

CVD Screening: We should measure CV risk

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Screening Requirements

- ◆ Disease should be widespread
- ◆ Disease should be preventable if diagnosed in an earlier (asymptomatic) stage
- ◆ Test should be easily available and inexpensive
- ◆ Test should be without harm
- ◆ Test should be highly accurate
- ◆ Test should give unique information that is necessary for prevention to occur

Studies Challenge Framingham Risk Score

The long-standing assessment for heart risk may not be accurate in some cases



Framingham Risk Score: Women

Step 1: Age Points

Years	Points
20-24	-7
25-34	-3
35-39	0
40-44	3
45-49	6
50-54	8
55-59	10
60-64	12
65-69	14
70-74	16
75-79	16

Step 4: SBP Points

SBP (mmHg)	If treated	If untreated
<120	0	0
120-129	1	3
130-139	2	4
140-149	3	5
150-159	4	6
>160	4	6

Step 5: Smoking Status Points

	Age 20-39	Age 40-49	Age 50-59	Age 60-69	Age 70-79
Nonsmoker	0	0	0	0	0
Smoker	9	7	4	2	1

Step 6: Sum of Points

Age
Total Cholesterol
HDL-C
Systolic Blood Pressure
Smoking Status
Point Total

Step 2: Total Cholesterol Points

TC (mg/dl)	Age 20-39	Age 40-49	Age 50-59	Age 60-69	Age 70-79
<160	0	0	0	0	0
160-199	4	3	2	1	1
200-239	8	6	4	2	1
240-279	11	5	3	2	
≥280	13	7	4	2	

Step 3: HDL-C Points

>60	-1
50-59	0
40-49	1
<40	2

Step 7: 10-year CHD Risk

Point Total	10-year Risk	Point Total	10-year Risk	Point Total	10-year Risk
<9	<1%	15	3%	22	17%
9	1%	16	4%	23	22%
10	1%	17	5%	24	27%
11	1%	18	6%	≥25	>30%
12	1%	19	8%		
13	2%	20	11%		
14	2%	21	14%		

CV Risk Assessment

- ◆ Patient population
 - ◆ Asymptomatic (Framingham Risk Score)
 - ◆ Low risk - <10% event rate in 10 years by FRS
 - ◆ Intermediate risk - 10-20% event rate
 - ◆ High risk - >20% event rate
 - ◆ Validated over many years
 - ◆ Works equally well in women and men
 - ◆ Ages 30 -74 years old
 - ◆ Office -based assessment

Case - BZ

- ◆ 55 year old woman
- ◆ Mother died of CAD at age 62
- ◆ Marathon runner
- ◆ BP - 124/70
- ◆ Total Cholesterol - 220
 - ◆ LDL - 135
 - ◆ HDL - 68
- ◆ Non - Smoker

Case - BZ

- ◆ 55 year old woman - 8 points
- ◆ Mother died of CAD at age 62
- ◆ Marathon runner
- ◆ BP - 124/70 - 1 point
- ◆ Total Cholesterol - 220 - 4 points
 - ◆ LDL - 135
 - ◆ HDL - 68 - -1 point
- ◆ Non - Smoker - 0
- ◆ Total - 12 points = 1% 10 year risk

