

Optimal Aging: Strategies for Life



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National Geographic Author:
"Fortify Your Life",
"Healthy At Home"
"Life Is Your Best Medicine"
Guide to Medicinal Herbs

www.DrLowDog.com

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Reflection

- What if someone could predict with 90% accuracy how long you will live?
- Would you want to know?
- How would it affect the way you live?
- What if you planned to live to 100?
- Would it change the way you...
 - work and play?
 - manage your money?
 - spend time with your family?



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When Does “Late Life” Begin?



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- Studies have defined older populations in different ways: some as 65 and older, others at 60, and some at 50.
- Consensus seems to be growing:
 - Young-old: 65-80 years
 - Old-old: 80-99 years
 - Oldest-old: centenarians

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The Oldest of the Old



Jeanne Louise Calment
21 February 1875 – 4 August 1997
122 years, 164 days

www.managedhealthcareconnect.com/article/7994

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What is “Optimal” Aging?



The capacity to function across many domains—physical, functional, cognitive, emotional, social and spiritual—to one's satisfaction and in spite of one's medical conditions.”

To live a life that is *meaningful, fulfilling, and relatively independent*.

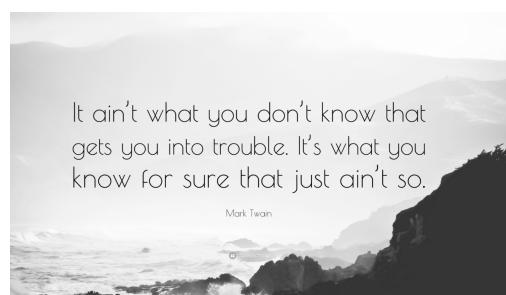
Brummel-Smith K, Optimal Aging, Part I: Demographics and Definitions,
Annals of Long-Term Care, 2007; 15: 26 – 28

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It ain't what you don't know that gets you into trouble. It's what you know for sure that just ain't so.

Mark Twain



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Chronic Inflammation

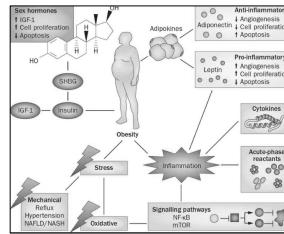
- Inflammatory response crucial for our survival. But there is a dark side.
- When **inflammation becomes chronic** it contributes to conditions as varied as **gum disease, osteoporosis, cardiovascular disease, Alzheimer's disease, type-2 diabetes, autoimmune disorders, cancer, and more.**

Chang SC, Yang WV. *Crit Rev Oncol Hematol* 2016; 108:146-153

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Inflammaging

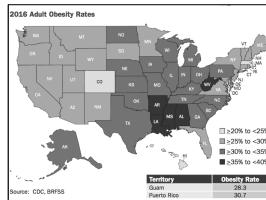
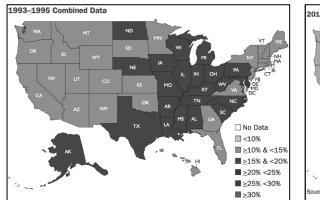


- Obesity + aging** drastically increases chronic low-grade inflammation: a key link between **obesity, insulin resistance, elevated blood sugar, insulin-growth factors (IGF), and age-associated diseases.**
- Elevated insulin and IGF increases tumor growth and aggressiveness.

Frasca D, et al. Aging, Obesity and Inflammatory Age-Related Diseases. *Front Immunol* 2017 Dec 7:8:1745.

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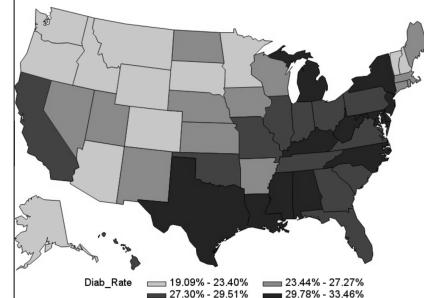
The Changing Landscape of Adult Weight



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Diabetes Period Prevalence, 2015



<https://www.cccdata.org/web/guest/medicare-charts/medicare-chronic-condition-charts>

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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 unrestricted diet.

news.wsj.com/article/SB1000142405270230373310431708832014.html
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 Geriatr A Biol Med Sci* 2015;70(7):1097-104

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- 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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Fasting-Mimicking Diets



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

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- USC study **100 healthy people** randomized into 2 study arms to test 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 cycles reduced **body weight, total body fat, lowered blood pressure, cholesterol, triglycerides and IGF-1**.
- Note: **25% drop-out rate**
- Effects still noted **3 months AFTER study ended**.

