

## Integrative Medicine: *It's Not Alternative Anymore*



Tieraona Low Dog, M.D.

Chair: US Pharmacopeia  
Dietary Supplements Admissions Joint  
Standard Setting Sub-Committee

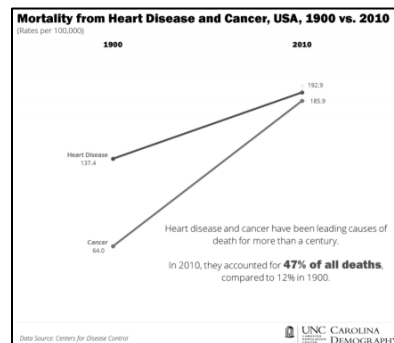
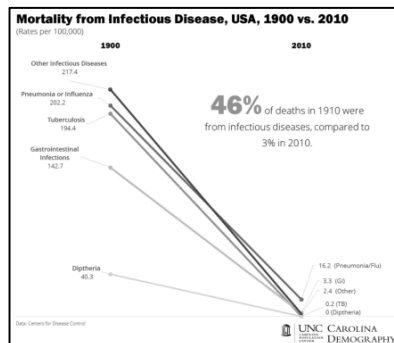
Author of National Geographic's "*Fortify Your Life*" "*Healthy At Home*" and "*Life Is Your Best Medicine*"

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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*

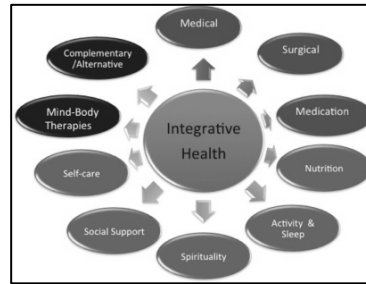
93% of diabetes, 81% of heart attacks, 50% of strokes, and 36% of all cancers could be prevented.

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

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## Integrative Medicine

- Takes account of the **whole person including lifestyle**
- Emphasizes **relationship between practitioner and patient**
- Is informed by **evidence**
- **Makes use of all appropriate therapies**



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## Pain



- **>100 million Americans, more than heart disease, cancer, diabetes combined.**
- **25.3 million adults suffer from daily chronic pain, while 23.4 million report severe pain.**
- **Incidence of chronic low back pain, neck pain, and arthritic pain can be as high as 29%, 15.7%, and 28%, respectively, in adult population.**

<http://iom.edu/Reports/2011/20Relieving-Pain-in-America-A-Blueprint-for-Transforming-Prevention-Care-Education-Research/Report-Brief.aspx>  
Nahin RL. Estimates of pain prevalence and severity in adults: United States, 2012. *J Pain* 2015 Aug;16(8):769-80.

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## Musculoskeletal Pain



- Musculoskeletal conditions are leading cause of **long-term pain/disability**
- **Aging, obesity and lack of regular physical activity are major risk factors for arthritis and back pain.**
- In US, 52 million American adults have arthritis and **by 2040, that number will reach 78.4 million, or roughly 26% of all adults.**

Hootman JM, et al. Updated Projected Prevalence of Self-Reported Doctor-Diagnosed Arthritis and Arthritis-Attributable Activity Limitation Among US Adults, 2015-2040. *Arthritis Rheumatol* 2016 Jul;68(7):1582-7.

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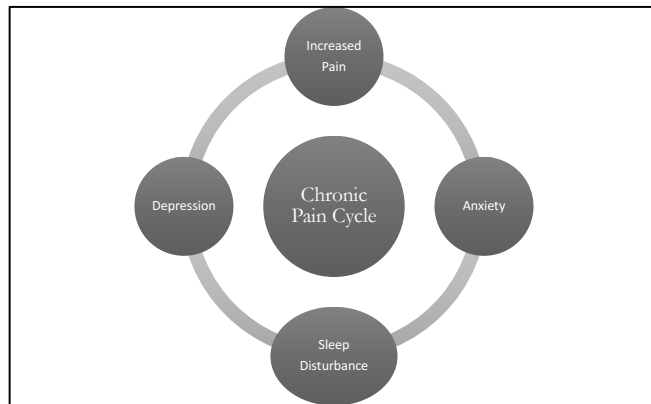
## Mood, Sleep and Pain



