omega 3 fatty acids and were only given organic feed and no growth hormones or antibiotics.
- Humanely raised.....

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Red Meat and Cancer

- Poultry/turkey and fish neutral/beneficial effects regarding cancer/health.
- The **American Institute for Cancer Research** has made the following recommendations regarding red meats (**beef, lamb, pork**) based upon the data that links them to an **increased risk of colon cancer**:
 - **Limit red meats to < 18 ounces per week.**
 - **Avoid processed** red meats (e.g., bologna, salami, hot dogs, corned beef)

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Fish and Seafood



- Fish and seafood are excellent source of protein high in **omega 3 fatty acids**. They also provide vitamin D and contribute valuable mineral nutrients to the diet such as selenium, iodine, magnesium, iron and copper.
 - Beneficial for helping to **prevent atherosclerosis and maintaining healthy blood pressure and blood flow.**
 - Promote brain health and may help reduce the **risk of depression.**
 - Necessary for the health of the eyes. Can help reduce **dry eye syndrome.**
 - Crucial for **healthy pregnancy and childhood development.**
 - Help **quell inflammation**, which has been linked to many chronic disorders.

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Olive Oil

- Cornerstone of Mediterranean diet.
- **Rich in monounsaturated fat oleic acid (73%), antioxidants, modest levels of vitamins E and K.**
- Oleocanthal mimics ibuprofen reducing **inflammation**.
- **Protects against heart disease and stroke**; lowers total blood cholesterol, LDL-C, triglycerides; improves HDL, has a mild blood pressure lowering effect.
- May offer additional protection against Alzheimer's disease, diabetes and cancer as part of a healthy diet.
- **Keep refrigerated for optimal shelf life.**
- To find top olive oils that meet rigorous quality and taste standards: www.bestoliveoils.com



Hernandez A, et al. *Arterioscler Thromb Vasc Biol* 2014; 34(9):2115-9.
Crous-Bou M, et al. *BMJ* 2014;349:g6674

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Full or Low Fat Dairy?

- Full fat dairy products may help protect against type 2 diabetes. Fat slows absorption of milk sugar, causing slower rise in blood sugar, and lower/slower release of insulin. No evidence full fat dairy increases heart disease.
- Full fat dairy recommended for women trying to get pregnant as it reduces anovulatory infertility.
- Full fat dairy improves acne, low fat dairy aggravates it.
- Full fat dairy lower in lactose, better tolerated by lactose intolerant individuals.
- Only 30% of global population able to produce enough lactase to digest and absorb lactose throughout adult life (highest in Scandinavian and northern Europeans).

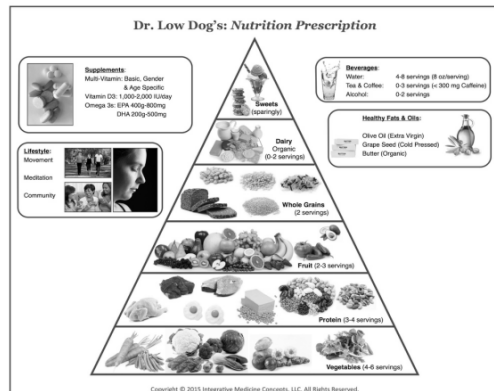


Chavarro JE, et al. *Hum Reprod* 2007; 22(5):1340-7.
Alexander DD, et al. *Br J Nutr* 2016; 115(4):737-50

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Dr. Low Dog's Nutrition Prescription



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Real State of Our Nutrition

- 90 million Americans are vitamin D deficient (using the Endocrine Society guidelines < 20ng/mL)
- 30 million are deficient in vitamin B6
- 18 million people have B12 deficiency
- ~16 million have very low serum vitamin C
- 13% of Latinas and 16% of African American women (ages 12-49) are iron deficient
- Women 25-39 overall have borderline iodine insufficiency

