Reducing Cardiovascular Risk in Adults

ACC Guidelines for Cholesterol Reduction: NCEP ATP4

2014 CAOM Winter Seminar

A Roadmap: Defining the Problem, Implementing Solutions

- Discuss U.S. Healthcare costs, outcomes, and longevity
- Cardiovascular disease: driving healthcare costs, morbidity, and mortality
- Overview of ACC/AHA cholesterol treatment guidelines: 2013 ATP4
- Cardiac calcium scores, CTA
- Therapeutic Lifestyle Change

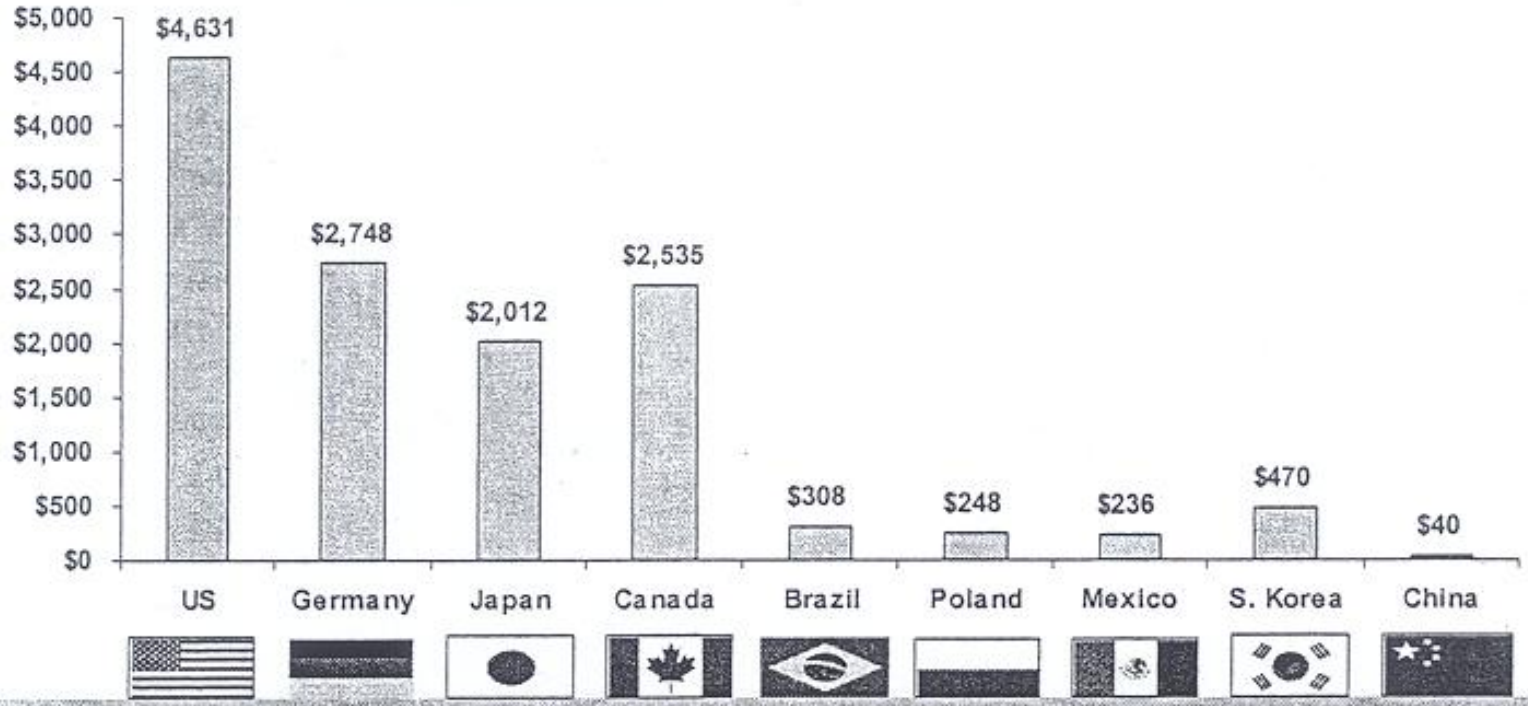
21st Century US Cardiovascular Risk

1. Cardiovascular disease (CVD): Leading cause of death in the US.
2. 725,000 deaths in 2002
3. 1.2 million total AMI's
4. Initial presentation of up to 50% of people is MI or sudden death

21st Century US Cardiovascular Costs

- 40 million noninvasive cardiac exams/yr
- 20% annual growth rate in noninvasive tests
- Cardiac imaging consumes enormous percentage of annual Medicare budget ~ $740,000,000

