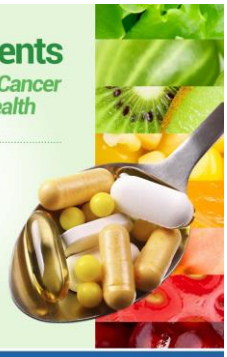
Nutritional Supplements

Exploring Evidence-Based Use in Cancer Prevention and Cardiovascular Health

Presented by:
Karen Collins, MS, RDN, CDN, FAND



1-Credit Continuing Education Webinar

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Disclosures

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Karen is Nutrition Advisor to the American Institute for Cancer Research (AICR) and serves as consultant to the National Processed Raspberry Council

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Learning Objectives

Suggested CDR Learning Codes: 2000, 4000, 4040, 5150, 5160, 9020 ; Level 2

1. Describe current overall research conclusions regarding adult use of supplements, including antioxidants, vitamin D, omega-3 fatty acids and multivitamins, to reduce risk of cardiovascular disease and cancer.
2. Explain factors to consider in evaluating contradictory findings among studies addressing supplements' potential role in cardiovascular health and cancer prevention.
3. Identify sources of reliable information on nutritional supplements for professional reference and patient information.

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Our Target for Today

- Adults
- Cardiovascular Health
- Reducing Cancer Risk

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Who's Using Supplements?

- Americans spent > $36 billion in 2014[1]
- NHANES 2007-2010: [2]
  48.8% of adults: 43.1% of men, 54.4% of women
  Variation by age: 67.4% over age 60
- Survey for Council for Responsible Nutrition: [3]
  Any use 2007 to 2011: 64% - 69%
  Regular use: 48% - 53%

[1]Office of Dietary Supplements, NIH; Nutrition Business Journal, NBJ's Supplement Business Report 2015.
[2]Bailey, JAMA Intern Med. 2013; 173(5):355-361
[3]Dickinson, J Amer Coll Nutr 2014; 33(2):176-182

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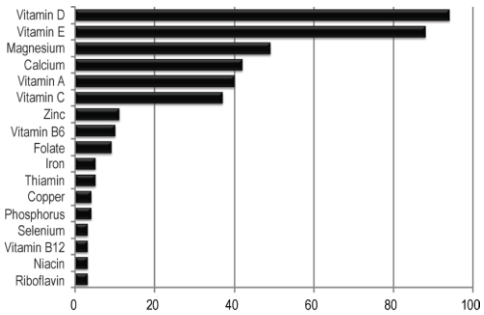
How Common is Intake Below Average Requirements?



Percent of U.S. Population with Average Intake Below EAR

Scientific Report of the 2015 Dietary Guidelines Advisory Committee, Fig. D1.1
From: What We Eat in America, NHANES 2007-2010

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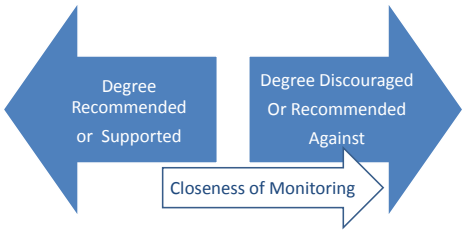
Questions to Consider

- Evidence of Benefit
- Patient's Perspective
- Evidence of Risk
- Degree of Burden



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Individualized Perspective

- Current intake: naturally-occurring, fortified foods, supplements
- Estimated needs
- Baseline health risks
- Individual values, beliefs, barriers

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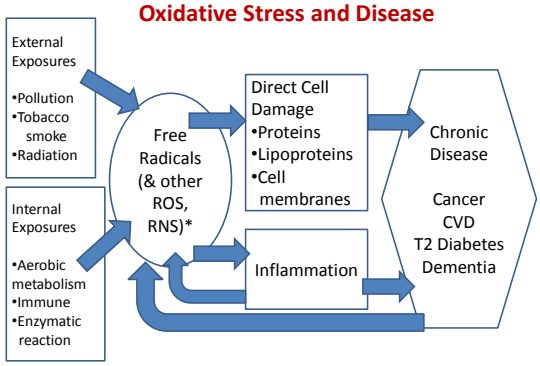
Oxidative Stress and Disease



*ROS= Reactive Oxygen Species RNS= Reactive Nitrogen Species

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Our Antioxidant Defense System

Endogenous Antioxidants

Enzymatic	Non-enzymatic	Metal-binding Proteins
• Superoxide dismutase (SOD)	• Glutathione (GSH)	• Ferritin
• Glutathione peroxidase (GPx)	• Lipoic acid	• Lactoferrin
• Glutathione reductase	• Melatonin	• Transferrin
• Thioreduxan reductase	• Uric acid	• Ceruloplasmin
• Catalase (CAT)	• NADPH	
• Glucose-6-phosphate dehydrogenase	• Bilirubin	
	• Ubiquinol (formed from CoQ10)	

