Emerging Challenges in Primary Care: 2017

Prevention of Heart Disease
(...and dementia...and even cancer...)
2017

Faculty

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  Co-director, UCLA Program in Preventive Cardiology
  Director, UCLA Barbra Streisand Women's Heart Health Program
  Los Angeles, CA

Disclosures

• Karol E. Watson, MD, PhD serves as a consultant for Amarin and Amgen. Dr. Watson also serves as a consultant/speakers bureau member for Boehringer Ingleheim.
Learning Objectives

• Review preventive strategies (traditional and non-traditional) for the prevention of heart disease.

• Review common preventive strategies against heart disease, cancer and dementia.

• Discuss controversies and complexities in prevention.

After decades of decline, heart disease mortality rates flattened between 2011-2014 and actually INCREASED in 2015.

Trends in ischemic stroke and ST elevation myocardial infarction (STEMI)
Total Deaths, United States - 2015

<table>
<thead>
<tr>
<th>Cause</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart Disease</td>
<td>600,000</td>
</tr>
<tr>
<td>Cancer</td>
<td>560,000</td>
</tr>
<tr>
<td>Chronic lower respiratory disease</td>
<td>500,000</td>
</tr>
<tr>
<td>Accidents</td>
<td>400,000</td>
</tr>
<tr>
<td>Stroke</td>
<td>300,000</td>
</tr>
<tr>
<td>Alzheimers disease</td>
<td>200,000</td>
</tr>
</tbody>
</table>

Centers for Disease Control and Prevention, National Center for Health Statistics (2015)

Dementia: The disease Americans fear the most
“What disease do you fear the most?”

<table>
<thead>
<tr>
<th>Disease</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dementia</td>
<td>36%</td>
</tr>
<tr>
<td>Cancer</td>
<td>23%</td>
</tr>
<tr>
<td>Stroke</td>
<td>15%</td>
</tr>
</tbody>
</table>

Data from YouGov survey, August 2013; US respondents over 60
Graphic from 2014 Alzheimer’s Disease Facts and Figures, Alzheimer’s Association, Chicago

Learning Objectives

- To review preventive strategies (traditional and non-traditional) for the prevention of heart disease
- To review common preventive strategies against heart disease, cancer and dementia
- To discuss controversies and complexities in prevention
CASE

- Your 61-year-old patient with hypertension and h/o gout presents for routine follow up. He’s rattled by recent high-profile cardiovascular deaths, so he’s begun drinking wine (he heard it was “good for the heart”). But he asks “What else should I be doing?”

Current medications:
Losartan 100 mg daily

Pertinent physical exam findings:
BP-149/82 BMI-34.9

Pertinent lab findings:
LDL-115 FBS – 115 HbA1c-6.5

HYPERTENSION

Clinical Review & Education

Special Communication

2014 Evidence-Based Guideline for the Management of High Blood Pressure in Adults
Report From the Panel Members Appointed to the Eighth Joint National Committee (JNC 8)

-- Arima, Published online December 18, 2013. doi:10.1001/jama.2013.284427
BP goal in the Elderly: A comparison of guidelines

- **ACP and AAFP**
  - JNC 8: < 150/90 -> > 60 years
  - ESH/ESC: < 150/90 -> > 80 years
  - CHEP: < 150/90 -> > 80 years
  - NICE: < 150/90 -> > 80 years
  - ASH/ISH: < 150/90 -> > 80 years

We, the panel minority, believed that evidence was insufficient to increase the SBP goal from its current level of less than 140 mm Hg, partially undoing the remarkable progress in reducing cardiovascular mortality in Americans older than 60 years.

Hypertension Guidelines

Members of the JNC-8 panel who voted against increasing the target systolic blood pressure in people over age 60 years explain why they think the increased target is a bad idea.
A Randomized Trial of Intensive versus Standard Blood-Pressure Control

- Randomized trial examining the effect of a SBP goal of <140 mm Hg or a goal of < 120 mm Hg
- Men and women ≥ 50 years old
- SBP 130 – 180 mm Hg (Treated or untreated)
- High Risk
  - Clinical or subclinical CVD
  - CKD (GFR 20 – 59)
  - Framingham Risk Score ≥ 15%
  - Age ≥ 75 years
- Exclusions: prior stroke, severe CKD, CHF, diabetes