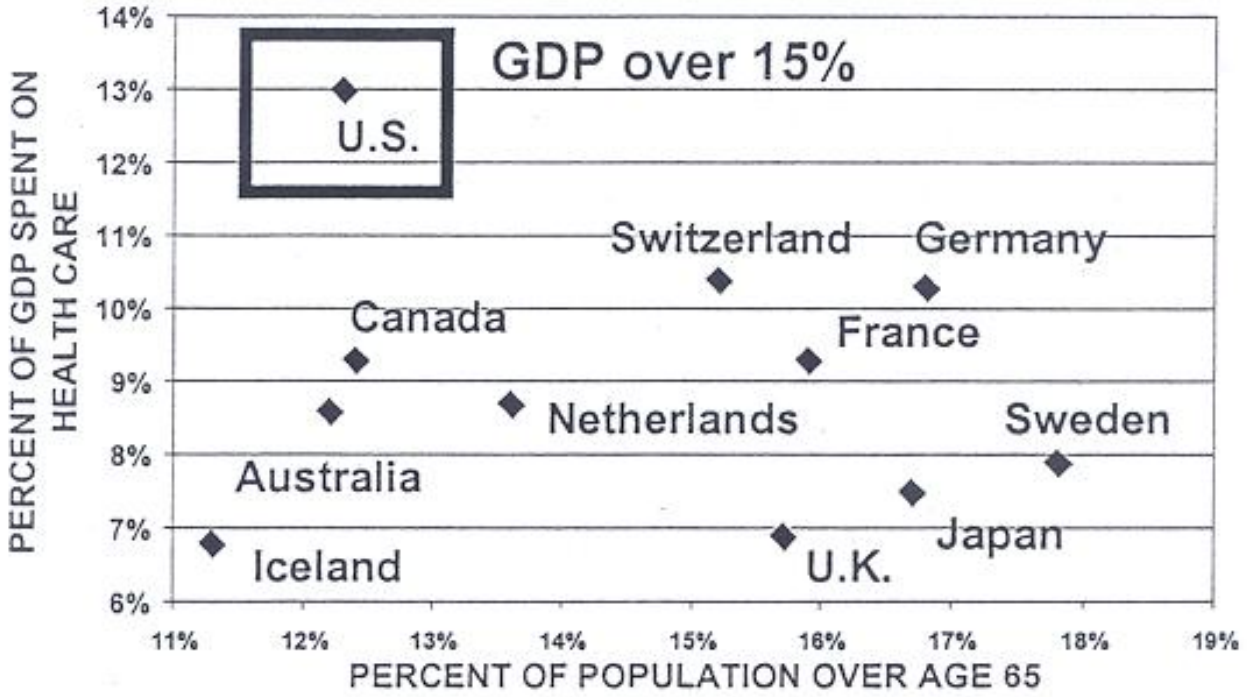
Health Care Spending per Capita



GM

U.S. Spends more on Health Care per capita than any other country

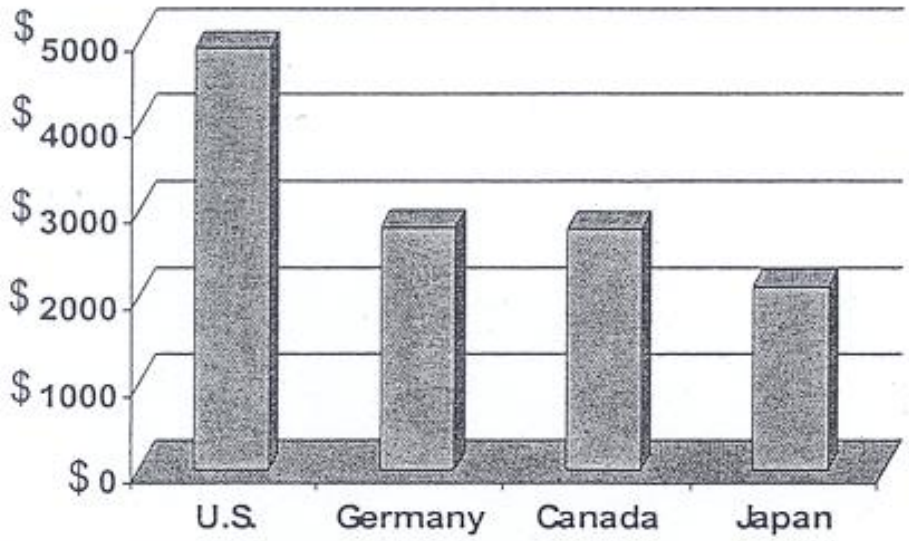
U.S. Spends the Most on Health Care Despite Having One of the Youngest Populations



Source: OECD Data Reported, 2002

U.S. Pays More for Health Care But Does Not Get More

(2001 cost per capita)



Despite spending the most per capita, the U.S. system has the 2nd lowest outcome rating among 13 industrialized nations measured

Average ranking on 16 health indicators	*12th*	*13th*	*3rd*	*1st*
Average Life Expectancy (yrs)	*77*	*78*	*79*	*81*

2012 Ohio Rank: #35

AMERICA'S HEALTH RANKINGS®

United Health Foundation

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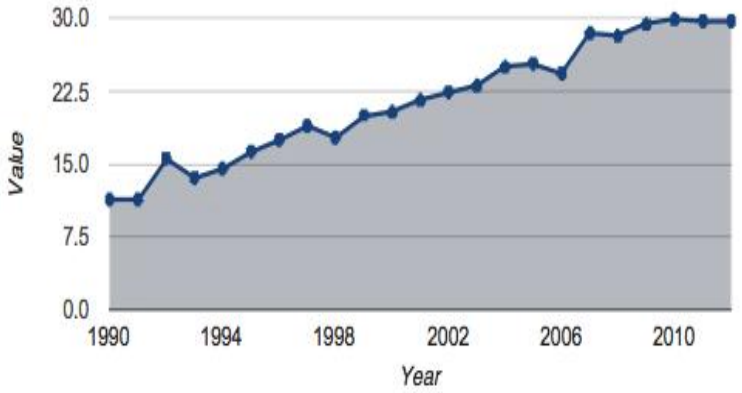
Overview

Ohio
Overview: 2012

2012 Edition map

Get the full 2012 Edition report

Ohio Obesity (1990-2012)



Strengths:

- High immunization coverage
- Low occupational fatalities rate
- Low geographic disparity within the state

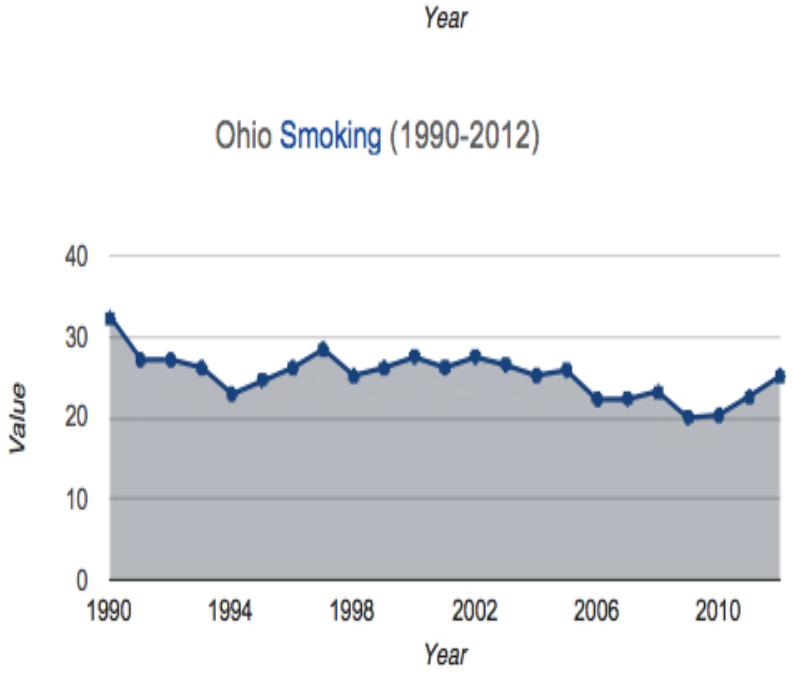
Challenges:

Challenges:

- High prevalence of smoking
- High levels of air pollution
- High rate of preventable hospitalizations

