



كلية طب وايل كورنيل في قطر  
Weill Cornell Medical College in Qatar

Member of Qatar Foundation

# The Truth About Nutrition (Dietary) Supplements

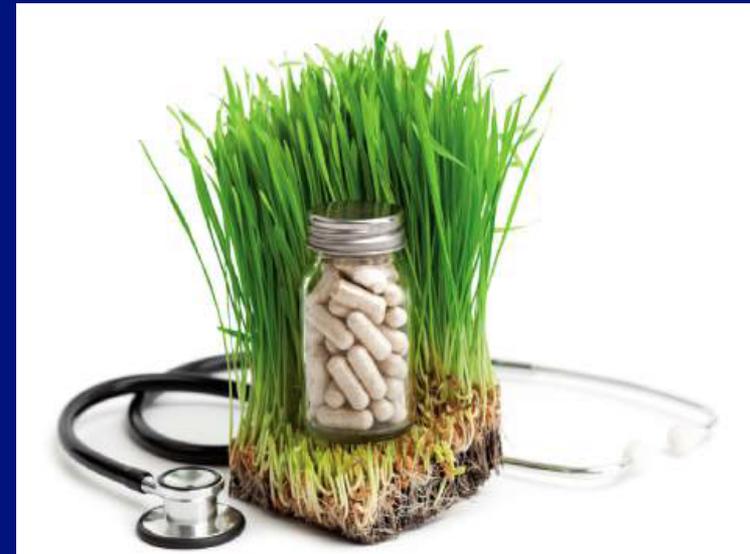
**Ravinder Mamtani, MD**

**Professor of Healthcare Policy and Research**

**Associate Dean for Global and Public Health**

**Weill Cornell Medical College in Qatar**

**May 10th 2015**





كلية طب وايل كورنيل في قطر  
Weill Cornell Medical College in Qatar

Member of Qatar Foundation

*As faculty of Weill Cornell Medical College in Qatar we are committed to providing transparency for any and all external relationships prior to giving an academic presentation.*

***Ravinder Mamtani, MD***

***I DO NOT have a financial interest in commercial products or services.***

# Objectives

- Describe the patterns of supplements use – herbal and nutritional
- Discuss their benefits, limitations and risks.
  - a) Vitamins, minerals
  - b) Herbs
  - c) Vegetarian diets and phytochemicals

# Dietary supplement is a product that is

- Intended to supplement the diet.
- Contains one or more dietary ingredient (herbs, vitamins, minerals and so on).
- Taken by mouth.

# U.S DIETARY SUPPLEMENT HEALTH AND EDUCATION ACT, 1994

Supplement = food

- Supplements are not FDA approved, but the manufacturers must follow GMP.
- Not required to undergo pre-market testing for safety.
- Supplements can be marketed with suggested doses.

# My discussion today...

- Is not about recommending/ not recommending supplements.
- It is about sharing scientific information about their effectiveness and safety.
- Lack of compelling evidence for a treatment/ supplement does not imply that the treatment is ineffective.

# References

- The Wellness Reports, UCB, Supplements, 2014
- Harvard Medical School Special Health Report, Vitamins and Minerals, 2012
- The Desktop to CAM – An evidence based approach. Edzard Ernst, Mosby, 2001 and 2006;
- The Wellness Reports, UCB. The Benefits of Vitamin D, 2012
- Supplements and sports. American Fam Physician, 2008; 78 (9): 1039
- My own clinical experience

# Clearly

- Supplement use is extensive.
- Its demand is strong and growing.
- Marketing is intensive.

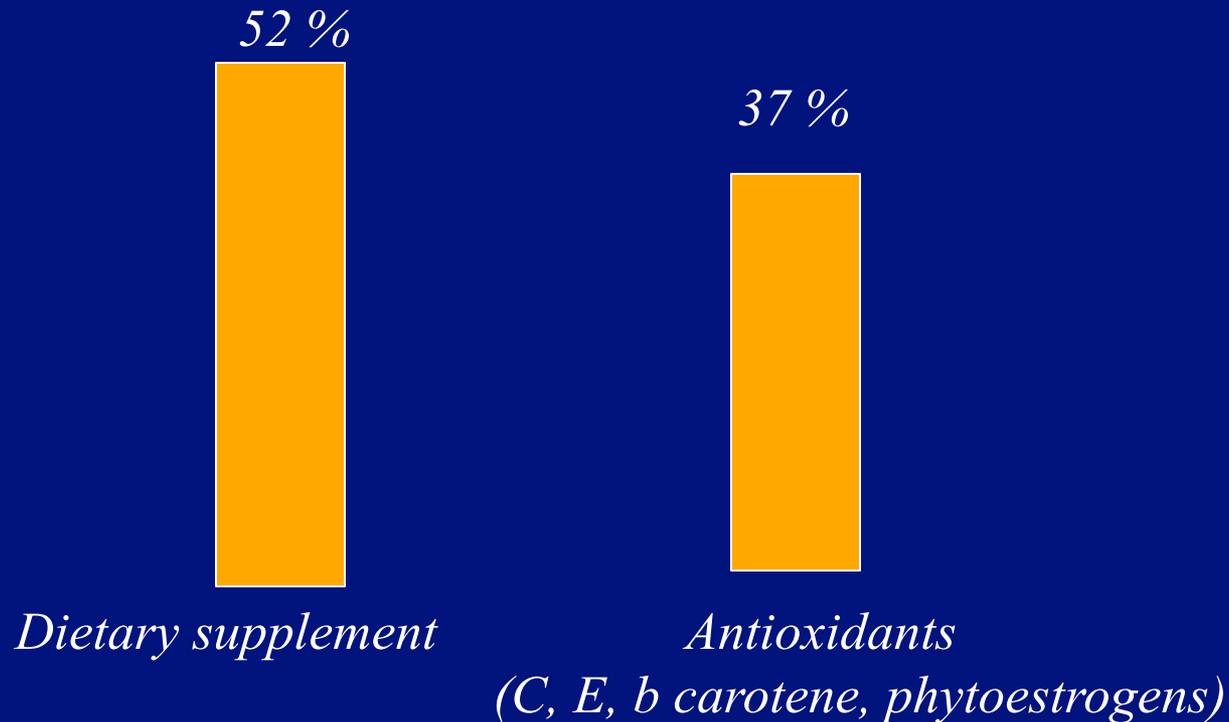
PHARMA & HEALTHCARE 5/07/2015 @ 7:27AM | 7,646 views