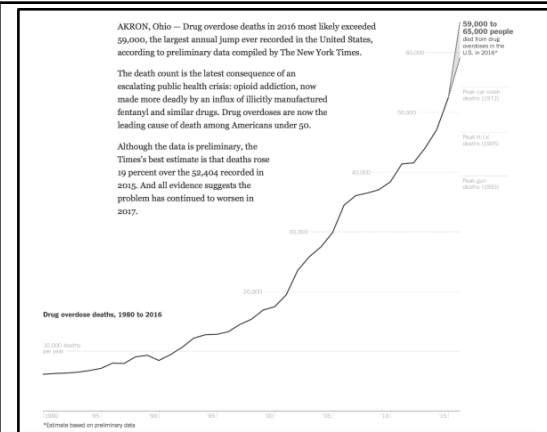
- **Depression and pain** leading causes of **global disability.**
- Study of 273,952 individuals/47 countries found **depression significantly associated with severe pain** (odds ratio 3.93 (95% CI 3.54-4.37).
- Patients with chronic pain, most common central symptoms were **difficulty concentrating, loss of interest/pleasure, depressed mood, fatigue.**
- **Back/neck pain are the leading cause of workplace disability, followed by major depression and arthritis.**
- **50-80% chronic pain patients have sleep disturbance.** Pain can interfere with sleep and sleep disturbance can exacerbate pain.

McWilliams LA, et al. A Network Analysis of Depressive Symptoms in Individuals Seeking Treatment for Chronic Pain. *Clin J Pain* 2017 Oct;33(10):899-904.

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## Acute or Subacute Low Back Pain: Guidance



- Given most patients with acute or subacute low back pain improve over time **regardless of treatment**, clinicians and patients should select **non-pharmacologic treatment with superficial heat, massage, acupuncture, or spinal manipulation.**
- If pharmacologic treatment is desired, clinicians and patients should select nonsteroidal anti-inflammatory drugs or skeletal muscle relaxants.

(Grade: strong recommendation)

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## Spinal Manipulation for Acute Back Pain

- 15 randomized controlled trials (RCTs) found **spinal manipulation resulted in an improvement in pain of about 10 points on a 100-point scale.**
- 12 RCTs, some of which overlapped with above but not all, found spinal manipulation **resulted in improvements in function.**



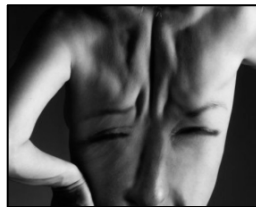
Paige NM, et al. Association of Spinal Manipulative Therapy With Clinical Benefit and Harm for Acute Low Back Pain: Systematic Review and Meta-analysis. *JAMA*. 2017;317(14):1451-1460.

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## Chronic Low Back Pain Guidelines

- For patients with chronic low back pain, clinicians and patients should **initially** select non-pharmacologic treatment with **exercise, multidisciplinary rehabilitation, acupuncture, mindfulness-based stress reduction, tai chi, yoga, progressive relaxation, cognitive behavioral therapy, spinal manipulation...**

(Grade: strong recommendation)



Qaseem A, et al. Noninvasive Treatments for Acute, Subacute, and Chronic Low Back Pain: A Clinical Practice Guideline From the American College of Physicians. *Annals of Internal Medicine* 2017;166(7):514-530.

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## Yoga

- The “**union of the divine**,” yoga practiced for thousands of years in India.
- Yoga incorporates **breathing exercises, different postures, stretches, and meditation** to help one gain **greater acceptance, compassion and centering.**
- Studies have found yoga to help **ease stress, anxiety, and pain, while improving mood.**



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6 studies yoga used to treat patients with back pain;  
2 studies to treat rheumatoid arthritis;  
2 studies to treat patients with headache/migraine;  
6 studies other pain indications.

