Integrative Geriatrics: Evidence Based Modalities to Advance Older Adult Health

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Disclosures

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- Co-owner and Medical Director of GW Center for Integrative Medicine.
- I use number of references from Integrative Geriatrics Textbook that I edited
- Paid consultant - The DC Center for Rational Prescribing (DCRX)

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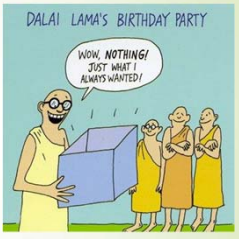
Successful aging is far beyond being healthy and vibrant. It is rectifying internal conflicts, paradoxes, and continuous redefining life's meaning.

Mikhail Kogan, MD from Oxford University Press Textbook on Integrative Geriatric Medicine



Integrative Geriatrics - definition

Is a new field of medicine that advocates for a whole-person, patient-centered, primarily non-pharmacological approach to medical care of the elderly. The practice of integrative geriatrics is rooted in lifestyle interventions, such as nutrition, movement therapies, and mind-body and spirituality approaches, that allow patients to have different path to their healthcare - one that utilizes pharmaceuticals and invasive procedures only when safer integrative approaches are not available or not effective.

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Aging around the World
Average vs Exceptions
Why is it so important?

Average

USA

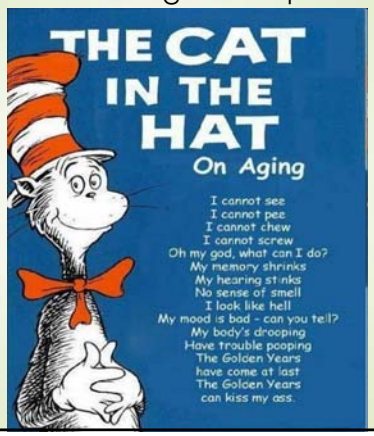
Sardinia

Exceptions

Canada

USA

Sad Average Perception



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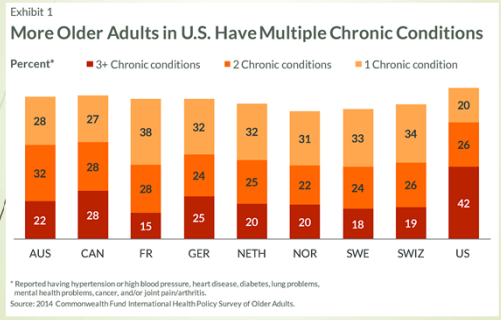
Chronic Conditions



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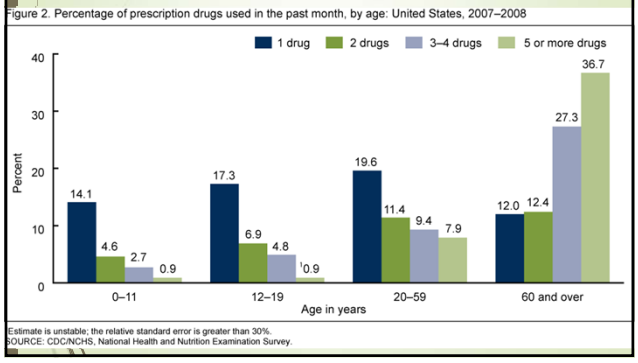
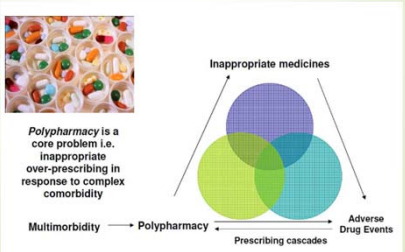
Polypharmacy



Complex Comorbidity plus Lack of Non Pharmacological Treatment Options = 4th Leading Cause of Death in US as of 2014

2.74 million serious adverse reactions/year and 128,000 deaths



https://ethics.harvard.edu/blog/new-prescription-drugs-major-health-risk-few-offsetting-advantages

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So what about lifestyle interventions for older adult?

"What fits your busy schedule better, exercising one hour a day or being dead 24 hours a day?"

Concept of Blue Zones

https://www.youtube.com/watch?v=CpCZ0DBbCOE

The Blue Zones

The "Blue Zones" are communities where common elements of lifestyle, diet, and outlook have led to a superior quality and length of life in the elderly populations.

