

Occupational Health and the Heart

John B Tomarchio, M.D.,M.P.H.,M.B.A.
FACEP, FACOEM
SOMD SRS

OBJECTIVES

- JT BKGRD & CAREER CHOICES 2 MIN
- SRS PRESIDENT SAFETY PRES 10 MIN
- REAL CASES FROM SRS 10 MIN
- OVERVIEW OF Occ HEART DX 2 MIN
- EVAL OF POTENTIAL ACS 7 MIN
- SCREENING , FFD, RTW 5 MIN
- SCD AND AEDs 5 MIN
- SUMMARY AND TAKE HOME 2 MIN
- DISCUSSION- TBD

43 MIN?

Heart Attacks

(Fast Track for the busy executive)

John B. Tomarchio, M.D., M.P.H., M.B.A.

SOMD

Savannah River

DO NOT PANIC
(FOR THE **ULTRA RUSHED**)

- **REDUCE** → ***RFs**
- **START** → ***CPR**
- **GET** → ***AED**

Objectives

- 1. Magnitude of the problem
- 2. Why apparently healthy people drop dead
(even when they just saw their doctor)
- 3. Vulnerable Plaque
- 4. Risk factors
- 5. What you can do to prevent this tragedy
from happening to you and others

America's Wars Total

U.S. Military Service During War.....	41,891,368
Battle Deaths.....	651,022
Other Deaths (In Theater).....	308,797
Other Deaths in Service (Non-Theater).....	230,279
Non-mortal Woundings.....	1,431,290
Living War Veterans.....	17,484,000
Living Veterans (War & Peacetime).....	23,532,000

Source: Department of Defense (DoD), except living veterans, which are VA estimates as of September 30, 2007.



Pipeline Industry and Fires and Explosions in All Industries - Injuries, Illnesses, and Fatalities Fact Sheet

The **Injuries, Illnesses, and Fatalities (IIF)** program provides data on illnesses and injuries on the job and data on worker fatalities.

- [Current Injury, Illness, and Fatality Data](#)
- [Economic News Releases and Schedule](#)
- [Special Notices](#)
- [Get Detailed IIF Statistics](#)
- [Publications](#)
- [Overviews, Descriptions, and Documentation](#)
- [Definitions](#)
- [Record keeping, Standards, and Forms](#)
- [Related Links](#)
- **NEW** [Information for Respondents](#)
- [Frequently Asked Questions](#)
- [Contact Us](#)

[▲ Back to Top](#)

CURRENT INJURY, ILLNESS, AND FATALITY DATA:

[Select a subject area](#)

- OSHA recordable case rates ([TXT](#)) ([PDF](#) 95K) - latest incidence rates, by industry, for nonfatal work-related injuries and illnesses.
- [Fatal injuries - 2006 data now available](#)
 - **NEW** [Industry incidence rates and counts](#)
 - **NEW** [Case and demographic characteristics](#)
- [Survey of Workplace Violence Prevention, 2005](#)

[▲ Back to Top](#)

ECONOMIC NEWS RELEASES AND SCHEDULE:

[Current](#)

- Census of Fatal Occupational Injuries ([HTML](#)) ([PDF](#) 118K)
- Nonfatal occupational injuries and illnesses from the Survey of Occupational Injuries and Illnesses
 - **NEW** [Industry counts and frequency rates \(HTML\)](#) ([PDF](#) 62K)

Latest Numbers

Nonfatal injuries and illnesses, private industry

Total recordable cases:

📈 4,085,400 in 2006

Cases involving days away from work:

📈 1,183,500 in 2006

Fatal work-related injuries

Total fatalities (all sectors),

📈 5,703(p) in 2006

Total fatalities (private industry):

📈 5,202(p) in 2006

Highway incidents (private industry):

📈 1,167(p) in 2006

Falls (private industry):

📈 771(p) in 2006

Homicides (private industry):

📈 441(p) in 2006

 » p- preliminary
 » Click on the 📈 icon for 10 years of historical data.

People Are Asking...

1. [What information does BLS have about injuries, illnesses, and fatalities in the pipeline industry and about injuries, illnesses, and fatalities due to fires and explosions in all industries?](#)
2. [What information does BLS have about coal mining injuries,](#)

LCWK9. Deaths, percent of total deaths, and death rates for the 15 leading causes of death: United States and each State, 2004

[Rates per 100,000 population.]

Rank ¹	Cause of death (Based on the Tenth Revision, International Classification of Diseases, 1992) and State	Number	Percent of total deaths	Rate
United States				
...	All causes	2,397,615	100.0	816.5
1	Diseases of heart (I00-I09,I11,I13,I20-I51)	652,486	27.2	222.2
2	Malignant neoplasms (C00-C97)	553,888	23.1	188.6
3	Cerebrovascular diseases (I60-I69)	150,074	6.3	51.1
4	Chronic lower respiratory diseases (J40-J47)	121,987	5.1	41.5
5	Accidents (unintentional injuries) (V01-X59,Y85-Y86)	112,012	4.7	38.1
6	Diabetes mellitus (E10-E14)	73,138	3.1	24.9
7	Alzheimer's disease (G30)	65,965	2.8	22.5
8	Influenza and pneumonia (J10-J18)	59,664	2.5	20.3
9	Nephritis, nephrotic syndrome and nephrosis (N00-N07,N17-N19,N25-N27)	42,480	1.8	14.5
10	Septicemia (A40-A41)	33,373	1.4	11.4
11	Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	32,439	1.4	11.0
12	Chronic liver disease and cirrhosis (K70,K73-K74)	27,013	1.1	9.2
13	Essential (primary) hypertension and hypertensive renal disease (I10,I12)	23,076	1.0	7.9
14	Parkinson's disease (G20-G21)	17,989	0.8	6.1
15	Assault (homicide) (*U01-*U02,X85-Y09,Y87.1)	17,357	0.7	5.9
...	All other causes (Residual)	414,674	17.3	141.2



[A](#) [B](#) [C](#) [D](#) [E](#) [F](#) [G](#) [H](#) [I](#) [J](#) [K](#) [L](#) [M](#) [N](#) [O](#) [P](#) [Q](#) [R](#) [S](#) [T](#) [U](#) [V](#) [W](#) [X](#) [Y](#) [Z](#)

[Faststats Home](#) | [NCHS Home](#) | [CDC/NCHS Privacy Policy Notice](#) | [Accessibility](#) | [Search NCHS](#) | [Data Definitions](#) | [Contact us](#)

Deaths/Mortality

(Data are for U.S. for year indicated)

- Number of deaths: 2,397,615
- Death rate: 816.5 deaths per 100,000 population
- Life expectancy: 77.8 years
- Infant Mortality rate: 6.8 deaths per 1,000 live births

Number of deaths for leading causes of death:

- Heart disease: 652,486
- Cancer: 555,666
- Stroke (cerebrovascular diseases): 150,074
- Chronic lower respiratory diseases: 121,987
- Accidents (unintentional injuries): 112,012
- Diabetes: 73,138
- Alzheimer's disease: 65,965
- Influenza/Pneumonia: 59,664

- About NCHS ▶
- NCHS en Español ■
- FASTSTATS A to Z ■
- Help ▶
- Events ■
- Surveys and Data ■
- Collection Systems
- NHANES ▶
- NHCS ▶
- NHIS ■
- NIS ■
- LSOAs ■
- NSFG ■
- SLATS ■
- Vital Statistics ▶
- Initiatives ■
- Aging ▶
- Disease Classification ■
- Healthy People ■
- Injury ■
- Research and Development ■
- Research Data Center ■
- Press Room ■
- News Releases ■
- Publications and Information Products ■
- SETS ■
- Listservs ■
- Other Sites ■

Cardiovascular Disease: Still #1

Where Healthcare Meets
Policy

Epidemiology

(WHAT'S THE PROBLEM?)

- Leading cause of death
- >12,000,000 Americans have CAD
- - 1,000,000 heart attacks per year
 - >500,000 deaths/yr. in the U.S. from CAD
 - 50% die before reaching the hospital
 - >250,000 pts. with prehospital cardiac arrest

SCARE TACTIC

(But unfortunately true)

- 1/3 people in this room will die from heart disease:
 - Of those who die from heart disease:
 - 1/4 will die suddenly
 - 3/4 will suffer a 3-5 yr long suffocation type death
from heart failure

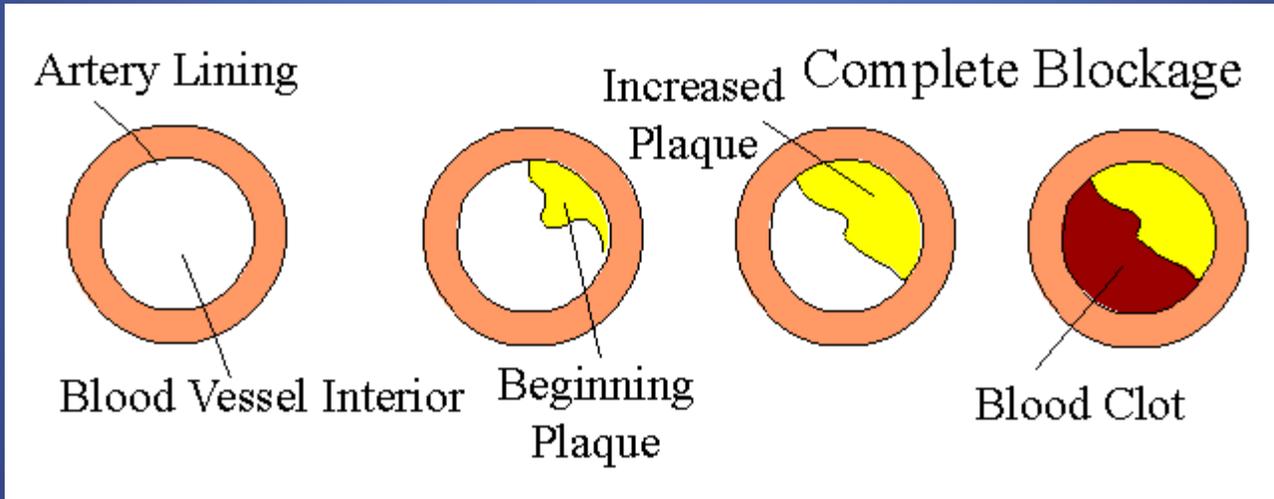


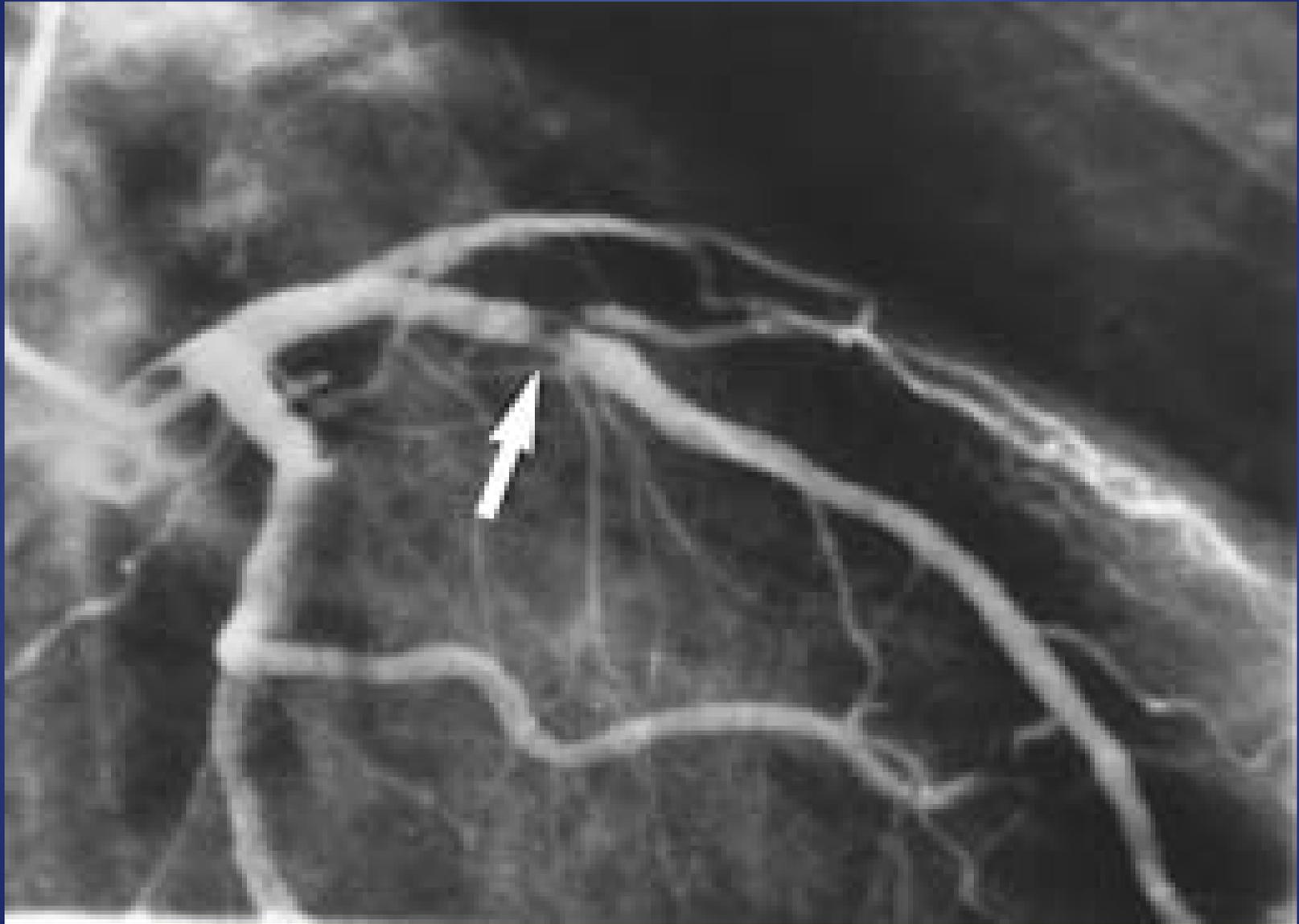
WHY WORRY?