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Our Antioxidant Defense System

Exogenous Antioxidants

- Vitamin C
- Vitamin E (tocopherols & tocotrienols)
- Selenium
- Carotenoids (α-carotene, β-carotene, lycopene, lutein, zeaxanthin, β-cryptoxanthin)

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Evolving Understanding:
Health-Supporting Balance

ROS Exposure
External
+ Internal

Antioxidant Defense
Endogenous
+ Exogenous

Individual Variation

Genetic
Microbiota

Low level ROS:
- Cell signaling to modulate cell proliferation & apoptosis
- Immune response regulation
- Vascular activation of eNOS
- Gene expression
- Triggers body's endogenous antioxidant defense system

High level ROS:
- Toxic to lipids & proteins

Physiologic level:
- Antioxidant
- Anti-inflammatory

Supraphysiologic level:
- Pro-oxidant
- Pro-inflammatory

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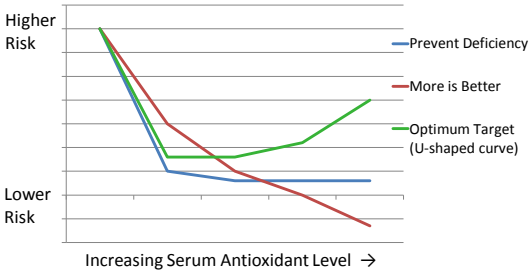
Antioxidant Levels & Mortality
Potential Models



Examples:
Rayman, Lancet 2012, 379:1256;
Goyal, Cancer Epid Bio Prev 2013, 22:2202

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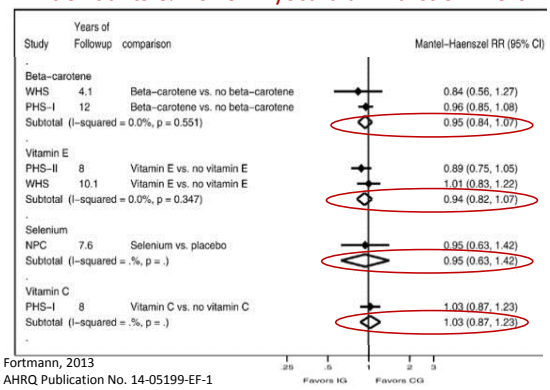
Antioxidants & CVD Risk
Observational Data from Prospective Cohorts

- Decreased serum or dietary levels link to increased CVD risk in some – but not all – studies for β-carotene, vit C, vit E
- Dose-response meta-analysis – CHD risk [1]
  - Vit C: q 30 mg/day ◊ RR 1.01 (0.99-1.02)
  - Vit E: q 30 IU/day ◊ RR 0.96 (0.94-0.99)
  - β-carotene: q 1 mg/day ◊ RR 1.00 (0.88-1.14)
- Q1 to Q2 or Q3 often biggest drop in risk [2]
- Confounders – dietary & lifestyle -- significant

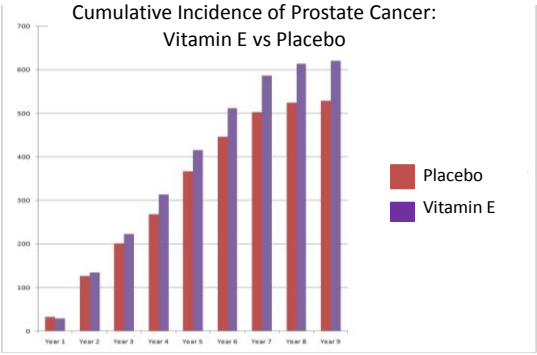
[1] Ye, Eur J Cardiovasc Prev Rehabil 2008, 15(1):26
[2] Goyal, Cancer Epid Bio Prev 2013, 22:2202

Antioxidants & Risk of Myocardial Infarction: RCTs[16]



Fortmann, 2013
AHRQ Publication No. 14-05199-EF-1

SELECT: Selenium, Vit E & Prostate Cancer Risk[17]



National Cancer Institute, 2015

Selenium, Vit E & Prostate Cancer Risk[18]

SELECT – RCT of Se (200 mcg) ± Vit. E (400 IU)

2008 (5.5 years):

- Study stopped – no effect on prostate cancer risk
- Non-significant increase in DM with Se alone 2011: Vitamin E alone – 17% incr prostate cancer

2014:

- High baseline Se
  - Se supplement: 91% increased risk high-grade prostate ca
- Low baseline Se
  - Vit E supplement: >2x risk high-grade prostate ca
- High baseline Vit E
  - Se supplement with or without E: 2x risk prostate ca