How Fake News Articles And Lies About Billionaires Were Used To Market An Iffy Dietary Supplement

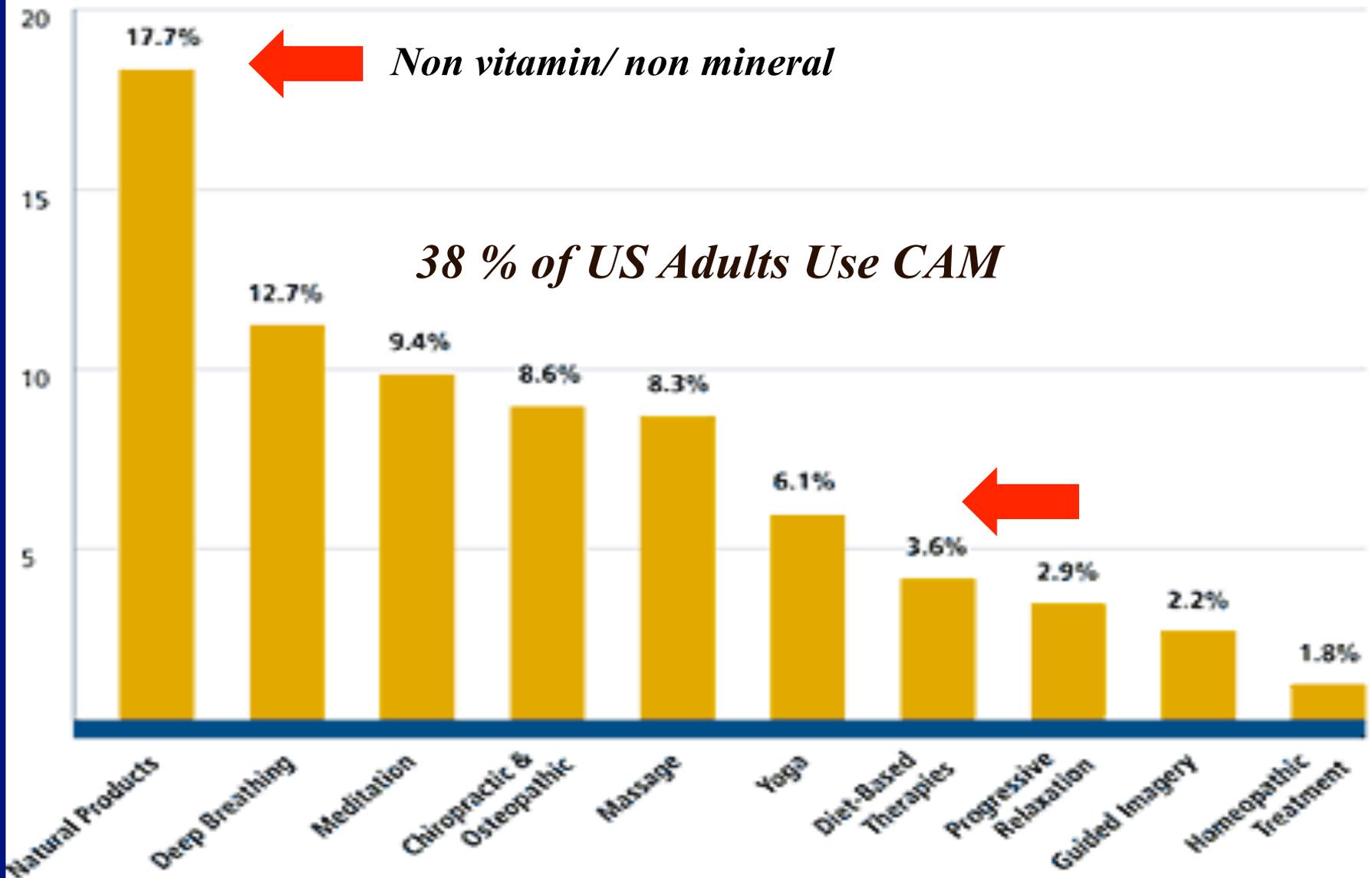
- Benefits and risks are becoming apparent.