Review found a **26% overall treatment effect and 21% improvement in pain related disability.**

Bussing A, et al. Effects of yoga interventions on pain and pain associated disability: a meta-analysis. *J Pain* 2012; 13(1):1-9



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## Migraine Headache

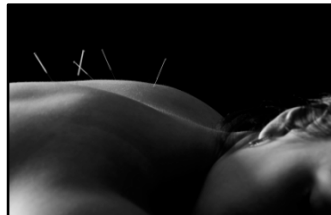


- **Stress and poor sleep** are biggest triggers for migraines, as well as **dehydration, bright lights, menses, TMD, specific foods, etc.**
- The following have been found effective (varying degrees) for prophylaxis:
  - Acupuncture
  - Yoga
  - Magnesium
  - Riboflavin
  - Butterbur
  - CoQ10
  - Feverfew

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## Acupuncture for Migraine

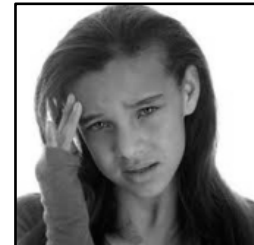
- Cochrane review 22 trials (n=4985) concluded that **adding acupuncture to symptomatic treatment of attacks reduces the frequency of headaches AND that acupuncture may be at least as effective as treatment with prophylactic drugs.**
- “Acupuncture can be considered a treatment option for patients willing to undergo this treatment.”



Linde K, et al. Acupuncture for the prevention of episodic migraine. *Cochrane Database Syst Rev* 2016; Jun 28; (6):CD001218

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## Magnesium for Migraines



- Studies show **migraineurs have low brain Mg** during migraine and low systemic mag.
- Reduces **pediatric migraine** and **tension headaches.**
- Canadian Headache Society: **strong recommendation** for prophylaxis with **600 mg magnesium citrate.**
- **Diarrhea** most common side effect (**mag oxide > citrate/malate>glycinate**).  
Caution in poor kidney function.

Sun-Edestein C, Mauskop A. *Clin J Pain*. 2009 Jun;25(5):446-52.  
Pringsheim T, et al. *Can J Neurol Sci* 2012; 39(2Suppl):S1-S9  
Chiu HY, et al. *Pain Physician* 2016; 19(1):197-112.

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## Riboflavin for Migraines



Rajapakse T, et al. Nutraceuticals in migraine: a summary of existing guidelines for use. *Headache* 2016; Apr;56(4):808-16.

- The CHS guidelines **gave riboflavin a strong recommendation: 400 mg/d to eligible patients for migraine prophylaxis.**
- AAN/AHS guidelines give riboflavin a Level B recommendation, stating it is **probably effective and should be considered for migraine prevention.**
- **Riboflavin deficiency increases photosensitivity. Primary source in American diet is dairy.**

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## Butterbur Extract for Migraines (*Petasites hybridus*)



Rajapakse T, et al. Nutraceuticals in migraine: a summary of existing guidelines for use. *Headache* 2016; Apr;56(4):808-16.

- Butterbur has Level A recommendation for migraine prevention in adults from American Academy of Neurology and American Headache Society.
- **For migraine prophylaxis: 75 mg twice daily.**
- These recommendations may be revised (but have not) due to **several cases of liver damage reported in the literature.**
- **Extracts must be PA free.**

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## Feverfew (*Tanacetum parthenium*)



Wider B, et al. Feverfew for preventing migraine. *Cochrane Database Syst Rev* 2015; 4:CD002286

- Recent Cochrane review **acknowledges mixed and inconclusive findings**, however, includes a recent randomized study that showed a difference of 0.6 attacks per month with feverfew compared to placebo.
- **Quality of products highly variable.**

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## *Cannabis sativa, C. indica*



- Cannabis used to **treat pain thousands of years.**
- Major **psychotropic component of cannabis is Δ9-tetrahydrocannabinol (THC)**, one of 120 naturally occurring phytocannabinoids.
- **Cannabidiol (CBD) also found in cannabis in large amounts but does not produce euphoric effects but has anxiolytic, anti-seizure, analgesic, and anti-inflammatory properties.**
- Overall effects of herbal *Cannabis* represent the collective activity of **THC, CBD and a number of minor components such as terpenes, flavonoids.**

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## Cannabis and Pain

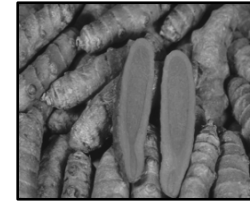
- Cannabis has been demonized for more than one century.
- Systematic review and meta-analysis of cannabinoids (28 randomized trials) for chronic pain found that, compared with placebo, cannabinoids were associated with greater a reduction in pain.
- CBD may have therapeutic potential for the treatment of insomnia, REM sleep behavior disorder, and excessive daytime sleepiness.