Areas of highest concentration of CENTENARIANs

Buettner, D. The Blue Zones, 2008

Blue Zones – Universal Similarities

- Move Naturally a lot and daily
- Balance between rest, activity, lots of sleep, following daily rhythm, daily light exposure
- Regular intermittent fasting or continuous caloric restriction
- All diets are micronutrients and phytonutrients dense and low in glycemic index
- Food As Medicine
- Developed sense of belonging or meaning in life within social context

https://www.bluezones.com/

15 Blue Zones – Power 9

- 1. Move Naturally a lot and daily
- Right Outlook
  - 2. Know your purpose
  - 3. Downshift: work less, slow down, take vacations, rest a lot
- Eat Wisely
  - 4. Eat until 80% full
  - 5. More veggies, less meat, no processed foods
  - 6. Drink a glass of wine every day
- Belong
  - 7. Create healthy social networks
  - 8. Spirituality
  - 9. Prioritize Family

16 So can we implement some life style changes for ALL of our patients?

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Selected Clinical Pearls

- Back Pain – New ACP Guideline
- Prophylactic use of Probiotics
- Get your older adults off PPIs – Why and How?
- Frequent UTIs – do we have any antibiotic alternatives?
- Is there an alternative osteoporosis/osteopenia treatment?

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Chronic Back Pain April 4, 2017 New ACP Guidelines

- Recommendation 1:*Given that most patients with acute or subacute low back pain improve over time regardless of treatment, clinicians and patients should select nonpharmacologic treatment with superficial heat (moderate-quality evidence), massage, acupuncture, or spinal manipulation (low-quality evidence). If pharmacologic treatment is desired, clinicians and patients should select nonsteroidal anti-inflammatory drugs or skeletal muscle relaxants (moderate-quality evidence). (Grade: strong recommendation)*

Ann Intern Med. 2017;166(7):514-530.

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- Recommendation 2: *For patients with chronic low back pain, clinicians and patients should initially select nonpharmacologic treatment with exercise, multidisciplinary rehabilitation, acupuncture, mindfulness-based stress reduction (moderate-quality evidence), tai chi, yoga, motor control exercise, progressive relaxation, electromyography biofeedback, low-level laser therapy, operant therapy, cognitive behavioral therapy, or spinal manipulation (low-quality evidence). (Grade: strong recommendation)*

Ann Intern Med. 2017;166(7):514-530.

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Integrative Non Pharmacological Approaches

- Mind Body: MBSR, Biofeedback
- Nutritional: Anti-inflammatory Diet, Supplements
- Body Body Based: Massage, PT, Osteopathy, Chiro
- Energy Based: Reiki, Tai Chi, Acupuncture
- Movement Based: Alexander, Yoga
- Interventional: Acupuncture, Trigger Points Injections

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Challenges

- Cost for patients on fixed income
- Medicare covers PT, Chiro, Osteopathy
  - Massage, Cranial
  - Yoga and Tai Chi can be covered as THERAPEUTIC exercise under PT/OT
  - Small Payments, draconian rules of documentation and frequent audits.
- Lack of coverage for many well evidenced approaches
  - Acupuncture
  - Alexander
  - Tai Chi/Yoga
- No coverage for nutritionists (except if end stage Renal Disease or Diabetes)
- Coordination of care by MD is covered but under very strict guidelines that are not defined for integrative providers.
- **Medical Shared Group is one possible solution – AIM Health experience**

Case - peripheral neuropathy in elderly

- 76 year old frail woman with Diabetes Mellitus related peripheral neuropathy and chronic kidney disease admitted to the hospital ICU with severe delirium.
- 7 days before admission dose of Gabapentin (Neurontin) for chronic neuropathy was increased to 300mg every 8 hours.
- Geriatrics consult was called, Gabapentin was rapidly tapered down and delirium slowly resolved. Patient followed at GW Center for Integrative Medicine.
- Outpatient treatment:
  - Weekly acupuncture
  - Finished Gabapentin taper
  - Combination of Alpha Lipoic Acid, Benfotiamine, and GLA (Evening Primrose Oil)
  - Medical Cannabis Recommendation – sublingual tincture as needed

Case – 12 weeks follow up

- "Well I did get very high few times, reminded me of my hippie years. After few weeks I figured out how to dose it just right."
- "I have no idea if supplements are doing anything but acupuncture has been somewhat helpful."
- "I have to choose pot over acupuncture, all these costs add up."
- "Can't you write me some letter for Medicare? I mean why all your effective treatments are not covered, while the medication that almost killed me is?"
- "Oh, and my primary care doctor wants you to call him. He thinks I should not use pot as it is very dangerous at my age and he wants to put me on another medication instead, but I don't think so."

