

## Gender and Coronary disease: Getting to the Heart of the Matter



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*Women's Health 2006  
VCU, Norfolk, April 2006*

## Objectives

- Heart disease in men and women
- Manifestation of CHD in women
- Recognition by women/health care providers
- Risk factors
- Diagnosis
- Prognosis
- Management

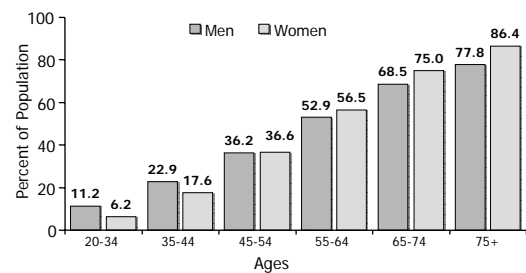
## Gender-Related Differences in CV Disease

- 70.3 million Americans have CVD (2003)
  - 33.1 million men
  - **38.2 million women**
- ↑ Recognition of CVD in women
  - ↑ Programs oriented to diagnosis and treatment of women
- Knowledge gap of CV risk
  - Many Americans unaware mortality due to heart disease is higher than for all cancers



AHA. Heart Disease and Stroke Statistics – 2006 Update, Dallas: AHA 2006

## Prevalence of Cardiovascular Disease\* in the United States by Age and Gender



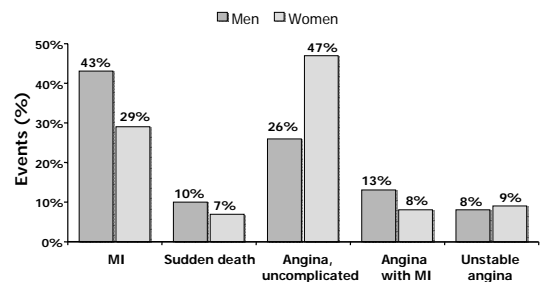
\* Includes CHD, CHF, stroke and hypertension

AHA. Heart Disease and Stroke Statistics – 2005 Update, Dallas: AHA 2005

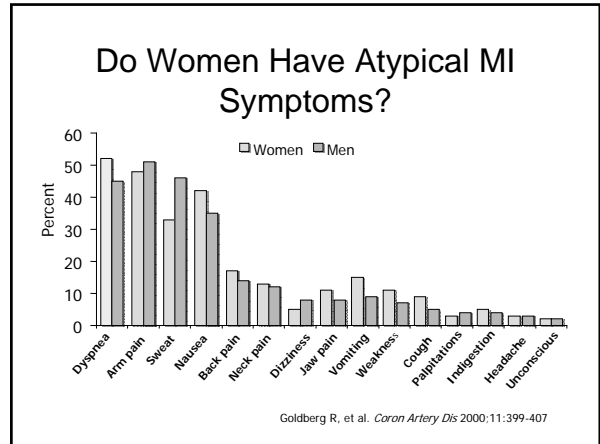
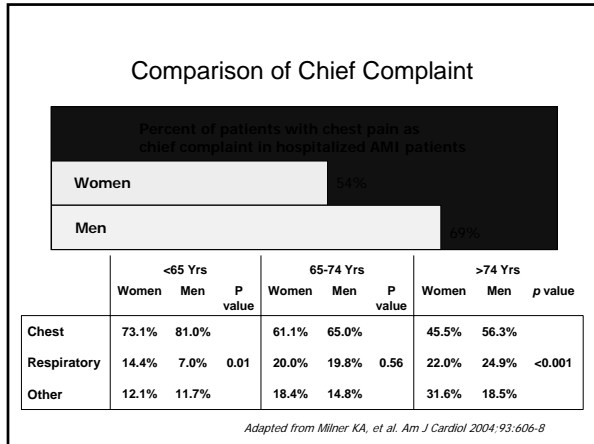
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## Clinical Manifestations of CHD