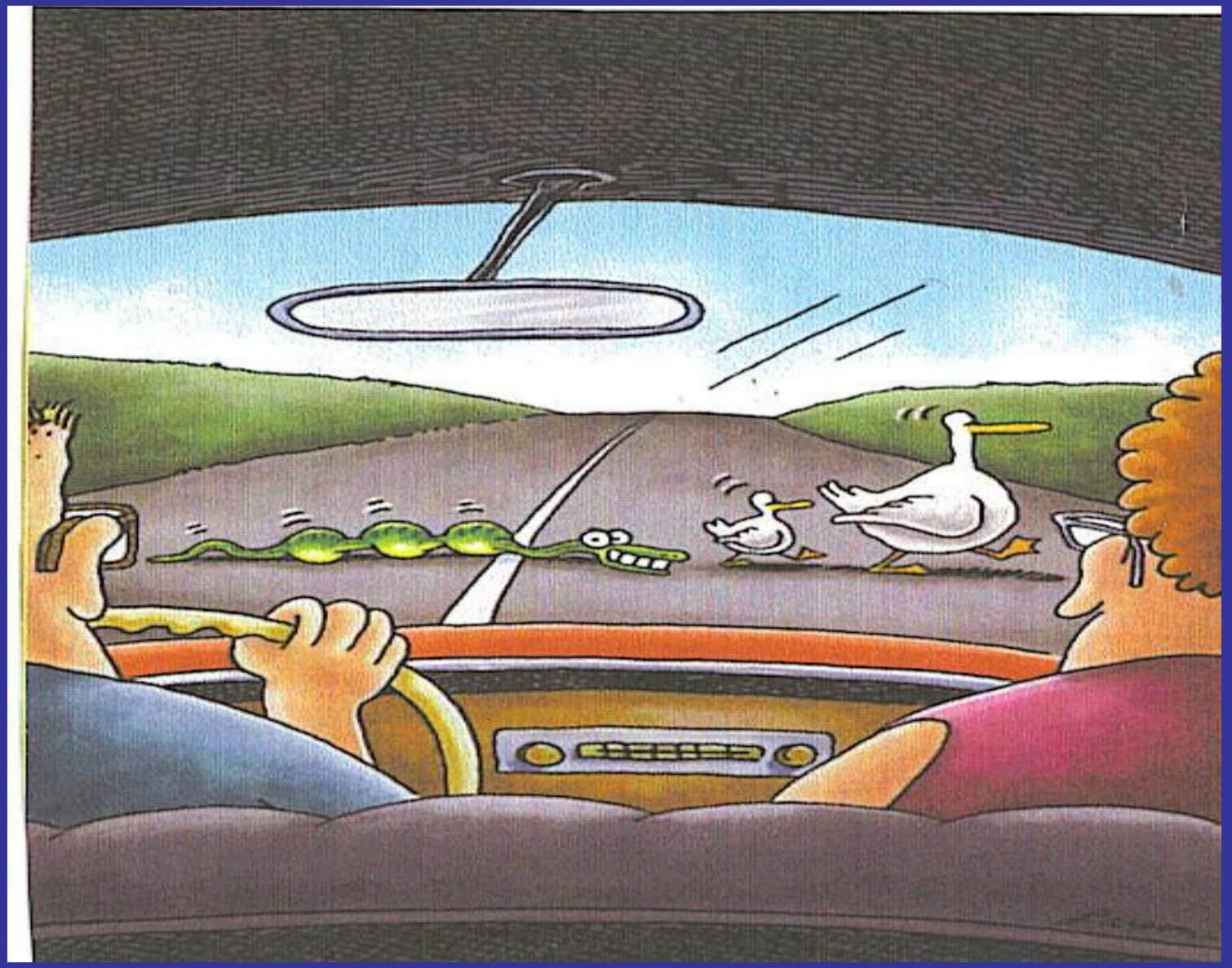
Highlights:

- Smoking remains high at 25.1 percent of the adult population, with more than 2.2 million adult smokers.
- Last year, public health funding was $45 per person; today it is $51 per person.
- In the past 5 years, air pollution decreased from 13.9 to 12.0 micrograms of fine particulate per cubic meter.
- In the past 5 years, the rate of preventable hospitalizations decreased from 88.0 to 78.5 discharges per 1,000 Medicare enrollees; however, it still remains high compared to other states.
- In the past 10 years, the rate of uninsured population increased from 10.7 percent to 13.7 percent. Last year it was 13.7 percent.

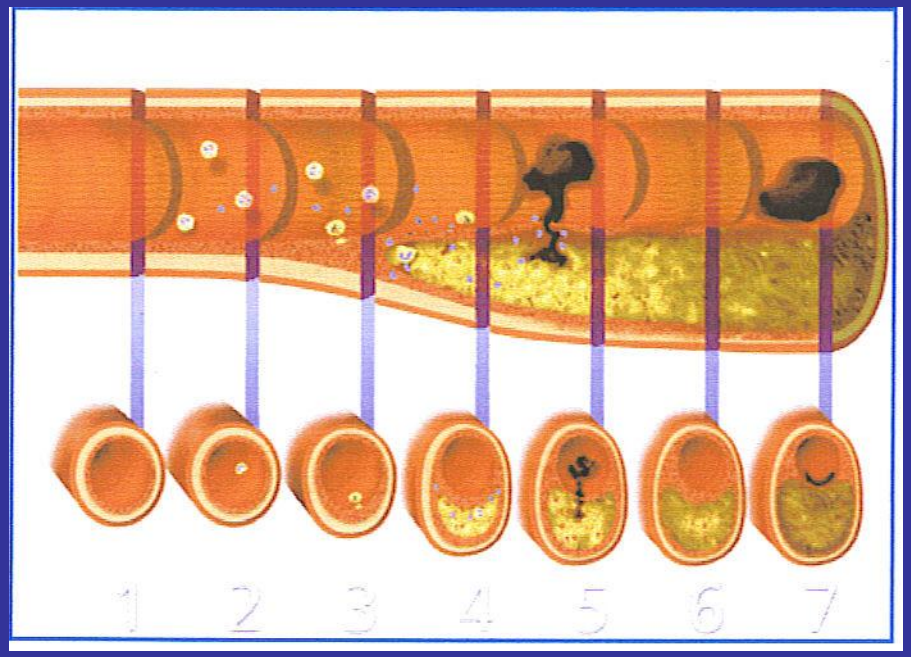


Ohio Diabetes (1990-2012)