- For 1 in 4 people with known or unknown coronary artery disease the first symptom is

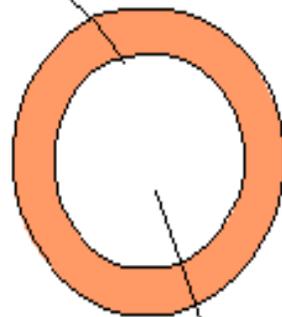
sudden death





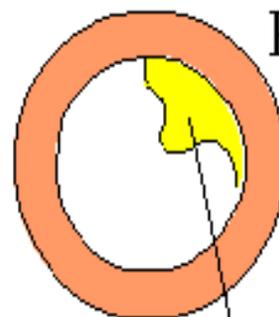


Artery Lining

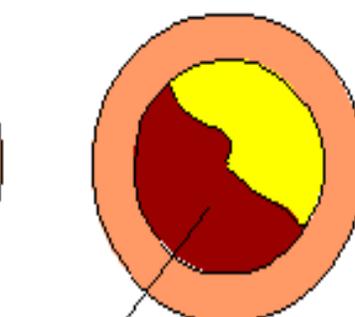
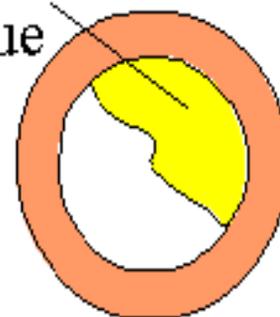


Blood Vessel Interior

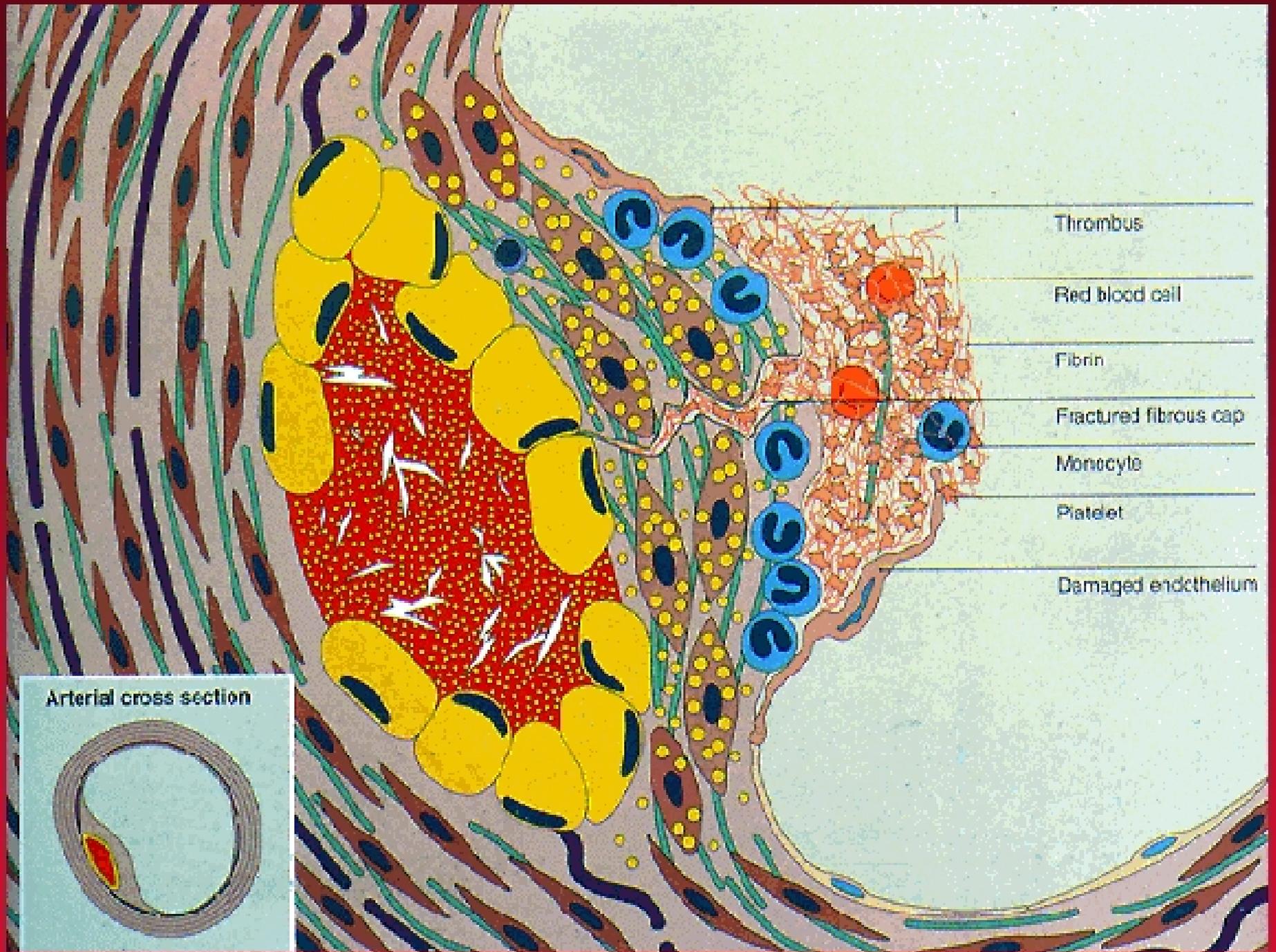
Increased Plaque Complete Blockage



Beginning Plaque



Blood Clot



Thrombus

Red blood cell

Fibrin

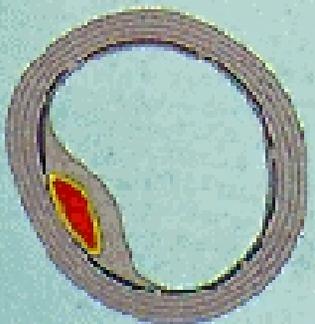
Fractured fibrous cap

Monocyte

Platelet

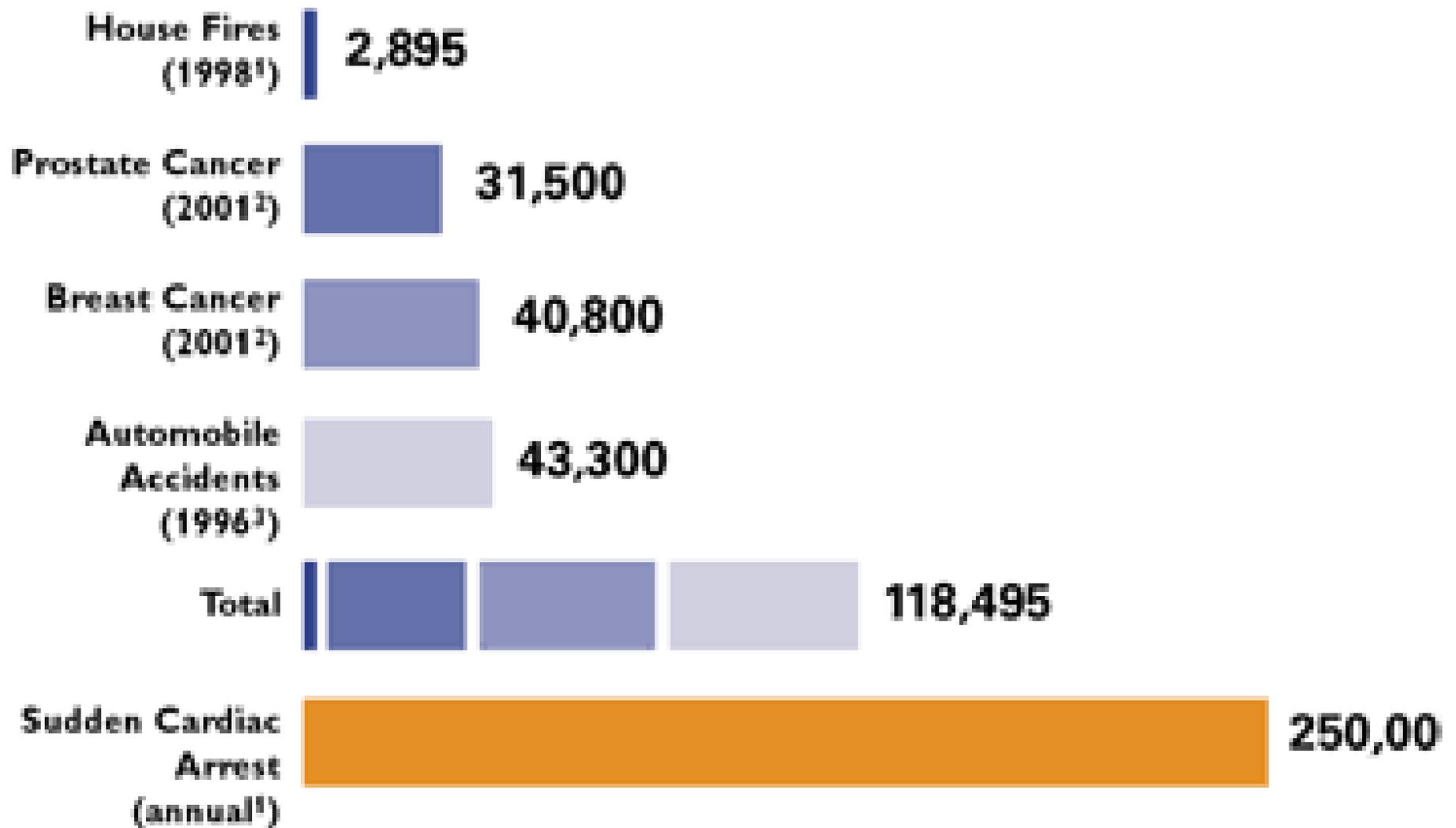
Damaged endothelium

Arterial cross section





COMMON CAUSES OF DEATH IN THE U.S.



Sources: 1. <http://www.americanheart.org>; 2. <http://www.cancer.org>; 3. U.S. Statistical Abstract of the United States, 1998, Table 138; 4. <http://www.americanheart.org>

Determine presence of major risk factors (other than LDL):

Major Risk Factors (Exclusive of LDL Cholesterol) That Modify LDL Goals

Cigarette smoking

Hypertension (BP \geq 140/90 mmHg or on antihypertensive medication)

Low HDL cholesterol ($<$ 40 mg/dL)*

Family history of premature CHD (CHD in male first degree relative $<$ 55 years;
CHD in female first degree relative $<$ 65 years)

Age (men \geq 45 years; women \geq 55 years)

** HDL cholesterol \geq 60 mg/dL counts as a "negative" risk factor; its presence removes one risk factor from the total count.*

Americans Have Become Complacent About Cardiovascular Disease, and Overestimate Their Cardiovascular Health

- 76% say they try to maintain healthy weight, but only 36% do
- 68% say they try to exercise regularly, but only 19% do
- 60% say they try to avoid high fat, high cholesterol foods, but only 10% follow national nutritional guidelines

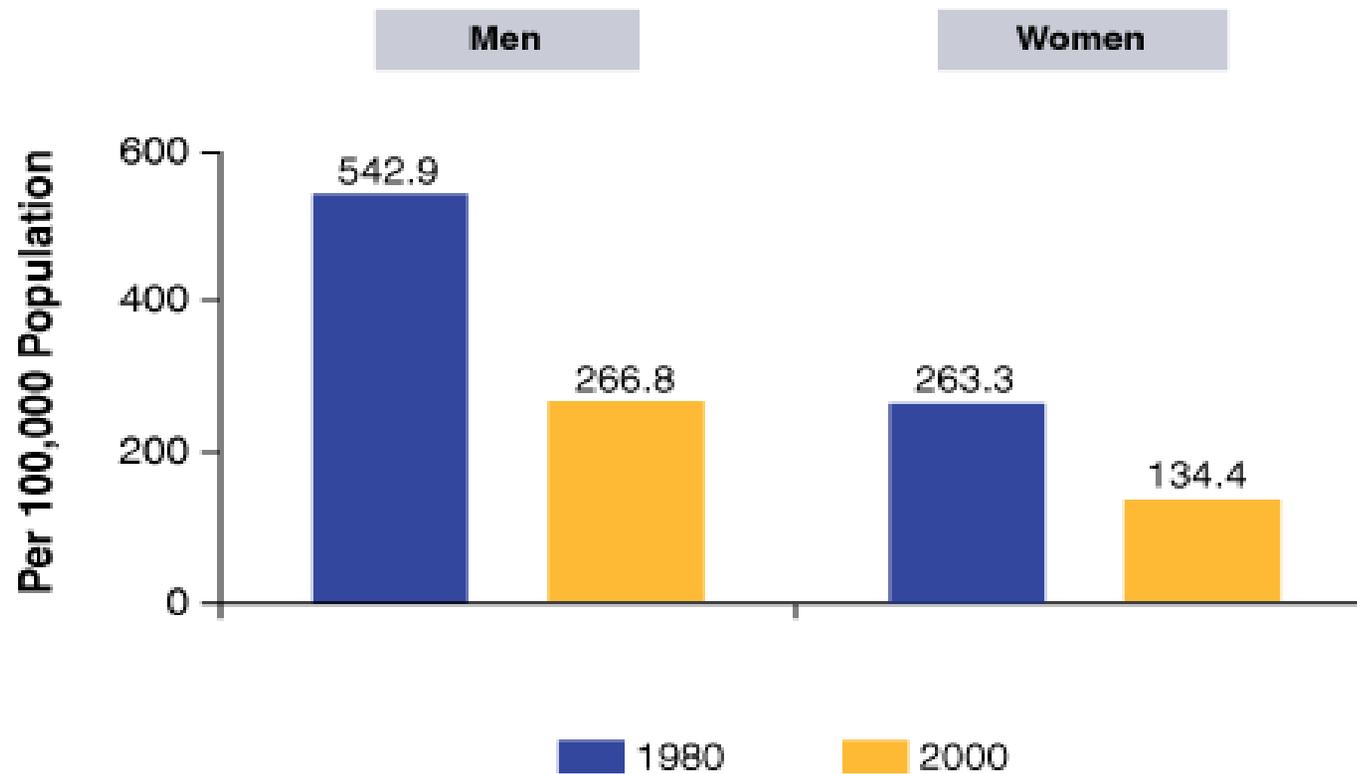
AND

- 57% do not believe they are at “much risk”
- 59% do not believe cardiovascular disease is a killer

Man's Will

- *“Heart disease before 80: It’s man’s fault, not God or Nature’s will.”*
 - Paul Dudley White, MD
(WHO)

Age-Adjusted Death Rate for Coronary Heart Disease: 1980-2000



Factors Influencing U.S. Mortality from Coronary Disease: 1980-2000

Treatment-Related Effects		Risk Factor-Related Effects		Benefits Offset by Increases in	
2° preventive therapies after MI or revascularization	↓11%	Reduction in total cholesterol	↓24%	Body mass index	↑8%
Initial treatments for acute MI/UA	↓10%	Systolic blood pressure	↓20%	Prevalence of diabetes	↓10%
Treatment for heart failure	↓9%	Smoking prevalence	↓12%		
Revascularization for chronic angina	↓5%	Physical inactivity	↓5%		
Other therapies	↓12%				

MI = myocardial infarction; UA = unstable angina.