World – 80% of population uses herbs

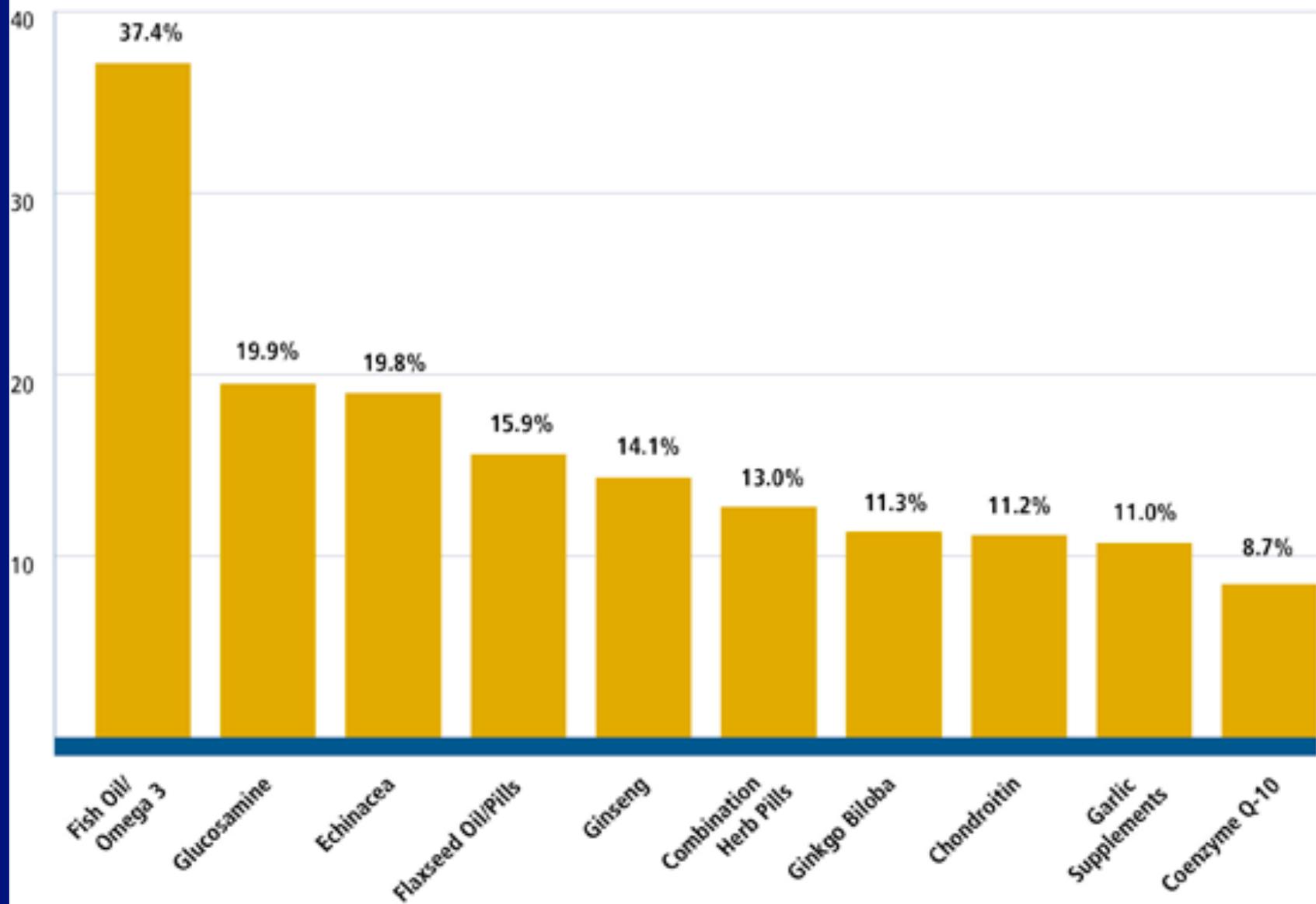
Dietary supplement use , US NHANES, 2000  
(10,000 respondents) – 1/2 Americans Use Them



# 10 Most Common CAM Therapies Among Adults - 2007



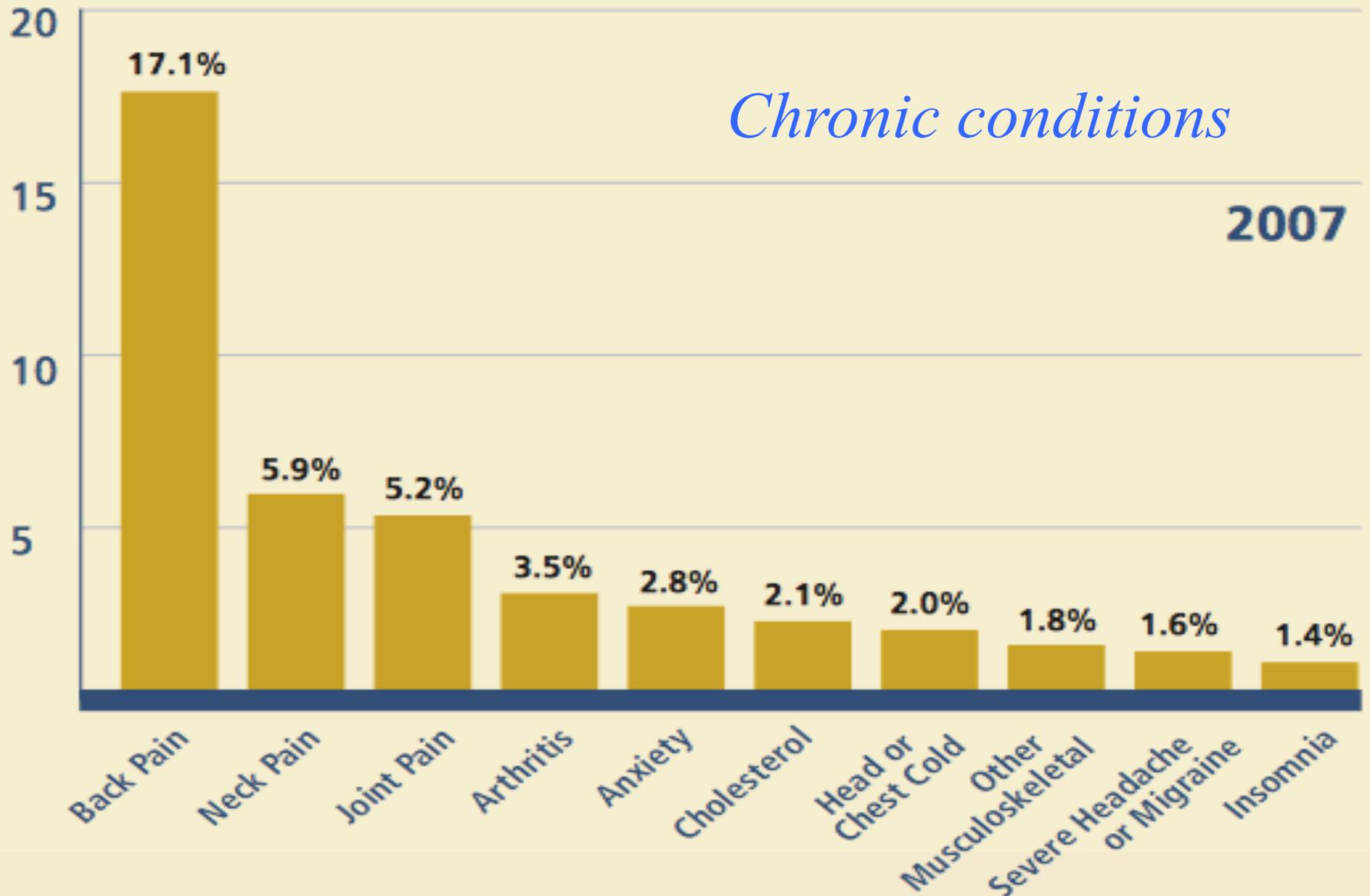
# 10 Most Common Natural Products Among Adults\* - 2007



\*Percentages among adults who used natural products in the last 30 days.