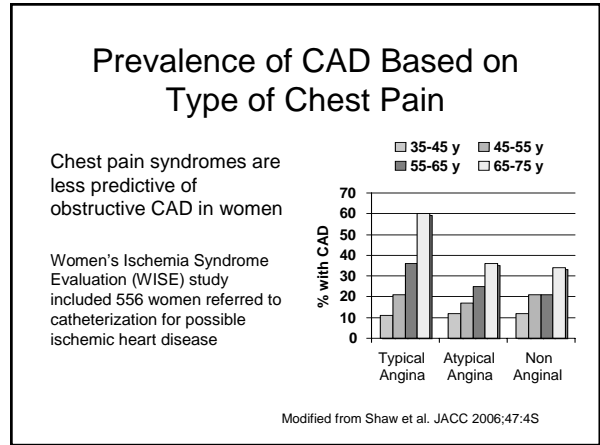
Lerner DJ, Kannel WB. Am Heart J 1986;111(2):383-90



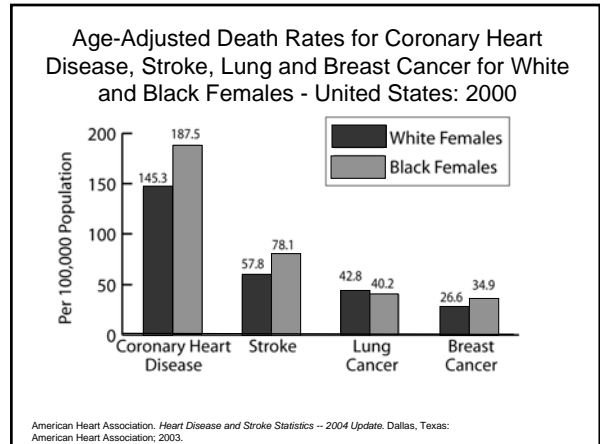
### MI in Worcester: Characteristics by Gender

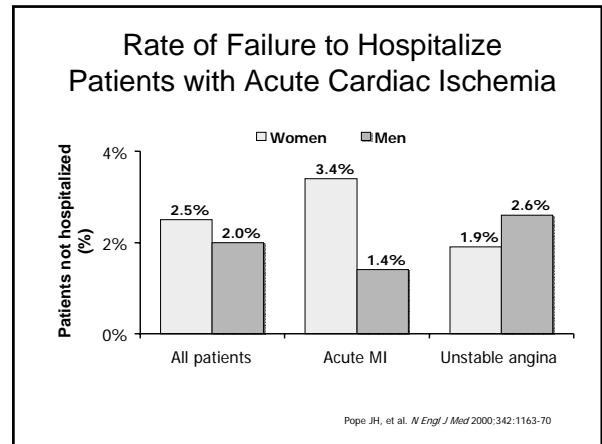
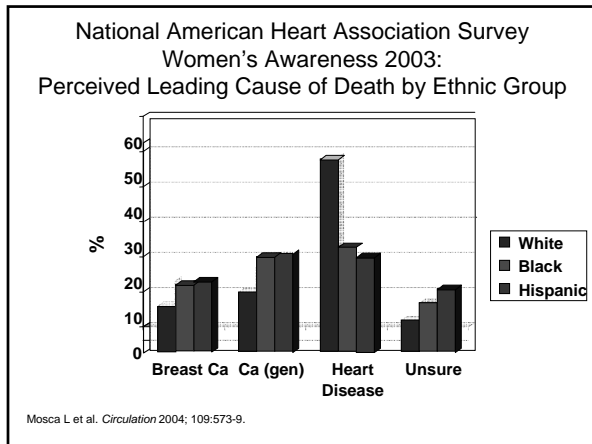
	Men (n=1916)	Women (n=1232)
Mean age (years)	63.9	71.7
History of angina	16.8%	21.8%
diabetes	16.1%	26.9%
hypertension	40.2%	50.9%
Q-wave MI	68.3%	58.2%
Peak CK > 5x normal	59.3%	47.7%
Complicated by CHF	30.5%	46.1%
shock	5.4%	8.4%

*Goldberg RJ, et al. Circulation 1993;87:1847-53*



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### Recognition of CHD in Women

**Patient and Physician Issues**

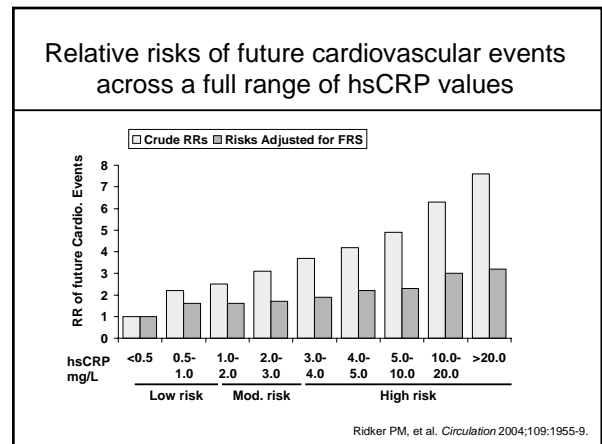
- Both patients and physicians attribute symptoms to non-cardiac causes
- Women present later to the ED for symptoms
- Health care providers tend to not recognize less typical symptoms as cardiac in origin