**INTERHEART Study:
Nine Modifiable Risk Factors Account for More than
90% of the Risk of an Initial Acute Myocardial Infarction**

- Smoking
- Hypertension
- Lipids (ApoB/A1 ratio)
- Abdominal obesity
- Diabetes
- Fruit and vegetable intake
- Alcohol
- Exercise
- Psychosocial

Take Home Points

- **Cardiovascular Disease: Still #1**
- **Most people aren't as healthy as they think**
- **Sudden death with no prior symptoms is possible**
- **No way to 100% diagnose who will die or have a heart attack**
- **Risk factor reduction is best approach for now**

MY ADVICE

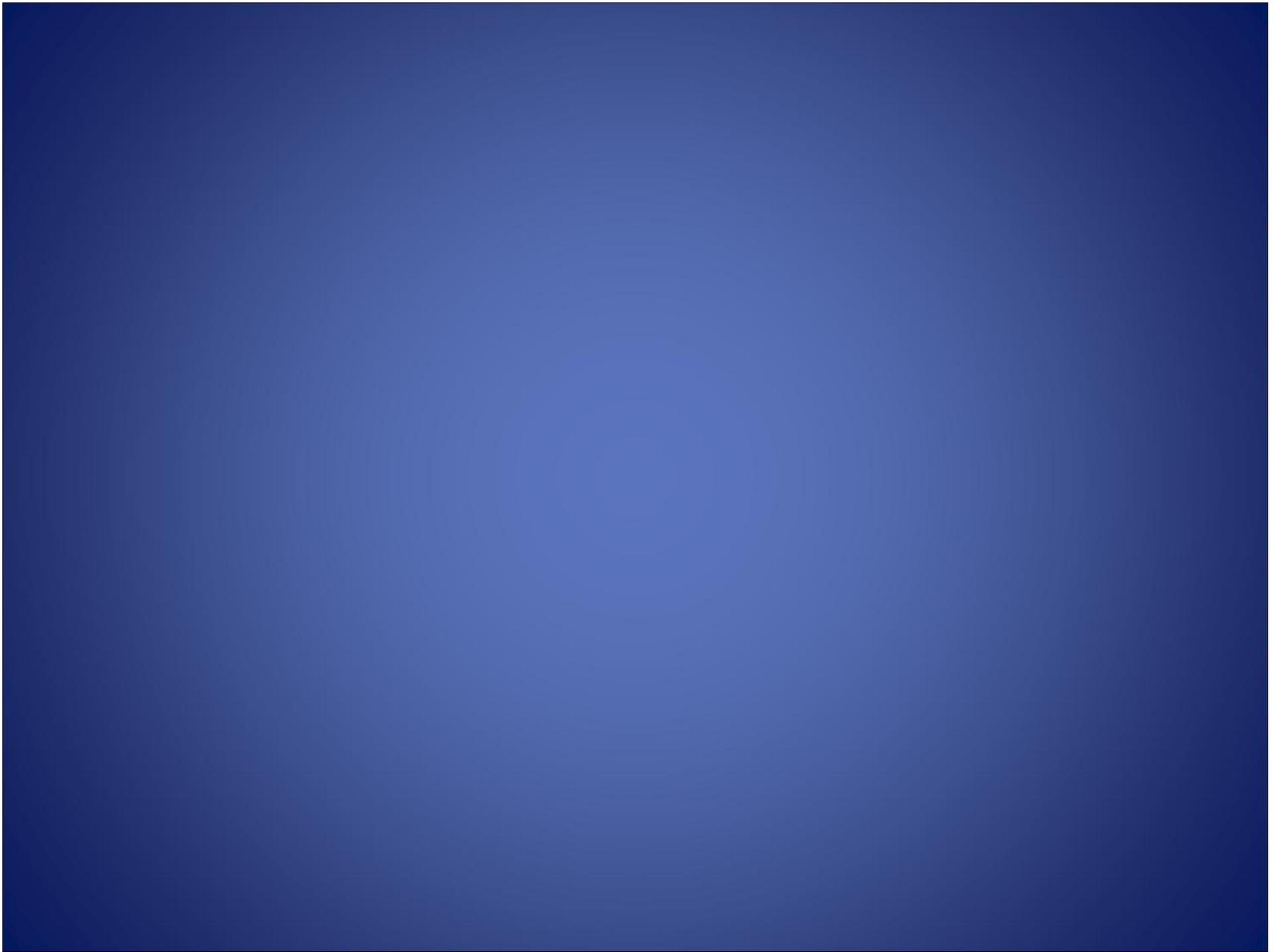
- 1. Know and Manage Your Blood Pressure
- 2. Don't smoke
- 3. Eat healthier and watch your weight
- 4. Walk
- 5. Take your health seriously, your job seriously, safety seriously, but don't take yourself so seriously
- 6. Know and Manage your LDL and HDL

Other Tid Bits

- Floss your teeth regularly, get your teeth cleaned regularly
- Get a flu shot every year
- Love somebody and be loved
- Show mercy and tolerance to others
- Hold hands with the one you love while you walk
- Drink 2 drinks (*NOT QUARTS*) of alcohol a day if you can tolerate

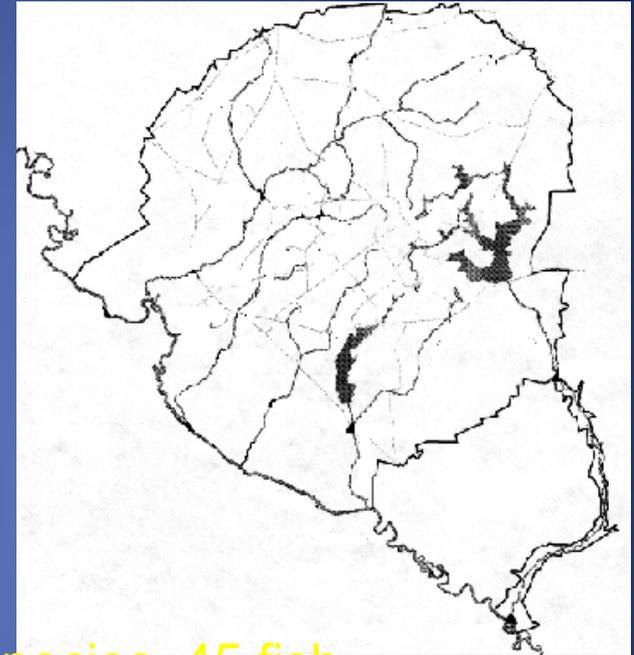
Never ever give up!





SRS Natural Features

- 310 square miles of territory, @ 15% industrialized
- 4,000 acres of ponds and reservoirs
- 300 miles of streams
- 530 acres of streams and waterways
- 5,800 acres of swamp forest
- 35,000 acres of bottomland hardwood
- 40,000 cubic feet of timber harvested annually
- 44 amphibian, 59 reptile, 255 bird, 54 animal species, 45 fish species, 1,322 species of flora
- Some endangered/threatened species are residents of SRS
 - Southern Bald Eagle, red-cockaded woodpecker, smooth purple coneflower, Bachman's sparrow, American alligator, shortnose sturgeon, bog spice bush



Savannah River Site

- Missions
- Operations
 - Tritium
 - Non-proliferation
- Closure
 - Environmental remediation
 - Waste management
 - Natural resources & ecosystem management
 - Deactivation & demolition
- Research & Development
 - National Laboratory



Hazards

- Industrial
- Chemical
- Criticality
- Environmental
- Operational
- Radiological
- Waste

SRS

OCCUPATIONAL MEDICINE

- SERVE 10-12K EMPLOYEES
- 5 MAJOR CUSTOMERS
- 2 CLINICS
- 8 RNs, 5 DOCS, 2.5 PSYCH, 3 DCMs
- 35,000 VISITS / YR
- EMERGS, Occ Inj, MED SURV, FFD, RTW, SAP, DCM,, LTD, PERS ILLs, PSYCH, SAFETY EYEGASSES
- 4 AMBULANCES
- SOMD ALSO -MED CONTR EMS, MED DIR FF, CHAIR IRB, CHAIR IBC

CASE # 1

- 54 Y/O MALE
- JOB TITLE: UPPER LEVEL MANGR
- CC: POSITIONAL DIZZINESS ESP IN THE AM WHEN SHAVING
- NO OTHER ASSOC SX
- SHX: RUNS 2 MILES 3X / WK
- PMH: NON CONTRIB
- RF: TC 240, LDL 145 HDL 40--- NO OTHERS
- PE: SLIT OVERWT OTHERWISE WNL
- NEGATIVE STRESS ECHO 3 WEEKS AGO AND NORMAL EXAM BY CARDIOLOGIST

CASE # 1 (CONT)

- TOOK VACATION 2 WEEKS AFTER CLINIC
- COLLAPSED WHILE RUNNING WITH HIS WIFE ON THE BEACH
- AUTOPSY SHOWED COMPLETE LAD

CASE # 2

- 53 Y/O MALE SPOII
- HERE FOR ROUTINE EXAM 1046, 712, RESP
- PMH: HTN, DIET CONTR DM
- RF: 1 PACK/DAY X 35 YR, TC 245 HDL 38, LDL 142, HTN, DM
- FH: NONCONTRIB
- LABS: WNL X TC, EKG- NST, LV STRAIN?
- PE: OVERWT, BP: 148/94, SLT DECR BS BILAT C FEW RHONCHI OTHERWISE WNL
- NORMAL STRESS ECHO 10 MONTHS AGO

CASE # 2 (CONT)

- CALLED EE PRIOR TO DEPARTURE FOR THIS MEETING
- SAYS HE'S FINE AND ASYMP
- QUAL 1046 AND ½ MILE RUN DAY OF QUAL EXAM 6 MONTHS AGO

CASE # 3

- 47 Y/O MALE SPOII
- NO C/O, HERE FOR ANNUAL EXAM FOR 1046, 712, RESP
- PERS HLTH HX FORM ALL NO
- PMH: QUIT SMOKING 5 YRS AGO, HTN, OTHERWISE NONCONTRIB
- FH: MOTHER STROKE AT 78
- PE: BP: 142/86, SLT OVERWT, OTHERWISE WNL, EKG- WNL
- NORMAL ROUTINE STRESS ECHO 9 MONTHS AGO

CASE # 3 (CONT)

- QUALIFIED 1046 1 MILE RUN MORNING OF QUAL EXAM
- 3 MONTHS LATER COLLAPSED 10 MINUTES AFTER INTERVAL TRAINING ON TREADMILL AT WORK DURING VOLUNTARY TRAINING MILD-MOD INTENSITY ON RECORDER AND VIDEO
- CPR IMMED BY SPO
- AED APPLIED 11 MIN AFTER COLLAPSE
- AUTOPSY SHOWED 90% OCC LM
- LSI BY DOE

CASE # 4

- 54 Y/O MALE ENGINEER
- HERE FOR ROUTINE BP CHECK
- C/O SOME INTERMIT TIGHTNESS IN CHEST BUT SAW PMD YESTERDAY AND EKG WNL, PLACED ON NEXIUM
- NO OTHER C/O

CASE # 4 (CONT)

- RN CALLED SITE MD TO EVAL
- TRANSPORTED TO LOCAL ER
- ADMITTED FOR R/O
- 3 VESSEL CABG
- RTW 3 MONTHS LATER

CASE # 5

- 42 Y/O MALE WORK PLANNER
- HERE FOR RTW FOLLOWING TRANSPORT TO ER YESTERDAY FOR SHARP, STABBING CP
- DX: COSTOCHONDRITIS CLEARED FOR RTW BY ER DOC HAS NOTE
- STILL HAS PAIN INTERMITTANTLY
- SCHEDULED FOR EST AND CARDIOLOGIST APPT NEXT WEEK
- NO CARD RF

CASE # 5 (CONT)

- NOT ALLOWED TO RTW
- CARD AGREED TO DO EST NEXT DAY
- 2 STINTS PLACED (RM, LAD)
- 6 MONTHS LATER DEVELOPED LE CLAUDICATION
- CT – BILAT ILIAC OCCLUSION WITH ONE ANEURYSM
- ILIAC STINTS PLACED
- CONTINUED PELVIC PAIN
- TOOK LTD 2 MONTHS AGO



WSI-SRS STANDARD PROCEDURE

Title: WSI-SRS MEDICAL/PHYSICAL FITNESS QUALIFICATION TRAINING PROGRAM	Procedure Number: 1-6508 Page: 1 of 10
Prepared by: TRN - TSD	Revision Number: 26 Revision Date: 1/9/06
Effective To: Indefinite	Original Date: 01/02/91

I. PURPOSE

This procedure is provided to ensure that the applicable medical and physical fitness qualifications are met for the Protective Force according to 10 CFR 1046 and RAC #98-0001, Supervised Elements of the WSI-SRS Physical Fitness Program.

II. SCOPE

This procedure applies to all Security Officers and Security Police Officers and non-protective force employees who attend a medical examination.

C. PROTECTIVE FORCE MEDICAL EXAMINATIONS

1. All protective force will attend a two phase medical examination. The DOE designated physician may grant exceptions to conduct a one-phase exam.
 - a. Phase 1 will be scheduled no more than 60 days prior to the anniversary run date (SO's are scheduled by the anniversary run date that existed when they were SPO qualified). The Phase 1 portion will consist of the following:
 - 1) All tests and screenings conducted by the medical staff (i.e., bloodwork, EKG, etc.).
 - 2) Body fat assessment conducted by the PFS, not applicable for SO's and Pilots.
 - 3) Health Screening and Coronary Artery Disease Risk Appraisal issued by the PFS (not applicable for SO's and Pilots.) This form will determine if the SPO needs to complete a stress test (see Section V.I). The form is forwarded to and retained by WSRC Medical.