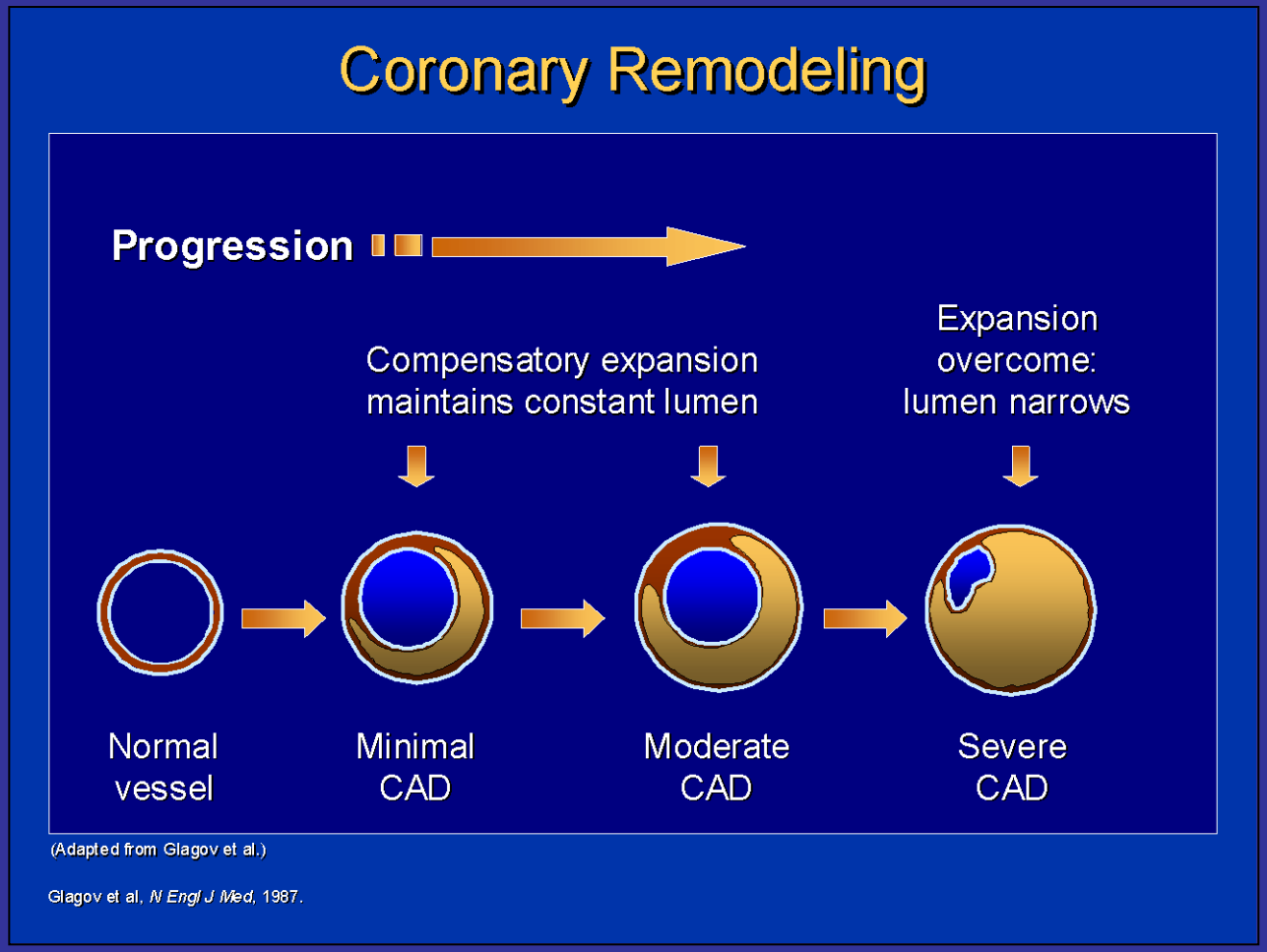
What you can’t yet see can hurt you



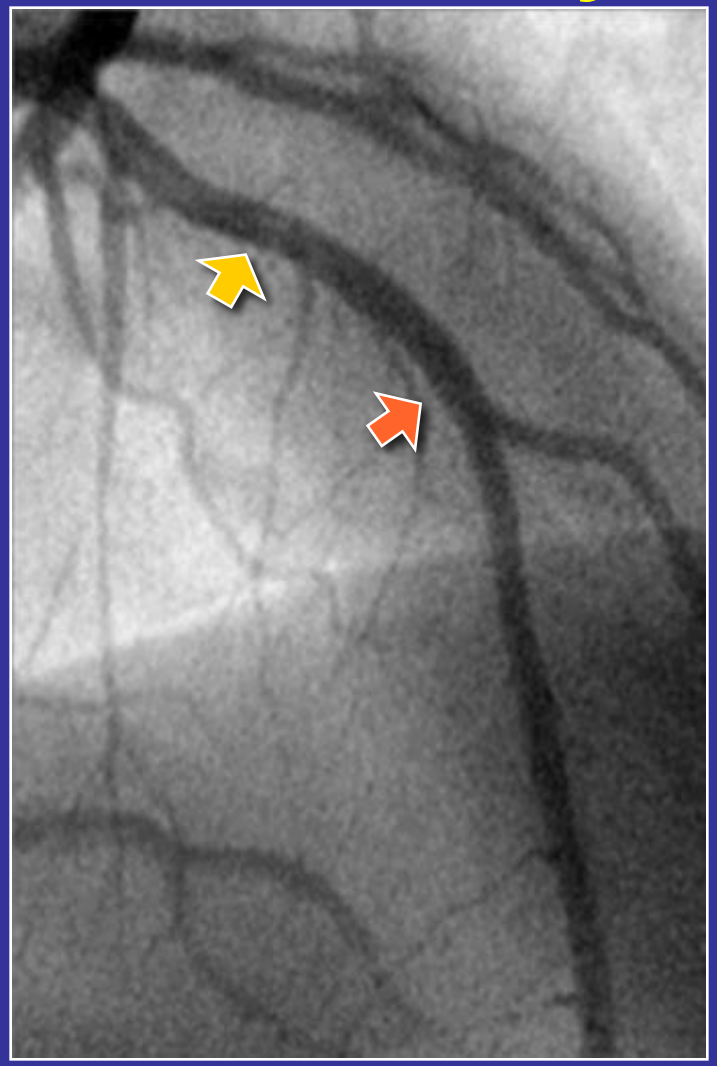
Atherosclerotic Plaque

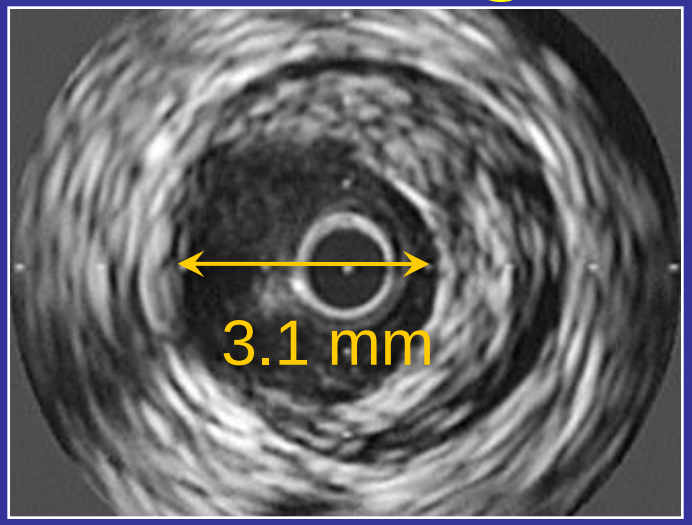


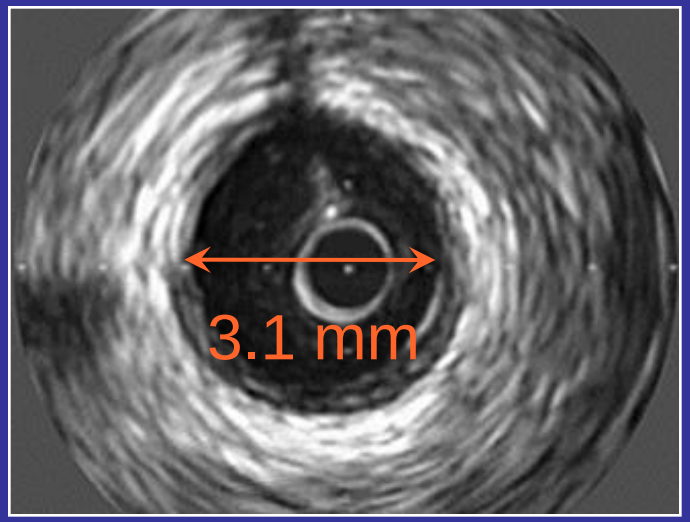
Glagov's Model



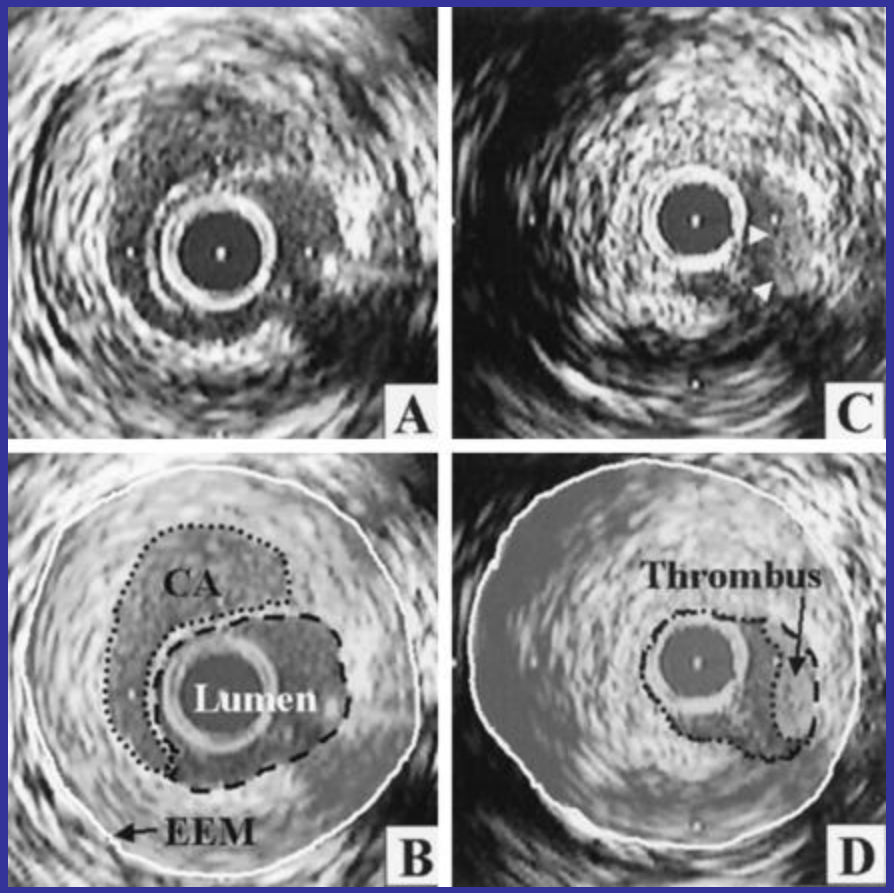
Angiography Cannot Account for Coronary Remodeling







IVUS Image: Ruptured Coronary Plaque



Door to Balloon Time (D2BTime)

- Time from a person entering the ER (Door) to successful angioplasty balloon inflation (Balloon).
- ACC and AHA Goals:
- LakeWest 90 minutes