**SPRINT: Outcomes**

**Primary Outcome**
(Heart, Stroke, Heart failure, ACS, CV death)

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>HR</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Prior CKD</td>
<td>0.70 (0.56; 0.87)</td>
<td>0.36</td>
</tr>
<tr>
<td>Prior CKD</td>
<td>0.82 (0.65; 1.04)</td>
<td>0.12</td>
</tr>
<tr>
<td>Age ≥ 75</td>
<td>0.67 (0.50; 0.92)</td>
<td>0.03</td>
</tr>
<tr>
<td>Female</td>
<td>0.94 (0.71; 1.27)</td>
<td>0.62</td>
</tr>
<tr>
<td>Race</td>
<td>0.70 (0.56; 0.87)</td>
<td>0.05</td>
</tr>
<tr>
<td>African-American</td>
<td>0.77 (0.53; 1.14)</td>
<td>0.23</td>
</tr>
<tr>
<td>Non-African-American</td>
<td>0.74 (0.57; 0.97)</td>
<td>0.08</td>
</tr>
<tr>
<td>No Prior CVD</td>
<td>0.71 (0.57; 0.88)</td>
<td>0.03</td>
</tr>
<tr>
<td>Prior CVD</td>
<td>0.83 (0.62; 1.19)</td>
<td>0.29</td>
</tr>
<tr>
<td>SBP ≥ 132</td>
<td>0.70 (0.55; 0.89)</td>
<td>0.02</td>
</tr>
<tr>
<td>SBP ≥ 145</td>
<td>0.77 (0.70; 0.85)</td>
<td>0.01</td>
</tr>
</tbody>
</table>

**Total Mortality**

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>HR</th>
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<tr>
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<td></td>
</tr>
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</tbody>
</table>

**SPRINT: Pre-specified Subgroups**
### SPRINT Serious Adverse Events

<table>
<thead>
<tr>
<th>SAE reports</th>
<th>Number (%) of Participants</th>
<th>Intensive</th>
<th>Standard</th>
<th>HR (p value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypotension</td>
<td>110 (2.4)</td>
<td>66 (1.4)</td>
<td>1.67 (0.001)</td>
<td></td>
</tr>
<tr>
<td>Syncope</td>
<td>107 (2.3)</td>
<td>80 (1.7)</td>
<td>1.33 (0.05)</td>
<td></td>
</tr>
<tr>
<td>Injurious fall</td>
<td>105 (2.2)</td>
<td>110 (2.3)</td>
<td>0.95 (0.71)</td>
<td></td>
</tr>
<tr>
<td>Bradycardia</td>
<td>87 (1.9)</td>
<td>73 (1.6)</td>
<td>1.19 (0.28)</td>
<td></td>
</tr>
<tr>
<td>Electrolyte abnormality</td>
<td>144 (3.1)</td>
<td>107 (2.3)</td>
<td>1.35 (0.020)</td>
<td></td>
</tr>
<tr>
<td>Acute kidney injury or renal failure</td>
<td>193 (4.1)</td>
<td>117 (2.5)</td>
<td>1.66 (&lt;0.001)</td>
<td></td>
</tr>
</tbody>
</table>

### COMPLEXITY

In general, the more intensive the pharmacologic therapy, the more side effects.

### CASE

Your 61-year-old patient with hypertension and h/o gout presents for routine follow up. He’s worried about recent high-profile cardiovascular deaths, so he’s begun drinking wine (he heard it was “good for the heart”). But he asks “What else should I be doing?”

**Current medications:**
- Losartan 100 mg daily

**Pertinent physical exam findings:**
- BP: 149/82
- BMI: 34.9

**Pertinent lab findings:**
- LDL: 115
- FBS: 115
- HbA1c: 6.5

Because of the SPRINT data, we add Amlodipine to treat his hypertension.

Oh by the way... Mr. Smith mentions that he is also worried about dementia and cancer.
Rationale for Common Strategies

- Why might heart disease, dementia and cancer share common preventive strategies
- All 3 are known to have a preventive component
- All 3 are strongly age related
- All 3 involve common pathophysiology:
  1. Inflammation
  2. Oxidative stress
  3. Cellular dysfunction

All-cause and vascular dementia rates increase with increasing BP levels

Treating hypertension reduces dementia
Increasing BP levels are associated with increased cancer incidence and mortality

[Graph showing hazard ratio for cancer incidence/mortality vs. average SBP mm Hg]

Increasing BP levels are associated with increased cancer incidence and mortality. The hazard ratio for cancer incidence is less than 0.001, and for cancer mortality, it is less than 0.001.