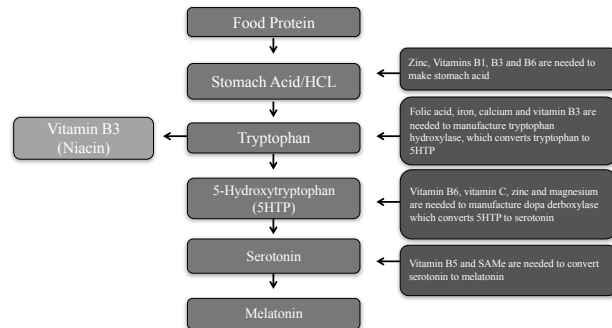


CDC: 2nd National Report on the Biochemical Indicators of Diet and Nutrition in the U.S. population

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Serotonin and Melatonin Pathways



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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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Calcium and Vitamin D: Fracture

- Osteoporosis responsible more than 8.9 million fractures annually worldwide.
- Meta-analysis by National Osteoporosis Foundation: eight studies (n= 30,970 participants) found that all studies showed **calcium plus vitamin D** supplementation **produced a statistically significant 15 % reduced risk of total fractures and 30% reduced risk of hip fractures.**



Weaver CM, et al (2016). Calcium plus vitamin D supplementation and risk of fractures: an updated meta-analysis from the National Osteoporosis Foundation. *Osteoporosis Int*, 27: 367-376

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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.
- **25 eligible randomized controlled trials (n=10,933, aged 0-95 years).**
- Vitamin D supplementation **reduced risk of acute respiratory infection** among all participants (NNT=33) and **those who were vitamin D deficient experienced the most benefit (NNT=4)**, as did those who were receiving daily or weekly vitamin D and *not* receiving vitamin D boluses (NNT=20).

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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 2nd 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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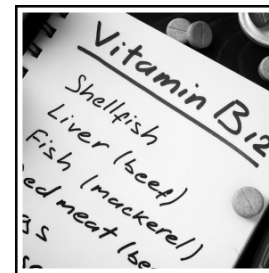
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Prescription Meds and Nutrients: Just a Glimpse

- Widespread use of **prescription drugs** for management of chronic health conditions can make it difficult to **maintain adequate levels of specific nutrients.**
- **PPI drugs** are one of the most commonly prescribed medications and are also available over-the-counter in the United States. Long-term use can **increase the risk of fracture, cause magnesium levels to plummet, and interfere with B12 absorption, as well as increasing the risk of *C. difficile* infection.**
- With increasing prevalence of type-2 diabetes, we will continue to see increase in **metformin use, a drug known to deplete vitamin B12.**

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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 KORA-Age Study. *Nutrients* 2017; doi: 10.3390/nu9121276

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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.**

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.

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

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The Need is Real and Urgent

- Clinicians must have more training in how to **identify potential nutrient deficiencies and what testing is most appropriate for determining the status of specific nutrients.**
- We urgently **need more research to determine the “optimal” reference range for key micronutrients in specific populations**, as well as making nutrient testing more widely available, more economical, and reimbursed by insurance and government programs.
- Given that even marginal micronutrient status can adversely affect muscle, joint, and eye health, as well as the immune, cardiovascular and neurological systems, there is an urgent need for better education and communication with public health officials, medical professionals and the public.

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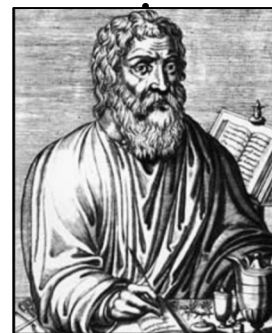


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Eating alone will not keep a man well. He must also take exercise.

