Nutrition Counseling for Office Practice:
Understanding the New Guidelines and the Cacophony of Expert Opinion

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Associate Dean for Graduate and Continuing Medical Education
Director, UCSF Adult Weight Management Program

Disclosure
No relevant financial relationships

Why Do We Care About What We Eat?

<table>
<thead>
<tr>
<th>US Leading Causes of Death, CDC</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Heart Disease</td>
<td>32.6%</td>
</tr>
<tr>
<td>2. Cancer</td>
<td>30.9%</td>
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<td>3. Chronic lower respiratory disease</td>
<td>7.5%</td>
</tr>
<tr>
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<td>7.0%</td>
</tr>
<tr>
<td>5. Accidents</td>
<td>6.4%</td>
</tr>
<tr>
<td>6. Alzheimer’s disease</td>
<td>4.3%</td>
</tr>
<tr>
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</tr>
<tr>
<td>8. Influenza and pneumonia</td>
<td>2.9%</td>
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<tr>
<td>9. Nephritis, nephrotic syndrome &amp; nephrosis</td>
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Lifestyle and Disease

- 1/3 of premature deaths in the U.S. are attributable to poor nutrition and physical inactivity.
- Well over 50% of American adults do not get the recommended amount of physical activity.
- Only 10% of Americans eat a healthy diet consistent with current nutrition recommendations.

U.S. Calorie Intake

- Calorie consumption in the U.S. has increased 30% over the past 4 decades.

<table>
<thead>
<tr>
<th>Year</th>
<th>Average calories consumed</th>
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<tbody>
<tr>
<td>1970</td>
<td>2,057</td>
</tr>
<tr>
<td>2008</td>
<td>2,674</td>
</tr>
</tbody>
</table>

Topics

- Total calories and macronutrient balance
- Weight Loss Diets
- Dietary Fiber
- Dietary Guidelines
- Sodium
- Vegetarian Diets
- Mediterranean Diets
- Antioxidants and B vitamins
- Fish oil
- Vitamin D and Calcium
- Final Recommendations

Top calorie sources in U.S.

1. Grain-based desserts
2. Yeast breads
3. Chicken and chicken-mixed dishes
4. Soda, energy drinks, and sports drinks
5. Pizza
6. Alcoholic beverages
7. Pasta and pasta dishes
8. Mexican mixed dishes
9. Beef and beef dishes
10. Dairy desserts
Extra Calories From Eating Away From Home

<table>
<thead>
<tr>
<th>Normal Weight</th>
<th>Calories/meal at home</th>
<th>Calories/meal at a restaurant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>550</td>
<td>825</td>
</tr>
<tr>
<td>Overweight/Obese</td>
<td>625</td>
<td>900</td>
</tr>
</tbody>
</table>

Public Health Nutrition, 2013

Macronutrient Composition

- **Macronutrient composition**: the relative proportions of fat, carbohydrate, and protein in the diet
- **Bottom line**:
  - A wide range of macronutrient composition is consistent with a healthy diet
  - In most clinical circumstances, total calories “trump” macronutrient composition
  - Achieving desired calorie intake will achieve most clinical goals

COMPARISON OF WEIGHT LOSS DIETS WITH DIFFERENT MACRONUTRIENTS

- RCT of 811 patients, 4 diets: fat/protein/carbs
  - 20/15/65;  20/25/55;  40/15/45;  40/25/35
- 6 months: 6 kg, 7% weight;
- 2 years: completers lost 4 kg. 15% lost 10% of weight
- Results similar for:
  - 15% pro v. 25% pro
  - 20% fat v. 40% fat
  - 35% carbs v. 65% carbs
- Weight loss highly correlated with adherence; satiety, hunger, lipids, insulin all equal

Dietary Fiber

- **Plant matter**
- Not digested by human digestive enzymes
- Some can be digested by gut bacteria
- Includes
  - Cellulose, hemicellulose, pectins, gums, and mucilages, lignins
- Classified as soluble or insoluble
- IOM: Men 30-38 g/day. Women 21-25 g/day.
Dietary Fiber: The Most Important Nutrient?