Treating hypertension has no effect on cancer

[Graphs showing no effect of ACE inhibitors, beta blockers, and calcium channel blockers on cancer incidence and mortality]

Treating hypertension has no effect on cancer incidence or mortality.

COMPLEXITY

Just because an association exists between a given risk factor and a given outcome, it doesn’t mean that modifying that factor will improve outcomes.
We tell our patient

• Antihypertensive therapy:
  – Will reduce his risk of heart disease, stroke and cardiovascular death
  – Will likely reduce his risk of dementia
  – Will have no effect on his risk of cancer

CHOLESTEROL

CASE

• A 61 year-old man with a h/o hypertension and gout presents for routine follow up. He’s rattled by recent high-profile cardiovascular deaths, so he’s begun drinking wine (he heard it was “good for the heart”). But he still wonders “What else should I be doing?”

Current medications:
Lisinopril 10 mg daily

Pertinent physical exam findings:
BP-149/82, BMI-34.9

Pertinent lab findings:
[Highlighted values: LDL-115, FBS – 115, HbA1c-6.5]
Statin use is associated with reduced dementia risk in observational studies

Results of 7 observational studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Journal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rockwood K et al. Arch Neurol.</td>
<td>2002</td>
<td>59:223-227</td>
</tr>
<tr>
<td>Yaffe K et al. Arch Neurol.</td>
<td>2002</td>
<td>59:376-384</td>
</tr>
</tbody>
</table>

ALL COHORT STUDIES

-0.43 (0.31-0.62)

Statin use had no effect on cognitive function in the PROSPER trial (RCT)

5,804 patient > 70 y.o. Randomized to pravastatin 40 mg daily or placebo. Formal cognitive testing performed.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Pravastin - Placebo</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of correct letter digits recalled</td>
<td>-0.01 (-0.24-0.23)</td>
<td>p=0.95</td>
</tr>
<tr>
<td>Number of words Remembered</td>
<td>+0.02 (-0.12-0.0)</td>
<td></td>
</tr>
<tr>
<td>Time needed to complete Stroop test</td>
<td>+0.8 s (-0.4-2.0)</td>
<td>p=0.19</td>
</tr>
<tr>
<td>MMSE score</td>
<td>+0.06 (-0.04-0.16)</td>
<td>p=0.26</td>
</tr>
</tbody>
</table>

COMPLEXITY

Even if observational studies suggest benefit of a given therapy, we don’t truly know if the therapy works until we test it by randomized controlled trial.
Low cholesterol levels are associated with increased cancer rates in observational studies

70,179 Copenhagen cardiovascular study participants

Cancer rates

Genetically decreased LDL cholesterol levels are not associated with cancer rates. “This finding suggests that low LDL cholesterol levels per se do not cause cancer.”

Marianne Benn et al. JNCI J Natl Cancer Inst 2011;jnci.djr008

Statin therapy has no effect on cancer rates

<table>
<thead>
<tr>
<th>Events (%)</th>
<th>Treatment</th>
<th>Control</th>
<th>Rate Ratio (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1 year</td>
<td>412 (1.0)</td>
<td>441 (1.0)</td>
<td>0.95 (0.81 – 1.12)</td>
</tr>
<tr>
<td>1-2 years</td>
<td>532 (1.4)</td>
<td>573 (1.3)</td>
<td>1.03 (0.89 – 1.20)</td>
</tr>
<tr>
<td>2-3 years</td>
<td>512 (1.4)</td>
<td>514 (1.4)</td>
<td>0.99 (0.85 – 1.15)</td>
</tr>
<tr>
<td>3-4 years</td>
<td>494 (1.4)</td>
<td>476 (1.4)</td>
<td>1.00 (0.86 – 1.16)</td>
</tr>
<tr>
<td>4-5 years</td>
<td>384 (1.3)</td>
<td>374 (1.3)</td>
<td>1.02 (0.86 – 1.21)</td>
</tr>
<tr>
<td>5+ years</td>
<td>233 (1.3)</td>
<td>218 (1.2)</td>
<td>1.05 (0.84 – 1.32)</td>
</tr>
<tr>
<td>All times</td>
<td>2567 (6.4)</td>
<td>2536 (6.4)</td>
<td>1.00 (0.95 – 1.06)</td>
</tr>
</tbody>
</table>