Whiting PF, et al. Cannabinoids for medical use: a systematic review and meta-analysis. *JAMA*. 2015;313:2456–2473

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## Turmeric Rhizome (*Curcuma longa* and others)

- Rhizomes provide bright yellow-orange culinary spice and dye.
- Yellow pigments = curcuminoids
- Long history of medicinal use for respiratory, skin, digestive and inflammatory conditions in India.
- More than 65 clinical trials have shed light on its potential role in CVD, diabetes, cancer, fatty liver, arthritis, neuro/psych disorders.
- Dose generally 1000-1500 mg per day of extract (95% curcumin).



Kunnumakkara AB, et al. *Br J Pharmacol* 2016; Sep 17. doi: 10.1111/bph.13621.

Prasad S, et al. *Biochemical Adv* 2014; 32(6):1053-1064

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## Turmeric for Arthritis?

- Laboratory, translational and clinical trials, in general, support use of curcumin for osteoarthritis.
- 13 randomized clinical studies of varying methodological quality show turmeric/curcumin at sufficient dosing and in optimal preparations can reduce pain and improve the functionality of patients with knee osteoarthritis.



Chin K-Y. *Drug Des Dev Ther* 2016; 10: 3029–3042

Peddada KV, et al. *Orth Surg* 2015; 7(3):222-31

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## Turmeric for Depression?

- Mini meta-analysis of 6 studies found curcumin reduced depression symptoms, particularly in middle-aged patients when given at higher doses for longer periods of time.
- Authors concluded, “there is supporting evidence that curcumin administration reduces depressive symptoms in patients with major depression.”
- Is this an impact on microbiome? Is it due to systemic reduction in inflammation? *More research needed.*



Al-Kawari D, et al. *Phytother. Res* 2016; 30(2):175-83

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## The Role of Diet in Pain



- The role of diet has been recognized in numerous pain conditions but likely contributes to many pain disorders:
  - Irritable bowel syndrome**
  - Inflammatory bowel disease**
  - Migraine** (food triggers, as well as fasting induced headaches)

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## Dietary Inflammatory Index (DII)

- Inflammation often driven by dietary patterns. An anti-inflammatory diet may reduce **sub-chronic inflammation**, improve **cardiovascular, metabolic, neurologic and pain 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

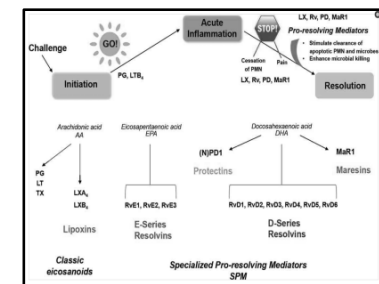
FOOD	SERVING SIZE	SERVING SIZE (GRAMS)	IF RATING
AGAVE NECTAR	1 TBSP	21	-74
ALMOND BUTTER	¼ CUP	64	100
CHEESE, CHEDDAR	1 OUNCE	28.35	-20
CHICKEN BREAST, RSTD	3 OUNCES	85	-19
MILK, WHOLE	1 CUP	246	-46
OLIVE OIL	1 TBSP	14	74
ONIONS, COOKED	½ CUP	105	240
RICE, WHITE	1 CUP	158	-153
SPINACH	1 CUP	30	75
SALMON,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

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## Resolution Biology

- Research shows that **resolution of inflammation is an active, programmed response**.
- Omega 3 fatty acids** produce specialized **pro-resolving mediators (SPM)** – resolvins, protectins and maresins.
- Increasing omega 3 fatty acids in the diet** can help with mood, pain and promote overall health.