Lippman, JAMA 2009; Klein, JAMA 2011; Kristal, J Natl Cancer Inst 2014; Albanes, Ca Prev Res 2014

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Antioxidants & Cancer Risk:
Observational Studies

Vitamin E

- Iowa Women's Health Study [1]
  Vit E from food + supplements & colon cancer
  High (>35.7 IU/d) vs Low (<5.7 IU/d) RR=0.32
- Nurses' Health Study & Health Prof. Follow-up Study [2]
  Vit E from supplements:
  No sig link to colon cancer risk

Carotenoids

- Nurses' Health Study [3]
  Plasma carotenoids High vs Low: breast cancer RR 0.77 (.63-.94)
- Meta-analysis [4]
  Blood carotenoids High vs Low: breast cancer RR 0.74 (.57-.96)
  Beta-carotene supplement intake: no link to breast cancer

[1] Bostick, Cancer Res 1993, 53(18):4230; [2] Wu, Cancer Epid Biomark Prev 2002, 11(11):1298;
[3] Eliassen, Am J Clin Nutr 2015, 101(6):1197; [4] Aune, Am J Clin Nutr 2012, 96(2):356

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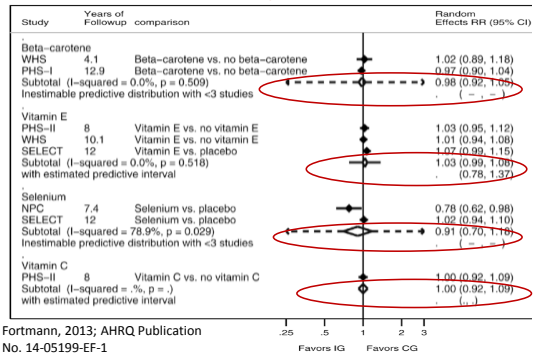
Antioxidant Supplements & Risk of Any Cancer Incidence
Meta-Analysis of RCTs



Fortmann, 2013; AHRQ Publication No. 14-05199-EF-1

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Antioxidants: Lots of Questions

- Potential benefit of higher amounts?
  - Vitamin C or Vitamin E for endothelial function?
  - For higher-risk groups?
  - If started at younger age, continued longer?
  - If different forms?
- Potential risk of higher amounts?
  - Could β-carotene or Vitamin E in doses > RDA pose risk even if < UL?

Ashor, Br J Nutr 2015; 113(8):1182-94
Bjelakovic, PlosOne 2013; 8(9):e74558

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Shaping our Messages:

Shifting the Talk about Antioxidants

- "In vitro" does not equal "in your body"
- Health-promoting balance (homeostasis) is the goal
- Supporting antioxidant defenses is one part of a strategy based on multiple effects of nutrients and natural compounds in food…working together with healthy body composition, activity and lifestyle
- A healthy eating pattern supports a wide range of systems in our body

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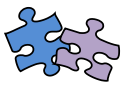

Resources

Antioxidant-Related Summaries

- National Center for Complementary & Integrative Health (NCCIH)
  Antioxidants and Health
  https://nccih.nih.gov/health/antioxidants/introduction.htm
- National Cancer Institute (NCI)
  Antioxidants and Cancer Prevention
  http://www.cancer.gov/cancertopics/causes-prevention/risk/diet/antioxidants-fact-sheet

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Multivitamins: Watching the Research
What counts?

- Most common definition in studies: 3 or more vitamins, with or without minerals
- Some federal use (CDC, NHANES): 3 or more vitamins and minerals
- More common understanding: At least 10-15 vitamins and minerals
- Variables:
  - With botanicals, amino acids, omega-3's, carotenoids?
  - Dosed at or near 100% DV? Or high-dose also?

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Multivitamins & Health
Observational Studies

- Several prospective cohort studies: [1]

  No effect on CVD risk, cancer risk or mortality

  -Relatively healthy middle age & older adults

  -Follow-up 5.5 to 11 years
- A prospective cohort linking to mixed benefit: [2]

  NHS: Use for ≥15 yrs → 75% lower colorectal cancer

  -No effect breast cancer

  -Use for ≥10 yrs → nearly 2x greater N-H Lymphoma

[1] Park, Am J Epid 2011; Neuhouser, Arch Int Med 2009; Muntwyler, Arch Int Med 2002
[2] Giovannucci, Ann Int Med 1998; Ishitani, Am J Epidemiol 2008; Zhang, Am J Epidemiol 2001

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MultiVits & CVD or Cancer Risk
Meta-Analysis of RCTs

Health Outcome	Relative Risk	95% Confidence Interval
Any CVD event	1.02	0.94-1.10
CVD mortality	0.97	0.85-1.11
Any Cancer incidence	0.94	0.89-1.00
• Breast cancer	0.94	0.71-1.24
• Prostate cancer	0.99	0.89-1.06
• Colorectal cancer	0.89	0.68-1.17
• Lung cancer	0.84	0.62-1.15
Any Cancer mortality	0.88	0.78-1.01