- **Heart**: Lowers LDL, lowers triglycerides
- **Diabetes**: Reduces blood sugar
- **Gut**: Prevents constipation, hemorrhoids, diverticular disease
- **Weight**: Promotes satiety

Baron RB, BMJ 2013

Dietary Fiber: The Most Important Nutrient?

- Meta-analysis of 22 cohort studies:
  - Every 7 grams of fiber associated with a 9% decrease in CV events
  - One portion of whole grains and one portion of legumes, or from two to four servings of fruits and vegetables.

Threapleton DE, BMJ, 2013

Quantifying Dietary Fiber (per serving)

<table>
<thead>
<tr>
<th>Food</th>
<th>Fiber (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple</td>
<td>4.4</td>
</tr>
<tr>
<td>Blueberries</td>
<td>3.6</td>
</tr>
<tr>
<td>Orange</td>
<td>3.0</td>
</tr>
<tr>
<td>Grapes</td>
<td>0.8</td>
</tr>
<tr>
<td>Pear</td>
<td>5.5</td>
</tr>
<tr>
<td>Raspberries</td>
<td>8.0</td>
</tr>
<tr>
<td>White bread</td>
<td>0.7</td>
</tr>
<tr>
<td>Wheat bread</td>
<td>1.9</td>
</tr>
<tr>
<td>Brown rice</td>
<td>1.5</td>
</tr>
<tr>
<td>White rice</td>
<td>0.3</td>
</tr>
<tr>
<td>Wheat-bran cereal</td>
<td>7.4</td>
</tr>
<tr>
<td>Oatmeal</td>
<td>4.8</td>
</tr>
<tr>
<td>Shredded wheat</td>
<td>6.1</td>
</tr>
<tr>
<td>Cornflakes</td>
<td>0.9</td>
</tr>
<tr>
<td>Peanuts</td>
<td>9.1</td>
</tr>
<tr>
<td>Kidney beans</td>
<td>6.8</td>
</tr>
<tr>
<td>Asparagus</td>
<td>1.4</td>
</tr>
<tr>
<td>Broccoli</td>
<td>1.1</td>
</tr>
<tr>
<td>Carrot</td>
<td>1.7</td>
</tr>
<tr>
<td>Spinach</td>
<td>3.5</td>
</tr>
<tr>
<td>Powdered psyllium</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Principles of a Healthy Diet

- Wide variety of foods
- High food quality
- Moderation (right quantity)
Dietary Guidelines 2010

- Enjoy food, but eat less
- Make half your “plate” fruits and vegetables; consume beans, whole grains, nuts and seeds
- Increase the intake of seafood & fat-free & low-fat milk and milk products
- Drink water instead of sugary drinks
- Compare sodium in foods and choose the lower v
- Consume only moderate amounts of lean meats, poultry & eggs

MyPlate

- Limitations on dietary cholesterol have been removed
- Consume a diet rich in fruits and vegetables, whole grains, low-fat dairy, seafood, legumes, and nuts
- Consume a diet low in red or processed meats, sugar sweetened foods and beverages, and refined grains
Dietary Guidelines 2015

- Limit daily consumption of added sugars (<10% of calories), saturated fat (<10% of calories), and dietary sodium (2300 mg)
- Half of all grain intake should come from whole grains
- Moderate alcohol is fine in most adults
- Up to five cups of coffee per day is not associated with adverse effects in most adults

Too Many Refined Grains

- Guidelines recommend six, 1-ounce servings per day for a 2000 calorie diet, and half should be whole grain.
- The average person eats 8 servings of grains per day, and 7 of the 8 are refined.

What is a serving of grain?

- 1/2 cup cooked rice or other cooked grain
- 1/2 cup cooked pasta
- 1/2 cup cooked hot cereal, such as oatmeal
- 1 six inch tortilla
- 1 slice of bread (1 oz.); ½ bun
- 1 very small (1 oz.) muffin
- ½-1 cup ready-to-eat cereal
  (¼ cup = ½ a baseball)

Select whole grains

- Look for “whole” in the first ingredient on the label.
- Aim for total carbs/fiber = <10 for bread and <5 for cereals.
- Whole grains: wheat (spelt, farro, durum, bulgur, others), barley, buckwheat, corn, millet, oats, quinoa, rice, rye)
Way Too Much Added Sugar

The average person consumes 30 teaspoons of sugar and sweeteners per day (over 15% of calories).