The New York Times

THE NEW OLD AGE

Older Americans Are Flocking to Medical Marijuana

Oils, tinctures and salves — and sometimes old-fashioned buds — are increasingly common in seniors' homes. Doctors warn that popularity has outstripped scientific evidence.

Co-authors of a recent article on medical marijuana and older adults in the Journal of the American Geriatrics Society, they support legalization for medical use. They hope the federal government will reclassify cannabis ("a huge undertaking," Dr. Briscoe admitted), reducing obstacles to much-needed research.

Cannabis and Chronic Pain

Cannabis in painful HIV-associated sensory neuropathy

A randomized placebo-controlled trial

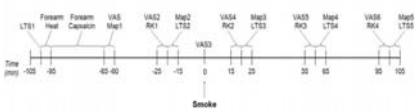
D.I. Abrams, MD; C.A. Jay, MD; S.B. Shade, MPH; H. Vizoso, RN; H. Reda, BA; S. Press, BS; M.E. Kelly, MPH; M.C. Rowbotham, MD; and K.L. Petersen, MD

Abstract—*Objective:* To determine the effect of smoked cannabis on the neuropathic pain of HIV-associated sensory neuropathy and an experimental pain model. *Methods:* Prospective randomized placebo-controlled trial conducted in the inpatient General Clinical Research Center between May 2003 and May 2005 involving adults with painful HIV-associated sensory neuropathy. Patients were randomly assigned to smoke either cannabis (3.56% tetrahydrocannabinol) or identical placebo cigarettes with the cannabinoids extracted three times daily for 5 days. Primary outcome measures included ratings of chronic pain and the percentage achieving >30% reduction in pain intensity. Acute analgesic and anti-hyperalgesic effects of smoked cannabis were assessed using a cutaneous heat stimulation procedure and the heat/capsaicin sensitization model. *Results:* Fifty patients completed the entire trial. Smoked cannabis reduced daily pain by 34% (median reduction; IQR = −71, −16) vs 17% (IQR = −29, 8) with placebo ($p = 0.03$). Greater than 30% reduction in pain was reported by 52% in the cannabis group and by 24% in the placebo group ($p = 0.04$). The first cannabis cigarette reduced chronic pain by a median of 72% vs 15% with placebo ($p < 0.001$). Cannabis reduced experimentally induced hyperalgesia to both brush and von Frey hair stimuli ($p \leq 0.05$) but appeared to have little effect on the painfulness of noxious heat stimulation. No serious adverse events were reported. *Conclusion:* Smoked cannabis was well tolerated and effectively relieved chronic neuropathic pain from HIV-associated sensory neuropathy. The findings are comparable to oral drugs used for chronic neuropathic pain.

NEUROLOGY 2007;68:515–521

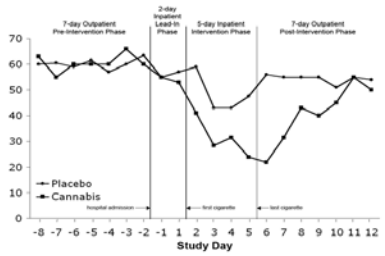
Experimental Pain Model

Pain Model Timeline: Days 1 and 5



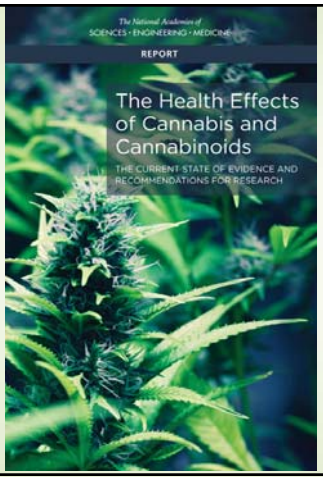
www.doh.dc.gov

Results: Neurology RCT



Abrams 2007

www.doh.dc.gov



CONCLUSIONS FOR: THERAPEUTIC EFFECTS

There is conclusive or substantial evidence that cannabis or cannabinoids are effective:
- For the treatment for chronic pain in adults (cannabis) (4-1)
- Antiemetics in the treatment of chemotherapy-induced nausea and vomiting (oral cannabinoids) (4-3)
- For improving patient-reported multiple sclerosis spasticity symptoms (oral cannabinoids) (4-7a)