Fortmann, 2013; AHRQ Publication No. 14-05199-EF-1

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Total Folate Intake & Breast Cancer Incidence

Effect Varies with Level of Intake
Top vs Bottom Quintile

Malmo Diet & Cancer HR 0.56 (p=.006)
456 ug vs 160 ug

PLCO Cancer Screening HR 1.27 (p=.05)
>853 ug vs ≤336 ug

Ericson, Am J Clin Nut 2007, 86:434
Stolzenberg-Solomon, Am J Clin Nut 2006, 83:895

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Folic Acid Issues

Folic Acid & Fortification
Absorption 2 times greater than dietary folate
NHANES 2011-2012: Adult supplement users avg. 652 mcg/d
UL 1000 mcg: applies to supplemental + fortification folic acid only
- People over 50: 5% exceed
- People over 50 with supplement >400 mcg: 50% exceed [1]

Potential Double-Edged Sword in Colon & Breast Cancer?
Colorectal Cancer Risk:
- NIH-AARP Study [2] ◊ ≥400 mcg DRI: 20-25% lower CRC vs <200 mcg
  ◊ No significant benefit beyond 400 mcg
- Meta-analysis [3]: No significant link to blood folate or total intake
- Effects on risk could vary with age & timing?

Risk reduction related to alcohol consumption

[1] Yang, Amer J Cliin Nutr 2010, 91:64; [2] Gibson, Amer J Clin Nutr 2011
[3]WCRF/AICR Continuous Update Project Report, Colorectal Cancer 2011

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Multivitamins: Other Nutrients of Interest

- Vitamin B-12
  - 10-30% of people >50 years at risk: IOM advises getting RDA of 2.4 mcg in supplement or fortified food
  - 40% of Daily Value meets RDA (DV = 6 mcg)
- Vitamin A (retinol)
  - Too much of a good thing: liver abnormalities, birth defects, potential bone fracture risk if excessive
  - Caution for smokers and ex-smokers
  - 46-60% of Daily Value meets RDA (DV=5000 IU)
- Iron
  - Nutrient of concern for pre-menopausal women
  - Men & post-mp women look for "senior" or no-iron

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Multivitamins & Fortified Foods

Is there the equivalent of an MVM in someone's fortified foods?

- Breakfast cereal (note portion, use for snacks)
- Juice and blended juice drinks, smoothies
- Bars
- Fortified grains

Generally not excessive intake, but is MVM supplement duplication?

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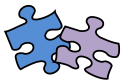

Resources

Multivitamin/Mineral Supplements Reviews & Summaries

- National Center for Complementary & Integrative Health (NCCIH): https://nccih.nih.gov/health/vitamins
- Nutrition Action by Center for Science in the Public Interest (CSPI): "Should I Take a Multivitamin?" http://bit.ly/1SWIlz8
- "Addressing nutritional gaps with multivitamin and mineral supplements" (Nutrition Jrnal 2014, 13:72; by Elizabeth Ward, MS, RD; *honorarium by Pfizer) http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4109789/

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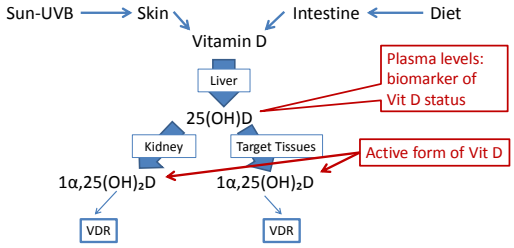
Vitamin D – Basic Science Matters



Endocrine Function (Intestine, Bone, Kidney)

Produced & Acting Locally (Endothelium, Colon, Breast, Endometrium, Pancreas, Adipose, Immune, others)

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Vitamin D and CVD Risk

Potential CVD Protection

- Inhibit vascular smooth muscle cell proliferation?
- Anti-inflammatory?
- Promote blood pressure control via renin-angiotensin-aldosterone system?

Intervention Trials:

No significant effect of Vit D supplements (alone or with calcium) on any CVD incidence

- Doses too low? How low at baseline?