J. **STRESS TEST PROGRAM**

1. **Maximal stress test**

During the Phase 1 exam process, SPO II and III personnel are screened for coronary artery disease risk factors. If the SPO meets the pre-determined criteria described below, he/she is scheduled for a stress test. WSI contracts a cardiologist to conduct the stress test.

NOTE: SPOs and Training Division Instructors may volunteer for a stress test.

a. Major risk factors that determine the necessity of a sub-maximal stress test:

- 1) Age – 45 years old and over.
- 2) Hypertension – determined by the DOE designated physician on case-by-case basis. ** The PFS will not use blood pressure as an indicator for a stress test unless directed by the DOE designated physician.
- 3) Hypercholesterolemia – total serum cholesterol above 240 mg/dL. ** The PFS will use cholesterol as an indicator if the SPO identifies a level above 240 mg/dL during the Phase 1 exam process. Usually the SPO is not aware of the cholesterol level until after the Phase 2 exam. If during the Phase 2 exam the cholesterol level is determined to be above 240 mg/dL, it is the DOE designated physician's decision to request a stress test (the PFS would schedule the test).
- 4) Other significant blood lipid abnormalities (with concurrence of the DOE designated physician).
- 5) Diabetes Mellitus
- 6) Current tobacco use (smoke or smokeless). To be considered a non-tobacco user, the SPO must have quit at least one year prior to the Phase 1 exam.
- 7) Family history of coronary artery disease in first degree relatives manifested prior to age 55.

b. Testing frequency:

- 1) Initial testing
 - As the SPO turns 45 years old
 - SPO with two or more risk factors
- 2) Annual testing (regardless of age)
 - SPO with two or more risk factors
- 3) Testing every two years
 - Age is the only risk factor

c. The DOE designated physician can request a stress test at any time and for any reason. The PFS will schedule the stress test.

2. Stress Echocardiogram

The contracted cardiologist conducts a stress echocardiogram for employees when deemed necessary by the DOE designated physician or who display abnormalities during the maximal stress test.

3. Follow-up medical procedure or surgery

If additional medical procedures or surgery is required for the SPO as a result of the stress test program, the SPO may use the services of another cardiologist.

SRS EST EXPERIENCE 2006-2007

2006

EST 190

ECHO 38 (1+)----- 3 VES CABG
1 SCD IN 2007

2007

EST 203

ECHO 23 (1+)----- 1 STINT PLACED

OCCUPATIONAL MEDICINE AND HEART DISEASE

- **** SCD ON SITE
- *** EVAL OF ASYMPTOMATIC EMPLOYEES, ESP SAFETY SENS
JOBS
- *** EVAL OF POTENTIAL ACS
- *** RTW EVAL
- *** FFD EVAL
- ** REVIEW CARDIAC RF DURING SURV. EXAMS
- ** EDUCATION AND INTERVENTION IN EFFORTS TO REDUCE RF
- * TOXINS

Standards and Regulations We Are Expected to Comply With

- 10 CFR 1046 (PRO FORCE)
- 10 CFR 712 (HRP)
- DOT
- FAA
- ANSI Z 88.6
- OSHA 29 CFR 1910.134
- NFPA 1582 AND 1500
- LOCAL SITE PROCEDURES
- HAZWOPER

Occupational Health and the Heart

Two facets

Workplace exposures and their effects on the heart

- Primary causes of disease
- Exacerbations of underlying disease
- Attribution and workers' compensation



Cardiovascular health and its effects on work

- Work capacity and abilities
- Workplace as focus for prevention efforts

Agent and work effects on the heart

Agents can be grouped by main or major effects:

Angina

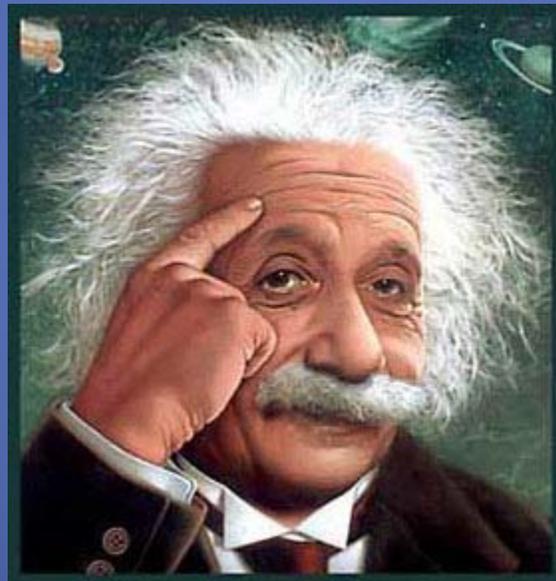
Atherogenesis

Dysrhythmias

Cardiomyopathy

Hypertension

**“ I NEVER MEMORIZE ANYTHING THAT
CAN BE EASILY LOOKED UP”**



R/O ACS ~~MI~~

- EVALUATION OF CHEST PAIN AND POTENTIAL ACS SYMPTOMS IN THE OM CLINIC

WHAT I REMEMBER AFTER 6 BIO AND BUSINESS STATS COURSES

- When the p is low, reject the H_0
- α is your tolerance for rejecting the H_0

from: Dr. Mitra

Auburn Univ.

PhD Mech Eng

PhD Statistics

Six Sigma Master BB

THE H_0 FOR ER DOCs

- Everybody has ACS

(Until Proven Otherwise)

(Therefore: admit the whole world to CCU)

Various Stakeholders α 's for Missing ACS

- Scientific researchers- .05 or .01
- Cardiology Fellow- .10
- IM Resident- .50
- IM Intern- .50-1.0
- Emergency Physicians- .001
- Attorneys & Gen.Public- .0000
- DOE- .????? (TBD)

Actual ED(A&E) Missed ACS

- From Multiple Multicenter Studies:
- U.S.- 2-4%
- Canada- 6-10%
- UK- 5-10%

ACC/AHA PRACTICE GUIDELINES—FULL TEXT (with 2002 edits highlighted)

ACC/AHA 2002 Guideline Update for the Management of Patients With Unstable Angina and Non–ST-Segment Elevation Myocardial Infarction

A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on the Management of Patients With Unstable Angina)

COMMITTEE MEMBERS

Eugene Braunwald, MD, FACC, *Chair*

Elliott M. Antman, MD, FACC
John W. Beasley, MD, FAAFP
Robert M. Califf, MD, FACC
Melvin D. Cheitlin, MD, FACC
Judith S. Hochman, MD, FACC

Joel Kupersmith, MD, FACC
Thomas N. Levin, MD, FACC
Carl J. Pepine, MD, MACC
John W. Schaeffer, MD, FACC
Earl E. Smith III, MD, FACEP

ACC/AHA GUIDELINE REVISION

ACC/AHA 2007 Guidelines for the Management of Patients With Unstable Angina/Non-ST-Elevation Myocardial Infarction—Executive Summary

A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 2002 Guidelines for the Management of Patients With Unstable Angina/Non-ST-Elevation Myocardial Infarction)

Developed in Collaboration with the American College of Emergency Physicians, the Society for Cardiovascular Angiography and Interventions, and the Society of Thoracic Surgeons

Endorsed by the American Association of Cardiovascular and Pulmonary Rehabilitation and the Society for Academic Emergency Medicine

**Writing
Committee
Members**

Jeffrey L. Anderson, MD, FACC, FAHA, *Chair*

Cynthia D. Adams, RN, PhD, FAHA
Elliott M. Antman, MD, FACC, FAHA
Charles R. Bridges, ScD, MD, FACC, FAHA*
Robert M. Califf, MD, MACC
Donald E. Casey, Jr, MD, MPH, MBA, FACP†
William E. Chavey II, MD, MS‡
Francis M. Fesmire, MD, FACEP§
Judith S. Hochman, MD, FACC, FAHA

Thomas N. Levin, MD, FACC, FSCAI||
A. Michael Lincoff, MD, FACC
Eric D. Peterson, MD, MPH, FACC, FAHA
Pierre Theroux, MD, FACC, FAHA
Nanette Kass Wenger, MD, FACC, FAHA
R. Scott Wright, MD, FACC, FAHA

*Society of Thoracic Surgeons Representative; †American College of Physicians Representative; ‡American Academy of Family Physicians Representative; §American College of Emergency Physicians Representative; ||Society for Cardiovascular Angiography and Interventions Representative

ACC/AHA 2007 Guidelines for the Management of Patients With Unstable Angina/Non ST-Elevation Myocardial Infarction: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 2002 Guidelines for the Management of Patients With Unstable Angina/Non ST-Elevation Myocardial Infarction) Developed in Collaboration with the American College of Emergency Physicians, the Society for Cardiovascular Angiography and Interventions, and the Society of Thoracic Surgeons Endorsed by the American Association of Cardiovascular and Pulmonary Rehabilitation and the Society for Academic Emergency Medicine

Jeffrey L. Anderson, Cynthia D. Adams, Elliott M. Antman, Charles R. Bridges, Robert M. Califf, Donald E. Casey, Jr, William E. Chavey, II, Francis M. Fesmire, Judith S. Hochman, Thomas N. Levin, A. Michael Lincoff, Eric D. Peterson, Pierre Theroux, Nanette Kass Wenger, R. Scott Wright, Sidney C. Smith, Jr, Alice K. Jacobs, Cynthia D. Adams, Jeffrey L. Anderson, Elliott M. Antman, Jonathan L. Halperin, Sharon A. Hunt, Harlan M. Krumholz, Frederick G. Kushner, Bruce W. Lytle, Rick Nishimura, Joseph P. Ornato, Richard L. Page, and Barbara Riegel
J. Am. Coll. Cardiol. 2007;50;1-157; originally published online Aug 6, 2007;
doi:10.1016/j.jacc.2007.02.013

This information is current as of March 25, 2008

Definition of ACS

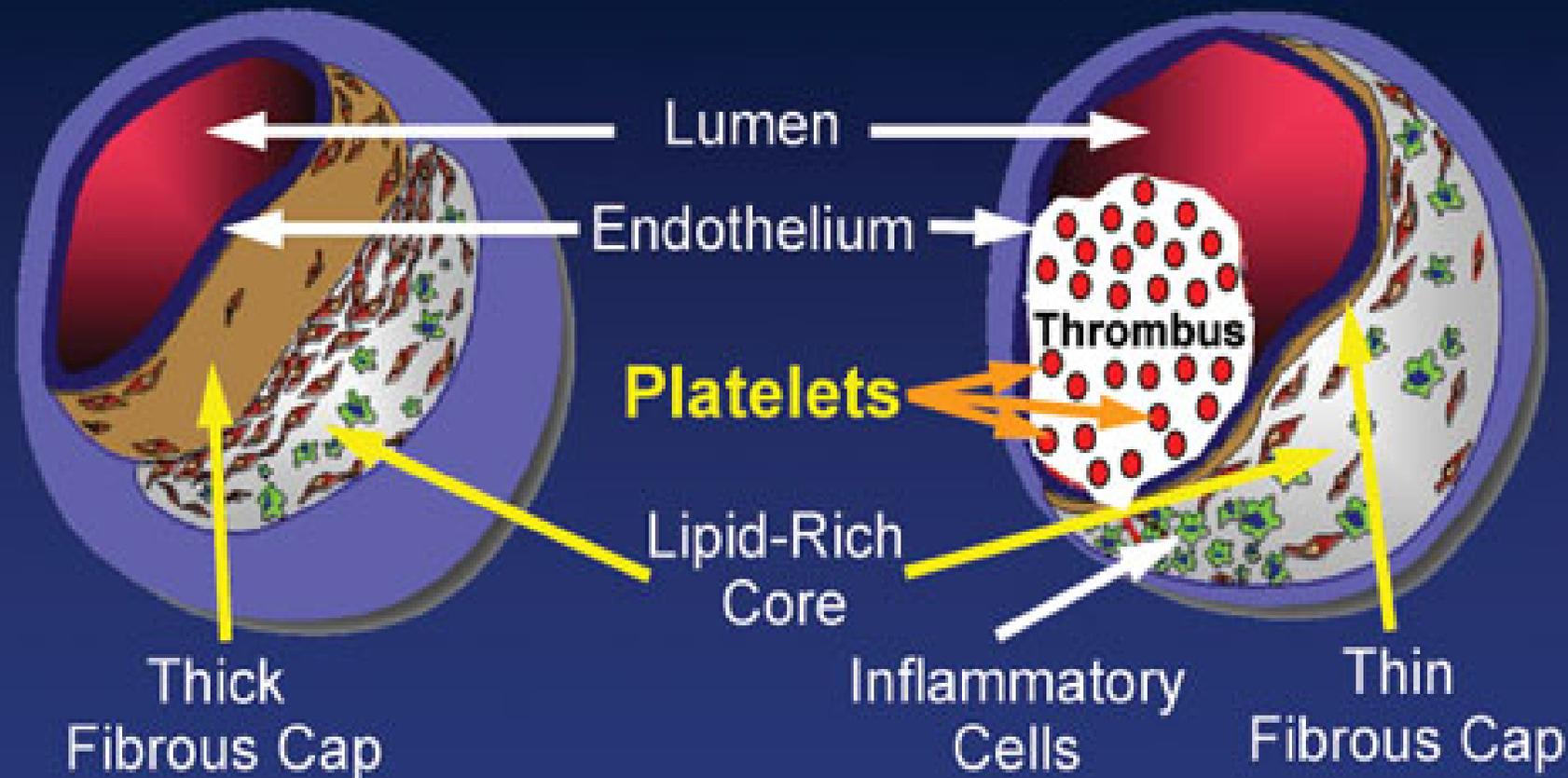
(Braunwald, 2002)

- *Acute coronary syndrome* has evolved as a useful operational term to refer to any constellation of clinical symptoms that are compatible with acute myocardial ischemia.
- It encompasses AMI (ST-segment elevation and depression, Q wave and non-Q wave) as well as UA.

Types of Atherothrombotic Lesions Causing Coronary Artery Disease

Stable Angina

Non ST \uparrow ACS



MI = myocardial infarction.

Adapted with permission from Falk E, et al. *Circulation*. 1995;92:657-671.