(Includes cane and beet sugar, high fructose corn syrup, corn syrup, dextrose, honey)

- The AHA recommends ≤ 6 teaspoons (24 grams) of added sugar per day for women, and ≤ 9 (36 grams) for men.
- A 20 oz. soda has twice that.


Salt and Public Policy

- Coronary Heart Disease Policy Model to quantify benefits of modest salt reduction in U.S.
- Benefit through a reduction in systolic blood pressure from 1-9 mm Hg in selected populations
- New cases of CHD decrease by 4.7 - 8.3 and stroke by 2.4 to 3.9 /10,000
- Regulatory change leads to wide benefit and is cost-effective

Bibbins-Domingo K, et al. NEJM 2010

Sodium reduction and BP control in individual patients

- Reduce sodium intake to ≤100 meq/d (2.4 g Na): 2-8 mm Hg in SBP
- DASH Diet: 6 mm alone;
- DASH diet plus sodium restriction: 14 mm Na

Dietary Guidelines 2010

Addressing Sodium:

- 2,300 mg per day for general population
- 1,500 mg for aged 51+, African Americans & hypertension, diabetes & kidney disease
Sodium

But:

• 1/2 of U.S. would qualify for 1,500 mg recommendation
• Average current intake 3,400 mg per day (1.5 teaspoon salt)

Institute of Medicine: May 2013:
• Limit everyone to 2,300 mg per day (1 teaspoon salt)
• Evidence doesn’t support lower recommendations

Top sodium sources in U.S.

1. Yeast breads
2. Chicken and chicken-mixed dishes
3. Pizza
4. Soda, energy drinks, and sports drinks
5. Cold cuts
6. Condiments
7. Mexican mixed dishes
8. Sausage, franks, bacon and ribs
9. Regular cheese
10. Grain-based desserts

Classification of Dietary Fat

Fat

- Saturated
- Mono-unsaturated
- Poly-unsaturated
- Trans

Saturated: Beef, dairy
Mono-unsaturated: Olive oil, canola oil
Poly-unsaturated: Omega-3 (fish, walnuts, flaxseed, soybean)
Trans: Hydrogenated oils (processed foods)

Sources: Mattes et al.
Saturated Fat and Cardiovascular Disease (CVD)

- Recent meta-analysis of observational studies: no association between higher saturated fat and CVD
- But strong evidence from randomized trials: replacing saturated fat with unsaturated fat reduces total and LDL cholesterol.
- Replacing sat fat with carbohydrates: reduces total and LDL cholesterol but increases triglycerides and lowers HDL

Current recs: Limit saturated fat, but be careful what replaces it
- Use oils (soy, corn, olive, canola) to replace animal fats (butter, cream, lard) or tropical oils (palm, coconut)

Mediterranean Diet:
Healthy fats and good carbs with a big side of fruits and vegetables

HEALTHY EATING PLATE

Use healthy oils (like olive and canola oil) for cooking, on salads, and at the table (and butter! Avoid trans fat).

The more veggies—and the greener the better. Potatoes and French fries don’t count.

Eat plenty of fruits of all colors.

Choose fish, poultry, beans, and nuts; limit red meat; avoid bacon, cold cuts, and other processed meats.

Harvard Medical School
Harvard Health Publications
Primary Prevention of Cardiovascular Disease with a Mediterranean Diet

NEJM, Feb. 25, 2013

7447 Men and women, type 2 diabetes or at least 3 CV risk factors. 4.8 years

Compared 1) Mediterranean diet supplemented with 4 Tbsp/day of olive oil or 2) with 1 ounce of nuts/day; vs. 3) a low fat diet (the control)

Results: 288 cardiovascular events occurred: 3.8% in the olive oil group, 3.4% in the nut group, and 4.4% in the control group. (P=0.015)

Eat about 1 ounce of nuts most days

- 1 ounce of nuts=1/4 cup or a small handful

- But be aware of the calories...
  - 1 ounce=160-200 calories

Vegetarian Diets

- Vegans
- Fruitarians
- Lacto-vegetarians
- Lacto-ovo vegetarians
- Pesco-vegetarians
- Pollo-vegetarians
- Flexitarians (Semi-vegetarians)

Vegetarian Diets: Observational Study

- Adventist Health Study 2
  - 73,000 participants; 2570 deaths
  - 5.8 years follow-up

- Compare: vegans, pesco-; lacto-ovo-; and semi-vegetarians to non-vegetarians

- Outcome: lowest mortality in pesco-vegetarians and vegans (15-20%).