### Objectives

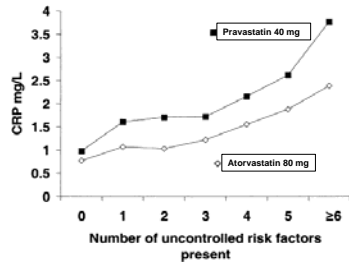
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### Risk Factors for CAD in women

- Basically the same risk factors as for men.
- DM is more powerful risk factor for CHD and CHF in women than men, and completely negates the protective effect of female gender even in pre-menopausal women.
- Cigarette smoking is a stronger risk factor in women than men (even passive smoking). Smoking associated with 1/2 of all coronary events in women.
- +Family History for premature CHD is independent RF in women



## Relationship between Number of Uncontrolled RF and median CRP



Ray et al JACC 2005;46:1417

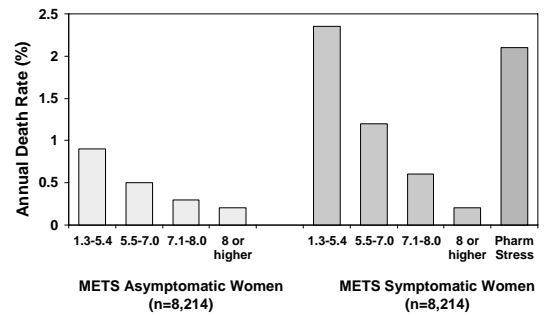
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## Noninvasive diagnosis of coronary heart disease in women

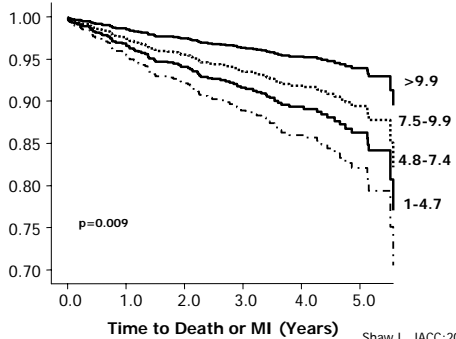


## Prognostic Value of Functional Capacity in Asymptomatic and Symptomatic Women



Mieres JH, et al. Circulation 2005;111:682-96

## WISE: Death or MI-Free Survival by Duke Activity Status Index (DASI) Measure of METs (N=914)



Shaw L, JACC:2006;47:365

## Critical Factors Affecting Diagnostic Accuracy of the Exercise ECG

- Factors altering provocation of ischemia in women
  - Hormonal influences
    - Digoxin-like effect of estrogen
  - Functional capacity
  - Resting ST-T wave changes
  - Lack of validation of Bruce protocol in women
    - Lower prevalence of CHD, especially in pre-menopausal women
    - More false-positives in women [(+)ETT / (-) angio]
    - Less sensitivity/specificity in women

ACC/AHA Chronic Stable Angina Guidelines, 2002

### ECG Testing in Women: Decreased Accuracy Sensitivity and Specificity of >1 mm ST Segment Depression

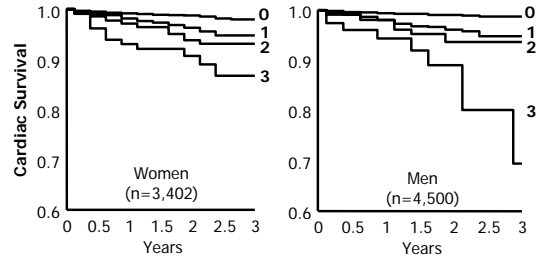
COMPARISON OF AHRQ RESULTS TO PRIOR STUDIES IN WOMEN

	Ex ECG		Echo		SPECT	
	Sn	Sp	Sn	Sp	Sn	Sp
Fleischmann (1998)	-	-	85%	77%	87%	64%
Kwok (1999)	61%	70%	86%	79%	78%	64%
Beattie (2003)			81%	73%	77%	69%