Schnatz, Clin Chem 2014; 60(4):600-609
Fortmann, 2013; AHRQ Publication No. 14-05199-EF-1

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Caution: Beware of Headlines on Vitamin D & Cancer

"Recent Study Confirms Relationship between Vitamin D and Breast Cancer"

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Vitamin D & Cancer Risk
Laboratory evidence

- Promotes cell differentiation
- Reduces inflammatory cytokines
- Inhibits proliferation
- Induces apoptosis

Feldman, Nature Rev Cancer 2014, 14(5):342;
Toner, JADA 2010, 110(10):1492

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Vitamin D & Cancer Risk
Population studies

Each 10 ng/ml increase in 25(OH)D [1] [25 nmol/L]

- Colorectal cancer meta-analysis: 15% decreased risk
- Breast cancer meta-analysis: 11% decreased risk
  **Much less consistent; often obesity/waist confounding
- Benefits not seen in all studies

High vs low comparisons:

- Meta-analysis 25(OH)D weak link to breast cancer risk, but ~40% lower all-cause and breast cancer mortality in breast cancer [2]
- 14% lower cancer mortality for high vs low 25(OH)D [3]
- U-shaped curve for prostate cancer? [4]

[1] Gandini, Int J Cancer 2011
[2] Kim, Br J Cancer 2014; 110(11):2772
[3] Chowdhury, BMJ 2014
[4] Kristal, Cancer Epid Biom Prev 2014

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Vitamin D & Cancer Risk
Controlled Intervention Trials

- Meta-analysis shows little if any effect on cancer incidence
- Combined all doses and all types of cancer
- No difference total vitamin D supplements or vitamin D_3
- No difference when participants had vitamin D baseline levels < 20 ng/mL versus when baseline ≥ 20 ng/mL
- No difference with or without concomitant calcium

Bjelakovic, Cochrane Database Syst Rev. 2014 Jun 23;6:CD007469.

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Vitamin D Questions

What is optimal blood level?

- IOM[1]: ≥ 20 ng/ml (50 nmol/L) for bones
- Endocrine Society[2]: ≥ 30 ng/ml (75 nmol/L) for bones/falls
- VITAL trial in progress: target 30-36 ng/ml (75-90 nmol/L)
- U-shaped curve: risk > 45, 150 ng/ml ??

Confounders: Age, BMI, time outside = activity?

Is testing everyone the answer?

- Problems with consistent lab assays
- Problems with interpreting normal values

USPSTF: insufficient evidence to assess benefits versus harms of screening asymptomatic individuals.

Endocrine Society: recommends screening only people at risk

[1]IOM (Institute of Medicine) 2011 Dietary reference intakes for calcium and vitamin D.
[2]Clinical Practice Guidelines: Holick, J Clin Endocrinol Metab. 2011; 96(7):1911-30

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Vitamin D: How Much is Enough?

Based on skeletal benefits only

Institute of Medicine[1]

- RDA 600 IU (800 IU if >70 yrs)
- UL 4000 IU (age ≥ 9 years)

Endocrine Society[2]

- Adults 19-70 – at least 600 IU
- Adults 70+ years – at least 800 IU
- For 25(OH)D >30 ng/ml: may need ≥ 1500–2000 IU/day
- For people with obesity, malabsorption syndromes, or medications affecting vitamin D metabolism – suggest 2-3 times higher dose

Individual differences: genetics, skin, clothing, pollution

[1]IOM (Institute of Medicine) 2011 Dietary reference intakes for calcium and vitamin D.
[2]Clinical Practice Guidelines: Holick, J Clin Endocrinol Metab. 2011; 96(7):1911-30

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Can We Reach Healthful Amounts of Vitamin D without Supplements?

- USDA Dietary Pattern 2015
  1600 kcals = 266 IU Vitamin D
  2000 kcals = 274 IU
  2400 kcals = 294 IU
- Adjusted 2000 kcal pattern reaches 400 IU EAR
- Note: EAR & RDA assume minimal sun

Scientific Report of the 2015 Dietary Guidelines Advisory Committee,
Appendix E-3.3: Meeting Vitamin D Recommended Intakes in USDA Food Patterns

What Does It Take to Reach Vitamin D EAR or RDA without a Supplement?

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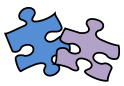
Food Group	Vit D Content	Dietary Change
Fortified Milk or Yogurt	115 IU / cup	Limit cheese to ≤ 1/4 of dairy (std pattern based on ~1/2 dairy as cheese)
Fortified Juice	100 IU/8 oz cup	Replace unfortified juice
Fortified Grains	Wh grains 21 IU/oz equiv, Fort'd cereals/bars 38-100 IU/svg	Choose fortified grains when possible (versus 6 IU/oz wh grns, 1 IU/oz ref grns)
Seafood: High n-3 types	99 IU/ounce on average; some 150-250 IU/oz	Choose high n-3 fish for all 8 oz/ week of fish in pattern
Seafood: Low n-3 types	20 IU/ounce average	Choose seafood more often (versus poultry 1 IU/oz avg, meat 4 IU/oz avg)
Eggs	44 IU each (yolk only)	Choose eggs as appropriate; consider eggs from enriched feeding (120 IU)
Mushrooms	UV: 700-1000 IU/cup (3 oz) raw	Choose UV-exposed or maitake