Orlich, JAMA IM, 2013
Baron, JAMA IM, 2013
Antioxidants

- Meta-analysis of 47 high-quality randomized trials of antioxidants
- 181,000 individuals
- 25,000 deaths

Bjelakovic, JAMA, 2007

Antioxidants: All-cause mortality

- Vitamin A 16% increase
- Beta-carotene 7% increase
- Vitamin E 4% increase
- Vitamin C 6% trend towards increase

All p << 0.05 except vitamin C

Bottom line: actively discourage anti-oxidant use

Bjelakovic, JAMA, 2007

Folate Supplements

- Pooled meta-analysis of 8 large, high quality randomized trials
- 37,485 individuals
- 5,125 deaths
- 9,326 major vascular events
- 3,010 cancers

Clarke, Archives IM, 2010

Folate/Homocysteine RCTs

- Homocysteine 25% decrease
- Death No effect: 1.02 (97-1.08)
- CVD events No effect: 1.01 (.97-1.05)
- Cancer No effect: 1.05 (.98-1.13)

Folate does not prevent cancer or heart disease

Clarke, Archives IM, 2010
Folate And Neural Tube Defects (NTD)

- 70% reduction in 2nd occurrences
- 4 mg of folate
- 63% reduction in 1st occurrence
- 0.4 mg of folate
- Since flour fortification
- 46% reduction in NTD

Blencowe, 2010

Classification of Dietary Fat

Omega 3 Fatty Acids: Meta-analysis

- 48 RCTs of 36,913 participants; 41 cohort trials
- No significant effect of omega 3 fats on mortality, CV events, or cancer
- Analysis of diet only trials: also no benefit
- No reason to advise people to stop rich sources of omega 3 fats, but better trials needed

Cochrane Library, 2009

Two additional Randomized Trials

- ORIGIN trial: NEJM June 2012
  - 12,536 patients with DM or high sugar
  - 1 g daily of omega-3 x 6.2 years
  - NO reduction in death, CVD events

- Risk and Prevention Trial: NEJM May 2013
  - 12,513 patients at high risk for CVD
  - 1 g daily of omega-3 x 5 years
  - NO reduction in death, CVD events
Vitamin D

• Many clinicians measure vitamin D and recommend supplements, often high doses, for possible prevention of cancer, CVD, diabetes, autoimmune disorders, cognitive decline, and other conditions

But:
• USPSTF: no data to support overall risks and benefits of supplemental vitamin D and no role for screening for vitamin D deficiency
• IOM: no clear evidence that supplemental vitamin D lowers risk of non-skeletal health outcomes

Manson, JAMA 2015

Calcium

• Adequate calcium important for skeletal health at all ages
• Food is preferred approach. No routine recommendation for supplements. May consider if intake is inadequate
• Recent studies have raised concerns about increased CV risk with supplements

Bauer, NEJM 2013

Vitamin D

• IOM: Recommends 600 IU < age 70; and 800 IU > age 70
• Equivalent to: 3-4 servings per day for fortified foods: milk, yogurt, soy beverages, OJ, cereal plus fatty fish twice per week
• Adequate for 97.5% of US and Canadian residents (including those who live in north in winter.)
• Normal serum concentration of 20-50 ng/ml

Manson, JAMA 2015

Calcium

IOM Recommends:
• Women age 19-50 and men age 19-70: 1000 mg per day
• Women >50 and men >70: 1200 mg per day
• Avoid > 2000 mg per day (after age 50)