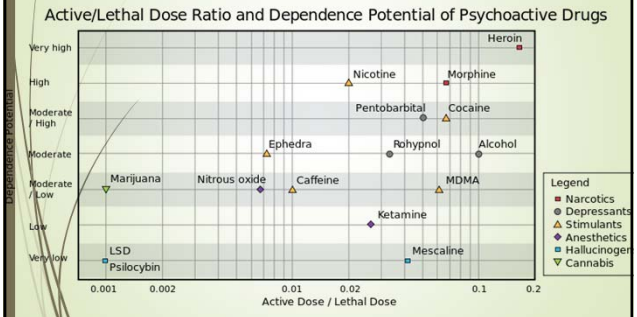
There is moderate evidence that cannabis or cannabinoids are effective for:
- Improving short-term sleep outcomes in individuals with sleep disturbance associated with obstructive sleep apnea syndrome, fibromyalgia, chronic pain, and multiple sclerosis (cannabinoids, primarily nabiximols) (4-19)

There is limited evidence that cannabis or cannabinoids are effective for:
- Increasing appetite and decreasing weight loss associated with HIV/AIDS (cannabis and oral cannabinoids) (4-4a)
- Improving clinician-measured multiple sclerosis spasticity symptoms (oral cannabinoids) (4-7a)
- Improving symptoms of Tourette syndrome (THC capsules) (4-8)
- Improving anxiety symptoms, as assessed by a public speaking test, in individuals with social anxiety disorders (cannabidiol) (4-17)
- Improving symptoms of posttraumatic stress disorder (nabilone; one single, small fair-quality trial) (4-20)

There is limited evidence of a statistical association between cannabinoids and:
- Better outcomes (i.e., mortality, disability) after a traumatic brain injury or intracranial hemorrhage (4-15)

There is limited evidence that cannabis or cannabinoids are *ineffective* for:
- Improving symptoms associated with dementia (cannabinoids) (4-13)
- Improving intraocular pressure associated with glaucoma (cannabinoids) (4-14)
- Reducing depressive symptoms in individuals with chronic pain or multiple sclerosis (nabiximols, dronabinol, and nabilone) (4-18)

Cannabis Toxicity/Addiction



R. S. Gable, et al 2006

Cannabis and Opioids

HHS Public Access

Author manuscript

JAMA Intern Med. Author manuscript; available in PMC 2015 October 01.

Published in final edited form as:

JAMA Intern Med. 2014 October ; 174(10): 1668–1673. doi:10.1001/jamainternmed.2014.4005.

Medical Cannabis Laws and Opioid Analgesic Overdose Mortality in the United States, 1999–2010

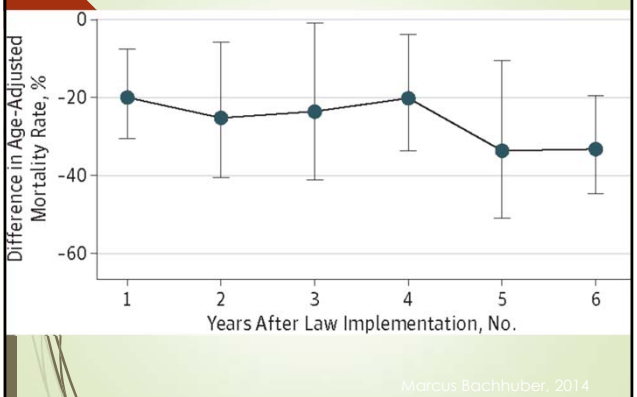
Marcus A. Bachhuber, MD, Brendan Saloner, PhD, Chinazo O. Cunningham, MD, MS, and

Abstract

IMPORTANCE—Opioid analgesic overdose mortality continues to rise in the United States, driven by increases in prescribing for chronic pain. Because chronic pain is a major indication for

"We found there was about a 25 percent lower rate of prescription painkiller overdose deaths on average after implementation of a medical marijuana law," lead study author - Marcus Bachhuber, MD

Marcus Bachhuber, 2014



Marcus Bachhuber, 2014

JAMA Internal Medicine Published online April 2, 2018

JAMA Internal Medicine | Original Investigation | HEALTH CARE POLICY AND LAW

Association Between US State Medical Cannabis Laws and Opioid Prescribing in the Medicare Part D Population

Ashley C. Bradford, BA; W. David Bradford, PhD; Amanda Abraham, PhD; Grace Bagwell Adams, PhD

Invited Commentary
Related article
Supplemental content

IMPORTANCE Opioid-related mortality increased by 15.6% from 2014 to 2015 and increased almost 320% between 2000 and 2015. Recent research finds that the use of all pain medications (opioid and nonopioid collectively) decreases in Medicare Part D and Medicaid populations when states approve medical cannabis laws (MCLs). The association between MCLs and opioid prescriptions is not well understood.