Sn = Diagnostic Sensitivity (True Pos / CAD)  
Sp = Diagnostic Specificity (True Neg / No CAD)

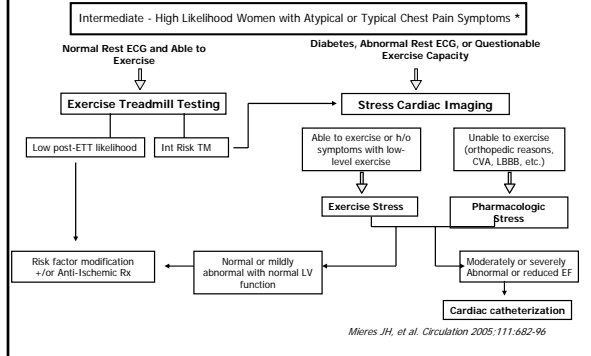
Fleischmann JAMA 1998;280:913-20.  
Kwok AJC 1999;83:660, AHRQ (May 2003): www.ahrq.gov/clinical-ipcsums/checksumsum.htm  
Delrano & Froelicher, Prog CVD 1988;31:173  
Heller, Nuclear Cardiology: State of the Art & Future Directions. 1998:302  
Redberg & Shaw Prog CVD 2003;46(3):239-58.

### Prognosis with SPECT: Risk Stratification with Stress SPECT Economics of Noninvasive Diagnosis (END) Study



Adapted from Marwick TH, et al. Am J Med 1999;106:172-8

### Algorithm for Evaluation of Symptomatic Women Using Non-Invasive Testing

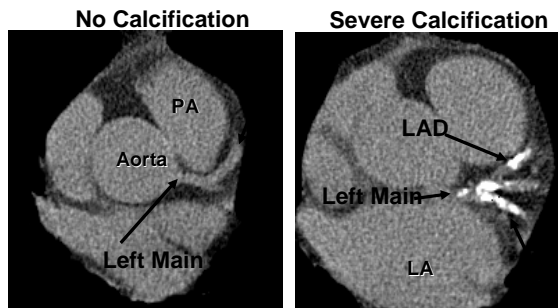


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### New Technologies to Assess CHD

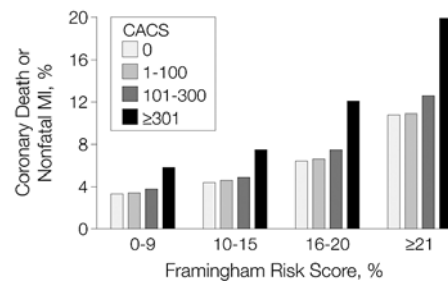
- Coronary Calcium
- Coronary CT angiography

### Non-Contrast EBCT Scans at the Base of the Heart



From JA Rumberger

### Predicted 7-Year Event Rates for CHD Death or Nonfatal MI



Greenland, P. et al. JAMA 2004;291:210-215.