Source: Barnes PM, Bloom B, Nahin R. *CDC National Health Statistics Report #12. Complementary and Alternative Medicine Use Among Adults and Children: United States, 2007.* December 2008.

# *Diseases / Conditions For Which CAM Is Most Frequently Used*



# Ever Use of Supplements in Qatar (50%, F/M = 56/43 %)

Eastern Mediterranean Health Journal (WHO), Vol 15, 2015

## Herbal and nutritional supplement use among college students in Qatar

R. Mamtani,<sup>1</sup> S. Cheema,<sup>1</sup> B. MacRae,<sup>1</sup> H. Alrouh,<sup>1</sup> T. Lopez,<sup>1</sup> M. ElHajj<sup>1</sup> and Z. Mahfoud<sup>1</sup>

### استخدام المكملات العشبية والتغذوية لدى طلاب الجامعات في قطر

رافيندر مامتاني، سهيلة شيما، بروس ماكراي، حكمت الروح، تانيا لوبيز، ماغي الحاج، زياد رياض محفوض

الخلاصة: هناك طلب متزايد على المكملات العشبية والتغذوية في الشرق الأوسط. وقد هدَفَ هذا البحث إلى دراسة استخدام المكملات من قبل طلاب الجامعات في قطر وإلى استجلاء وجهات نظر المستخدمين بشأنها. وقام ما مجموعه 419 طالباً من طلاب الجامعات بملء استبيان ذاتي. فكان ما يقرب من نصف المستطلَّعين (49.6%) قد استخدموا مكملات (مستخدمين في أي وقت مضى)، مع 32.7% استخدموها خلال الأشهر الستة السابقة (مستخدمين حاليين). وكان 27.7% من المجموعة الأخيرة قد استخدموا مكملات عشبية، و 56.2% فيتامينات ومعادن، و 56.9% مكملات غير فيتامينية وغير معدنية وغير عشبية. واعتبر العديد من المشاركين أن المكملات أكثر أماناً وأكثر فعالية من الأدوية التقليدية. وكانت المكملات مفضَّلة على الأدوية التقليدية لمعالجة الحالات الهضمية والعلل التنفسية الشائعة وللتحكُّم في الوزن. وخلصت الدراسة إلى أن تثقيف مقدَّمي الرعاية الصحية بشأن فوائد ومخاطر المكملات أمرٌ لا بد منه، ومن شأنه أن يمكِّن ممارسي الرعاية الصحية من توجيه المرضى في اتخاذ قرارات مستنيرة بشأن استخدام المكملات.

**ABSTRACT** There is increasing demand for herbal and nutritional supplements in the Middle East. This study aimed to examine the use of supplements by college students in Qatar and to elucidate users' views about them. A total of 419 college students completed a self-administered questionnaire. Almost half of the respondents (49.6%) had used supplements (ever users), with 32.7% reporting using them in the previous 6 months (current users). Of the latter, 27.7% had used herbal supplements, 56.2% vitamins and minerals and 56.9% non-vitamin, non-mineral, non-herbal supplements. Many participants considered supplements to be safer and more effective than conventional medicines. Supplements were preferred over conventional medicines for the treatment of digestive conditions and common respiratory ailments and for weight management. Educating health-care providers about the benefits and risks of supplements is imperative and viable health-care practitioners to

# Why are we having this discussion ?

- Widespread use of supplements – 50 % in Qatar  
Chronic disease, health promotion, prevention
- Clinical implications
  - a) Supplement/ medication interaction not uncommon  
Vitamin E / many herbs reduces platelet aggregation – so those on warfarin could be at increased risk of bleeding
  - b) 1/5 patients undergoing surgery report their use (herbs and nutrition supplements).

# Vitamins/Minerals

## Deficiency

## Excess



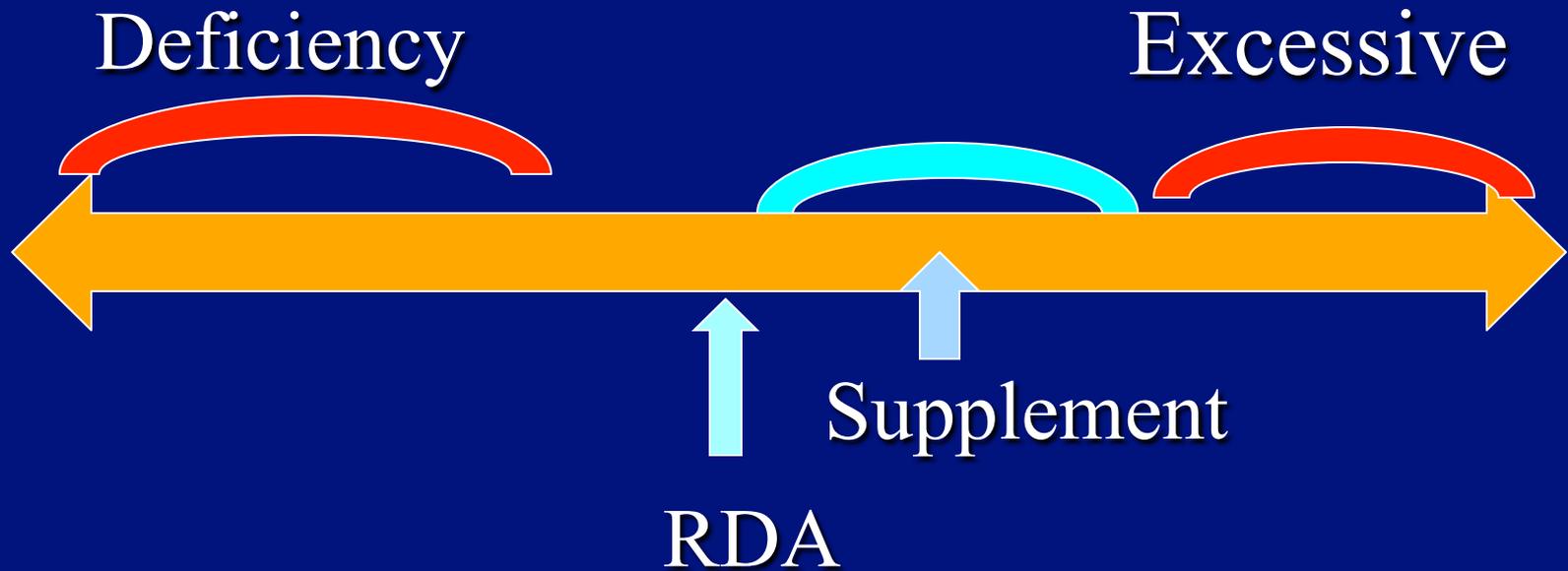
- Scurvy
- Rickets
- Night blindness



- Fat soluble vitamins
- Vit. A hepatotoxicity
- Vitamin D - arrhythmia  
calcification