Hippocrates



- Higher risk for heart disease, type 2 diabetes, certain cancers, Alzheimer's disease and increase lower back pain, depression and anxiety.
- **Half of baby boomers in the US report having NO exercise.**
- **80 million Americans over age of 6 years of age are entirely inactive**

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Movement: *Sound Body = Sound Mind*

- Known since ancient times, **exercise and physical activity are keys to a long and healthy life. Reducing risk of diabetes, heart disease, osteoporosis.**
- Movement increases blood flow to the brain, promoting growth of new blood vessels, **stimulating release of endorphins that diminish pain, as well as compounds that elevate mood and reduce tension.**
- More than **400 studies** show exercise can **reduce risk depression/anxiety.**
- Regular exercise **increases energy levels and eases fatigue.** Just 20 minutes 3 x per week of moderate exercise can improve energy levels in just 4 weeks!
- Fatigue, low energy, pain and depressed mood all impact our emotional wellbeing. Make movement a habit!

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Motivation

- Use a fitness tracker – assess your baseline (normal activity 3 days) and see where you can improve.
- Use an app, join a class, grab a friend
- **Make it a habit. Just do it.**
- Do something you enjoy
- Focus on the *immediate* benefits you will feel once you start exercising regularly

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Lack of Sleep



- **1 in 3 Americans** do not get sufficient sleep. Research shows chronic sleep problems can lead to **weight gain, obesity, diabetes** (33% increased risk type 2 DM), and **heart disease.**
- **Biological clock** most important regulator of the sleep wake cycle. Responsible for 24 hour fluctuations in hormone secretion, body temperature and other bodily functions.
- **Lack of exposure to sunlight** and use of **bright lights at night** increases the likelihood of disordered circadian clock. Consider **dawn simulation** device/app, use **blue light blocking glasses** at night with technology.
- **Controlled release melatonin** now first line therapy for those older than 60 (**2 mg**)

Shan Z, et al. *Diabetes Care* 2015;38(3):529–37
Matheson E, et al. *Insomnia: Pharmacologic Therapy. Am Fam Physician* 2017; Jul 1;96(1):29-35.

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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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- **Controlled-release melatonin** and doxepin are recommended as first-line agents in older adults; the so-called z-drugs (zolpidem, eszopiclone, and zaleplon) should be reserved for use if the first-line agents are ineffective.

- Dose generally 3-5 mg melatonin.

- **Trial of 4-6 weeks.**



Matheson E, et al. Insomnia: Pharmacologic Therapy. *Am Fam Physician* 2017; Jul 1;96(1):29-35.

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Apps for Sleep

Sleep Cycle



- Sleep Cycle sits under your pillow and gathers data to wake you up when you'll feel the least groggy. Easy-to-read graphs show your sleep patterns. Free.

Deep Sleep



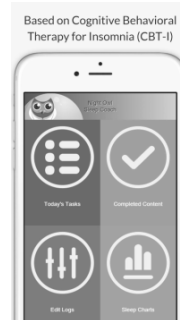
- Deep Sleep provides step-by-step instructions to guide you into state of deep relaxation. Andrew Johnson is awesome and his CDs are truly amazing. \$2.99

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Cognitive Behavioral Therapy

- CBT has emerged as a recommended *first-line therapy for insomnia*. Digital CBT has been shown to be effective for improving sleep, as well as mental health and well-being.
- CBT-I typically consists of:
 - Psychoeducation about sleep and insomnia
 - Stimulus control
 - Sleep restriction
 - Sleep hygiene
 - Relaxation training
 - Cognitive therapy



Luik AI, et al. Digital cognitive behavioral therapy for insomnia: a state of the science review. *Curr Sleep Med Rep* 2017; 3(2): 48-56

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Sleep Evaluation

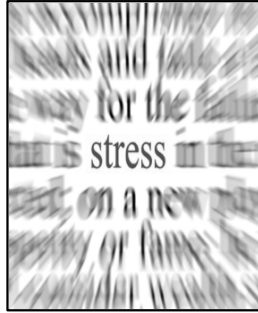
- There are numerous medications that can impair sleep (e.g., beta blockers antidepressants, steroids, ADHD meds, possibly statins, etc.) Do some online research and/or talk to your pharmacist. If you are taking medication that disrupts sleep, talk to your health care provider.
- Restless leg syndrome impacts many people. Talk to you 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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High cortisol levels are linked to high blood pressure, high cholesterol, high blood sugar, insulin resistance, insomnia, weight gain, headaches, mood swings, depression, and increased risk of infections.