Statin therapy has no effect on cancer rates. Cholesterol Treatment Trials. Lancet 2005; 366: 1267-1344

COMPLEXITY

Reverse causality (chicken vs. egg) can lead us astray when assessing associations
We tell our patient

- Statin therapy:
  - Will reduce his risk of heart disease, stroke and cardiovascular death
  - Will likely have no effect on cognitive function
  - Will have no effect on cancer rates

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**OBESITY**

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**CASE**

- A 61 year-old man with a h/o hypertension and gout presents for routine follow up. He’s rattled by recent high-profile cardiovascular deaths, so he’s begun drinking wine (he heard it was “good for the heart”). But he still wonders “What else should I be doing?”

Current medications:
Lisinopril 10 mg daily

Pertinent physical exam findings:
BP-149/82, BMI-34.9

Pertinent lab findings:
LDL-115, FBS – 115 HbA1c-6.5
Swedish Obese Subjects (SOS) Study
Nonrandomized prospective study of obese patients. 2,010 had surgery compared with 2,037 contemporaneously matched controls.

Bariatric Surgery and Prevention of Type 2 Diabetes in Swedish Obese Subjects
Lara M.S. Carlsson, MD, PhD; Marie Hidalgo, PhD; Sabrina Hidalgo, MD; Arne Andersson, MD; Claes Backlund, MD; Bente Carlsson, MD, PhD; Perk Jacobsson, MD, PhD; Hana Landgren, MD, PhD; Christian Berg, MD, PhD; Jonas Hambraeus, MD, PhD; Ola Adhikari, MD, PhD; Elizabeth Sjostrom, MD, PhD; Hans Wern, MD, PhD; Per Olofsson, MD, PhD; Lars Sjostrom, MD, PhD.

Bariatric Surgery is Associated with Reduced Mortality: SOS Study 15 year f/u
30% lower mortality risk
41% lower CAD risk

Effect of bariatric surgery on cancer incidence – SOS study
MEN
WOMEN
No effect
42% lower cancer risk
What about dementia? 
Obesity is associated with lower brain volumes

- Obesity is associated with:
  - Lower brain volumes
    Ward, et al., 2005
  - Worse cognitive function
    Debette, et al., 2011
  - Brains of overweight / obese people appear 8 and 16 years older, respectively
    Raji, et al., 2010

CASE

We recommend 30 minutes of brisk walking daily and a calorie reduced diet for weight reduction

Current medications:
Lisinopril 10 mg daily

Pertinent physical exam findings:
BP-149/82, BMI-34.9

Pertinent lab findings:
LDL-115, FBS – 115 HbA1c-6.5

We tell our patient

- Weight loss:
  - Will reduce his risk of heart disease, stroke and cardiovascular death
  - May reduce his risk of cancer
  - May improve his cognitive function
Should he take daily Aspirin to lower his cardiovascular risk? 

Meta-analysis of aspirin therapy in primary prevention 

2016 USPSTF :Aspirin Recommendation 

People 50 - 69 years old who have a 10% or greater 10-year risk for CVD and who do not have a higher risk of bleeding should consider taking low-dose aspirin to help prevent CVD and colorectal cancer 

The current evidence is insufficient to assess the balance of benefits and harms of the use of aspirin for the primary prevention of CVD and CRC in adults aged 70 years or older.
How can we determine who should get aspirin?