# Our Interest Vitamins / Minerals



# Interest in vitamins and minerals as supplements stems from findings of

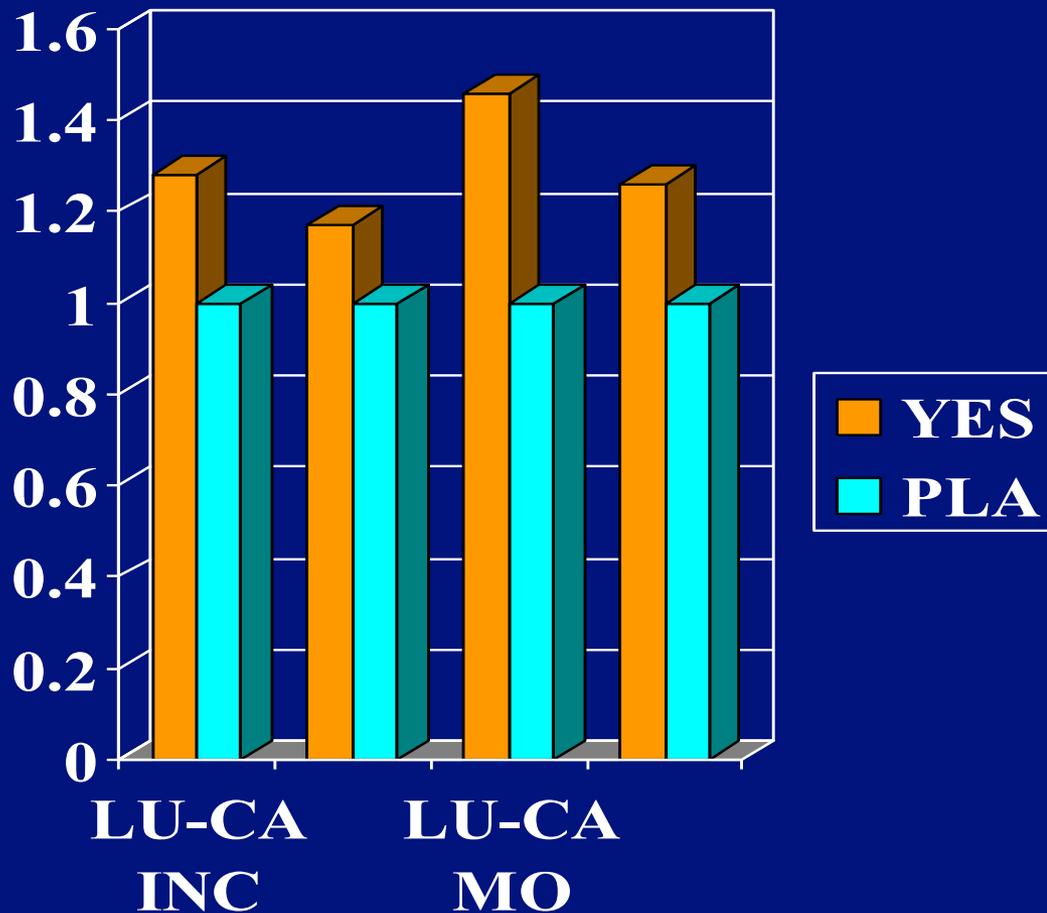
- Studies performed in China (60s) – supplements reduced frequency of cancer.
- Observational studies - diet rich in fruits and vegetables result in lower mortality from chronic diseases – which resulted in several supplement intervention studies.

# Supplements reduce cancer

- Antioxidant and cancer reduction in malnourished population (China, 1960-70s).
- “Large intake of vitamin E or C did not protect women in the study. A low intake of vitamin A may increase the risk of breast cancer; any benefit of vitamin A supplement may be limited women with diets low in vitamin A” (Willett, 1996, NEJM).

# INTERVENTION STUDIES

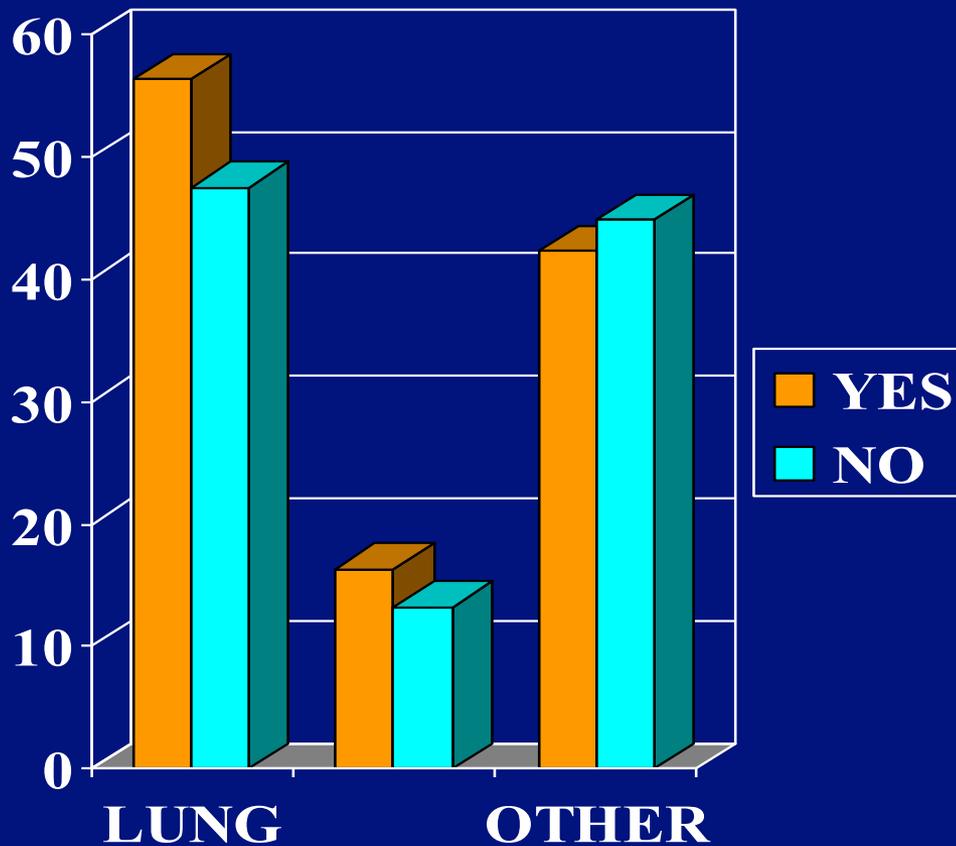
## EFFECT OF $\beta$ -CAR/VIT A ON LUNG CA AND CVD MORT.