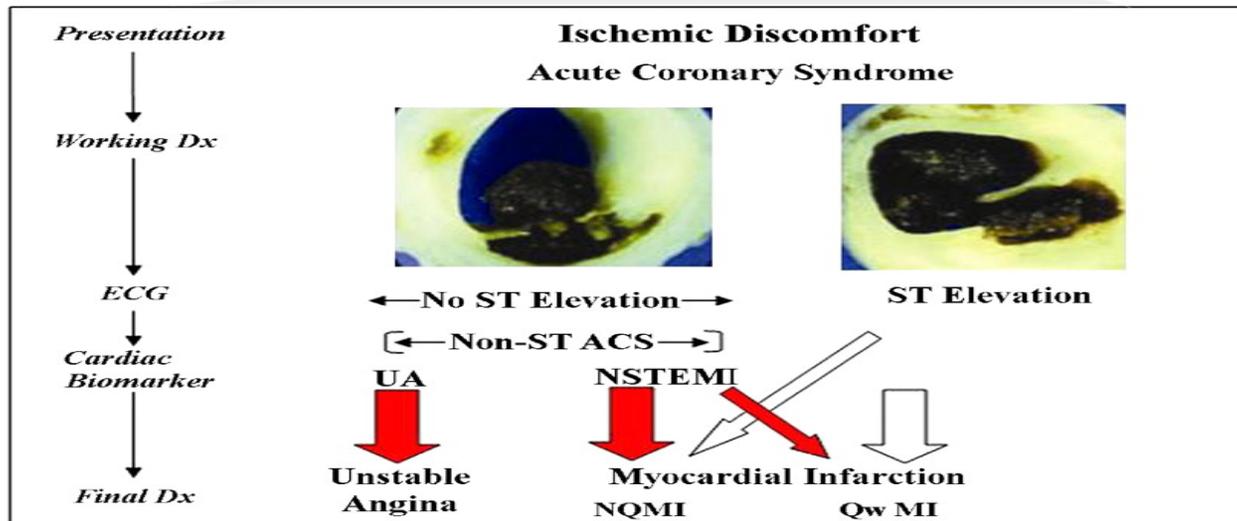
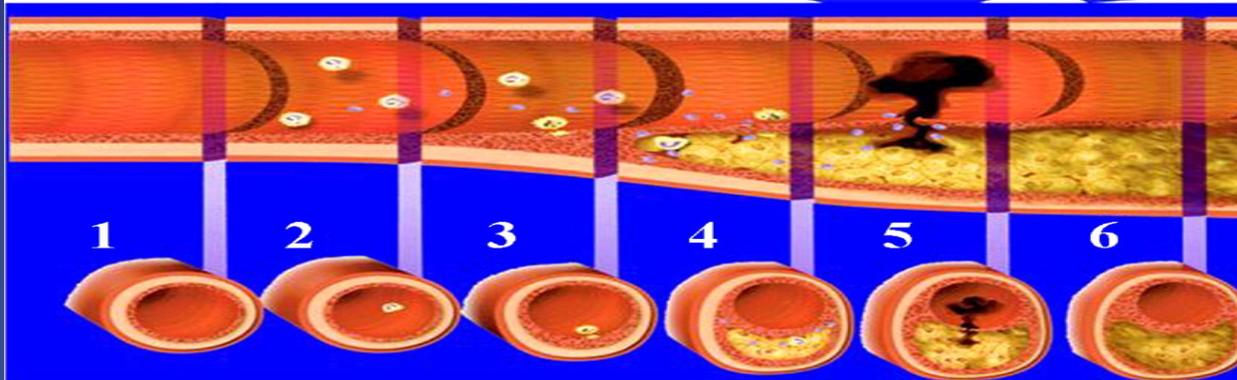
Acute Coronary Syndromes

Onset of UA/NSTEMI
 - Initial recognition and management in the Emergency Department
 - Risk Stratification
 - Immediate Management

Hospital Management
 - Medications
 - Conservative versus Invasive Strategy
 - Special Groups
 - Preparation for discharge

Management Prior to UA/NSTEMI

Secondary Prevention/ Long-Term Management



Anderson, J. L. et al. J Am Coll Cardiol 2007;50:e1-e157

Important Point!

- R/O MI Does not R/O ACS

**One missed ACS can change
your life**

and your patient's life Forever !

Actual ED(A&E) Missed ACS

- From Multiple Multicenter Studies:
- U.S.- 2-4%
- Canada- 6-10%
- UK- 5-10%

Concepts

1. ACS is frequent, elusive, and deadly
2. Evaluation of ACS is inexact and hazardous
3. 100% assurance does not exist in 2008
4. Can limit risk to patient and physician
5. Even with new high tech procedures available; sound judgment, integrity, compassion, and conscientiousness are still required

B. Early Risk Stratification

Recommendations for Early Risk Stratification

Class I

1. A determination should be made in all patients with chest discomfort of the likelihood of acute ischemia caused by CAD as high, intermediate, or low. (Level of Evidence: C)
2. Patients who present with chest discomfort should undergo early risk stratification that focuses on angular symptoms, physical findings, ECG findings, and biomarkers of cardiac injury. (Level of Evidence: B)
3. A 12-lead ECG should be obtained immediately (within 10 min) in patients with ongoing chest discomfort and as rapidly as possible in patients who have a history of chest discomfort consistent with ACS but whose discomfort has resolved by the time of evaluation. (Level of Evidence: C)
4. Biomarkers of cardiac injury should be measured in

EKGs for Dummies (like me at 4am)

1. Know what an absolutely normal EKG looks like

2. EKG Results

- Normal

- Abnormal (Not absolutely normal)

 - New

 - Old

 - Unk. (treat as new)

THE “Diagnostic Challenge”

- Studies show that an equal number with ACS and without ACS get relief with “GI cocktail” episodic, intermittent, placebo effect
- Studies demonstrate that as many people with ACS as without ACS get relief with NTG esoph. spasm relieved by NTG, placebo

Markers fall short:

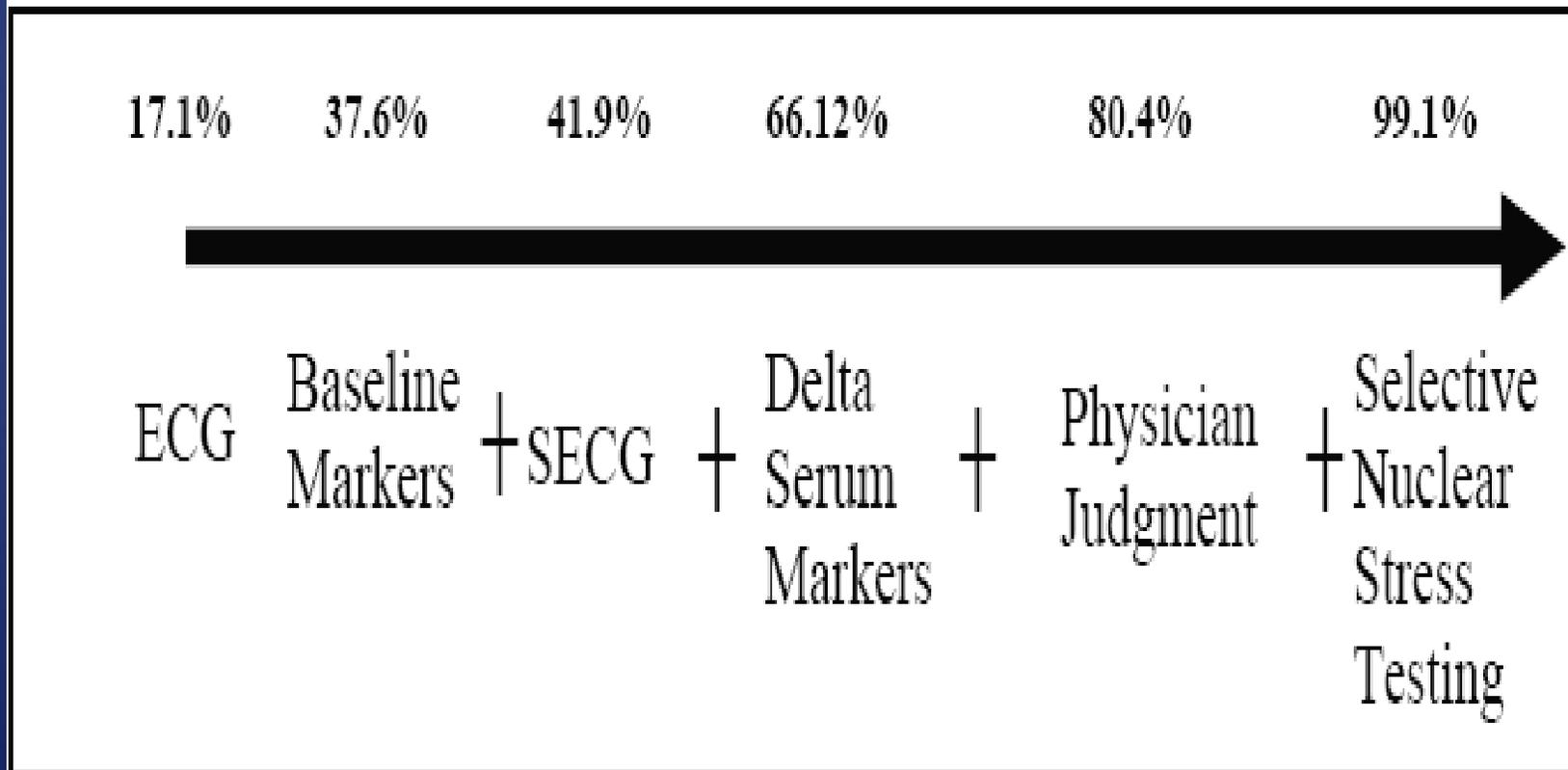
- Only measure necrosis, not ischemia
- Low sensitivity in first 6 hours
- *Never do one measurement, need at least 2
- Not specific for ACS etiology
- Negative marker does not mean
No ACS

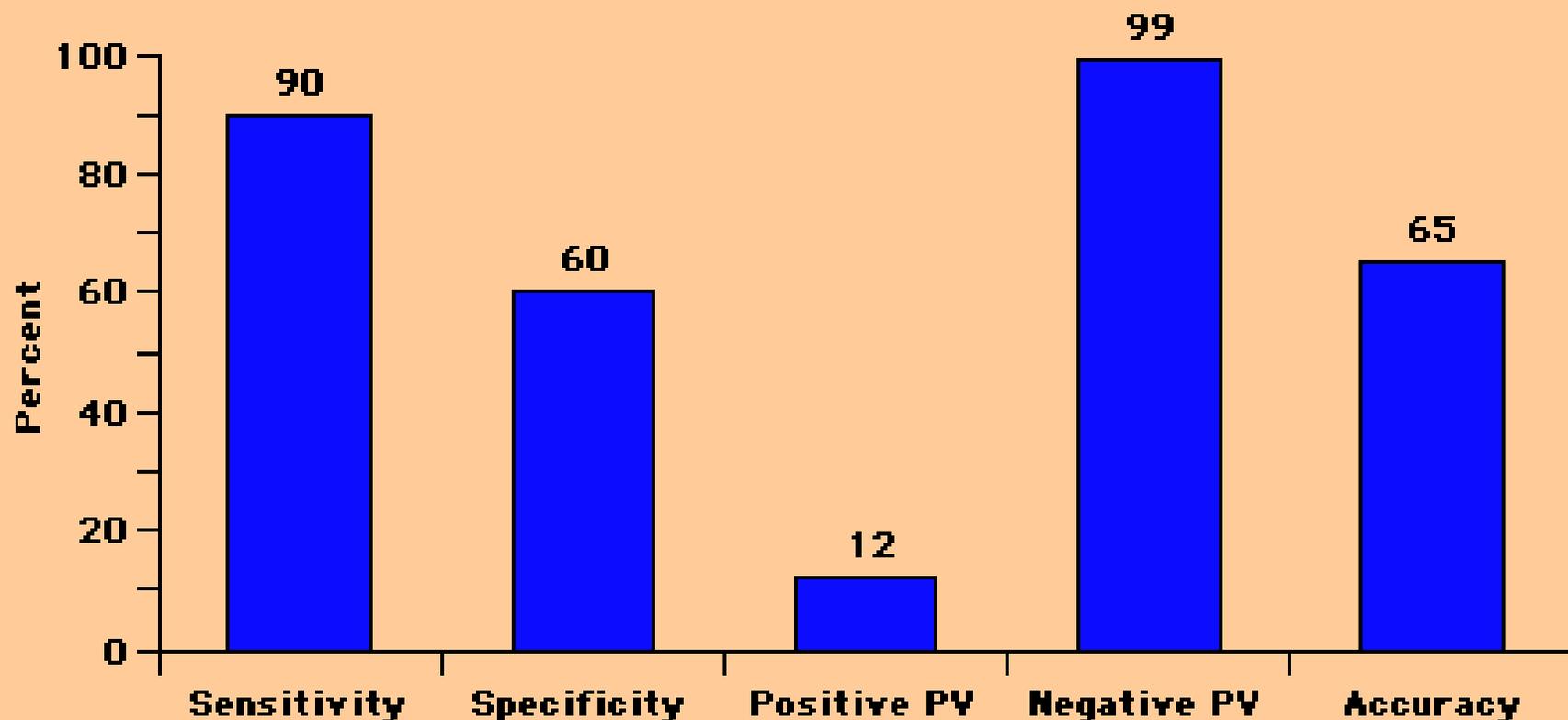
R/O Dissection

- **You Must Ask and Document This in All Chest Pain Patients**
- Was it:
 - - tearing or ripping?
 - - start at maximal intensity?
 - - Radiate to back, abdomen and legs?
- ***If you ask all 3, you will pick up 90% of Dissection, 1/4 of us ask 0-1 of the questions... Add a CXR and 97% sensitivity***

Incremental Sensitivity for Detecting 30d ACS

Ann Emerg Med 2002;40:584-594





Resting SPECT imaging in evaluation of chest pain In a group of 357 patients presenting to the emergency room, 20 had a documented myocardial infarction (MI). Resting perfusion imaging with technetium-99m tetrofosmin had a sensitivity of 90 percent but a positive predictive value of only 12 percent since most positive tests were false positives. However, a negative study was associated with a very low cardiac event rate (negative PV 99 percent). (Redrawn from Heller, GV, Stowers, SA, Hendel, RA, J Am Coll Cardiol 1998; 31:1011.)