- Tripoint 120 minutes
- Short D2B times improve survival and quality of life, better heart function

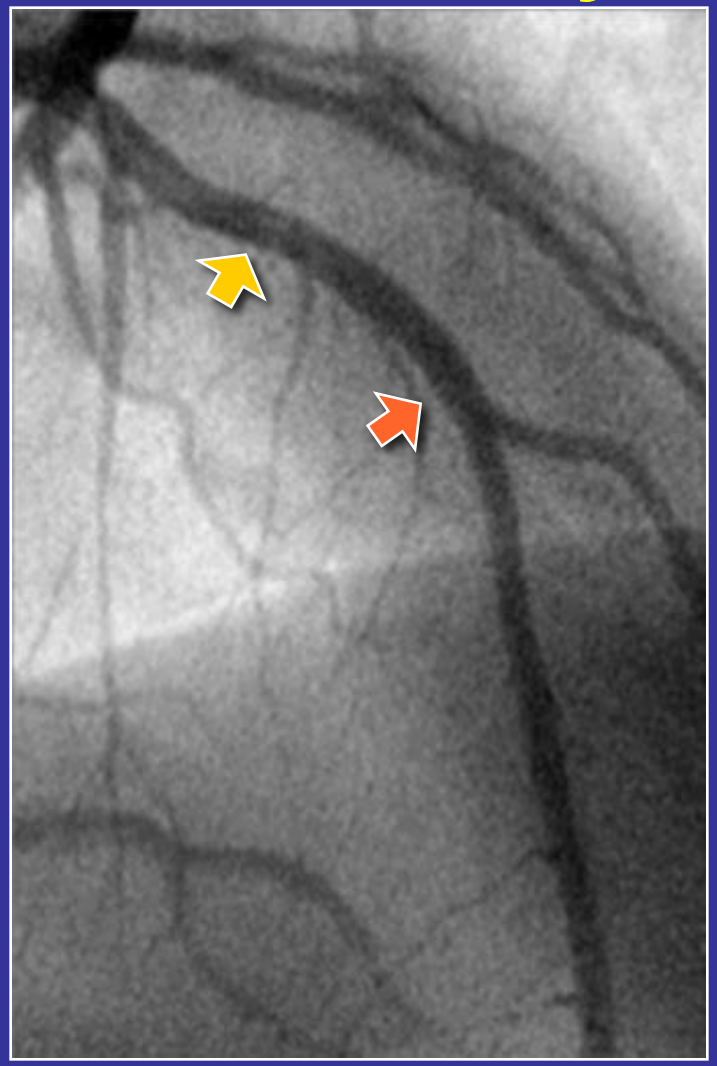
The Story of L.C.

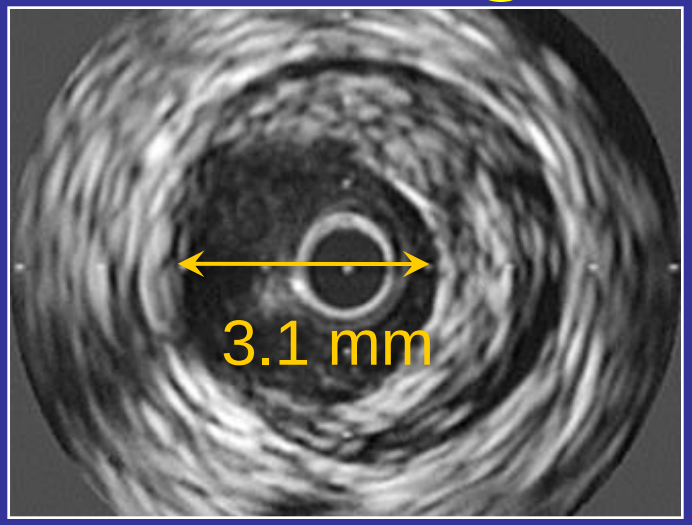
- How Snow covered drives and Loving wives can save a Man's Life
- 62 y/o with prior MI, cardiac arrest, excess body weight, HTN, hyperlipidemia (treated)
- Severe chest pressure and SOB shoveling his driveway, 30 minutes later with ongoing pain, he tells his wife who calls EMS. Then he passes out briefly.

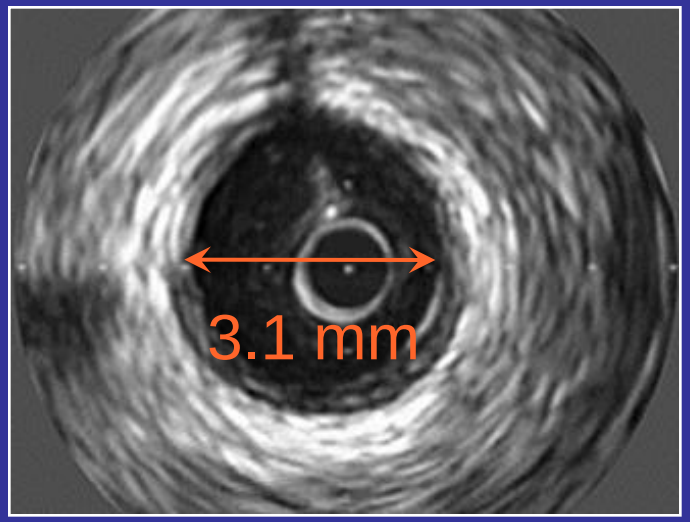
The Story of L.C.