- Randomized, Double Blind Placebo Controlled Trial in 18,314 Smokers, former Smokers
- Higher RR observed in the supplement Gps.

Source: *NEJM* 334:18, 1151, 1996

# EFFECT OF $\beta$ -CAROTENE ON CANCER IN SMOKERS



NEJM 330,15:1994

- 29,133 Adult Smokers were followed for 5-8 years, in randomized double blind placebo controlled study.
- Increase inc of LUNG CA - 18 % (95 % CI=3 to 36 %)-  $\beta$ -Car.

Vitamins E and C in the prevention of cardiovascular disease in men: the Physicians' Health Study II randomized controlled trial. (JAMA 2008;300:2123-33)

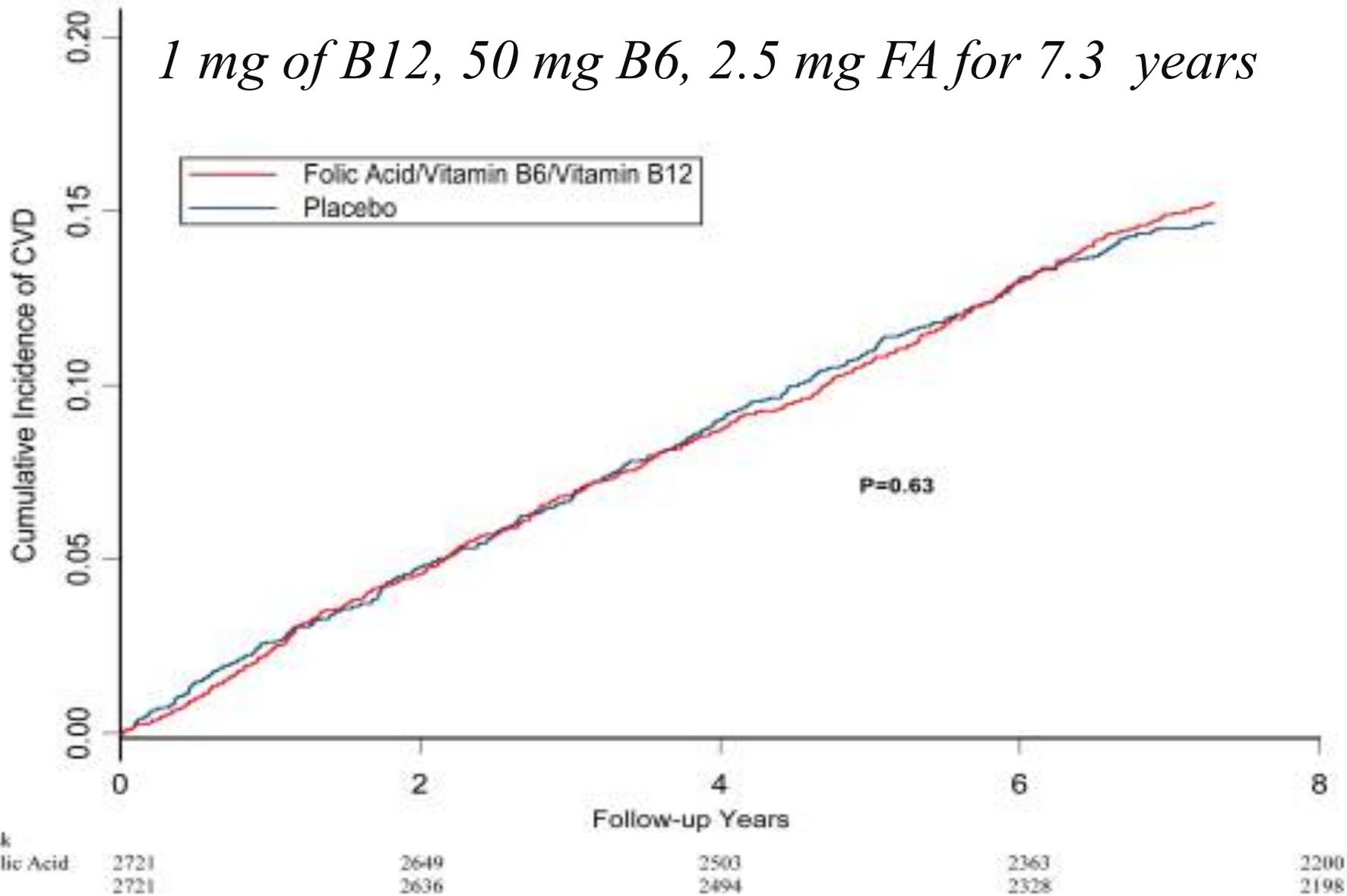
Intake of Vitamin E (and/or vitamin C)

 8 years later

No effect on the incidence of MI,  
CVA or mortality from them

Vitamin E was associated with  
a risk of hemorrhagic stroke.