Adapted from Scientific Report of the 2015 Dietary Guidelines Advisory Committee, Appendix E-3.3: Meeting Vitamin D Recommended Intakes in USDA Food Patterns



Resources

Vitamin D Supplements Reviews & Summaries

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- NIH Office of Dietary Supplements Vitamin D Fact Sheets
  For Health Professionals:
  http://www.cancer.gov/about-cancer/causes-prevention/risk/diet/vitamin-d-fact-sheet
  For Consumers:
  https://ods.od.nih.gov/factsheets/VitaminD-Consumer/
- NIH Office of Dietary Supplements Summary & Videos of Conference (2014): "Vitamin D: Moving Toward Evidence-Based Decision Making in Primary Care,"
  http://1.usa.gov/1R3LGTd
- National Cancer Institute: Vitamin D and Cancer Prevention
  http://www.cancer.gov/about-cancer/causes-prevention/risk/diet/vitamin-d-fact-sheet

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Omega-3 Fatty Acids: Protective ♥ Potential

Valid Hypothetical Mechanisms [1,3]

Anti-inflammatory potential through prostaglandins
Decreased susceptibility to arrhythmia
Decreased platelet activation
Reduced triglycerides
*mainly if TG ≥500 mg/dl with doses of 2-4 g/day supervised

Observational cohort studies

Support link to fish consumption and lower CVD
Fish 1 svg/wk or 2-4 svg/wk: 16-21% lower CHD mortality [2]
250 mg EPA+DHA/day: 36% lower CHD mortality [3]

[1] Jacobson, National Lipid Assoc Recommendations Pt 2, J Clin Lipid 2015
[2] Zheng, Pub Health Nutr 2012, 15(4):725-737
[3] Mozaffarian & Rimm, JAMA 2006, 219:1885-1899

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Long-Chain Omega-3 Fatty Acid Supplements & CVD Controlled Trials

Positive Studies

- DART
- GISSI-Prevenzione
- GISSI Heart Failure
- JELIS

Neutral Studies

- Alpha-Omega
- DART-2
- OMEGA
- Su.Fol.Om3
- ORIGIN

What's Different?

- Background medication
- Omega-3 intake
- Who's in the study
- Outcome

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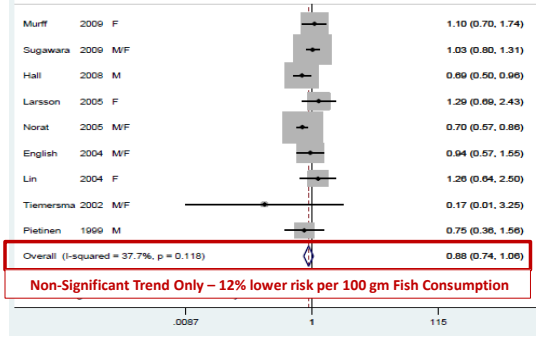
Fish Consumption & Colorectal Cancer Risk

Dose-Response per 100 gm/day Intake



Non-Significant Trend Only – 12% lower risk per 100 gm Fish Consumption

WCRF/AICR Continuous Update Project Report, Colorectal Cancer 2011

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Omega-3 Fatty Acids Without Supplements?

Fish

- High n-3 average 451 mg EPA+DHA per ounce
- Low n-3 average 102 mg EPA+DHA per ounce
- CVD Prevention: 8 oz. fish/week, prefer high n-3*
- 250 mg EPA+DHA/day:
  - 4 oz/week all high n-3
  - or 8 oz/week typical U.S.
  - or 12 oz/week all low n-3
- 500 mg EPA+DHA/day:
  - 8 oz/week all high n-3
  - or 12 oz/week if half high n-3

*Recommended by American Heart Association & Dietary Guidelines for Americans 2010

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Omega-3 Fatty Acids Without Supplements OR Fish?

Alpha-Linolenic Acid (ALA) – Natural Plant sources

- Walnuts, Flaxseeds (ground) or oil, Chia seeds, Hemp seeds, Avocado, Dark leafy greens, Seaweed, Soynuts,
- Canola & Soybean oil

Omega-3 Fortified Foods

- Total n-3 ≈ 115 mg per large egg
- EPA+ DHA ≈ 30-50 mg/svg

  Cheese, Milk, Peanut Butter, Orange Juice, Bread, Spreads(?)
- ALA ≈ 180-500 mg /svg (sometimes 1000 mg)

  Pasta, RTE Cereal, Oatmeal, Frozen Waffles, Spreads

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Omega-3 Fatty Acid Supplement Considerations

- Grams of Fish Oil ≠ Grams EPA+ DHA
  - 1 g fish oil may contain 80 – 800 mg EPA+DHA
- Fish liver oils: contain vitamins A & D in very high amounts (potential for excess)
- Calamari oil: good source of DHA especially
- Algal oil: vegetarian, source of DHA especially