- EMS takes ECG showing ongoing heart attack, transmitted to LakeWest ER.
- ER initiates ‘Code STEMI’ while patient being transported to assemble the cardiac cath lab team, interventional cardiologist, CCU nursing staff.
- Upon ER arrival, drug therapy started and emergent transport to cath lab.

Angiography Cannot Account for Coronary Remodeling







ACS Pharmacology Options

- Aspirin, Plavix or Effient, G2B3A inhibitors, Angiomax
- Heparin or lovenox antithrombins.
- Beta blockers, ACE-I, statins, for plaque stabilization, inflammation reduction, favorable ventricular remodeling

Reperfusion Strategies: Primary PTCA versus Thrombolysis

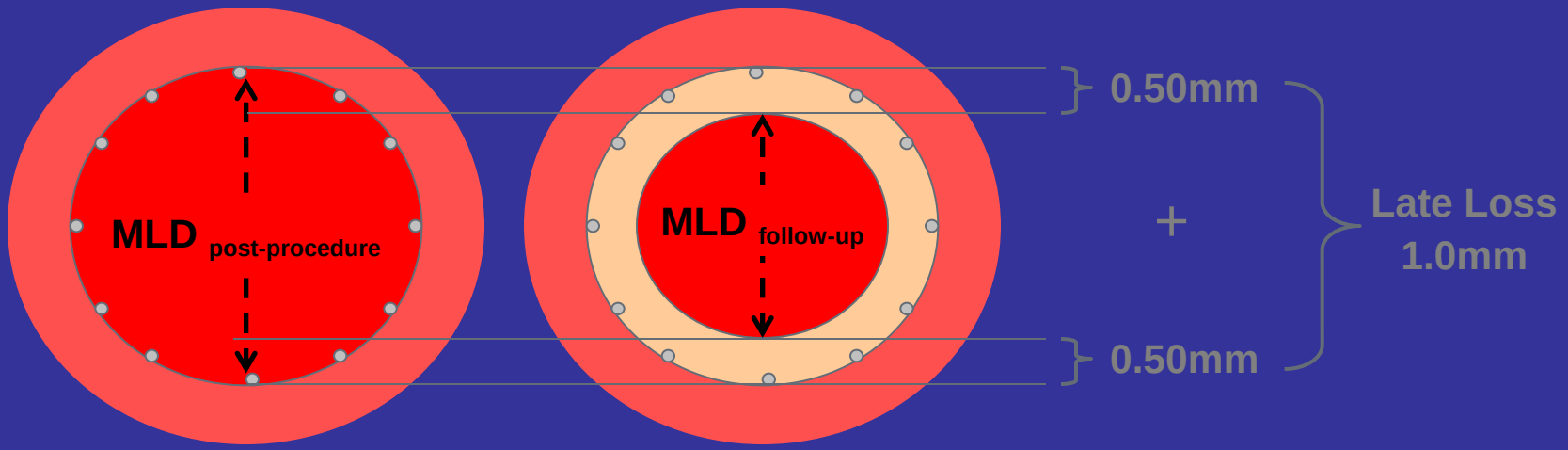
- Normal flow in coronary artery(TIMI 3) is goal of reperfusion-best myocardial salvage
- Thrombolysis restores TIMI 3 flow 54%, with early(10%)/ late(30%) reocclusion.
- Primary PTCA restores TIMI 3 flow 93-97%, and is superior re: death, CVA,reinfarction(GUSTO 2,PAMI)

Coronary Stent Technology

- Stainless steel, cobalt chromium, nitinol scaffolds
- Mounted on PTCA balloon, deployed to vessel size to prevent recoil/flap occlusion
- Restenosis is major shortcoming, coronary lumen renarrowing from smooth muscle cell migration and hypertrophy

Healing
Late Loss in Bare Metal Stents

- Late loss in bare metal stents is typically 1.0mm
- Late loss is thought to be largely comprised of neointima
- Late loss is nearly always a positive number, indicating the lumen decreases in size



Illustrations by Boston Scientific. Images not to scale.

Drug Eluting Stent Technology (DES)

- Revolutionary stents with drug and polymer coatings
- Inhibit restenosis, esp. in diabetics, long lesions, small vessels
- 2 FDA approved DES types in US:
- Sirolimus
- Paclitaxel
- Future: multiple stents and coatings

L.C. and the Rest of the Story

D2B Time 66 minutes.

Echo shows small amount of damage with overall normal heart function.

Medications optimized.

Cardiac rehab and wellness referrals.

Recommend: Leave the snow on your drive, Take your wife to dinner weekly.

Major Cardiovascular Risk Factors

- Age
- Gender
- Smoking
- Diabetes
- High LDL
- Low HDL
- Obesity
- Sedentary lifestyle
- HTN(140/90) or treated
- Family history premature CVD(F<65,M<55)

Features of ATP III : Aggressive Treatment Guidelines

Modification of Lipid and Lipoprotein Classification

- LDL cholesterol <70-80 mg/dL—optimal
- HDL cholesterol >40 mg/dL
  - Categorical risk factor
  - Raised from >35 mg/dL
- Lower triglyceride classification cut points (<150)
  - More attention to moderate elevations

10 Points to Remember on the Treatment of Blood Cholesterol to Reduce Atherosclerotic Cardiovascular Risk in Adults

Summary Prepared by Melvyn Rubenfire, MD

Point 1

The 2013 ACC/AHA Expert Panel included all 16 members of the National Heart, Lung, and Blood Institute Adult Treatment Panel (ATP) IV, and the document review included 23 expert reviewers and representatives of federal agencies. The expert panel recommendations arose from careful consideration of an extensive body of higher quality evidence derived from randomized controlled trials (RCTs), and systematic reviews and meta-analyses of RCTs.

Point 2

Through a rigorous process, four groups of individuals were identified for whom an extensive body of RCT evidence demonstrated a reduction in atherosclerotic cardiovascular disease (ASCVD) events (including coronary heart disease [CHD], cardiovascular deaths, and fatal and nonfatal strokes) with a good margin of safety from statin therapy:

Point 2 (cont.)

Four Statin Benefit Groups:

- Individuals with clinical ASCVD (acute coronary syndromes, or a history of MI, stable or unstable angina, coronary or other arterial revascularization, stroke, TIA, or peripheral arterial disease presumed to be of atherosclerotic origin) without New York Heart Association (NYHA) class II-IV heart failure or receiving hemodialysis.
- Individuals with primary elevations of low-density lipoprotein cholesterol (LDL-C) ≥190 mg/dl.
- Individuals 40-75 years of age with diabetes, and LDL-C 70-189 mg/dl without clinical ASCVD.
- Individuals without clinical ASCVD or diabetes, who are 40-75 years of age with LDL-C 70-189 mg/dl, and have an estimated 10-year ASCVD risk of 7.5% or higher.

Point 3

Individuals in the fourth group can be identified by using the new Pooled Cohort Equations for ASCVD risk prediction, developed by the Risk Assessment Work Group.