OBJECTIVE To examine the association between prescribing patterns for opioids in Medicare Part D and the implementation of state MCLs.

DESIGN, SETTING, AND PARTICIPANTS Longitudinal analysis of the daily doses of opioids filled in Medicare Part D for all opioids as a group and for categories of opioids by state and state-level MCLs from 2010 through 2015. Separate models were estimated first for whether the state had implemented any MCL and second for whether a state had implemented either a dispensary-based or a home cultivation only–based MCL

"States with active dispensaries saw 3.742 million fewer daily doses filled (95% CI, −6.289 to −1.194); states with home cultivation only MCLs saw 1.792 million fewer filled daily doses (95% CI, −3.532 to −0.052)"

statistically significant estimated negative associations observed for hydrocodone and

CONCLUSIONS AND RELEVANCE Medical cannabis laws are associated with significant reductions in opioid prescribing in the Medicare Part D population. This finding was particularly strong in states that permit dispensaries, and for reductions in hydrocodone and morphine prescriptions.

Cannabis in Palliative Medicine -

- "Moving forward to the present moment, I prefer that this type of care be termed "cannabinoid integrative medicine" (cim)," - S.K. Aggarwal, MD PhD*
- Euphoria is often described as a "side-effect" in trials
- Is it really an "adverse experience" or improved quality of life?
- In palliative care improved quality of life is the main goal
- **No other single treatment can help to increases appetite, decreases nausea and vomiting, and improve pain and sleep. And can be combined with opioids without added toxicity/side effects.**

S.K. Aggarwal, 2016 Curr Oncol

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Probiotics

The New York Times

Probiotics as prevention of antibiotic associated C. Diff colitis

- 2012 Meta-analysis
- Nearly 4000 patients
- 20 studies
- All but 2 studies positive
- Overall risk reduction 66%
- Less side effects in active group (statistically significant)

Bradley C. Johnston, *Annals of Int Med.* 2012

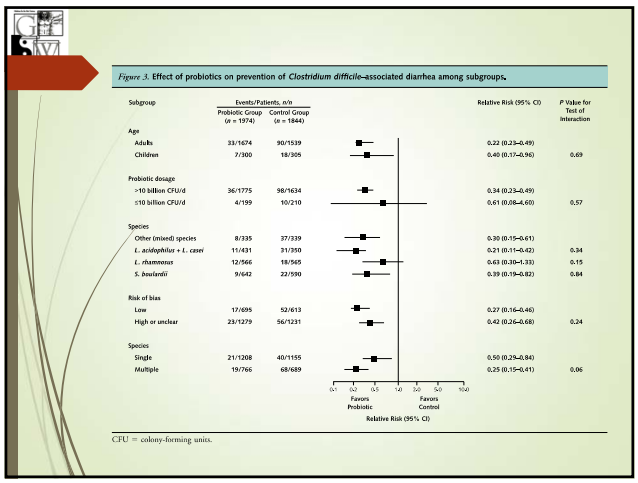


Figure 3. Effect of probiotics on prevention of *Clostridium difficile*–associated diarrhea among subgroups.

Subgroup	Events/Patients, n/n: Probiotic Group (n = 1974)	Control Group (n = 1844)	Relative Risk (95% CI)	P Value for Test of Interaction
Age				
Adults	33/1674	90/1539	0.22 (0.23–0.49)	
Children	7/300	18/305	0.40 (0.17–0.96)	0.69
Probiotic dosage				
>10 billion CFU/d	36/1775	98/1634	0.34 (0.23–0.49)	
≤10 billion CFU/d	4/199	10/210	0.61 (0.08–4.60)	0.57
Species				
Other (mixed) species	8/335	37/339	0.30 (0.15–0.61)	
L. acidophilus + *L. casei*	11/431	31/350	0.21 (0.11–0.42)	0.34
L. rhamnosus	12/566	18/565	0.63 (0.30–1.33)	0.15
S. boulardii	9/642	22/590	0.39 (0.19–0.82)	0.84
Risk of bias				
Low	17/695	52/613	0.27 (0.16–0.46)	
High or unclear	23/1279	56/1231	0.42 (0.26–0.68)	0.24
Species				
Single	21/1208	40/1155	0.50 (0.29–0.84)	
Multiple	19/766	68/689	0.25 (0.15–0.41)	0.06