*1 mg of B12, 50 mg B6, 2.5 mg FA for 7.3 years*



*Source: Women Antioxidant and Folic Acid Study (WAFACS). JAMA, 2008, Albert.C*

# Antioxidant supplements for prevention of mortality in healthy participants and patients with various diseases.

- 78 RCTs, > 500,000 individuals, mean duration of 3 years.
- RCTs of b-carotene, vit A, C, E & selenium versus placebo or no intervention.
- Outcome – mortality.
- No evidence.
- Vit E, b – carotene may increase mortality.

# Fortman et (Annals of Internal Medicine, 2013) - US TF Preventive Services

Reviewed 3 trials of multivitamin supplements and 24 trials of single or paired vitamins that randomly assigned more than 400 000 community dwelling adults



No effect on all-cause mortality, cardiovascular disease, or cancer.

# Enough Is Enough: Stop Wasting Money on Vitamin and Mineral Supplements

- Antioxidants, folic acid and B vitamins, and multivitamin and mineral supplements are ineffective for preventing mortality or morbidity due to major chronic diseases.
- $\beta$ -carotene, vitamin E, and possibly high doses of vitamin A supplements are harmful.

“We believe that the case is closed .. these vitamins should not be used for chronic disease prevention. Enough Is Enough.”

## Vitamin, mineral, supplements for the primary prevention of CVD and cancer: U.S. Preventive Service Task Force Recommendation

- Insufficient evidence to assess benefits/harms of multivitamins or single/paired nutrients for prevention of CVD or cancer.
- Recommendation against  $\beta$ -carotene or vitamin E supplements for the prevention of these diseases.

# Conclusion

The evidence is insufficient to assess the benefits/ harms of Vitamins A, E, b-carotene, minerals and multivitamin in well nourished population.

# How do we explain the following among vegetarians living in affluent countries?

- Low rates of cancer
- Low rates of CV mortality
- Total mortality
- Lower prevalence of Obesity, Hypertension, CAD, Dyslipidemia, Type 2 Diabetes  
(Adventist Health Study)

Wholesomeness of the foods –  
grains, vegetables,  
diary and herbs / spices.

That being said there are specific indications for supplementation.

- Calcium and Vitamin D for post-menopausal women and elderly
- Folates (400 ug/day) for child bearing age groups
- Vegetarian- B 12, Vitamin D, Iron, Ca and Omega

# Vitamin D supplementation for prevention of mortality in adults

- 56 RCT, > 94,000, predominantly elderly, women
- Vitamin D<sub>3</sub> decrease mortality in elderly  
Vitamin D<sub>2</sub>, alfacalcidol and calcitriol had no statistically significant beneficial effects on mortality.
- Vitamin D<sub>3</sub> combined with calcium increased nephrolithiasis.

# Vitamin D and Ca Recommendations

- 800 IU Vitamin D is a safe strategy without the need for prior determination of Vitamin D levels.
- In most individuals Ca 500 mg/ day is required to achieve a total intake of 1,200 mg. In some 1,000 mg per day (elderly).
- More calcium is absorbed from calcium citrate compared to calcium carbonate.

# Polyunsaturated fatty acids (Omega -3)

- Linoleic acid (LA) based (O-6); alpha-linolenic acid (ALA) based (O-3- short chain and long chain). Both are important.
- Omega -3 short - in nuts, flaxseed and soy.
- Omega -3 long ( EPA – eicosapentenoic and DHA- docosahexonic) are present only in fish.

# Omega – 3 benefits

- Lowers triglycerides, lowers BP.
- Asthma, IBS, Dementia, Depression, Menstrual pain, ADHD, Rh Arthritis – have been studied – mixed and positive results.
- Reduce the risk of heart attack, stroke, and death among people with heart disease (mixed results).

# Dose and safety

- Those without heart disease- get your Omega 3 from fatty fish – twice a week.
- Those who do not eat enough fish, Omega 3 supplement is safe.
- Those with CHD – One gm/ day (AHA).
- Those with high triglycerides - less than 3gms/ day.
- Some GI disturbance.
- High doses ( $> 3$  gm/ day)- bleeding, reduce immunity.

# Who should take multivitamin vitamin/mineral supplements ?

- Those taking less than 1200 cal/day.
- Heavy smokers, drinkers.
- Patients with malabsorption syndromes.
- Elderly people – reduced absorption.
- Those on drugs that diminish appetite.
- Those with erratic eating behavior, or feel they are not getting enough.

# Vitamin C

- RDA 60 mg (100-200 mg/day acceptable).
- Adverse Effects (usually occur at 3000 mg).
  - Diarrhea/abdominal bloating ( 2000 mg)
  - False negative results for occult blood in stool
  - Iron over load- hemochromatosis
  - Kidney stones (due to increased excretion of uric acid and oxalates)
  - Hemolysis in patients with G6PD deficiency ( > 6 gm IV)
- Anti-oxidant (Redox agent).
- Tissue levels are not increased further if supplement doses greater than 250 mg are used.

# Evidence and safety of commonly used herbal therapies

- Echinacea
- Ginseng
- Valerian
- Kava
- St John's Wort
- Gingko
- Hawthorne
- Chaste tree
- Black cohosh
- Saw palmetto
- Aloe
- Goldenseal
- Garlic
- Ginger
- Feverfew
- Evening primrose

# Herbs

- Pharmacology
- Clinical evidence: summary of the data relating to the effectiveness
- Dose
- Risks- CI/ adverse effects/ interactions
- Risk-benefit- Evidence based judgement whether the medicine does more good than harm. A lack of compelling evidence is not the same as ineffectiveness

*Source: The Desktop to CAM – an evidence based approach. Edzard Ernst, Mosby, 2001 and 2006; Fugh- Berman A. Herb-drug interactions, Lancet 2000; 355: 134-38; and Mar C. An evidence based review of 10 herbs, WJM, 1999, 171: 168-71; The Wellness Report, UC Berkley, Dietary Supplements, 2014*