Point 4

Lifestyle modification (i.e., adhering to a heart healthy diet, regular exercise habits, avoidance of tobacco products, and maintenance of a healthy weight) remains a critical component of health promotion and ASCVD risk reduction, both prior to and in concert with the use of cholesterol-lowering drug therapies.

1.5% of US adult population follows all 4 lifestyle recommendations.

Sedentary Lifestyle: Major Risk for Cardiovascular Disease

- 50% decrease in MI risk walking 30 minutes daily(1.5 miles): NCEP suggestion
- 80% decrease by vigorous activity 1-2X/wk
- 90% decrease by vigorous activity 3-4X/wk
- 98% decrease by vigorous activity 5>/wk
- Exercise decreases BP and HR, increases HDL,lowers body weight

Point 5

There is no evidence to support continued use of specific LDL-C and/or non–high-density lipoprotein cholesterol (non–HDL-C) treatment targets. The appropriate intensity of statin therapy should be used to reduce risk in those most likely to benefit. Nonstatin therapies, whether alone or in addition to statins, do not provide acceptable ASCVD risk reduction benefits compared to their potential for adverse effects in the routine prevention of ASCVD.

Point 6

This guideline recommends use of the new Pooled Cohort Equations to estimate 10-year ASCVD risk in both white and black men and women. By more accurately identifying higher risk individuals for statin therapy, the guideline focuses statin therapy on those most likely to benefit. It also indicates, based on RCT data, those high-risk groups that may not benefit.

Point 7

No recommendations are made to inform treatment decisions in selected individuals who are not included in the four statin benefit groups. In these individuals whose 10-year risk is <7.5% or when the decision is unclear, other factors including family history of premature ASCVD, LDL-C >160 mg/dl, high-sensitivity C-reactive protein ≥2 mg/dl, coronary calcium score ≥300 Agatston units or ≥75th percentile for age, sex, ethnicity, and ankle-brachial index <0.9, or elevated lifetime risk of ASCVD may be used to enhance the treatment decision making.

Point 8

High-intensity statin therapy is defined as a daily dose that lowers LDL-C by ≥50% and moderate-intensity by 30% to <50%. All patients with ASCVD who are age ≤75 years, as well as patients >75 years, should receive high-intensity statin therapy; or if not a candidate for high-intensity, should receive moderate-intensity statin therapy.

Point 9

Those with an LDL-C ≥190 mg/dl should receive high-intensity or moderate-intensity statin therapy, if not a candidate for high-intensity statin therapy. Addition of other cholesterol-lowering agents can be considered to further lower LDL-C. Diabetics with a 10-year ASCVD ≥7.5% should receive high-intensity statins and <7.5% moderate-intensity statin therapy. Persons 40-75 years with a ≥7.5% 10-year ASCVD risk should receive moderate- to high-intensity statin therapy.

Point 10

The following are no longer considered appropriate strategies: treat to target, lower is best**.** The new GL recommends**:** treat to level of ASCVD risk, based upon **estimated 10-year or** lifetime risk of ASCVD. The guidelines provided no recommendations for initiating or discontinuing statins in NYHA class II-IV ischemic systolic heart failure patients or those on maintenance hemodialysis.

Perspective

In primary prevention, the cholesterol guidelines recommend not only the risk calculation, but also the physician–patient review of the risk and the decision to take a statin. It is important to realize that the ASCVD risk calculator is heavily influenced by age. A 65-year-old man and a 71-year-old woman with optimal risk factors have a >7.5% 10-year risk. This is where physician judgment, statin safety issues, and a consideration of patient preferences can inform this decision. Prescription of a statin is not automatic, but part of a comprehensive approach to risk reduction that begins with the use of the ASCVD risk calculator and with the assumption that the physician is addressing each of the modifiable risk factors.

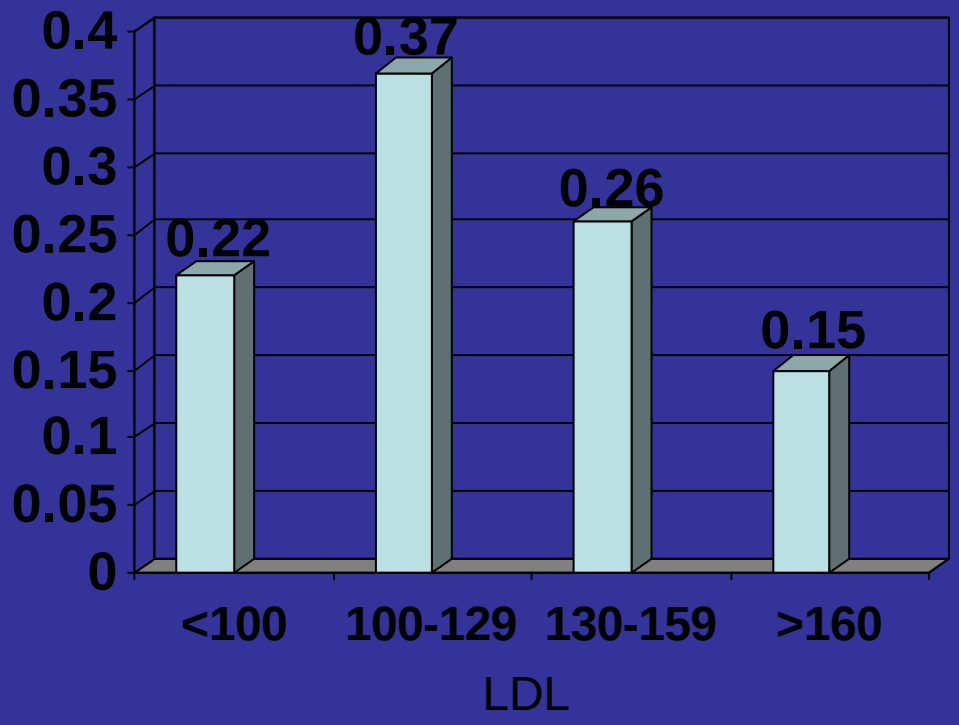
Limitations of Conventional Risk Factor Assessment

1. Framingham or Reynolds scores are global risk scores and their use to guide statin therapy is controversial. Influenced strongly by age, smoking, HTN.
2. Risk scores are best for guiding risk reduction by eliminating treatable risks.
3. RCTs have shown clear benefits for statin therapy in populations with elevated LDL, low HDL, and elevated CRP(inflammation).
4. Hemodialysis and CHF populations: no statin benefit

Preventing Myocardial Infarction in the Young Adult Akosah,JACC 2003

- 222pts: Men≤55 Women≤65
- Age 50 ± 7 75% Men 25% Women
- Framingham risk with lipids assessed in all patients with first, unheralded MI