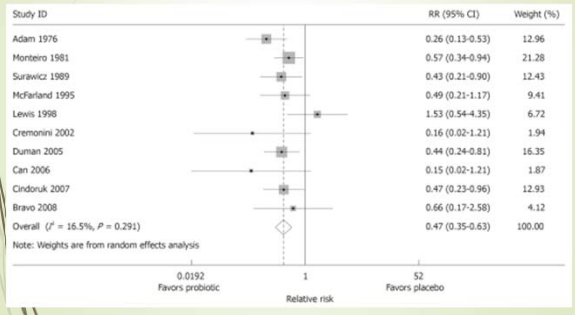
Favors Probiotic — Favors Control

Relative Risk (95% CI)

CFU = colony-forming units.

Saccharomyces boulardii

Prevention of Antibiotic Associated Diarrhea



World J Gastroenterol. 2010 May 14; 16(18): 2202–2222.

Probiotics as supplements

- Pick 2-3 favorite probiotics that can be obtained from different places
- Pick one brand that includes *S. boulardii*
- Pick non refrigerated ones for traveling
- Average monthly probiotics cost is now $30-50
  - Cost – select on higher and lower end
  - Dose 10+ billion CFUs/capsule twice/day
  - As many different strains as possible

New Mantra? – No hand should ever write prescription for Antibiotics without Probiotics

- Make sure patients know how to handle them – refrigerate
- Know probiotics rich foods – and be able to recommend discuss with patients
  - Kefir – highest probiotic concentration from common US foods
  - Yogurt, Kombucha, Kim Chi
- Length of Intensive Probiotic course is not clear. Personally I recommend entire length of antibiotics plus at least 4 more weeks.

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Get your older adults off PPIs!!!

- Proton Pump Inhibitors drugs are heavily over prescribed
- Short courses are safe and often very effective for ulcers, acid reflux, acute GI bleeding, etc
- Long term PPI use is very concerning due to increased risks
  - Changes in Microbiome - changes in immune system – current hot research topic
  - B12 and Magnesium Deficiency
  - Falls and Fractures
  - Pneumonias
  - C- Diff Colitis
  - Kidney Failure

Tetsuhide Ito et. al. 2011, Daniel E. Freedberg et. al. 2015,
Joel J. Heidelbaugh et. al 2012, M Kogan, 2017 Integrative Geriatrics Textbook

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How to do it? Case

- 69 year old male with HTN, Chronic Fatigue and muscle aches, high cholesterol, Acid Reflux referred by his wife
- Healthy looking, fun to talk to, expresses concerns about decreasing functional status, hard time doing exercising, loves long distance running but dropped speed nearly 30% and still can't run for more than 30min. Previously regular half marathons (2.5 hours)
- Non stressful retirement, financial security, strong family support.
- Excellent diet and good sleep
- Meds/Supplements –for over a decade
  - Nexium 40mg, HCTZ 25mg , Lisinopril 20mg , Crestor 10mg ASA 81mg, Tylenol PRN
  - Fish Oil, Multivitamin, CoQ10, Vitamin D3 2000 units
- Exam – nothing to report, Labs – B12 300, Ferritin 65 wnl, RBC Magnesium 4, TSH 0.8, CBC, CMP wnl, Vitamin D 25 OH 40
- Total Cholesterol 185 TG 119 HDL 52 LDL 98 VLDL 15
- WHAT IS YOUR PLAN? Let's talk

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How to do it?

The Healthy Gut 303

Box 16.1 Weaning from PPIs

Weaning Protocol for Proton Pump Inhibitors *(pantoprazole, omeprazole, etc.)*

Skip dose every third day, substituting ranitidine 150 mg or famotidine 20 mg or other H2 blocker for 2 weeks.

If the patient tolerates this, skip every other day with substitution every other day for 2 weeks.

If this is tolerated, at the end of a month, switch entirely to ranitidine, famotidine, or other H2 blocker and keep pantoprazole or other PPI in reserve for flare-ups of heartburn.

May also consider DGL or aloe as an alternative to H2 blockers or to assist in the taper.