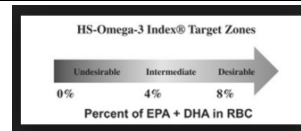


Serhan CN, Chiang N. *Curr Opin Pharmacol* 2013; 13(4):632-40

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## Canadians and Omega 3



- **Omega-3 Index** indicates % of EPA+DHA in red blood cells.
- Canadian government found mean Omega-3 Index of Canadians aged 20-79 was 4.5%. **Fewer than 3% had levels associated with low CHD risk; 43% had levels associated with high risk.**
- **What about chronic pain patients? Should we assess omega 3 fatty acid level to optimize their “anti-inflammatory” activity?**
- **Most benefit from 800-1000 mg EPA and 300-500 mg DHA per day.**
- **Order your own omega 3 test at [requestatest.com](http://requestatest.com)**

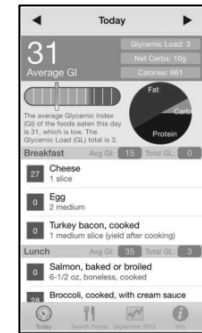
Langlois K, et al. *Health Rep* 2015; Nov 18;26(11):3-11

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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.
- Studies show **high carbohydrate meals** (high glycemic load) significantly **increase cortisol** when compared to control.
- **Protein and fat significantly decreased cortisol** when compared to carbohydrate.
- **A low glycemic load diet is important for overall health and certainly for those with chronic persistent stress.**



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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

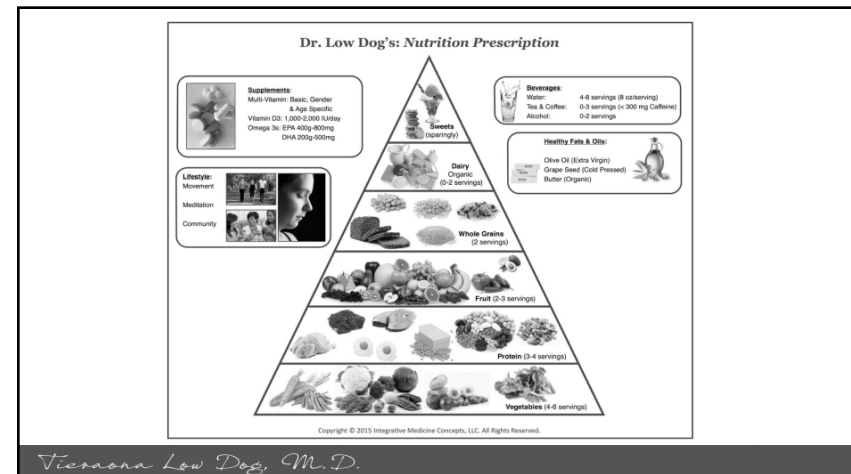
### Whole Day

Low	0-10	Low	< 80
Moderate	11-19	Moderate	80-120
High	20+	High	>120

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Food	Serving Size	Glycemic Load	Food	Serving Size	Glycemic Load
Grapefruit	½ large	3	Asparagus	½ cup	2
Apple	1 medium	6	Broccoli	1 cup	4
Banana	1 large	14	Green beans	1 cup	3
Raisins	1 small box	20	Tomato	1 medium	2
Watermelon	1 cup	8	Subway sandwich	6 inch	17
Carrots	1 large	5	Turkey breast		
Orange	1 medium	6	Butter pecan ice cream	5.5 ounces (small)	22
Sweet potato	1 cup	17	Vanilla ice cream cone	4.5 ounces (small)	19
Baked potato	1 medium	28	Potato chips, fat free	1 bag (8 ounces)	49
French fries	1 medium serving	26	Tortilla chips, white corn	3.5 ounces	38
Snickers	1 bar	35	Spaghetti	1 cup	38
Reese's cup	1 miniature	2	Brown rice	1 cup	23
White table wine	5 ounces	1	White rice	1 cup	33
Red table wine	5 ounces	1	Macaroni and cheese	1 cup prepared	31
Grape juice	6 ounces	12			

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## A Basic Multivitamin for Many