5 Practice Changes

(Great if you already do these!)

1. Atypical is typical! Be suspicious!
2. One EKG Begets another
3. Biomrks x 2
4. Document, Document,
Document
5. If in doubt, do a pro. test or Admit

The Sobering Bottomline

“The sobering bottom line is that 2 decades of research has taught us that without compelling evidence for a noncardiac cause, there is no absolutely fail-safe way to exclude myocardial ischemia or infarction at the time of a patient’s initial presentation.”

Lee Goldman, MD

(Ann. IM Dec. 2003)

Discharge Instructions

Build a Solid “Safety Net”

- avoid “f/u prn”
- provide options
- MD should instruct pt.
- pt. signature
- plain language
- be specific

Screening Asymptomatic Patients

RECOMMENDATIONS FROM MAJOR SOCIETIES

- The United States Preventive Services Task Force (USPSTF) ([See "USPSTF Guidelines: Screening for coronary heart disease: Recommendation statement"](#)).
- (ACC/AHA) guidelines for exercise testing
- American College of Physicians
- American Academy of Family Physicians
- American College of Sports Medicine
- American Diabetes Association
- NFPA
- DOT
- FAA

USPSTF

- **The United States Preventive Services Task Force (USPSTF) made two recoms in 2004 :**
 - They recommended against routine screening in adults at low risk for CHD events
 - They concluded that there was insufficient evidence to recommend for or against routine screening in adults at increased risk for CHD events

ACC/AHA

- Guidelines for exercise testing reached a similar conclusion that there is little evidence to support routine testing in asymptomatic adults. They did identify the following subgroups that might benefit from screening:
- The guidelines concluded that the weight of evidence favours evaluation of asymptomatic patients with diabetes who plan to begin a vigorous exercise program. This is consistent with the conclusion that diabetes is a CHD equivalent
- Exercise testing can also be considered (although the weight of evidence is less clear) in patients with multiple risk factors for CHD as a guide to risk reduction therapy, in men over age 45 and women over age 55 who plan to start a vigorous exercise program or who are involved in occupations that impair public safety, or in patients who are at high risk for CHD due to other diseases (eg, peripheral vascular disease and chronic renal failure).

Cardiovascular Disease

Chart 3-1
Prevalence of Cardiovascular Disease* by Age and Sex
FHS, 1998-2002

Percent of Population

The prevalence of CVD increases with age and reaches about 50 percent in men beginning at ages 75-84 and in women beginning at ages 85-94.

Age	Men	Women
45-54	9.9	3.7 [†]
55-64	14.8	9.1
65-74	35.7	18.4
75-84	51.7	43.6
85-94	68.3	51.8

* CHD, HF, cerebrovascular accident, or intermittent claudication.

[†] Unreliable rate.

Data from Table 5-37.

Chart 3-4
Age-Adjusted Prevalence of Coronary Heart Disease*
by Race and Sex, Ages 45-64
ARIC Cohort, 1987-1989

Percent of Population

Total	Men	Women	White Men	Black Men	White Women	Black Women
4.6	7.6	2.1	8.1	5.7	1.7	3.0

* MI or history of MI, CABG surgery, or angioplasty of coronary artery.
 Data from Table 5-2.

The age-adjusted prevalence of CHD (ages 45-64) is higher in men than in women overall, and both white and black. It is higher in white men than in black men, but higher in black women than in white women.

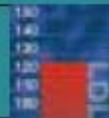
Detection



Third Report of the
National Cholesterol
Education Program (NCEP)
Expert Panel on

Detection,
Evaluation,
and Treatment
of High Blood
Cholesterol
in Adults
(Adult Treatment
Panel III)

Evaluation



Final Report

Coronary Disease Risk Prediction Score Sheet for Men Based on LDL Cholesterol Level

Step 1

Age	
Years	Points
30-34	-1
35-39	0
40-44	1
45-49	2
50-54	3
55-59	4
60-64	5
65-69	6
70-74	7

Step 2

LDL - Cholesterol		
(mg/dl)	(mmol/L)	Points
<100	<2.59	-3
100-129	2.60-3.36	0
130-159	3.37-4.14	0
160-189	4.15-4.91	1
>190	>4.92	2

Key	
Color	Risk
green	Very low
white	Low
yellow	Moderate
rose	High
red	Very high

Step 3

HDL - Cholesterol		
(mg/dl)	(mmol/L)	Points
<35	<0.90	2
35-44	0.91-1.16	1
45-49	1.17-1.29	0
50-59	1.30-1.55	0
>60	>1.56	-1

Step 4

Blood Pressure					
Systolic (mmHg)	Diastolic (mmHg)				
	<80	80-84	85-89	90-99	>100
<120	0	0 pts	1	2	3 pts
120-129	0	0 pts	1	2	3 pts
130-139	0	0 pts	1	2	3 pts
140-159	0	0 pts	1	2	3 pts
≥160	0	0 pts	1	2	3 pts

Note: When systolic and diastolic pressures provide different estimates for point scores, use the higher number

Step 5

Diabetes	
	Points
No	0
Yes	2

Step 6

Smoker	
	Points
No	0
Yes	2

Risk estimates were derived from the experience of the NHLBI's Framingham Heart Study, a predominantly

Step 7 (sum from steps 1-6)

Adding up the points	
Age	_____
LDL Cholesterol	_____
HDL Cholesterol	_____
Blood Pressure	_____
Diabetes	_____
Smoker	_____
Point Total	_____

Step 8 (determine CHD risk from point total)

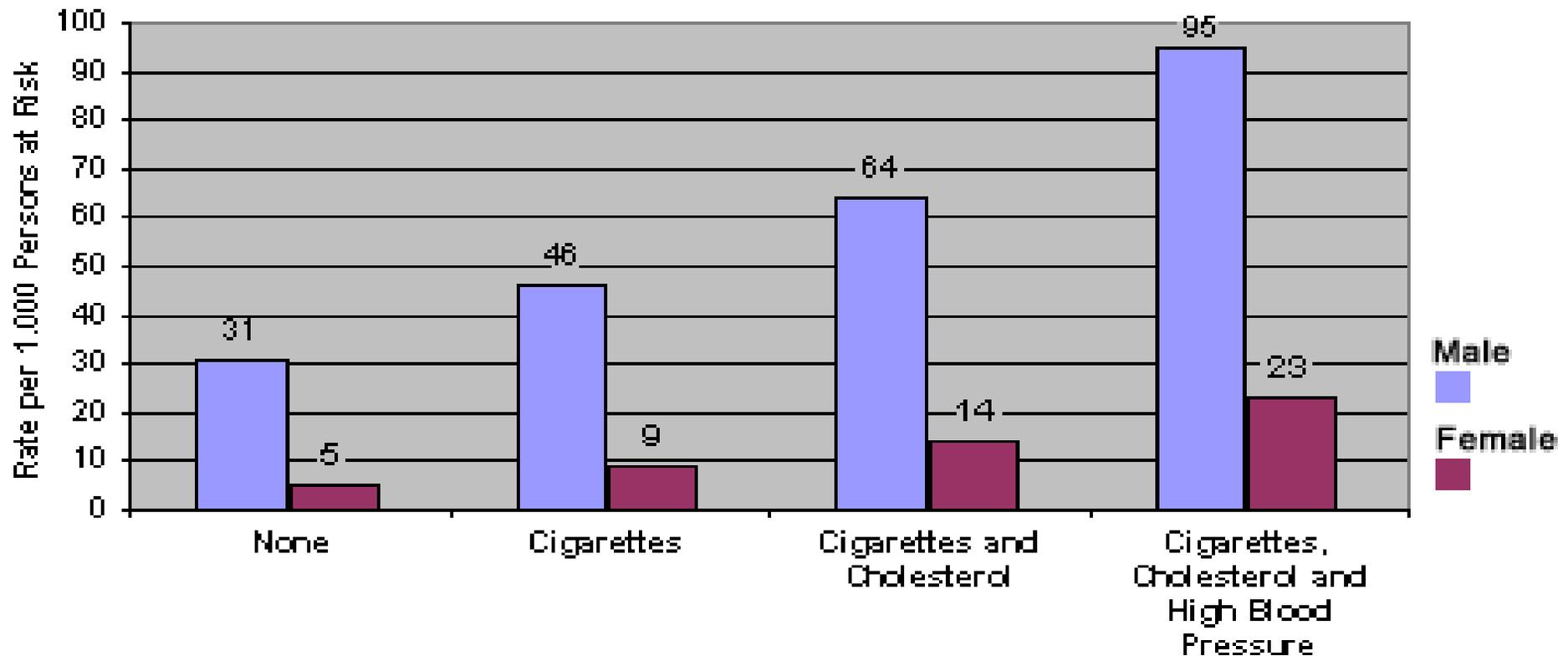
Point Total	10 Yr CHD Risk
<-3	1%
-2	2%
-1	2%
0	3%
1	4%
2	4%
3	6%
4	7%
5	9%
6	11%
7	14%
8	18%
9	22%
10	27%
11	33%
12	40%
13	47%
≥14	≥56%

Step 9 (compare to man of the same age)

Age (years)	Comparative Risk	
	Average 10 Yr CHD Risk	Low* 10 Yr CHD Risk
30-34	3%	2%
35-39	5%	3%
40-44	7%	4%
45-49	11%	4%
50-54	14%	6%
55-59	16%	7%
60-64	21%	9%
65-69	25%	11%
70-74	30%	14%

*Low risk was calculated for a man the same age, normal blood pressure, LDL cholesterol 100-129 mg/dL, HDL cholesterol 45 mg/dL, non-smoker, no diabetes

Risk of Heart Attack Within Eight Years by Risk Factors Present



This chart shows how a combination of three major risk factors can increase the likelihood of heart attack. This chart uses an abnormal blood pressure level of 150 systolic and cholesterol level of 260 in a 55-year-old male and female.

Source: Framingham Heart Study, section 37: The Probability of Developing Certain Cardiovascular Diseases in Eight Years at Specified Values of Some Characteristics (Aug. 1987)

ACC/AHA PRACTICE GUIDELINES—FULL TEXT

ACC/AHA 2002 Guideline Update for Exercise Testing

A Report of the American College of Cardiology/American Heart Association
Task Force on Practice Guidelines (Committee on Exercise Testing)

COMMITTEE MEMBERS

Raymond J. Gibbons, MD, FACC, FAHA, *Chair*

Gary J. Balady, MD, FACC, FAHA

J. Timothy Bricker, MD, FACC

Bernard R. Chaitman, MD, FACC, FAHA

Gerald F. Fletcher, MD, FACC, FAHA

Victor F. Froelicher, MD, FACC, FAHA

Daniel B. Mark, MD, MPH, FACC, FAHA

Ben D. McCallister, MD, FACC, FAHA

Aryan N. Mooss, MBBS, FACC, FAHA

Michael G. O'Reilly, MD, FACC

William L. Winters, Jr., MD, FACC, FAHA

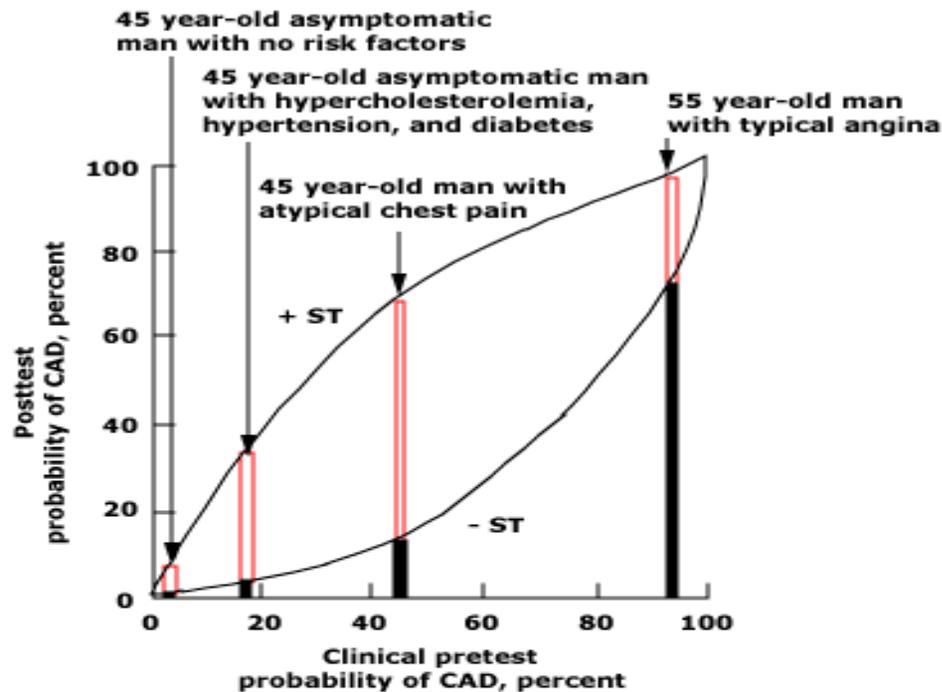
TASK FORCE MEMBERS

Raymond J. Gibbons, MD, FACC, FAHA, *Chair*

Elliott M. Antman MD FACC FAHA *Vice Chair*

Value ETT Bayes theorem

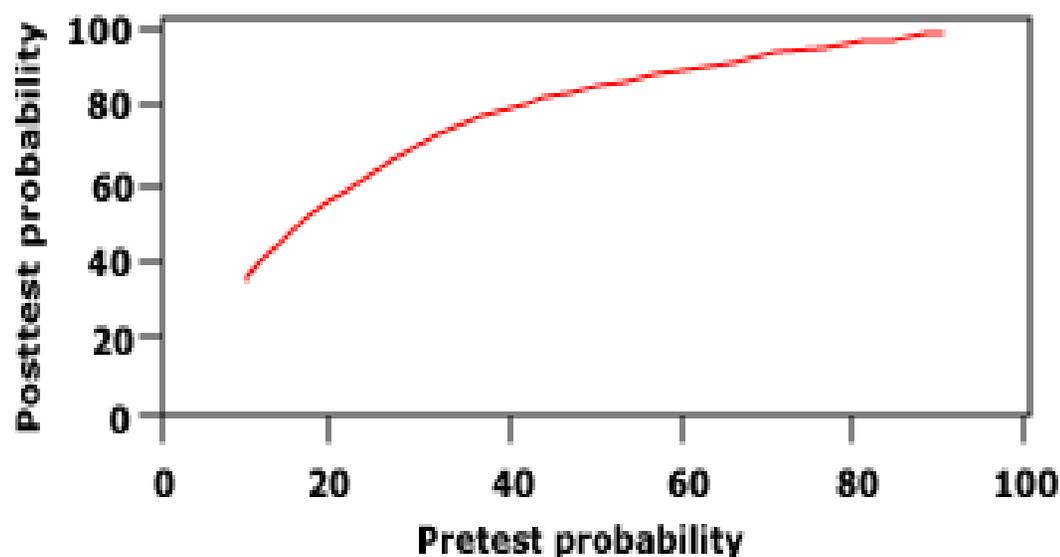
Calculation of probability of coronary artery disease