- Start the following
  - Aloe – as Juice or Capsules. Juice mix with water (cuts cost and easier to drink)
  - Okra – add to the diet
  - Deglycyrrhizinated licorice (DGL) before each meal, could also do after each meal and when start getting any acid reflux – MAKE SURE DGL is very high potency.
  - If diet is poor and stress – address that first – OFTEN THIS DOES IT!
    - DO NOT ASSUME GI DOCs recommended diet change/stress reduction

Serpina. al. Ch. 16 Integrative Geriatric Medicine, Oxford University Press 2017

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Case continue

- Follow above protocol plus
  - No eating after 8PM
  - Coffee down to 1 cup/day, substitute with Matcha green tea
  - Hold Chocolate for 3 month
  - Cut simple carbs (sugar and bread)- loves pasta
- Added topical Magnesium daily before each run, Changed Multivitamin to better quality with higher amount of B vitamins and in activated (methylated) form
- Electrolyte capsules 1-2 before each exercise
- Monitor Blood Pressure report when decreases under 100 systolic
- 4 weeks in get call from patient BP dropped – stop HCTZ
- 1 week later BP still under 100 systolic – stop Lisinopril

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Case – 3 months follow up

- Off Nexium, Lisinopril, HCTZ
- BPs are steady under 140 systolic
- Able to run 1 hour each time, but still get's exhausted
- Pain and fatigue is 50% better
- Looked through all records, no h/o CVA/MI, non smoker
- Stop Aspirin and Crestor

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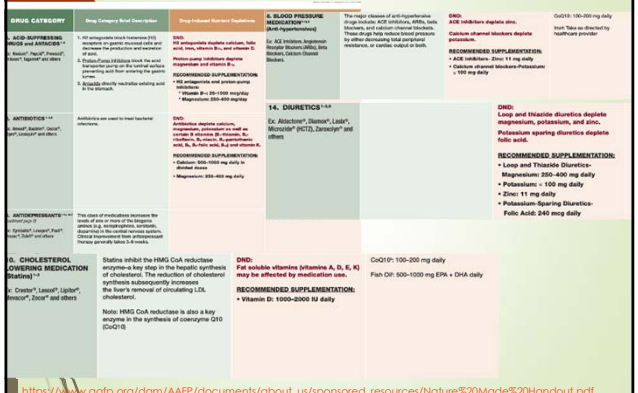
Case – 6 months follow up

- Off all meds
- Pain and Fatigue complete resolved
- Got his runs back to almost 2 hours and scheduled half marathon in months
- Total Cholesterol 233 TG 98 HDL 71 LDL 142 VLDL 16
- What happened???
  - Magnesium Deficiency was driving HTN, fatigue, and muscle cramps
  - Crestor may have contributed to Muscle pain
  - B12 deficiency/insufficiency was driving pain and fatigue
  - Increased exercise helped to raise HDL
- Who would restart Statin?
- Statins in Geriatric population – Difficult Conversation, Clearly overprescribed, to complex to discuss as part of this presentation.

Many Medications Cause Depletion of Nutrients



https://www.aafp.org/dam/AAFP/documents/about_us/sponsored_resources/Nature%20Made%20Handout.pdf

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74 year old woman with frequent UTIs

- PMH: stroke, hypertension, diabetes, peripheral neuropathy.
- Lives at home with her oldest daughter
- Dependent on most of her ADLs and incontinent of urine occasionally.
  - wheelchair-bound
  - attends activities at an adult daycare center weekly for different social activities such as art therapy and occasional physical therapy.
- Multiple UTI episodes prior to transfer to home base primary care.
- symptoms - dysuria, urinary frequency and urgency.
- Treated with multiple oral antibiotics including Augmentin, ciprofloxacin and cefpodoxime.

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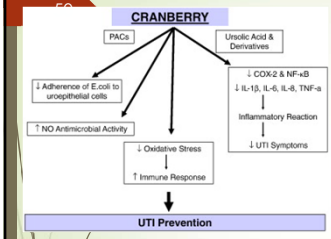
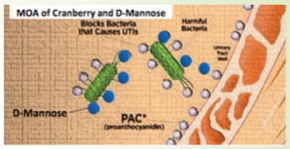
- Upon admission to Home Based Primary Care Program patient was prescribed
- D-Mannose Powder and Cranberry extract powder mix 1 teaspoon twice daily
- Providing 5gm of D-mannose and 1 gm of Cranberry extract/day.
- Patient subsequently had no recurrent UTIs for 3 years. She continues to be on D-mannose and cranberry regimen to this date.
- Easy to take powder quickly dissolves in water and avoids extra capsules/pills taking
- Prescription goes like this – take 1 tea spoon of powder into large glass of water 4 times/day – **notice large glass of water!**
- Monthly cost is $30-50