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Resources
Omega-3 Fatty Acids & Seafood Options

Seafood for Omega-3's

- *Seafood: Food Pattern Modeling Analysis* for 2010 Dietary Guidelines Advisory Committee Report, Appendix E-3.10
  http://www.cnpp.usda.gov/sites/default/files/dietary_guidelines_for_americans/AppendixE-3-10-Seafood.pdf
- *Seafood Health Facts: Making Smart Choices* - joint project of several universities with information on seafood choices, including EPA+DHA content and recommended amounts for demographic groups. Free downloadable consumer handout.
  http://seafoodhealthfacts.org/

Omega-3 Supplements

- Omega-3 Supplements: An Introduction for Consumers - National Center for Complementary & Integrative Health (NCCIH):
  https://nccih.nih.gov/health/omega3/introduction.htm

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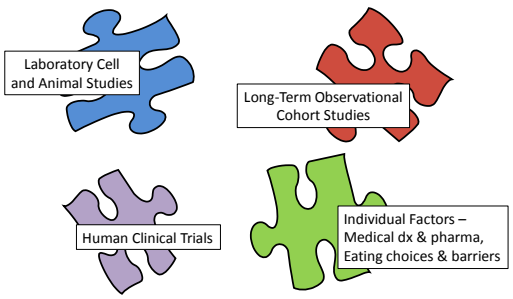
Putting Together Pieces of Evidence



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Looking Beyond Supplement Headlines:
Some Good Questions

- Study of humans, animals or cells?
- In humans, is group representative of person of interest?
- Compared to what other treatment or condition?
- What was the dose?
- Controlled for other influences (confounders)?
- How long an intervention and follow-up?
- Results: biomarkers, risk factors, or clinical outcomes?
- How closely did participants comply?
- Especially for review or meta-analysis, what is publication date?

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American Heart Association

- **Eat a healthy diet.**
- **Patients with heart disease** should consume about 1 gram of EPA + DHA, ideally from fish. This can be hard to get by diet alone, so a supplement could be needed. As always, consult with a physician first.
- **If you have elevated triglycerides**, try to get 2-4 g/day EPA+DHA.
- **Don't take antioxidant vitamin supplements such as A, C and E**.
- **Do not rely only on supplements.** There isn't sufficient data to suggest that healthy people benefit by taking certain vitamin or mineral supplements in excess of the daily recommended allowance. Some observational studies have suggested that using these can lower rates of cardiovascular disease and/or lower risk factor levels. However, it's unclear in these studies whether supplements caused these improvements.

AHA Website updated 6/12/2015: http://bit.ly/1MRWInx
AHA Science Advisory on Antioxidants: *Circulation. 2004; 110: 637-641*

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American Institute for Cancer Research (AICR)

- Don't use supplements to protect against cancer.
- To reduce your risk of cancer, choose a balanced diet with a variety of foods rather than taking supplements.
- In some dietary or health circumstances, supplements may be valuable.

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American Cancer Society

A diet rich in vegetables, fruits, and other plant-based foods may reduce the risk of cancer, but there is little proof that dietary supplements can reduce cancer risk.

- One exception may be calcium supplements, which may reduce the risk of colorectal cancer.
- Some high-dose supplements may actually increase cancer risk.
- Some dietary supplements may be beneficial for other reasons for some people, such as pregnant women, women of childbearing age, and people with restricted dietary intakes.

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Society for Integrative Oncology Recommendations on Supplements

Evidence-Based Clinical Practice Guidelines for Integrative Oncology: Complementary Therapies and Botanicals (2009)

Based on a current review of the literature, specific dietary supplements are not recommended for cancer prevention.

[Recommendation 16; Grade 1A = Strong recommendation, high-quality evidence]

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U.S. Preventive Services Task Force 2014 Recommendations

Population	Recommendation	Grade
Use of Multivitamins to Prevent Cardiovascular Disease or Cancer	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the use of multivitamins for the prevention of cardiovascular disease or cancer.	I
Single- or Paired-Nutrient Supplements for Prevention of Cardiovascular Disease or Cancer	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the use of single- or paired-nutrient supplements (except β-carotene and vitamin E) for the prevention of cardiovascular disease or cancer.	I
Use of β-carotene or Vitamin E for Prevention of Cardiovascular Disease or Cancer	The USPSTF recommends against the use of β-carotene or vitamin E supplements for the prevention of cardiovascular disease or cancer.	D

Final Recommendation Statement: Vitamin Supplementation to Prevent Cancer and CVD: Counseling. U.S. Preventive Services Task Force. May 2015.