The probability of coronary artery disease (CAD) based upon a positive exercise test depends upon the pre-test probability of CAD, ie, the prevalence of CAD in the population studied. The solid black bar indicates the results for a negative test (-ST) while the red bars indicate the results for a positive test (+ST). The results of a positive exercise test are less predictive in an asymptomatic population with a low pre-test probability of CAD while they are very predictive in patients with typical angina who have a high pretest probability of CAD. The posttest probability of CAD is optimal in patients with an intermediate prevalence of CAD, eg, the 45 year old with atypical chest pain. *Data from Patterson, RE, Horowitz, SF. J Am Coll Cardiol 1989; 13:1653.*

Positive predict value ETT

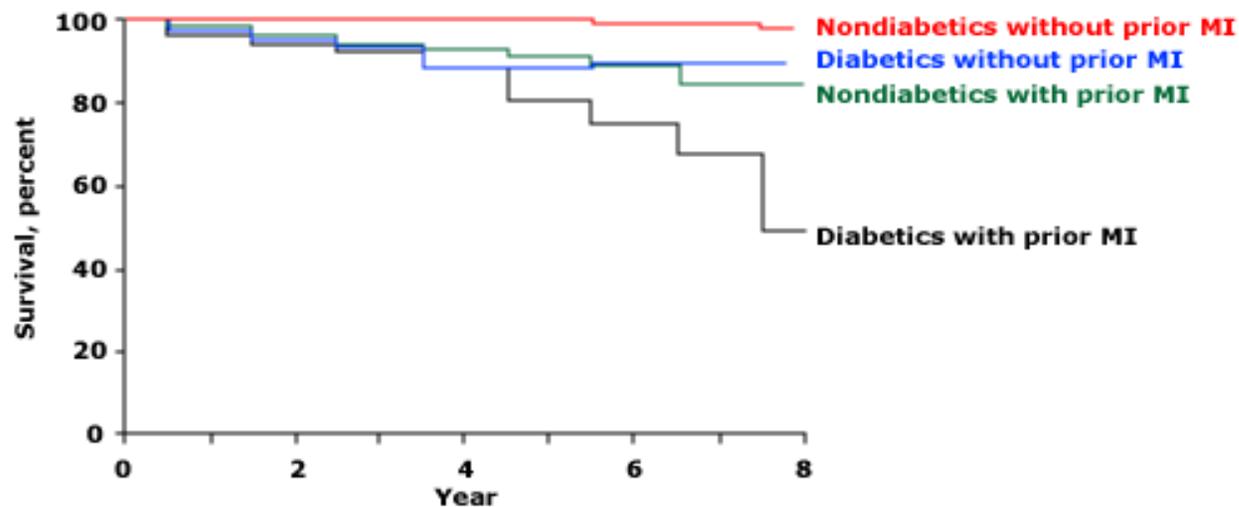
Estimated positive predictive value of exercise test



The positive predictive value of an ECG exercise test is related to the pretest probability of coronary heart disease (CHD), ie, the prevalence of CHD in the population studied.

Death MI diabetes no diabetes

Diabetes increases coronary mortality with and without a prior MI



In a seven year follow up of 1059 subjects with type 2 diabetes and 1378 nondiabetics, diabetics with or without a prior myocardial infarction (MI) had a greater mortality from coronary disease compared to nondiabetics (42 versus 16 percent for those with a prior MI and 15 versus 2 percent for those without a prior MI). The rate of coronary death and fatal and nonfatal MI in diabetics without a prior MI was the same as in nondiabetics with a prior MI, providing part of the rationale for considering type 2 diabetes a coronary equivalent. *Data from Haffner, SM, Lehto, S, Ronnema, T, et al, N Engl J Med 1998; 339:229.*

AN EXCELLENT SYSTEMATIC REVIEW



**U.S. Department
Of Transportation**
**Federal Motor Carrier
Safety Administration**

Cardiovascular Advisory Panel Guidelines for the Medical Examination of Commercial Motor Vehicle Drivers

Authored by

Roger Blumenthal, MD

Joel Braunstein, MD

Heidi Connolly, MD

Andrew Epstein, MD

Bernard J. Gersh, MD

Ellison H. Wittels, MD

Expert Panel Recommendations

Cardiovascular Disease and Commercial Motor Vehicle Driver Safety

Panel Members

Roger S. Blumenthal, MD
Andrew E. Epstein, MD
Richard E. Kerber, MD

Presented to

Federal Motor Carrier Safety Administration

April 10, 2007

Prepared for



MANILA Consulting Group, Inc.
1420 Beverly Road, Suite 220
McLean, VA 22101

Prepared by



A NONPROFIT AGENCY

ECRI
5200 Butler Pike
Plymouth Meeting, PA 19462

This report is comprised of research conducted to analyze the impact of Cardiovascular Disease on Commercial Motor Vehicle Driver Safety. Federal Motor Carrier Safety Administration considers evidence, expert recommendations, and other data, however, all proposed changes to current standards and guidance (guidelines) will be subject to public-notice-and-comment and regulatory processes.

APPENDIX A: 2002 CV Guidelines for Medical Examiners

Section 1: Drivers without Known Cardiovascular Disease

Diagnosis	Physiologic/functional	Certification	Recertification
Asymptomatic, healthy	Low CHD event risk. Assess for clinically apparent risk factors. Use, when possible, Framingham risk score model to predict 10- year CHD event risk; increasing age is a surrogate marker for increasing atherosclerotic plaque burden.	Yes, if asymptomatic. Rarely disqualifying alone.	Biennial
Asymptomatic, high-risk person (as designated by CHD risk-equivalent condition)* Asymptomatic, high-risk person >45 years with multiple risk factors for CHD	Sub-clinical coronary atherosclerosis is a concern; High-risk status requires close physician follow-up and aggressive comprehensive risk factor management.	Yes, if asymptomatic. No if: <ul style="list-style-type: none"> • Abnormal ETT.† • Ischemic changes on ECG.‡ • Functional incapacitation by one of conditions. 	Annual

*CHD risk-equivalent is defined as presence of diabetes mellitus, peripheral vascular disease or Framingham risk score predicting a 20% CHD event risk over the next 10 years.

†Abnormal ETT is defined by: an inability to exceed 6 METS through Stage II or six minutes on standard Bruce Protocol; presence of ischemic symptoms and/or signs (e.g. characteristic angina pain or 1 mm or greater ST depression or elevation in 2 or more leads); inappropriate systolic blood pressure (SBP) and/or heart rate response (e.g. inability of heart rate to meet or exceed 85% of age-predicted maximal heart rate unless on beta blocker); a rise in SBP \geq 20 mmHg; or ventricular dysrhythmia.

‡Ischemic changes on ECG are defined by the presence of new 1 mm or more ST-segment elevation or depression and/or marked T-wave abnormality

FMCSA Expert Panel Recommendations:
Cardiovascular Disease and Commercial Motor Vehicle Driver Safety

4/10/2007

Diagnosis	Physiologic/functional	Certification	Recertification
Angina Pectoris	Lower end of spectrum among CHD patients for risk of adverse clinical outcomes. Condition usually implies at least one coronary artery has hemodynamically significant narrowing.	Yes, if asymptomatic	Annual Biennial ETT at minimum. (If test positive or inconclusive, imaging stress test may be indicated). Cardiologist examination recommended.
		No if: <ul style="list-style-type: none"> Rest angina or change in angina pattern within 3 months of examination; Abnormal ETT; Ischemic changes on rest ECG; Intolerance to cardiovascular therapy. 	Not applicable
Post PCI	Rapid recovery for elective PCIs for stable angina; delayed re-stenosis is the major PCI limitation and requires intensive secondary prevention.	Yes if: <ul style="list-style-type: none"> At least 1 week after procedure; Cardiologist approves, Patient tolerates medications, ETT 3 to 6 months after PCI. 	Annual Recommend cardiologist examination. Biennial ETT at minimum. (If test positive or inconclusive, imaging stress test may be indicated.)
		No if: <ul style="list-style-type: none"> Incomplete healing or complication at vascular access site, Rest angina, Ischemic ECG changes. 	Not applicable
Post Coronary Artery Bypass Surgery (CABG)	Delay in return to work to allow sternal incision healing. Because of increasing risk of graft closure over time, ETT is obtained.	Yes if: <ul style="list-style-type: none"> At least 3 months after CABG, LVEF >40% post CABG, Approval by cardiologist, Asymptomatic and tolerant to medications. 	Annual After 5 years: annual ETT. Imaging stress test may be indicated.

*Some aspects of guidelines in this section are addressed by a Key Question in FMCSA's Evidence Report, "Cardiovascular Disease and CMV Driver Safety."

†Addressed by Key Question 5 and 6 of Evidence Report: What is the risk for sudden death or incapacitation in individuals with low LVEF? Is the relationship between LVEF and sudden death or incapacitation (if established) dependent on the underlying etiology of heart failure?

Section 1: CMV drivers without known heart disease

The MEP made a single recommendation regarding changes to the guideline statements found in Section 1.

3

FMCSA Expert Panel Recommendations:
Cardiovascular Disease and Commercial Motor Vehicle Driver Safety

4/10/2007

1. The MEP recommends that the currently used definition for abnormal exercise tolerance testing (ETT) should be revised so that it is defined as an inability to exceed 6 METS (metabolic equivalents) on ETT.

Justification for change: FMCSA's current guidelines define abnormal ETT as "...an inability to exceed 6 METS or through Stage II or six minutes on standard Bruce protocol." METS are standardized units (1 MET = 3.5 mL/kg/min) that allow determination and direct comparison of workload capacity data obtained across different ETTs. Consequently, to be certified to drive a CMV, an individual must be capable of exceeding 6 METS, regardless of the ETT protocol used.

Ischemic Heart Disease Dr. Roger Blumenthal and Dr. Joel Braunstein

 *Findings*

Almost 12% of those over age 40 have coronary heart disease (CHD). In the general population, the initial presentation of CHD is catastrophic in over two-thirds of cases.

i

 Risk factor identification and treatment is the key strategy in decreasing the mortality and morbidity of CHD. Commercial drivers have an increased prevalence of cardiovascular risk factors relative to other occupations; specific work-related factors further elevate the risk of CVD.

 *Recommendations*

There is some evidentiary utility for using the exercise tolerance test (ETT) to assess CMV drivers who have risk factors but no symptoms or signs of CHD. Because of its lack of specificity and sensitivity and its unknown cost effectiveness when used as a screening tool in this population, the Panel is not able to recommend for or against this strategy.

Medical examiners have been provided recommendation tables to assist in deciding whether to certify commercial drivers with coronary artery risk factors, with known CHD, following a cardiac event, or following a cardiac procedure.

Why Stress testing of some type is so important -

- Symptoms vs Degree of Obstruction
- At rest, patients may have up to 90% obst. with no sx, with stress may have sx with 50% obst.

Job Strain and Cardiovascular Disease

Body of evidence suggests relationship between job strain and cardiovascular mortality

Main associations are with exposure to high psychological demands and low control over job

Professional drivers (especially urban transport) have the most consistent evidence of increased risk



Cardiovascular effects: Return-to-Work after MI

Medical Factors

Major predictors of RTW:

- LV dysfunction
- persistent ischemia / angina after treatment

Non-Medical Factors

- Coping styles
- Perception of work (demands, satisfaction)
- Age, gender, education
- Benefits/incentives

Cardiovascular effects of work

- Reinfarction and death NOT more frequent at work
- Many workers older (>50) and have moved into sedentary roles even pre-infarction

Longshoremenn study: Lowest rates of CAD mortality linked to heaviest jobs:

Activity level	CV Mortality	Sudden Death
High	26.9	5.6
Medium	46.3	19.9
Low	49.0	15.7

Assessing work capacity: Some numbers

3.5 METs : Bartending, frequent walking with 10lb objects (many office jobs)

4 - 5 METs : Painting, masonry work, light carpentry

5 - 6 METs : Lighter digging, shoveling

6 - 7 METs : Heavier or more frequent shoveling

7 - 8 METs : Carrying 50-60 lbs; sawing hardwood

Assessing work capacity /capabilities

- Job description:
 - Always request
 - Assess *static vs dynamic* work
 - Other stressors (temperature, psych)
 - Other exposures (CO, cigarette smoke)
- Simulated work (+/- exercise EKG) may be better in judgment of capabilities than testing in lab setting
- Specialist opinion: but beware of conservatism

Fitness-for-Duty Evaluations

Many safety-sensitive jobs (fire, police) have qualification requirements based on exercise testing or physical fitness standards

Principles outlined in last slide apply: predictive value may be low in younger/healthier workers

Be careful not to exclude asymptomatic workers on basis of positive exercise test only

ADA conflicts: May not be limited in performance of job

Attribution and Workers' Compensation



- Heart disease multifactorial: risk from work exposures is superimposed on a high baseline
- Firefighters, Police: Often a *statutory presumption* that CAD arose from work, if worker has required years of service