- The **ASPIRIN GUIDE**: an app developed by physicians at Brigham & Women’s Hospital (Harvard)
- The app calculates potential vascular benefit (from ASCVD risk score) and also potential bleeding risk
- From this, an aspirin recommendation is made
COMPLEXITY

When trying to prevent one disease, it is important to beware of causing another disease

Long-term effect of aspirin on colorectal cancer incidence and mortality: 20-year follow-up of five randomised trials

Risk of Colorectal cancer in patients using aspirin in 15 year period prior to diagnosis

Reduced esophageal, pancreatic, lung, brain, stomach and prostate cancers are also associated with regular ASA use
Low-Dose Aspirin and Dementia in Older Women

- Observational study of 681 Swedish women (70 - 92 years)
- Women taking regular aspirin had less cognitive decline
- Equivalent data in men are lacking
- ASPREE RCT is underway

We tell our patient

- Regular aspirin use:
  - Will likely reduce his risk of heart disease, and cardiovascular death.
  - Will likely reduce his risk of cancer (after ~10 years of use)
  - May improve his cognitive function

Nonsteroidal Anti-inflammatory Drugs increase Cardiovascular Risk

Meta-analysis of 121 randomized trials evaluating the CV effects of COX-2 inhibitors

<table>
<thead>
<tr>
<th>COX-2 Inhibitor</th>
<th>No. of Trials</th>
<th>Event/h/1000-years</th>
<th>Rate ratio COX 2 inhibitor/ placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placebo</td>
<td>30</td>
<td>30/645</td>
<td></td>
</tr>
<tr>
<td>Celecoxib</td>
<td>64</td>
<td>46/697</td>
<td>1.53 (96% CI 1.03 to 2.29)</td>
</tr>
<tr>
<td>Etodolac</td>
<td>24</td>
<td>48/731</td>
<td>1.00 (96% CI 0.50 to 1.94)</td>
</tr>
<tr>
<td>Valdecoxib</td>
<td>14</td>
<td>67/648</td>
<td>1.63 (96% CI 0.96 to 2.76)</td>
</tr>
<tr>
<td>Total</td>
<td>121</td>
<td>153/1047</td>
<td></td>
</tr>
</tbody>
</table>

Heterogeneity between five drugs: $I^2 = 0$, $Q = 4$, $P = 0.9$
COMPLEXITY

If a little is good...a lot is not always better

What should he eat?
Primary Prevention of Cardiovascular Disease with a Mediterranean Diet

Men: 55-80 yr
Women: 60-80 yr
High CV risk without CVD (type 2 diabetes + 3 additional risk factor)

MeDiet with Extra Virgin Olive Oil (EVOO)
MeDiet with Mixed nuts N=1285
Control Diet (Low-Fat) N=1391

30 % lower risk of cardiovascular disease
Reduced cardiovascular mortality with increased adherence to Mediterranean diet

<table>
<thead>
<tr>
<th>Study</th>
<th>Relative risk (95% CI)</th>
<th>Weight (%)</th>
<th>Relative risk (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trichopoulou et al 2003</td>
<td>5.90 (0.61 to 0.60)</td>
<td>0.50</td>
<td>5.90 (0.61 to 0.60)</td>
</tr>
<tr>
<td>Knekt et al 2004</td>
<td>14.76 (0.76 to 0.96)</td>
<td>0.50</td>
<td>14.76 (0.76 to 0.96)</td>
</tr>
<tr>
<td>Wito et al 2007 (men)</td>
<td>67.03 (0.83 to 0.86)</td>
<td>0.50</td>
<td>67.03 (0.83 to 0.86)</td>
</tr>
<tr>
<td>Wito et al 2007 (women)</td>
<td>31.95 (0.88 to 0.96)</td>
<td>0.50</td>
<td>31.95 (0.88 to 0.96)</td>
</tr>
<tr>
<td>Total</td>
<td>100.00 (0.87 to 0.95)</td>
<td>0.50</td>
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</tr>
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</table>