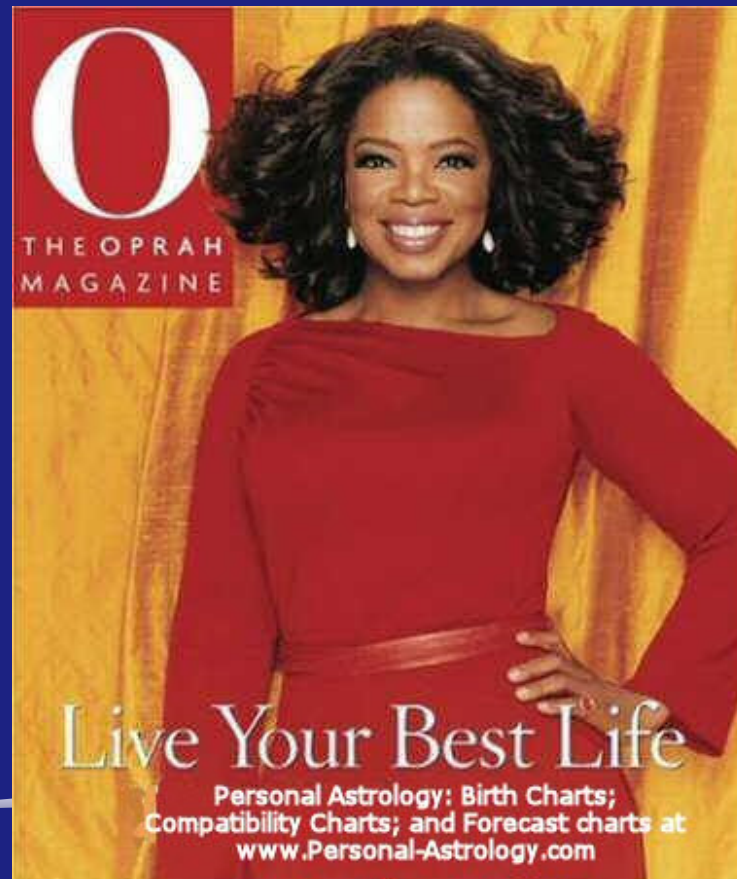
ARS 1 and 2

To be clinically useful, additional testing or imaging must:

- ◆ Significantly improve risk prediction compared to Framingham Risk Score
- ◆ Lead to actionable change, incremental to FRS alone
- ◆ Change must lead to better patient outcomes
- ◆ Must be free of adverse effects

What does Oprah say?

- Oprah Winfrey website: story on women's CV health touting cardiac CT



Time Magazine 2005



All the buzz...

NYT article June 29, 2008

- >1000 scanners installed (for cardiac purpose)
- Promoted via radio, TV, internet, direct mail
- 150,000 scans done last year in the U.S. w/ cost of >\$100 million
- Public assumes new technology is good



Coronary Artery Calcification

- **Variable amounts of calcium found w/ atherosclerosis**
- **Can indicate active plaque development**
- **More frequent in advanced lesions**
- **Can see small amounts in early dz in high risk pt**
- **Clinical settings: Screening of Asx pts vs. ED eval of chest pain**

CAC scoring

Score associated w/ plaque burden:

- 0: no identifiable disease
- 1 to 99: mild disease
- 100 to 399: moderate disease
- ≥ 400 : severe disease

In reality, score varies widely and can be in the 1000s and unclear if correlates



Coronary Calcium Does NOT Accurately Predict Near-Term Future Coronary Events in High Risk Adults

☛ South Bay Heart Watch

- N - 1196 (10% women)**
- 3 year FRS - 3.3%**
- Follow up - 3 years**

☛ ROC Curve for Cardiac Events

- Framingham risk - .69**
- Coronary Artery Calcium - .64**

CAC Score Combined with FRS for Risk Prediction in Asx Individuals

☛ South Bay Heart Watch

- 7 year follow up**
- Eliminated persons with diabetes**

☛ Conclusion - high CACS can modify risk prediction from FRS alone, esp. in intermediate risk pts

☛ What changed?