# Advice for patients who use herbal supplements

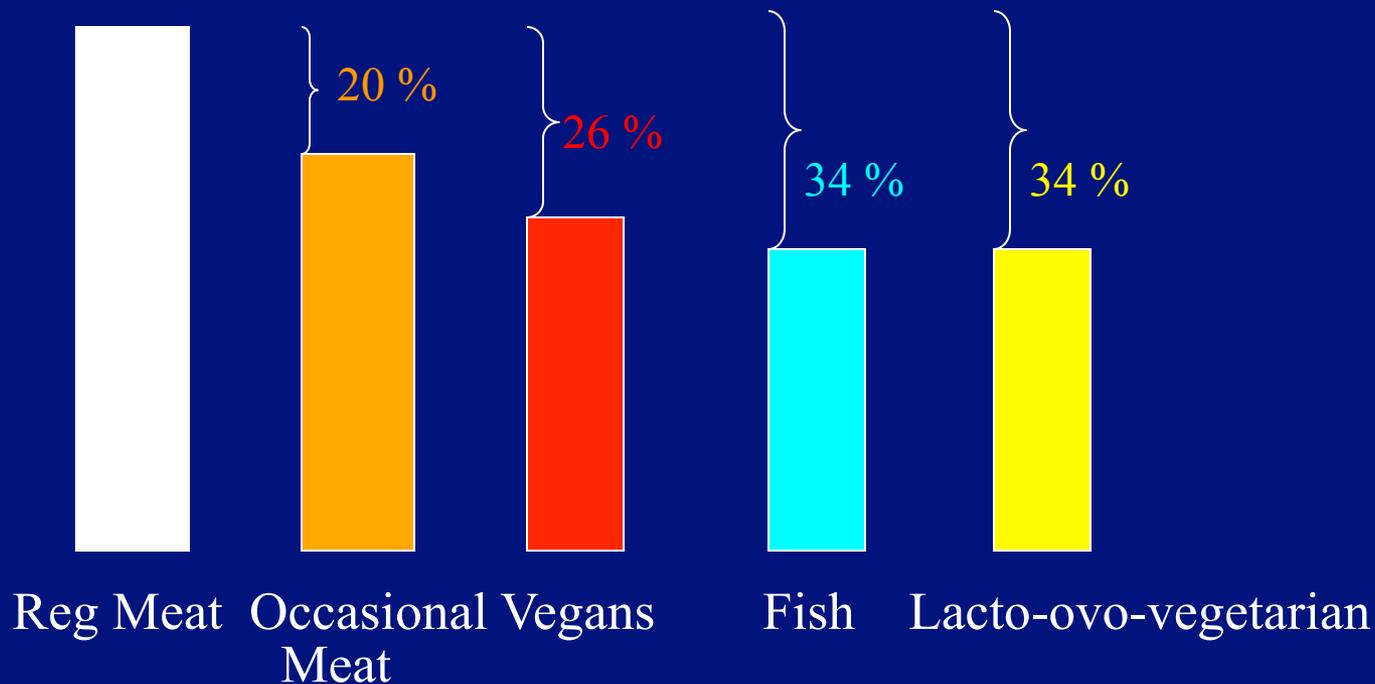
- Generally safe (in recommended doses), but treat herbal remedies as medicines.
- Do not exceed recommended doses; and not for prolonged period of time unless directed by a physician.
- They can interact with medications.
- Patients with serious disease should consult a physician.
- Do not use during pregnancy and lactation.

What do we know about health effects of vegetarian diet patterns?

## Vegetarians

- George Bernard Shaw
- Issac Newton
- Mahatma Gandhi
- Leonardo da Vinci

# CV Mortality in vegetarians and non vegetarians: findings from 5 prospective studies Sample: 76, 172



Vegetarian / Non vegetarian; P value < 0.01; OR = 0.76 (95%CI= 0.62-0.94)

# Vegetarian diets: What do we know of their effects on common chronic diseases?

- There is convincing evidence that vegetarians have lower rates of coronary heart disease (due to low LDL cholesterol & lower rates of hypertension), diabetes mellitus, obesity (BMI), prostate and colon cancer.

# Vegetarian Diet: Challenges

- Devoid of Vitamin 12 ( present in fermented foods - yogurt, tofu, soymilk).
- Calcium, Iron, Vitamin D and Omega 3 - their low content/ absence in vegetarian diets are of concern.

“Appropriately planned vegetarian diets are healthful, nutritionally adequate and provide health benefits in the prevention and treatment of certain diseases”

(ADA and Dietitians of Canada, 2009)

This includes use of fortified foods.

# In addition to containing plenty of nutrients, vegetarian diets contain phytochemicals

- Chemical compounds that give plant foods color and flavor.
- They have no traditional nutritive value but they may have positive effects in the long term - such as inhibiting tumor formation, producing anticoagulant effect and even lowering cholesterol effect.

The vast number of compounds (known and unknown) in fruits, vegetables, grains and legumes make it nearly impossible for supplements to substitute for a healthy diet.

*Clearly there are opportunities, but there are also dangers associated with supplements use*



## ***OPPORTUNITIES***

*Evidence based- Vitamin D  
Multivitamins, St Johns Wort*

## ***DANGERS/ Risks***

- 1. MEGA DOSES OF VITAMINS;***
- 2. PRESCRIBING supplements in place of proven treatments and without conventional work up***

# In conclusion, supplement use is widespread

- Supplements do not have the approval of FDA (US)
- They should not be taken in place of proven treatments.
- They should be viewed as medicinal substances/ interact with medications.
- The evidence is insufficient to assess the benefits/ harms of vitamins and minerals in well nourished population.

- Certain supplements may be helpful – vitamin D, Ca, FA, MV in certain situations. Mega doses are dangerous.
- Vegetarian diets are healthy – B 12, Calcium and Vitamin D.
- Obtain supplements through a wholesome, balanced diet, not thru pills.
- Obtaining nutrition and supplement history is important.

## *THOUGHT*

*Supplements are here to stay. We should engage in research to help us separate beneficial supplements from the ones that are harmful.*

# Thought

*There are benefits, limitations, risks to supplements (just as there benefits/limitations to any thing else). We must recognize what those limitations are. If we don't then we are doing our patients a major disservice.*

*Thank you !*