Reduced cancer with increased adherence to Mediterranean diet

<table>
<thead>
<tr>
<th>Study</th>
<th>Relative risk (95% CI)</th>
<th>Weight (%)</th>
<th>Relative risk (95% CI)</th>
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</thead>
<tbody>
<tr>
<td>Fuchs et al 2000</td>
<td>11.20 (0.93 to 1.00)</td>
<td>0.50</td>
<td>11.20 (0.93 to 1.00)</td>
</tr>
<tr>
<td>Lindblad et al 2000</td>
<td>1.89 (0.77 to 1.03)</td>
<td>0.50</td>
<td>1.89 (0.77 to 1.03)</td>
</tr>
<tr>
<td>Tung et al 2004</td>
<td>3.41 (0.83 to 1.03)</td>
<td>0.50</td>
<td>3.41 (0.83 to 1.03)</td>
</tr>
<tr>
<td>Wito et al 2007 (men)</td>
<td>34.79 (0.83 to 0.87)</td>
<td>0.50</td>
<td>34.79 (0.83 to 0.87)</td>
</tr>
<tr>
<td>Wito et al 2007 (women)</td>
<td>24.49 (0.83 to 1.03)</td>
<td>0.50</td>
<td>24.49 (0.83 to 1.03)</td>
</tr>
<tr>
<td>Brenna et al 2006</td>
<td>5.73 (0.83 to 0.96)</td>
<td>0.50</td>
<td>5.73 (0.83 to 0.96)</td>
</tr>
<tr>
<td>Total</td>
<td>100.00 (0.87 to 0.90)</td>
<td>0.50</td>
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Reduced dementia with increased adherence to Mediterranean diet

<table>
<thead>
<tr>
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<th>Relative risk (95% CI)</th>
<th>Weight (%)</th>
<th>Relative risk (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scarmeas et al 2000</td>
<td>11.06 (0.83 to 1.00)</td>
<td>0.50</td>
<td>11.06 (0.83 to 1.00)</td>
</tr>
<tr>
<td>Gao et al 2001</td>
<td>38.60 (0.80 to 1.00)</td>
<td>0.50</td>
<td>38.60 (0.80 to 1.00)</td>
</tr>
<tr>
<td>Gao et al 2007 (women)</td>
<td>70.04 (0.85 to 1.00)</td>
<td>0.50</td>
<td>70.04 (0.85 to 1.00)</td>
</tr>
<tr>
<td>Total</td>
<td>100.00 (0.87 to 0.96)</td>
<td>0.50</td>
<td>100.00 (0.87 to 0.96)</td>
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For decades, the AHA recommended that people snack on SUGAR, to avoid fat. In pamphlets such as this from the 1980s “An Eating Plan for Healthy Americans”

Hard candy, gum drops
Sugar, syrup, honey, jam, jelly, marmalade

History of the Fat Dietary Guidelines

“Replacing fat with carbohydrates DOES NOT decrease CV risk
“Obesity and type 2 diabetes DO NOT significantly increase CV risk
“Replacing fat with carbohydrates DOES NOT decrease CV risk

The types of fatty acids consumed are more important?
History of Dietary Fat Guidelines

- **Eat carbs, Not fat**
- **Avoid Fat**

1980: **Avoid Fat**

1985: **Avoid Fat**

1990: **Moderate Fat Intake**

1995: **Avoid Fat**

2000: **Moderate Fat Intake**

2005: **Avoid Fat**

2010: **Avoid Fat**

2015: **Avoid Fat**

"Replacing fat with carbohydrates DOES NOT decrease CV risk"

"The types of fats consumed are more important"

Increased Sugar Intake Increases Cardiovascular Mortality (NHANES-31,147 people)

The average American consumes about 15% of total calories as added sugar.

For a 2,000 calorie diet, that's the amount of sugar in a 16 oz soda.

AHA Scientific Statement

Dietary Sugars Intake and Cardiovascular Health

A Scientific Statement From the American Heart Association

“A prudent upper limit of intake...for most American women is no more than 100 calories per day and for most American men is no more than 150 calories per day from added sugars.”

For a 2,000 calorie diet, that's the amount of sugar in a 16 oz soda.
**Association between sugar consumption and cognitive function**

*737 people without diabetes*

- **Cognitive impairment**
  - **Total sugars**
  - **Added sugars**

---

**Association of different macronutrient intake with dementia risk**

- **Total carbohydrates**
- **Total fat**
- **Total protein**

---

**Sugar intake and cancer**

- Sugar, itself, is not carcinogenic
- However, cancer cells do thrive on sugar and in fact cancer cells utilize more sugar than normal cells
- Studies assessing the association between sugar intake and development of cancer are largely negative
- However, most studies show that increased sugar intake increases mortality in patients who have already developed cancer
Sugar-sweetened beverage intake associated with increased mortality in cancer patients

1,011 stage III colon cancer patients

We tell our patient

- Mediterranean diet plan and reduced sugar intake:
  - Will reduce his risk of heart disease, stroke, cardiovascular death and total mortality.
  - Will likely improve his cognitive function
  - May reduce his risk of developing or dying of cancer