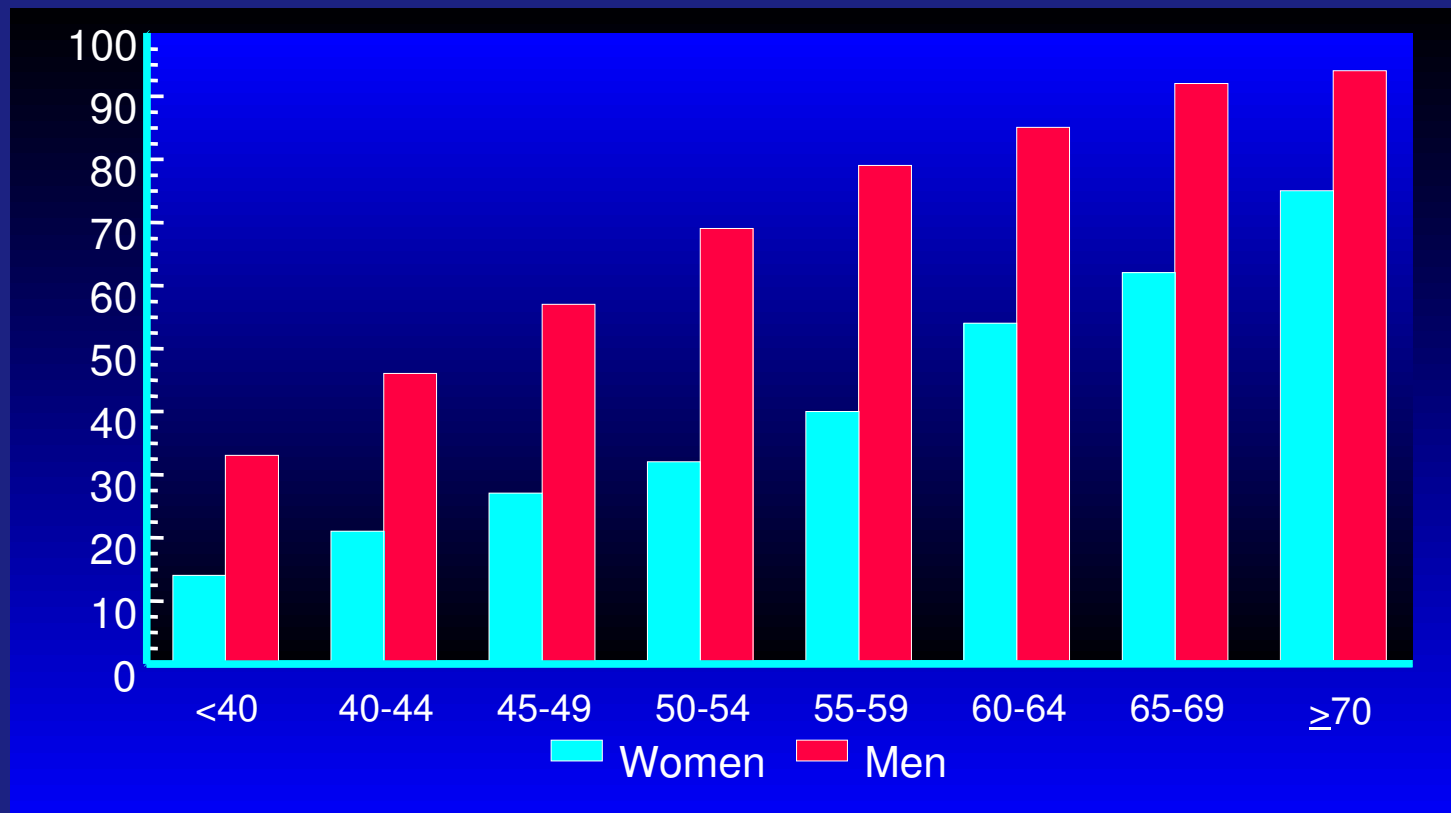
Imaging as a motivational tool

- ☞ N = 450 subjects, 2 x 2 factorial
- ☞ All get EBCT
 - Half are told results of scan
 - Half get intensive case management
- ☞ **CONCLUSION - Using CAC to motivate pts to make evidence-based changes in risk factors does not work**

JAMA 2003

O'Malley, Taylor

Prevalence (%) of CAC in 12,936 Asymptomatic Men and Women Across Age Groups



Nasir K, Raggi P, Rumberger JA et al,
Am J Cardiol. 2004 ;93:1146-9.

Limitations of current data

- ◆ **Highly selected populations**
 - ◆ Self - selected populations (CAC)
 - ◆ All patients referred to cath for coronary angio (CTA)
 - ◆ High pre-test probability (CTA)
- ◆ **Excluded technically inevaluable patients from denominator**
 - ◆ Falsely inflates accuracy
- ◆ **No outcomes data (CAC .CTA, ABI, carotid US)**

Carotid US/CAC/CTA for screening

◆ Benefits

- ◆ impressive pictures
- ◆ Anatomic info

◆ Risks

- ◆ Radiation
- ◆ Leads to additional (unnecessary) testing
- ◆ Anxiety over test results
- ◆ Test results do not lead to change in management
- ◆ No evidence base to change medical Rx
- ◆ No benefits of revasc in asx

US Preventive Services Task Force

◆ RECOMMENDS

◆ AGAINST CACP scanning

- ◆ for the presence of severe coronary artery stenosis
- ◆ For prediction of CHD events
- ◆ low risk patients

◆ NEITHER FOR OR AGAINST CACP Scanning

- ◆ Intermediate risk patients
- ◆ High risk patients

USPSTF: Screening for CHD

Data on CV imaging for screening

- ◆ Cardiac imaging growing rapidly
- ◆ Lack of outcomes data - no clear benefit
 - ◆ Does not add to risk prevention counseling or compliance
- ◆ Clear risks
 - ◆ Radiation
 - ◆ Anxiety - labeling
 - ◆ Downstream testing - tests beget tests
 - ◆ Incidental findings

ARS 3, 4