I would describe my diet as:
- Balanced, healthy
- Not as healthy as I want it to be
- Vegetarian
- Pesco-vegetarian
- Mediterranean
- Low carbohydrate
- Low glycemic index
- Gluten-free
- Paleo
- None of the above

Why Do We Care About What We Eat?

<table>
<thead>
<tr>
<th>US Leading Causes of Death, CDC</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Heart Disease</td>
<td>32.6%</td>
</tr>
<tr>
<td>2. Cancer</td>
<td>30.9%</td>
</tr>
<tr>
<td>3. Chronic lower respiratory disease</td>
<td>7.5%</td>
</tr>
<tr>
<td>4. Stroke</td>
<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>
<td>7. Diabetes</td>
<td>3.7%</td>
</tr>
<tr>
<td>8. Influenza and pneumonia</td>
<td>2.9%</td>
</tr>
<tr>
<td>9. Nephritis, nephrotic syndrome &amp; nephrosis</td>
<td>2.7%</td>
</tr>
<tr>
<td>10. Intentional self-harm (suicide)</td>
<td>2.0%</td>
</tr>
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Why Do We Care About What We Eat?

**US Leading Causes of Death, CDC**

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Lifestyle and Disease

- 1/3 of premature deaths in the U.S. are attributable to poor nutrition and physical inactivity.
- Over 50% of American adults do not get the recommended amount of physical activity.
- Only 10% of Americans eat a healthy diet consistent with federal nutrition recommendations.
  - Too high in calories, saturated and trans fat, salt, and refined sugars.
  - Too low in fruits, vegetables, whole grains, calcium, and fiber.

Topics

- Total calories and macronutrient balance
- Dietary Fiber
- US Dietary Guidelines
- Sodium
- Vegetarian Diets and Mediterranean Diets
- Antioxidants and B vitamins
- Fish oil
- 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>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>2,057</td>
</tr>
<tr>
<td>2008</td>
<td>2,674</td>
</tr>
</tbody>
</table>
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></th>
<th>Calories/meal at home</th>
<th>Calories/meal at a restaurant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Weight</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 “trumps” macronutrient composition
  - Achieving desired calorie intake will achieve most clinical goals

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

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>Wheat-bran cereal</td>
<td>7.4</td>
</tr>
<tr>
<td>Cornflakes</td>
<td>0.9</td>
</tr>
<tr>
<td>Oatmeal</td>
<td>4.8</td>
</tr>
<tr>
<td>Shredded wheat</td>
<td>6.1</td>
</tr>
<tr>
<td>Brown rice</td>
<td>1.5</td>
</tr>
<tr>
<td>White rice</td>
<td>0.3</td>
</tr>
<tr>
<td>Peanuts</td>
<td>9.1</td>
</tr>
<tr>
<td>Asparagus</td>
<td>1.4</td>
</tr>
<tr>
<td>Kidney beans</td>
<td>6.8</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>Tomato</td>
<td>1.0</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)

“Basic Four” Food Groups (1956)
Hot Topics in Clinical Nutrition

Food Group Pyramid (1992)

<table>
<thead>
<tr>
<th>Food Group</th>
<th>Servings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetables</td>
<td>2-4 bowls</td>
</tr>
<tr>
<td>Grains</td>
<td>4-6 oz</td>
</tr>
<tr>
<td>Fruits</td>
<td>2 cups</td>
</tr>
<tr>
<td>Milk &amp; Milk Products</td>
<td>2 cups</td>
</tr>
<tr>
<td>Protein</td>
<td>6-8 oz</td>
</tr>
<tr>
<td>Beverages</td>
<td>0-2 cups</td>
</tr>
</tbody>
</table>

MyPlate (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

Dietary Guidelines 2010
Too Many Refined Grains

- Federal 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 (½ 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.

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
Hot Topics in Clinical Nutrition

Salt in the US Diet

80% in processed or pre-prepared foods

Sources: Mattes et al.

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 cheeses
10. Grain-based desserts

Sources of sodium in US

- 35% from cereal and cereal products
- 26% from meat & meat products
- 8% from milk & milk products

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

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

Meta-analysis, Blencowe, IJE, 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
Since meta-analysis:
Two additional RCTs
- 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

Dietary Supplements:
Summary
- Beta-carotene: Discourage - harmful
- Vitamin E: Discourage - harmful
- Folate: Prevent neural tube defects
- Omega-3s: No benefit

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
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 primary care practice

Baron, RB. JAMA Int Med. 2013

For More Information

- CDC Division of Nutrition, Physical Activity & Obesity: http://www.cdc.gov/nccdphp/dnpao/index.html
- USDA National Agricultural Library: http://www.nutrition.gov/
- Center for Science in the Public Interest (CSPI): http://www.cspinet.org/
- ChooseMyPlate.gov: http://www.choosemyplate.gov/
- FDA: How to Understand and Use the Nutrition Facts Label: http://www.fda.gov/ResourcesForYou/Consumers/NFLPM/ucm274593.htm