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Professional Resources:
Published Statements

American Heart Association
- Science Advisory on Antioxidant Vitamin Supplements & CVD
  http://circ.ahajournals.org/content/110/5/637.full

American Institute for Cancer Research (AICR)
- Recommendations for Cancer Prevention (see #8 on Supplements)
  http://www.aicr.org/reduce-your-cancer-risk/recommendations-for-cancer-prevention/

American Cancer Society
- Guidelines on Nutrition and Physical Activity for Cancer Prevention (see "Common Questions")
  http://onlinelibrary.wiley.com/doi/10.3322/caac.20140/epdf

Society for Integrative Oncology – Clinical Practice Guidelines
- https://integrativeonc.org/docman-library/uncategorized/65-sio-guidelines-2009/file

United States Preventive Health Services Task Force
- Vitamin Supplementation to Prevent Cancer and CVD (2014)
  http://www.ncbi.nlm.nih.gov/pubmed/24566474
- USPSTF Statement for Patients:
  http://www.ncbi.nlm.nih.gov/pubmed/24567175

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Supplement Labels

USP VERIFIED · ConsumerLab.com APPROVED QUALITY · NSF

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Do Labels Mean What You Think?

Nutrient	DV	EAR	RDA (or AI)	UL
Vitamin A	5000 IU	500-625 mcg = 1665-2081 IU	700-900 mcg =2330-3000 IU	3000 mcg *retinol*
Vitamin C	60 mg	60-75 mg	75-90 mg	2000 mg
Vitamin D	400 IU	400 IU	600-800 IU	4000 IU
Vitamin E	30 IU	12 mg α-tocoph = 18-27 IU	15 mg α-tocoph =22-33 IU	1000 mg α-tocoph
Folate	400 mcg	320 mcg	400 mcg	1000 mcg
Calcium	1000 mg	800-1000 mg	1000-1200 mg	2000-2500 mg
Iron	18 mg	5.6 mg / 8.1 mg	8 mg / 18 mg	45 mg
Magnesium	400 mg	255-350 mg	320-420 mg	350 mg *supp only*
Selenium	70 mcg	45 mcg	55 mcg	400 mcg
Potassium	3500 mg	--	(4700 mg)	--

DV= Daily Value; EAR = Est'd Avg Requirement; RDA = Rec'd Dietary Allowance;
AI = Adequate Intake; UL = Tolerable Upper Intake Level

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What Do We Say?

- Supplements can play an important role – as "Supplements"
- Intake < RDA level does not mean "deficient"
- More is not necessarily better
- Food & supplements are not the same
- Base choices on expert recommendations & reports, not single studies and hearsay
- Supplement decisions are individual – assess needs & baseline

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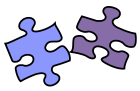

Professional Resources

- NIH Office of Dietary Supplements Dietary Supplement Label Database
  http://dsld.nlm.nih.gov/dsld/
- NIH Office of Dietary Supplements Fact Sheets for Professionals
  http://ods.od.nih.gov/factsheets/list-all/
- National Center for Complementary & Integrative Health (NIH)
  https://nccih.nih.gov/
- Integrative Medicine Center, Memorial Sloan Kettering Cancer Center -- "About Herbs, Botanicals & Other Products" (online info & app) http://bit.ly/1HRqvAF
- Natural Standard Database through personal or institutional subscription or as part of some dpg memberships
- Consumer Lab.com available through subscription

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Resources for the Public

- **U.S. Preventive Services Task Force**: Vitamin, Mineral, and Multivitamin Supplements to Prevent Cardiovascular Disease and Cancer: Consumer Guide

  Annals of Internal Medicine Patient Summary of USPSTF Report (1 page pdf)

  http://annals.org/article.aspx?articleid=1832965
- **NIH Office of Dietary Supplements**

  Fact Sheets in English & Spanish - http://ods.od.nih.gov/factsheets/list-all/

  FAQ -- http://1.usa.gov/1HRmPPi
- **American Institute for Cancer Research (AICR)**

  Facts about Supplements brochure - http://bit.ly/1TQ0L9y

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More Resources for the Public

- **U.S. Food & Drug Administration (FDA**)
  Tips for Supplement Users - http://1.usa.gov/1umyeN0
- **National Center for Complementary & Integrative Health (NIH)**
  https://nccih.nih.gov/
- **Integrative Medicine Center, Memorial Sloan Kettering Cancer Center**
  About Herbs, Botanicals & Other Products – online info & app with details on vitamins, botanicals, etc.
  http://bit.ly/1HRqvAF

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Let's Keep the Conversation Going!

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Healthful Eating Research & How-to's

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Credit Claiming

You must complete a brief evaluation of the program in order to download your certificate. The evaluation survey will be available on **www.CE.TodaysDietitian.com** for 1 year following the live presentation.

RDs should list CPE activity type 175 in their professional development portfolio.