Bauer, NEJM 2013
### Dietary Calcium

<table>
<thead>
<tr>
<th>Category</th>
<th>Food</th>
<th>Size</th>
<th>mg</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dairy</strong></td>
<td>Plain Yogurt</td>
<td>8 oz</td>
<td>448</td>
</tr>
<tr>
<td></td>
<td>Mozzarella</td>
<td>1.5 oz</td>
<td>333</td>
</tr>
<tr>
<td></td>
<td>Cheddar</td>
<td>1.5 oz</td>
<td>307</td>
</tr>
<tr>
<td></td>
<td>2% milk</td>
<td>1 cup</td>
<td>293</td>
</tr>
<tr>
<td></td>
<td>Cottage cheese</td>
<td>1 cup</td>
<td>206</td>
</tr>
<tr>
<td><strong>Fruits and vegetables</strong></td>
<td>Fortified OJ</td>
<td>6 oz</td>
<td>261</td>
</tr>
<tr>
<td></td>
<td>Kale</td>
<td>1 cup</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Bok Choy</td>
<td>1 cup</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td>Broccoli</td>
<td>1 cup</td>
<td>43</td>
</tr>
<tr>
<td><strong>Canned fish</strong></td>
<td>Sardines</td>
<td>3 oz</td>
<td>325</td>
</tr>
<tr>
<td></td>
<td>Salmon</td>
<td>3 oz</td>
<td>183</td>
</tr>
<tr>
<td><strong>Grains</strong></td>
<td>Fortified cereals</td>
<td>1 cup</td>
<td>100-1333</td>
</tr>
<tr>
<td></td>
<td>Fortified cooked oats</td>
<td>1 cup</td>
<td>187</td>
</tr>
<tr>
<td><strong>Commercial breads</strong></td>
<td>1 slice</td>
<td></td>
<td>30-73</td>
</tr>
</tbody>
</table>

### Calcium and Vitamin D: Summary

- Primary Prevention of Fractures: Insufficient (I)
- >400 D3 and >1000 Calcium: Insufficient (I)
- <400 D3 and <1000 Calcium: Discourage (D)
- Screening for Vitamin D deficiency: Insufficient (I)
- Vitamin D for preventing falls with in high risk, >65: Recommend (B)
- Screening for Vitamin D deficiency: Insufficient (I)
- Vitamin D for preventing falls with in high risk, >65: Recommend (B)

### Dietary Supplements: Summary

- Beta-carotene: Discourage - harmful
- Vitamin E: Discourage - harmful
- Folate: Prevent neural tube defects
- Omega-3s: No benefit
- Vit D and Ca: Use with bisphosphonates
  Correct deficiency: <20ng/ml
Michael Pollan’s Three Rules

- Eat food
- Not too much
- Mostly plants

Baron’s Rules

- Eat unprocessed foods
- Eat the right amount to maintain your weight
- Eat something colorful at every meal (and every snack)
- Don’t drink calories
- If can’t make the “best” choice, make a better choice
- Be as fit as you can be: exercise daily
- Eat with your children; eat at home

The “Generic” Diet

- Continued debate: macronutrient balance, amounts of meat/fish/fowl, other specific foods
- But almost all agree: Limit sugar, refined grains, large amounts of saturated and trans fat. Eat fruits and vegetables, healthy oils, whole grains, legumes and nuts
- Bottom line: Master a “generic” diet for patients and self

Baron, R. B. JAMA Int Med, 2013

For More Information

- Dietary Guidelines for Americans, 2015
- USDA’s Food & Nutrition Information Center:
- CDC Division of Nutrition, Physical Activity & Obesity:
- USDA National Agricultural Library:
- Center for Science in the Public Interest (CSPI):
  [http://www.cspinet.org/](http://www.cspinet.org/)
- ChooseMyPlate.gov: [http://www.choosemyplate.gov/](http://www.choosemyplate.gov/)
For More Information

- FDA: How to Understand and Use the Nutrition Facts Label:
  http://www.fda.gov/Food/ResourcesForYou/Consumers/
  NFLPM/ucm274593.htm

- FDA: Label Man – Make Your Calories Count:
  http://www.accessdata.fda.gov/videos/CFSAN/HWM/hw
  mintro.cfm

- Nutrition.gov: Shopping, Cooking & Meal Planning:
  http://www.nutrition.gov/shopping-cooking-meal-
  planning

- Healthy Eating Plate (Harvard):
  http://www.hsph.harvard.edu/nutritionsource/what-
  should-you-eat/pyramid/