Glycemic Index/Load



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

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Dietary Inflammatory Index (DII)

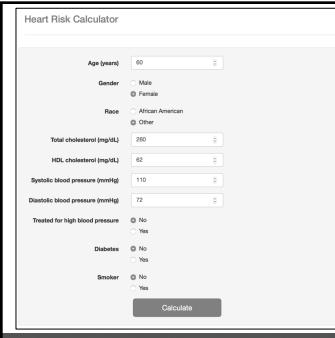
Wirth MD, et al. *J Nutr Health Aging* 2017; 21(5):487-491.
Boden S, et al. *Nutr J* 2017; 16(1):21.

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- Inflammation can be driven by dietary patterns. An anti-inflammatory diet may reduce **sub-chronic inflammation** and improve **cardiovascular, metabolic, and neurologic parameters**.
- Dietary Inflammatory Index** based on measuring inflammation in the body in response to specific foods (numerous clinical trials).
- Test can be downloaded **Dietary Inflammatory Index** (iTunes: DII Screener)

Heart Risk Calculator



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http://www.cvriskcalculator.com

Heart Risk Calculator

On the basis of your age and calculated risk for heart disease or stroke under 10%, the USPSTF guidelines suggest you would not likely benefit from starting aspirin.

Demography	Cholesterol	Blood pressure	Risk factors
Age: 60	Total: 260	Systolic: 110	Diabetes: no
Gender: female	HDL: 62	Diastolic: 72	Smoking: no
Race: not African-American		On medication: no	

2.8%

10-year risk of heart disease or stroke

Based on your age, your blood pressure is well-controlled.

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Statins in Persons at Low Risk of Cardiovascular Disease

In Summary, for those who received statins:

Benefits in Percentage	Harms in Percentage
<ul style="list-style-type: none"> 0% statistically significant mortality benefit 0.5% avoided a nonfatal heart attack (myocardial infarction) 0.3% avoided a nonfatal stroke 	<ul style="list-style-type: none"> 4.8% experienced pain from muscle damage 0.5% developed diabetes mellitus

http://www.thennt.com/nnt/statins-persons-low-risk-cardiovascular-disease/

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Mediterranean Diet for 5 Years for Heart Disease Prevention (Without Known Heart Disease)

In Summary, for those who ate the Mediterranean diet:

Benefits in Percentage	Harms in Percentage
<ul style="list-style-type: none"> 98.3% saw no benefit 1.7% were helped by avoiding a stroke, heart attack, or death 	<ul style="list-style-type: none"> 0% were harmed by effects of the diet

<http://www.thennt.com/nnt/mediterranean-diet-for-heart-disease-prevention-without-known-heart-disease/>

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Heart Risk Calculator

Age (years): 60
Gender: Male
Race: African American
Total cholesterol (mg/dL): 260
HDL cholesterol (mg/dL): 62
Systolic blood pressure (mmHg): 110
Diastolic blood pressure (mmHg): 72
Treated for high blood pressure: Yes
Diabetes: No
Smoker: No

<http://www.cvriskcalculator.com>

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Heart Risk Calculator

Home About Contact

5.3%
10-year risk of heart disease or stroke

On the basis of your age and diabetes, the ACC/AHA guidelines suggest you would not likely benefit from starting aspirin.

On the basis of your age and diabetes, the ACC/AHA guidelines suggest you should be on a moderate intensity statin.

Based on your age, your blood pressure is well-controlled.

Demography
Age: 60
Gender: female
Race: not African-American

Cholesterol
Total: 260
HDL: 62

Blood pressure
Systolic: 110
Diastolic: 72

Risk factors
Diabetes: yes
Smoking: no
On medication: no

Moderate intensity statin: examples: atorvastatin 10 mg, pravastatin 40 mg, simvastatin 20-40 mg per day

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Statins Given for 5 Years for Heart Disease Prevention (With Known Heart Disease)

In Summary, for those who took the statin for 5 years:

Benefits in Percentage	Harms in Percentage
<ul style="list-style-type: none"> 96% saw no benefit 1.2% were helped by being saved from death 2.6% were helped by preventing a repeat heart attack 0.8% were helped by preventing a stroke 	<ul style="list-style-type: none"> 2% were harmed by developing diabetes** 10% were harmed by muscle damage

*The development of diabetes is one such unanticipated harm found in a recent large study and it seems likely therefore that this applies to the data above, although this is a best guess.