- In one randomized study of 308 women D-mannose was as effective for Nitrofurantoin in prevention of UTIs
- Nursing home residents who were given 1 cup of cranberry juice or 6 capsules of extract had significant reduction in UTI frequency as compared to historical controls
- In one small pilot study combination of D-Mannose, Cranberry extract and 2 types of Lactobacillus had dramatic effect on UTI frequency

Krankcec B., et. al. World J Urol. 2014 Feb;32(1):79-84.

Osteoporosis – in addition to calcium

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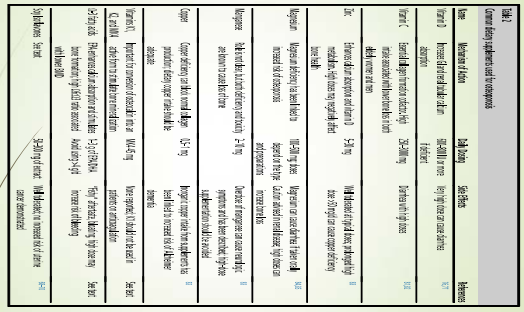

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Osteoporosis - Integrative Approach

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Table 1
Integrative approaches to preventing decline and improving muscle strength and coordination

Diet	Mediterranean diet, anti-inflammatory diet (include fatty fish, more vegetables and fruits), increase carotenoid intake, soy
Exercise	Promote mobility, walking, resistance training, yoga, tai chi, comprehensive fall prevention programs
Supplements	Fish oil, vitamin D, whey protein, soy protein, and soy isoflavones, amino acid supplementation; anti-inflammatory herbs like curcumin, if general inflammation is present or suspected; role of vitamin E is not clear
Androgens/ testosterone	Only if deficiency state is present after careful assessment of risks; not recommended for routine use

Strontium – used to be commonly used but BLACK BOX warning was placed on
Strontium Renolate in Europe – Increase risk of Heart Attacks and Strokes.
In US - Strontium is Supplement, form is different, doses are low

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72 year old woman with Osteoporosis

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Bone Density Exams Results:

Region Exam Date	Age	BMD g/cm2	T-score	BMD Change vs Baseline	BMD Change vs Previous
Total Hip(Left)				Statistically no significant change from previous scan.	
05/10/2016	72	0.690	-2.1	-0.060(-8.0%)*	0.007(1.0%)
08/25/2014	71	0.683	-2.1	-0.067(-8.9%)*	-0.039(-5.5%)*
08/21/2013	70	0.723	-1.8	-0.027(-3.6%)	-0.037(-4.9%)*
08/15/2012	69	0.760	-1.5	0.010(1.3%)	-0.001(-0.1%)
08/08/2011	68	0.760	-1.5	0.010(1.4%)	0.009(1.2%)
07/28/2010	67	0.751	-1.6	0.001(0.2%)	0.005(0.7%)
07/16/2009	66	0.746	-1.6	-0.004(-0.5%)	-0.004(-0.5%)
07/13/2007	64	0.750	-1.6		

*Denotes significance at 95% confidence level, LSC is 0.026675 g/cm2

Region Exam Date	Age	BMD g/cm2	T-score	BMD Change vs Baseline	BMD Change vs Previous
Femoral Neck(Left)				Statistically significant increase from previous scan.	
05/10/2016	72	0.583	-2.4	-0.038(-6.0%)*	0.035(6.4%)*
08/25/2014	71	0.548	-2.7	-0.073(-11.7%)	-0.060(-9.8%)*
08/21/2013	70	0.608	-2.2	-0.013(-2.1%)	-0.014(-2.2%)
08/15/2012	69	0.621	-2.1	0.000(0.1%)	-0.001(-0.2%)
08/08/2011	68	0.623	-2.0	0.002(0.3%)	0.014(2.2%)
07/28/2010	67	0.609	-2.2	-0.012(-1.9%)	-0.003(-0.6%)
07/16/2009	66	0.612	-2.1	-0.009(-1.4%)	-0.009(-1.4%)
07/13/2007	64	0.621	-2.1		

*Denotes significance at 95% confidence level, LSC is 0.028808 g/cm2

MK4 (Vitamin K2) dose increased to 45mg/day

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Thank you

Questions