- **90 million** Americans are **vitamin D** deficient using **Endocrine Society** guidelines
- **30 million** are deficient in **vitamin B6**
- **18 million** people have **B-12 deficiency**
- ~**16 million** are deficient in **vitamin C**
- **13% of Latinas** and **16% of African American black women** (ages 12-49) are iron deficient
  - **10% of Hispanic children** 1-5 years of age are low in iron
- Women 25-39 **borderline iodine insufficiency**
- **50% Americans** don't meet RDI for **magnesium**



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

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- Vitamin D deficiency can cause **osteomalacia** leading to **musculoskeletal pain** in the **pelvis, shoulders, low back, and proximal muscles**.
- Deficiency is common worldwide but often **more severe in elders** due to environmental and biological factors.
- **Anyone with musculoskeletal pain** should be screened for **vitamin D**.
- **Most of us** should take **1000-2000 IU/d**

## Vitamin D



Wintermeyer E, et al. Crucial Role of Vitamin D in the Musculoskeletal System. *Nutrients* 2016; Jun 1;8(6). pii: E319.

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## Mindfulness Meditation

- Long-time meditators have greater activation of areas responsible for sustaining **attention**, processing **empathy**, **integrating emotion and cognition**, and **perceiving** the mental and emotional state of **others**.
- Review of **47 trials** found **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.
- **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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## Meaning and Purpose

- What truly gives a person a sense of *meaning and purpose* in life?
- How can someone discover her life purpose to focus on the essence of who she is? Her *be-ing*.
- How can one live from a “*deep place*” despite his or her pain?
- So important to explore..... it is often the key to *less suffering*.....

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

~ Mary Oliver

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## CDC Guidance for Influenza 2017-18

- Influenza: acute viral respiratory infection caused by RNA viruses, resulting in fever and myalgia in infected people.
- Epidemically seasonal influenza leads to **three to five million severe illness cases** and around **250,000 to 500,000 deaths in the world yearly**.
- Flu viruses most common in US during fall/winter months, increasing in Oct/Nov, peaking between December and February and can last until May.
- CDC recommends annual flu vaccine for everyone 6 months and older.

<https://www.cdc.gov/flu/about/season/flu-season-2017-2018.htm> Accessed January 2, 2018

Wei Te Lei, et al. *Nutrients* 2017 Nov; 9(11):1175

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## Flu Vaccine Effectiveness

- Frequent alterations in antigenic structures of respiratory viruses, particularly for RNA viruses, pose difficulties in production of effective vaccines. **38% efficacy for 2017-18 flu vaccine.**

2010-11	Treanor 2011	WI, MI, NY, TN	4757	60	53, 66
2011-12	Ghmit 2014	WI, MI, PA, TX, WA	4771	47	36, 56
2012-13	McLean 2014	WI, MI, PA, TX, WA	6452	49	43, 55
2013-14	Gagliardi 2016	WI, MI, PA, TX, WA	5999	52	44, 59
2014-15	Zimmerman 2016	WI, MI, PA, TX, WA	9311	19	10, 27
2015-16*	Jackson 2017	WI, MI, PA, TX, WA	6879	48*	41, 55*
2016-17**	ACIP presentation, Ferdinands [743 KB, 19 pages]	WI, MI, PA, TX, WA	7410	39**	32, 46

\*Estimate from Nov 2, 2015–April 15, 2016.

\*\*Unpublished final estimates

<https://www.cdc.gov/flu/professionals/vaccination/effectiveness-studies.htm>  
Accessed January 2, 2018

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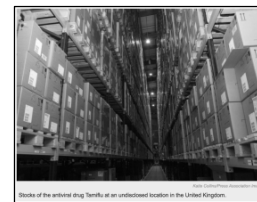
## CDC Guidance, continued

- **Most people with the flu have mild illness and do not need medical care or antiviral drugs.**
- “If you get sick with flu symptoms, in most cases, you should stay home and avoid contact with other people except to get medical care.”
- **Antiviral drugs** can be used to treat flu illness in those at risk for serious flu complications (i.e., **children younger than 5, adults 65 and older, pregnant women, people with long-term medical conditions, residents of nursing homes/long-term care facilities**) and people who are hospitalized for flu.