<http://www.thennt.com/nnt/statins-for-heart-disease-prevention-with-known-heart-disease/>

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No Fish Story

HS-Omega-3 Index® Target Zones

0% Undesirable 4% Intermediate 8% Desirable
Percent of EPA + DHA in RBC

- Omega-3 Index **gold standard for omega-3 biostatus testing**. Used as compliance marker for RCTs with fish oil supplements, and in epidemiological research.
- In 2008 Dr. Bernadine Healy said, "Before long, your personal Omega-3 Index just could be the new cholesterol—the number you want to brag about."
- Canadian government found that **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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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**.”

Siscovich DS, et al. *Circulation* 2017; Mar 13.

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To Find Your State Recommendations: <https://www.purdue.edu/hhs/nutr/fish4health/>

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Nutrient Needs Change with Aging

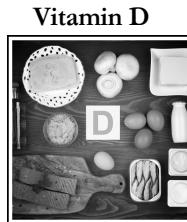
- The need for certain micronutrients increases with age. These are current recommendations but they may not be sufficient....
- Vitamin D** increases from 600 to 800 IU (20 mcg) per day
- Calcium** increases from 1000 to 1200 mg/day for women over the age of 50 and for men over the age of 70
- Due to decreased ability to absorb food bound **vitamin B12**, the Institute of Medicine recommends adults over the age of 50 get their B12 from fortified foods or supplements.

Marsman D, Belsky DW, Gregori D, Johnson MA, Low Dog T, et al. Healthy ageing: the natural consequences of good nutrition-a conference report. *Eur J Nutr*. 2018 Jun;57(Suppl 2):13-34.

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- Vitamin D deficiency can cause **osteomalacia**, leading to **musculoskeletal pain** in the pelvis, shoulders, low back, and proximal muscles.
- Deficiency often **more severe** in elders due to environmental/biological factors.
- As aging advances, intestinal resistance to 1,25(OH)2D impairs uptake of calcium and decline in renal function reduces activation of vitamin D.
- Meta-analysis by National Osteoporosis Foundation: 8 studies (n= 30,970 participants): calcium plus vitamin D supplementation produced a significant 15 % reduced risk total fractures and 30% reduced risk hip fracture



Wintenberger F, et al. Guideline Role of Vitamin D in the Musculoskeletal System. *Nature*. 2016; Jan;498(7412):pp 313-316.
Werner CM. Calcium plus vitamin D supplementation and risk of fractures: an updated meta-analysis from the National Osteoporosis Foundation. *Osteoporos 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: g6583.

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- 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 and those who were **vitamin D deficient** experienced the most benefit (NNT=4).

Endocrine Society Guidelines



Serum 25(OH)D level used to determine vitamin D status

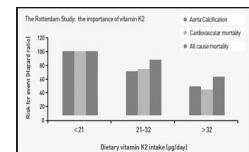
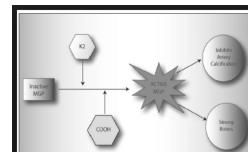
- Sufficiency:** 30 ng/mL (75 nmol/L) and above
- Insufficiency:** 21-29 ng/mL
- Deficiency:** <20 ng/mL
 - 66.8 million Americans 1 year and older had levels between 12-20 ng/ml
 - 23 million Americans 1 year and older had levels **less than 12 ng/ml**
- Vitamin D deficient adults should be treated with **50,000 IU** of vitamin D2/D3 **weekly for 8 weeks** or **6000 IU/d** of vitamin D2/D3 to achieve blood level of 25(OH)D **above 30 ng/ml**, followed by **maintenance therapy of 1500–2000 IU/d**

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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Vitamin K for Bone and CV Health

- Calcium and vitamin D crucially important for healthy bone, as is vitamin K. Synergistic interaction between vitamins D and K for bone and cardiovascular health.

Van Ballegooijen AJ, et al. *Int J Endocrinol* 2017; 2017:7454376Asemi Z, et al. *Br J Nutr* 2016; 116(2):286-93.

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Magnesium

- Low magnesium intakes/serum levels associated with type 2 diabetes, metabolic syndrome, high blood pressure, atherosclerotic vascular disease, sudden cardiac death, osteoporosis, migraine headache, asthma, colon cancer and inflammation.
- Magnesium required for activation of vitamin D.
- Medications deplete magnesium (e.g., diuretics, PPIs, OCPs, gout medication, B2-agonists, steroids, etc)
- Magnesium supplementation shown to improve glucose metabolism and insulin sensitivity in those with type-2 diabetes.