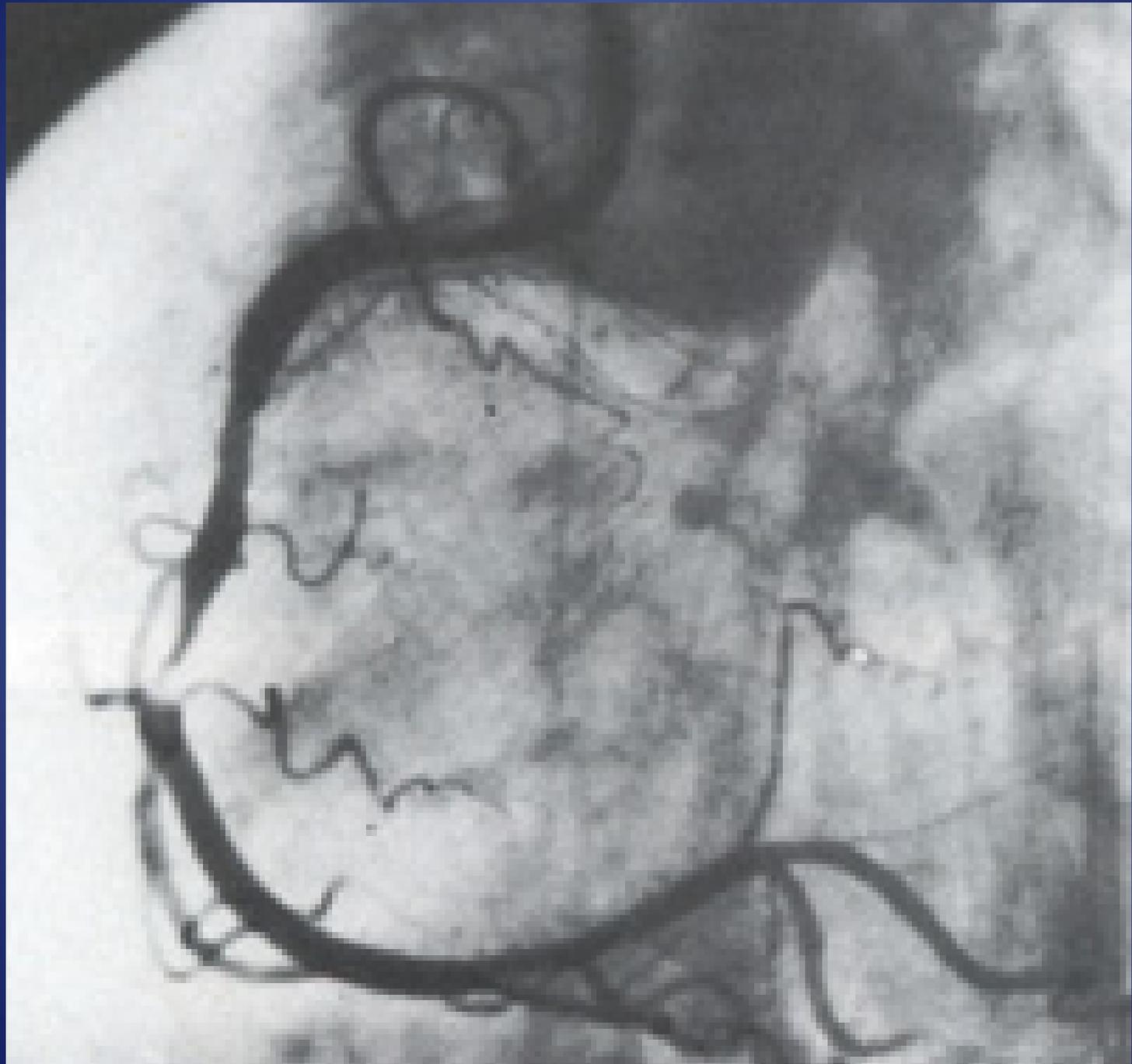
SUDDEN CARDIAC DEATH

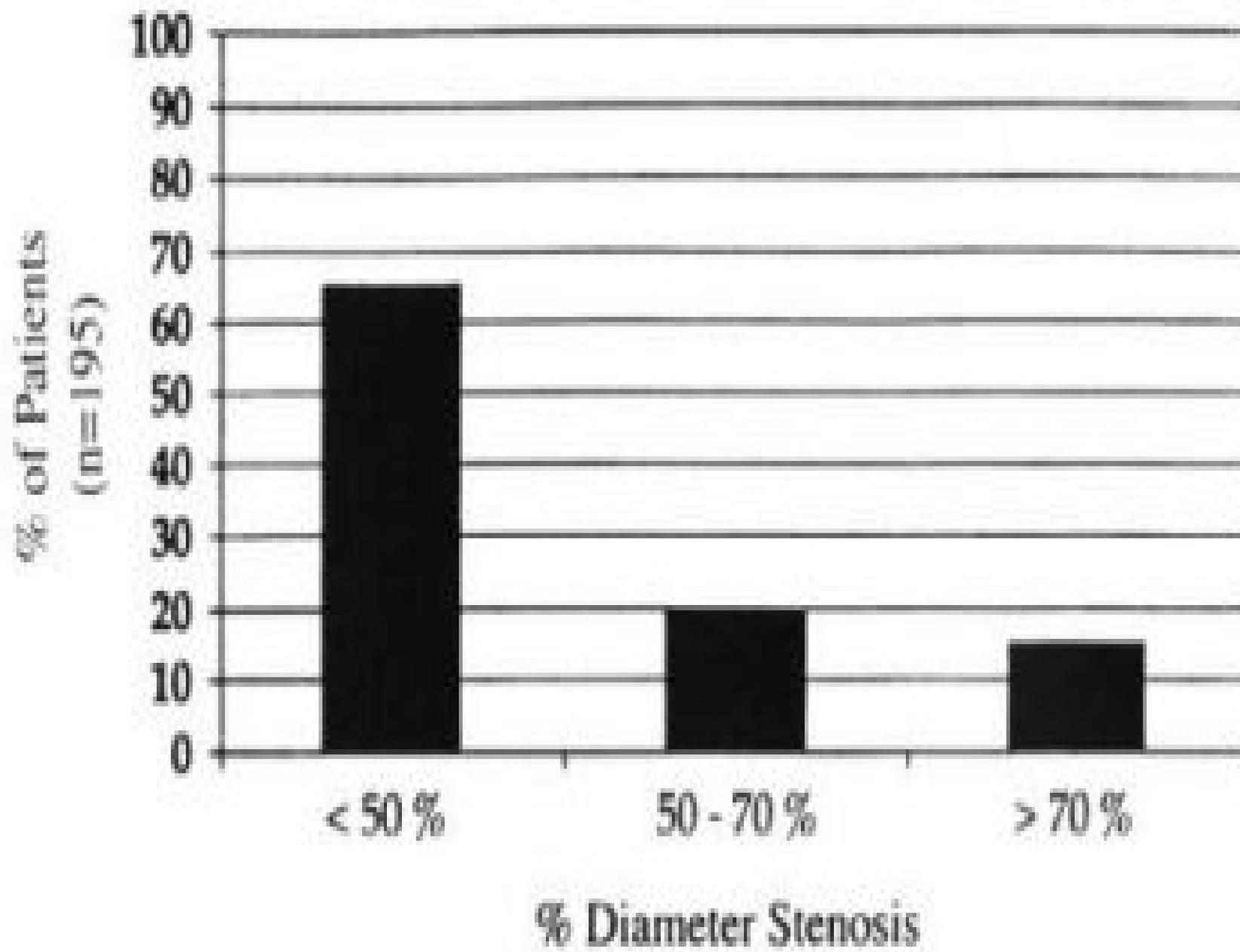
- SCD CLAIMS 250,000-300,000 LIVES/YR
- OVERALL SURVIVAL 3-8%
- GREAT GEOGRAPHIC VARIATION
- MOST OCCUR AT HOME (50-80%)
- MOST COMMONLY MALES AGE 50-75
- LESS THAN 50% OCCUR WITH MI

SUDDEN CARDIAC DEATH (SCD)

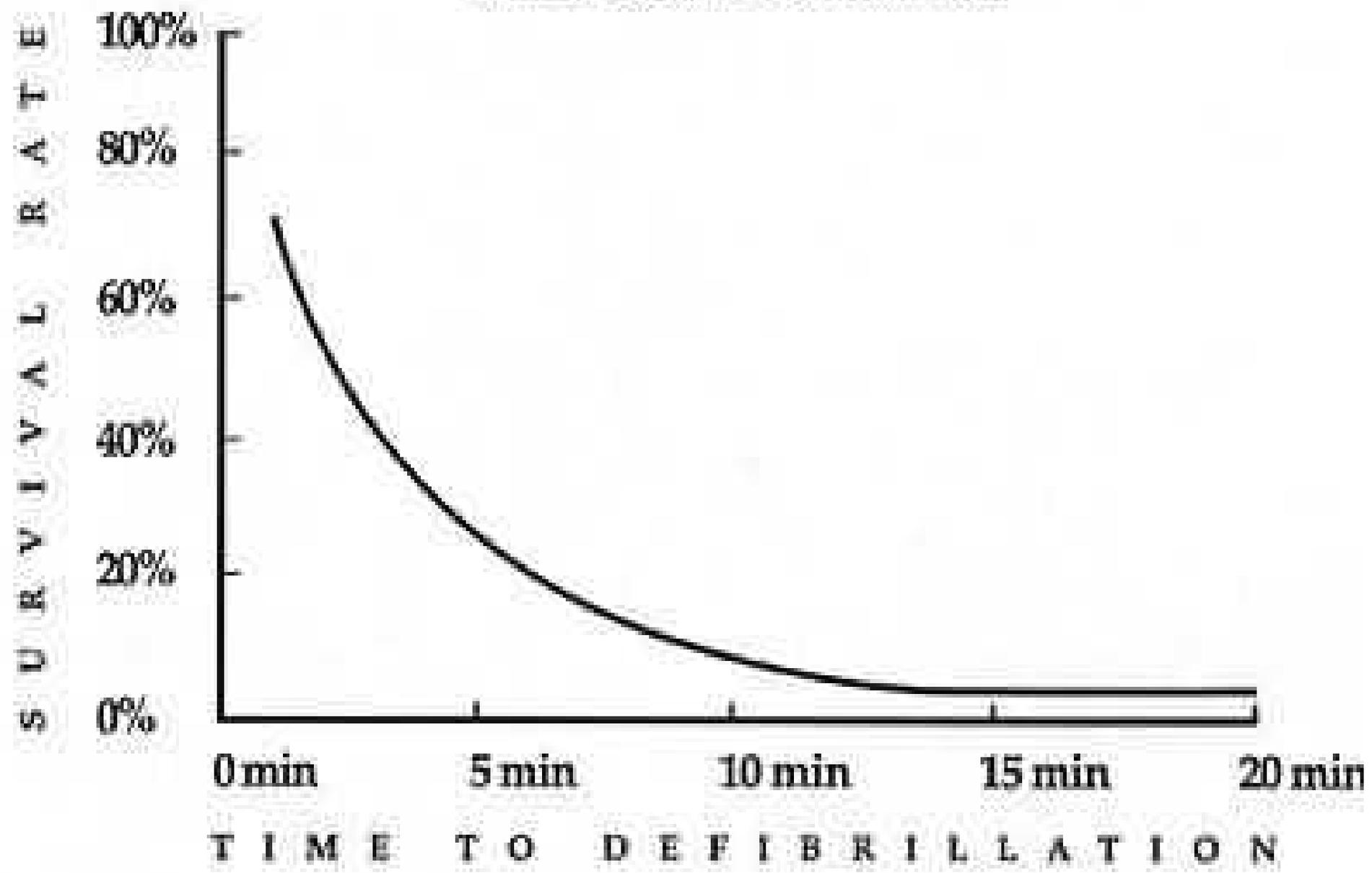
- 90% CAD
- LESS THAN 50% HAVE MI
- 1 in 4: 1st symptom: SCD
- No warning
- V fib 75%
- Only Rx: Rapid Defib.
- 1 min. delay = 10% decr. Survival
- 5-7 min. to defib. = 20-40% surv.







Relationship Between VF Survival Rate and Time to External Defibrillation



Currents

in Emergency Cardiovascular Care

Volume 16 Number 4 Winter 2005-2006

Highlights of the 2005 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care

This special issue of *Currents* summarizes the changes contained in the 2005 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care, published in the Dec 13, 2005, issue of the AHA journal *Circulation*. This edition of *Currents* does not replace the 2005 AHA Guidelines for CPR and ECC. It highlights major changes and provides background information and detailed explanations. It

the major changes for basic life support (BLS) for healthcare providers (HCP), defibrillation, advanced cardiovascular life support (ACLS), acute coronary syndromes (ACS), stroke, pediatric advanced life support (PALS), and neonatal resuscitation. The HCP section includes more detailed science support for new recommendations than in the lay rescuer section.

This issue of *Currents* does not contain references to the studies used in evidence evaluation for the guideline recommendations.

In This *Issue*

Major Changes Affecting All Rescuers Page 3

Lay Rescuer CPR Page 4

Simplifying Lay Rescuer CPR Page 7

First Aid Page 8

Healthcare Provider Basic and Advanced

Dec 13, 2005, issue of Circ.

The 5 major changes in the 2005 guidelines are these:

- Emphasis on, and recommendations to improve, delivery of effective chest compressions
- A single compression-to-ventilation ratio for all single rescuers for all victims (except newborns)
- Recommendation that each rescue breath be given over 1 second and should produce visible chest rise
- A new recommendation that single shocks, followed by immediate CPR, be used to attempt defibrillation for VF cardiac arrest. Rhythm checks should be performed every 2 minutes.
- Endorsement of the 2003 ILCOR recommendation for use of AEDs in children 1 to 8 years old (and older); use a child dose-reduction system if available.

TAKE HOME

- NO ONE IS 100% “CLEARED”
- BE CAREFUL ABOUT RTW (ESP POST ER)
- FFD CORRELLATED WITH EX CAP (10-12 METS)
- SCBA- RESP CLEARANCE- EX CAP
- KEEP TOXINS IN MIND ESP CO

TAKE HOME

- IF YOU ARE THINKING RTW OR D/C, GET A 2ND EKG,
- ATYPICAL IS TYPICAL (CHD EQUIV, HX CHD-----REFER)
- IF SX ARE TYPICAL, RFs ARE IRRELEVANT
- BEWARE!!!- “HEAT STRESS”, SYNCOPES OR NEAR SYNCOPES, BP CHECKS, DIAPHORESIS, “HYPOGLYCEMIA”, DIZZINESS, WEAKNESS, SOB, FOCAL NEURO SX, SHOULDER PAIN

**“Always err in a way that
the patient suffers the least-
“**

- (Commandment 10 of the Ten Commandments of Emergency Medicine)