What about alcohol?
There is a J-shaped relationship between alcohol intake and mortality

Meta-analysis of 34 studies (1,015,835 people)

Most of the mortality reduction is due to reduction in cardiovascular death

J-shaped relationship between alcohol intake and mortality

Meta-analysis of 34 studies

34 studies
1,015,835 subjects
94,533 deaths

~ 5 g/d
½ drink per day

~ 40 g/d
3 drinks per day

Audience Response Question

• Which alcoholic beverage is associated with the greatest reduction in cardiovascular disease?

1. White wine
2. Red wine
3. Fortified wine (such as port)
4. Vodka (because it contains no carbohydrates)
5. All alcoholic beverages are associated with approximately the same risk reduction

Ref: DiCastelnuovo et al., Arch Intern Med. 2006;166:2437-2445
How much Alcohol?

One drink is considered to be 14 grams of alcohol

12 oz. beer
8-9 oz. of malt liquor
5 oz. wine
3-4 oz. fortified wine (sherry)
2.3 oz. cordial liquor (aperitif)
1.5 oz. brandy or cognac
1.5 oz. 80 proof alcohol

Moderate alcohol intake is associated with reduced Alzheimer’s disease incidence


Moderate alcohol intake is associated with increased incidence of many cancers

Bagnardi et al, British Journal of Cancer 2001
We tell our patient

- Moderate alcohol intake:
  - May reduce his risk of heart disease, stroke, cardiovascular death and total mortality.
  - May improve his cognitive function
  - May actually increase his cancer risk
  - Excessive alcohol intake will likely increase total mortality - especially true for women

What about Coffee?

Moderate coffee intake is associated with reduced CVD

- A meta analysis of 36 prospective studies (1,279,804 people)
- Found a J-shaped relationship between coffee consumption and CVD, CHD and stroke
- Consumption of up to ~3-4 cups of coffee per day was associated with decreased risk
- Consumption of more than ~5 cups of coffee per day was associated with increased risk

Ming Ding et al. Circulation. 2014;129:643-659
Cognitive function is associated with increased lifetime coffee consumption


Coffee consumption and cancer mortality

Data from 21 prospective studies, with 997,464 participants

We tell our patient

- Moderate coffee consumption (up to 3-4 cups of coffee per day):
  - May reduce his risk of heart disease, stroke, and cardiovascular death
  - May improve his cognitive function
  - Will have no effect on his risk of cancer
  - Coffee intake above moderate levels may be harmful

No significant effect
Physical activity is associated with reduced cardiovascular risk

**Figure 1.** The inverse relationship between physical activity and cardiovascular risk.

Physical activity improves cognition

**Table 1.** Effect size estimates as a function of task type and group.
Physical activity is associated with reduced cancer risk

- Pooled data from 1.44 million adults (US and Europe)
- 11 year of follow up
- The most active people had a 20% lower risk of developing cancer

The most active people did the equivalent of 7 hours of brisk walking per week

How much exercise for health HARMS?

Observational studies of the dose-response relationship between physical activity and mortality

Can too much exercise harm the heart?

- The book the Haywire Heart argues that too much exercise can kill you.
- "...going too hard or too long can damage your heart forever."
- According to the publisher: This book is intended for anyone who competes in endurance sports like cycling, triathlon, running races of all distances, and cross-country skiing.
We tell our patient

- Regular exercise:
  - Will reduce his risk of heart disease, stroke, cardiovascular death and total mortality.
  - Will likely improve his cognitive function
  - Will likely reduce his risk of developing cancer
  - The biggest “bang for the buck” appears to come from changing sedentary lifestyles to any level of activity
  - Extreme exercise may be harmful

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* Evidence from observational studies only

Prevention works!
Prevention

- Prevention is where medicine gets hard
- To prevent something that may or may not happen in the future is difficult.
- Preventive medicine also requires us to treat people who are not sick, so the most important principle is "do no harm."
- But the good news is that many preventive therapies reduce risks for heart disease, dementia...and even cancer

Why we need to PREVENT chronic diseases

If we keep on doing what we've always done...we'll keep on getting what we've always gotten...

Questions?