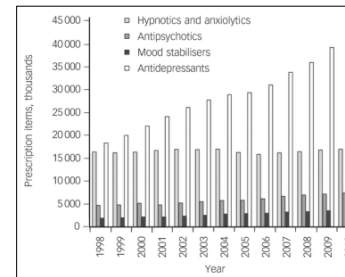
Scientists believe that prolonged elevation of stress hormones may shorten our lifespan by 15 years.



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Trends in prescriptions of major classes of psychiatric drugs 1998–2010.



Stephen Ilyas, and Joanna Moncrieff BJP
2012;200:393-398

THE BRITISH JOURNAL
OF PSYCHIATRY

- **400% increase** in anti-depressant prescriptions since 1980s. Rates of anxiety/depression in adolescents and young adults **skyrocketing**.
- JAMA review: For patients with **severe depression**, the **benefit** of medications over placebo is **substantial**; however, the magnitude of benefit may be **minimal or nonexistent**, on average, for those with **mild or moderate** symptoms.

Fournier, et al. JAMA. 2010;303(1):47-53

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The World Today

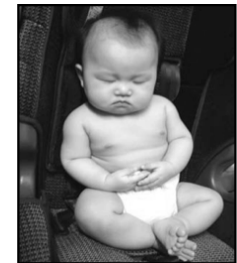
- We strongly emphasize **biological explanation** for depression and anxiety in modern times, as evidenced by the extensive use of antidepressants and anxiolytics.
- There remains **little** focus on **physiological, nutritional, societal, communal, familial and spiritual underpinnings**.
- "I take my Effexor and go to a **job I hate** and then home to a house full of **kids** that are **out of control** and a husband that **barely talks to me**. Is my depression better? Yea, I guess."
- **Complex world**. We often have unrealistic expectations. **Isolation** is common, **financial** problems, **lack of purpose, meaning**, a sense of **despair, hopelessness** – the world has less color and texture.

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Mindfulness Meditation

- Meditation is excellent for reducing stress perception and pain intensity, while elevating mood.
- Quiets the stream of thoughts that rage in our mind.
- Long-time meditators have greater activation of areas responsible for sustaining attention, processing empathy, integrating emotion and cognition.
- Review of 47 trials found that meditation improves:
 - Anxiety
 - Depression
 - Pain



Goyal M, et al. JAMA Intern Med 2014; 174(3):357-68

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Meditation Resources

- *Guided Mindfulness Meditation: A Complete Guided Mindfulness Meditation Program* from Jon Kabat-Zinn
- *Insight Timer* - ~4,000 guided meditations from more than 1,000 teachers (self-compassion, nature, stress, podcasts and more). More than 750 meditation music tracks. Free.
- *Headspace* – very good for beginners with 10 minute meditations. Free.
- *The Mindfulness App* – nice 5 days guided meditation program to get you started. Can be personalized and integrated into other health apps. Free.
- *Aura* – multiple teachers, from 3-10 minute daily meditations. Customizable. #1 new app on Apple in 2017. \$29 for 6 months.

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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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Loneliness, Social Isolation & Your Health



- 148 studies on the effects of social isolation on health found it is:
 - As bad as smoking 15 cigarettes a day.
 - As dangerous as being an alcoholic.
 - As harmful as never exercising.
 - Twice as dangerous as obesity.

Cacioppo JT, et al. *Ann N Y Acad Sci* 2011; 1231:17-22

Holt-Lunstad J, et al. *PLoS Med* 2010; 7:e1000316

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