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Rosanoff A, et al. *Nutr Rev* 2010;70(3):153-60.
Gamiela LM, Henselky JA, Bilezikian JP, de Bont JHJ (2010) Hypomagnesemia in Type 2 Diabetes: A Virtuous Circle? *Diabetes*, 60(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.

Dhaba 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.



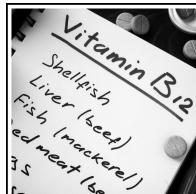
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Vitamin B12

- Key role in DNA synthesis, hematopoiesis and neurological function.
- Deficiency: megaloblastic anemia, neurological disorders (numbness/tingling feet, difficulty walking, memory loss, dementia) tongue soreness, constipation).
- Risk for deficiency: inadequate intake, impaired absorption, vegan, meds (metformin, PPIs), obesity, elders, alcoholism
- 18 million Americans deficient in B12**

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Niafar M, et al. *Intern Emerg Med* 2015; 10(1):93-102.

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Review on Turmeric and Boswellia

- Tufi's systematic review 11 RCTs (N = 1009).
- Both curcuminoid and boswellia formulations statistically significantly more effective than placebo for pain relief and functional improvement.
- No significant differences between curcuminoids or boswellia and placebo in safety outcomes.
- Curcuminoids showed no statistically significant differences in efficacy outcomes compared to NSAIDs; patients receiving curcuminoids were significantly less likely to experience gastrointestinal adverse events.
- Results suggest that curcuminoid and boswellia formulations could be a valuable addition to the knee OA treatment regimens by relieving symptoms while reducing safety risks.



Boswellia HK, et al. Efficacy of curcuma and Boswellia for knee osteoarthritis: Systematic review and meta-analysis. *Semin Arthritis Rheum* 2018 Mar 10 pii S0849-0172(18)30002-7.

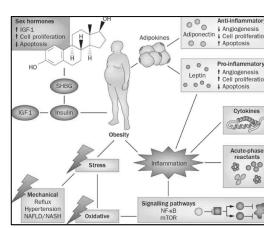
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Turmeric and Leptin

- Leptin (hormone regulating appetite and weight control) is often elevated in obese individuals.
- Meta-analysis showed significant decrease in plasma leptin concentrations following curcumin treatment (standardized mean difference -0.16, 95% confidence interval: -0.16, -0.25, p = 0.003, I² = 76.53%).
- No evidence of publication bias.

Akin SI, et al. Curcuminoids Lower Plasma Leptin Concentrations: A Meta-analysis. *Phytther Res* 2017 Dec;31(12):1836-1841.

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Need for 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**.
- 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. Regular sleep hygiene.
- Controlled release melatonin** now first line therapy for those older than 60 (2 mg)



Shan Z, et al. *Diabet 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 Evaluation

- There are numerous medications that can impair sleep (e.g., beta blockers, antidepressants, steroids, ADHD meds, statins, etc.)
- Restless leg syndrome impacts many people. Could be due to low iron, vitamin D or medications— 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)

Cheatle MD, et al. Assessing and Managing Sleep Disturbance in Patients with Chronic Pain. *Sleep Medicine Clinics*, 2016;11(4): 531-541
Lanza G, et al. *Sleep Med Rev*. 2015 Feb;19:39-50.

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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



Lauk 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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Loneliness, Social Isolation & Your Health



- Review found poor social relationships associated with 29% increase in risk of incident CHD and 32% increased risk of stroke.
- 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 **being obese**

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Meaning and Purpose

- What truly gives a person a sense of **meaning and purpose** in life?
- How can one live from a “**deep place**” despite his or her pain?
- How does one feel the oneness, find the **holy and sacred** in the mundane?

Listen.
Are you
breathing
just a little
and calling
it a life?
~ Mary Oliver

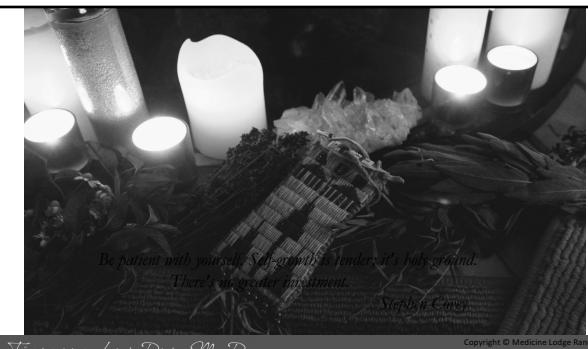
Von J. The effects of psychological meaning-centered therapies on quality of life and psychological stress: A meta-analysis. *Palliat Support Care* 2018; Sep 24:1-25.

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