<https://www.cdc.gov/flu/about/season/flu-season-2017-2018.htm> Accessed January 2, 2018

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Roof of the modern drug library at an unlicensed location in the United Kingdom.

Jefferson T, et al. *British Medical Journal* 2014; 348: g2545.

In October 2013, Cochrane reviewers received full Clinical Study Reports for 107 studies from Roche and GlaxoSmithKline, makers of antiviral meds. Most of studies had never been published.

- Reduction in time to first alleviation of symptoms from 7 to 6.3 days compared to control group.
- No evidence oseltamivir reduces hospitalizations or complications of flu: pneumonia, bronchitis, sinusitis, ear infections in adults or kids
- In prophylaxis trials, reduced flu-like symptoms in adults; did not prevent person-to-person spread.
- Increased risk of vomiting, headaches, psychiatric syndromes and a statistically significant increase in renal events.

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## Concluding Thoughts

- The stated intentions of governments to distribute Tamiflu to healthy people to prevent complications and interrupt transmission of influenza on the basis of a published evidence base that has been affected by reporting bias, ghost authorship, and poor methods is worrisome.
- ***“We believe these findings provide reason to question the stockpiling of oseltamivir, its inclusion on the WHO list of essential drugs, and its use in clinical practice as an anti-influenza drug.”***

Jefferson T, et al. *British Medical Journal* 2014; 348: g2545.

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## Echinacea and Elderberry

- Hydroethanolic extract prepared from freshly harvested ***Echinacea purpurea*** has demonstrated **strong activity against influenza virus strains (H1N1, H3N2, H5N1, H7N7, H1N1pdm2009)**
- 473 patients with flu symptoms less than 48 hours randomized to 240 mg echinacea herb/root extract + elderberry fruit (Vogel Bioforce) or tamiflu.
- No difference between recovery rates, antibiotic use, intermediate doctor visits, use of over-the-counter medications for symptoms, “ability to return to normal daily activities,” or physician- and patient-reported efficacy of the treatments.
- Safety from numerous trials is very good.

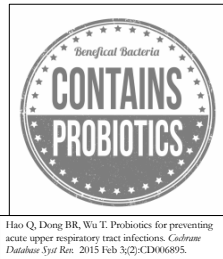


Raus K, et al. *Curr Ther Res*. 2015 Dec; 77: 66–72.

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## Probiotics



Hao Q, Dong BR, Wu T. Probiotics for preventing acute upper respiratory tract infections. *Cochrane Database Syst Rev*. 2015 Feb 3;(2):CD006895.

- Probiotics modulate innate and adaptive immunity in elderly and also reduce length of respiratory/flu infection in children and adults
- Review of 12 studies with 3720 participants including children, adults, and older people not at high risk for URTI.
  - Number of people who develop URTI is reduced when taking probiotics.
  - Probiotics probably reduce duration of a URTI by approximately 2 days.

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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: e6583.

- Acute respiratory infection kills an estimated 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).
- Why not check levels in September before flu season begins?

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## Vitamin D and Asthma

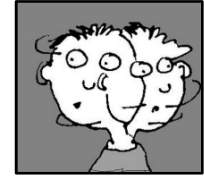
- **Viral** respiratory infections are a major cause of **asthma exacerbations**.
- Systematic review and meta-analysis of 8 RCTs (n=1078 participants) found **vitamin D supplementation reduced rate of asthma exacerbation requiring systemic corticosteroids** among all participants but greatest benefit seen in those with low baseline levels of vitamin D.
- Cochrane review found data suggest vitamin D is likely to reduce **both the risk of severe asthma exacerbation and healthcare use in those with mild-to-moderate asthma**.

Jolliffe DA, et al. Vitamin D supplementation to prevent asthma exacerbations: a systematic review and meta-analysis of individual participant data. *Lancet Respir Med* 2017 Nov;5(11):881-890.

Martineau AR, et al. Vitamin D for the management of asthma. *Cochrane Database Syst Rev* 2016 Sep 5;9(11):CD011511.