Need for Drug Therapy in Younger Adults with First MI by NCEP III Guidelines



Multislice CT (MSCT) or CTA

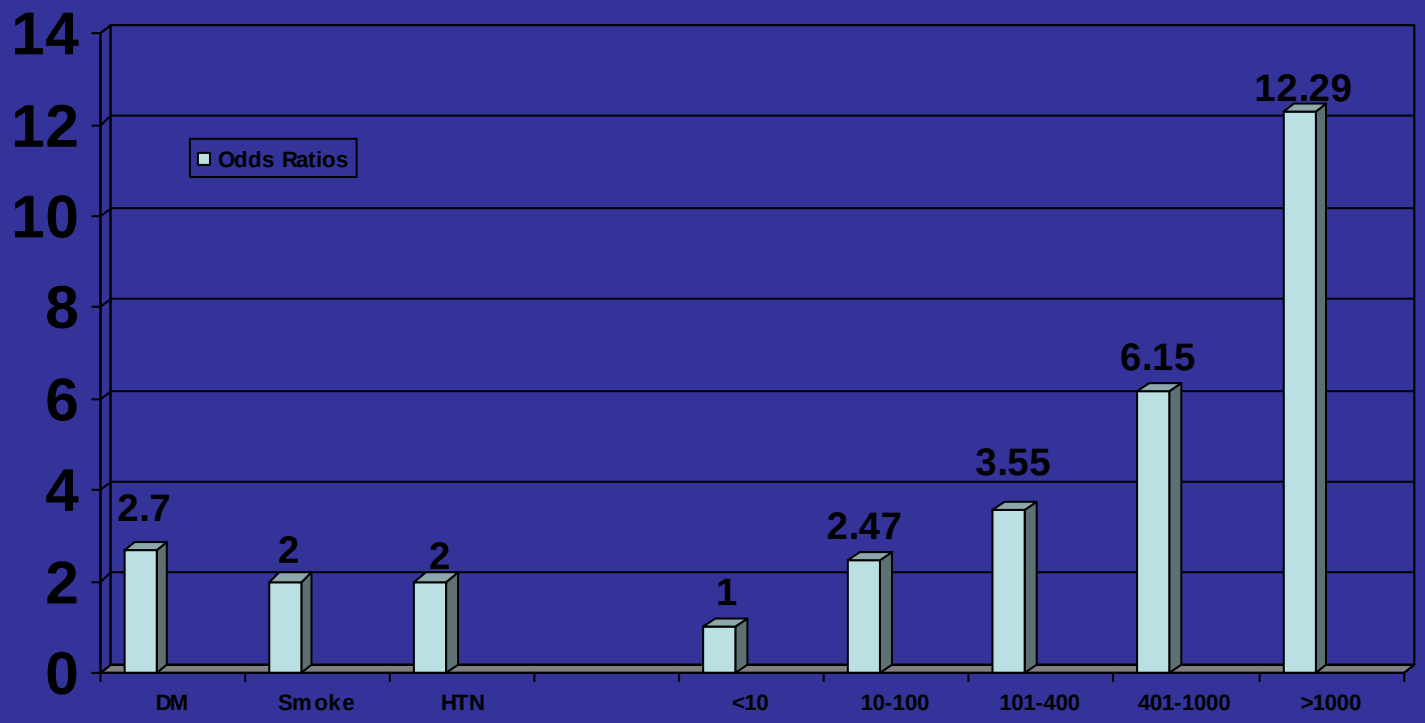
1. CTA shows both arterial lumen and presence of calcified and noncalcified plaque.

2. Coronary calcium scoring by CT indicates atherosclerotic plaque, and quantity of calcification is strong predictor (independent of conventional CAD risk factors) for coronary events.

3. Plaque characterization and Ca^{2+} detection allows identification of patients for aggressive lipid lowering before future cardiac events occur.

Temporal Resolution

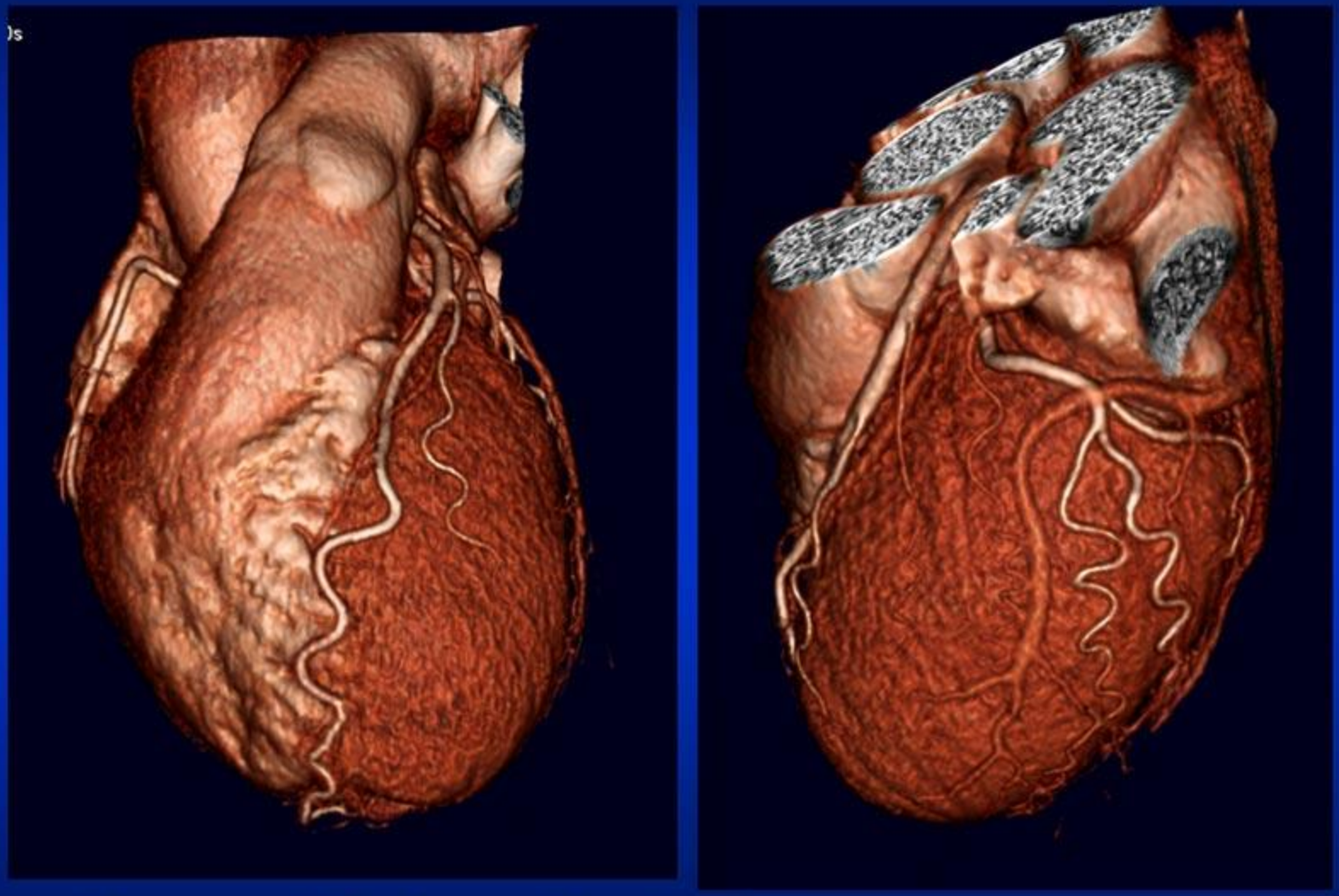
All Cause Mortality in Pts Without Known CAD



Calcium Score

CORE 64

LAD and LCX



Courtesy of : M. Dewey, Charite, Germany

Future Trials will Clarify Additional Statin Benefits

"The best thing about the future is that it comes one day at a time."

Abraham Lincoln