### Prevalence of coronary calcium, by ethnicity and gender, MESA

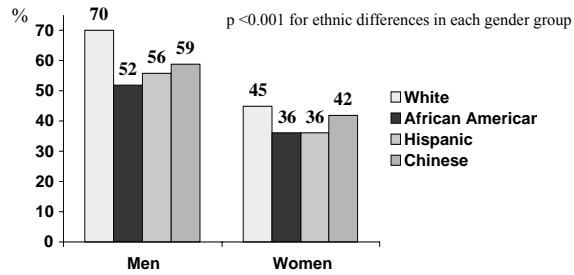


Bild et al. Circulation 2005;15L1313

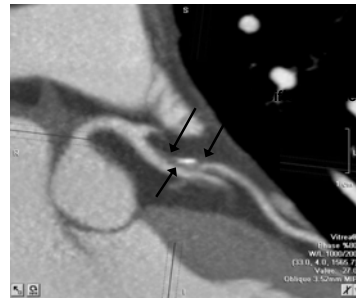
### Multidetector Cardiac CT



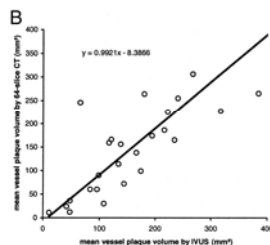
### Multidetector Cardiac CT



### Atherosclerotic Plaque by CTA



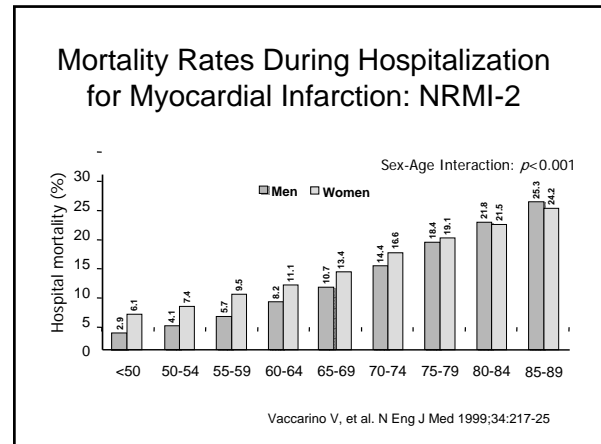
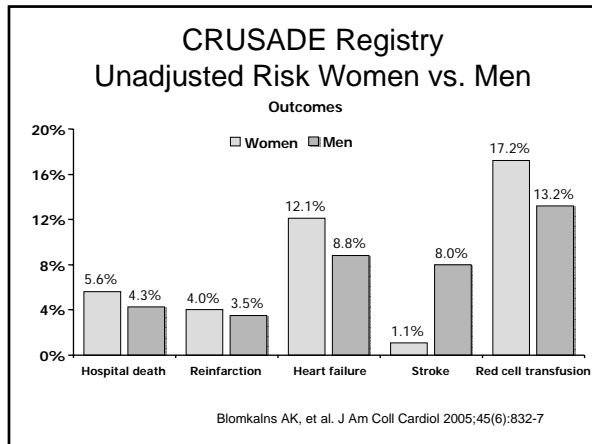
### Comparison between Plaque by MDCT and IVUS



Leber et al. JACC 2006;47:672

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- ### Treatment Strategies
- Women presenting with ACS are older, have greater morbidities
  - Women have similar benefit from early invasive strategies as men but this is less frequently implemented in women
  - Outcome from primary angioplasty is superior to lytics in women
  - Studies show that women are less likely to receive reperfusion therapy than white men

### Management

- ### Priorities for Prevention in Practice According to Risk Group
- High-risk women (>20% risk)
    - Class I recommendations:
      - Smoking cessation
      - Physical activity/cardiac rehabilitation
      - Diet therapy
      - Weight maintenance/reduction
      - Blood pressure control
      - Lipid control/statin therapy
      - Aspirin therapy
      - Beta blocker therapy
      - ACE inhibitor therapy (ARBs if contraindicated)
      - Glycemic control in diabetes
- Mosca L, et al. Circulation 2004;109:672-93

- ### Priorities for Prevention in Practice According to Risk Group
- High-risk women (>20% risk) continued
    - Class IIa recommendations:
      - Evaluate/treat for depression
    - Class IIb recommendations:
      - Omega 3 fatty acid supplements
      - Folic acid supplements
- Mosca L, et al. Circulation 2004;109:672-93

### Priorities for Prevention in Practice According to Risk Group

- Intermediate-risk women (10 to 20% risk)
  - Class I recommendations:
    - Smoking cessation
    - Physical activity
    - Heart healthy diet
    - Weight maintenance/reduction
    - Blood pressure control
    - Lipid control/statin therapy
  - Class IIa recommendations:
    - Aspirin therapy

Mosca L, et al. Circulation 2004;109:672-93

### Priorities for Prevention in Practice According to Risk Group

- Low-risk women (<10% risk)
  - Class I recommendations:
    - Smoking cessation
    - Physical activity
    - Heart healthy diet
    - Weight maintenance/reduction
    - Treat individual CVD risk factors as indicated

Mosca L, et al. Circulation 2004;109:672-93

### Summary: Women and Coronary Heart Disease

- Prevention of coronary heart disease is key
  - Adherence to evidence-based women's guidelines
- Education of providers and patients is needed
  - Coronary heart disease is
    - Not just a man's disease
    - Kills more women and men than any other disease entity
- Early recognition of symptoms and aggressive prevention and treatment strategies can ultimately lead to improved outcomes in women