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## Attention Deficit Hyperactive Disorder



- **11% of school aged kids in US have ADHD diagnosis.**
- **87% of these children are prescribed medication**, mostly methylphenidates (Ritalin) and amphetamines (such as Adderall). (15 have been approved for children)
- **Meds can cause liver toxicity, weight loss, sleep problems, mood swings, and even thoughts of suicide. They can also interfere with growth.**
- **\$320- \$500 million spent annually in U.S. on medications for those inappropriately diagnosed ADHD.**

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## Other Causes?

- **Environmental toxins**
- **Higher demands** on children
- **High carb, low nutrient diet, nutrient deficits**
- **Less physical activity**
- **Excessive use of technology**
- **Lack of regular physical activity**
- **Less effective parenting**
- **Everyone is more stressed**



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## Movement is Life.....

- **80 million** Americans 6 years and older are **entirely inactive**
- Relationship between physical activity and **cardiovascular, metabolic, neurological, immunological, and musculoskeletal** health well-established.
- Shown to **reduce the harmful effects of stressors** when performed at moderate intensities.
- **Meta-analysis of 398 studies** consistently shows **exercise** benefits mood, depression, anxiety and attention.

Delamater, et al. *Neuropsychobiology* 2009; 59(4):191-8  
Rebar AL, et al. *Health Psychol Rev* 2015; Mar 5:1-78



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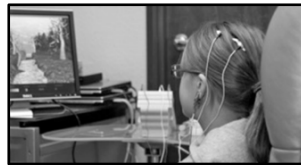
- **Meditation interventions** are being increasingly implemented among **youth in school, community, and clinic based settings**
- **16 studies** show meditation can be **effective intervention** for **psychosocial, and behavioral problems in children and teens.**

Black DS, et al. *Pediatrics* 2009; 124(3):e532-41

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- **104 children (7-11 years)** with ADHD randomly assigned to **40-sessions neurofeedback computer training intervention, cognitive training, or control** and evaluated six months post-intervention.
- **Neurofeedback** participants made **more prompt and greater improvements in ADHD symptoms**, which were **sustained at 6-month follow-up**. Cognitive training and control groups both had increased med dosing during follow up.

## Neurofeedback



Steiner NJ, et al. *Pediatrics* 2014; 133(3):483-92

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## Pesticide Exposure and ADHD

- Pound for pound, children drink **2.5 times more water**, eat **3-4 times more food**, and breathe **2 times more air**. They are exposed to more pesticide.
- Studies have found **significant association** between urinary pesticide levels and **hyperactive-impulsive symptoms**.
- Using data from NHANES – children with **typical levels of pesticide exposure from eating pesticide-treated fruits/vegetables**, have **higher risk of developing ADHD**.
- Children ages 8-15 with **higher urinary levels of pesticide residues** had **twice the odds of ADHD** when compared with children with low or undetectable levels.

Kuehn BM. *JAMA*. 2010 Jul 7;304(1):27-8.

Bouchard, et al. *Pediatrics*. 2010 Jun;125(6):e1270-7.

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## Pesticides and Organic Produce

- Consumption of organic diet for one week significantly reduced pesticide exposure in adults as measured by urinary metabolites.
- Mean total pesticide metabolites in organic phase were 89% lower than when eating conventional foods.
- Similar results shown in children.
- Unfortunately, **organic produce often more expensive than conventionally grown**, making it out of reach for some of most at risk citizens.

SHOPPER'S GUIDE TO PESTICIDES	
DIRTY DOZEN	CLEAN 15
Buy These Organic	Lowest in Pesticides
1 Celery	1 Onions
2 Peaches	2 Avocado
3 Strawberries	3 Sweet Corn
4 Apples	4 Pineapple
5 Blueberries	5 Mangoes
6 Nectarines	6 Sweet Peas
7 Bell Peppers	7 Asparagus
8 Spinach	8 Kale
9 Kale	9 Cabbage
10 Cherries	10 Eggplant
11 Potatoes	11 Cantaloupe
12 Grapes (imported)	12 Watermelon
	13 Grapefruit
	14 Sweet Potato
	15 Honeydew Melon

Oates L, et al. *Environ Res* 2014; 132:105-11  
 Bradman A, et al. *Environ Health Perspect* 2015; 123(10):1086-93

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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.

*Vicanna Low Dog, M.D.*