Coronary Artery Disease In Older Adults

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FACULTY DISCLOSURE DECLARATION

FINANCIAL OR OTHER RELATIONSHIP(S) DISCLOSURE:

Dr. Chen has indicated that he has not had financial or other relationships with commercial interests, related to this presentation, within the past 12 months.

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Objectives

- Describe the pathophysiology of CAD
- Understand the risk factors and treatment of CAD in older adults
- Understand how the presentation and management of CAD can differ in older adults

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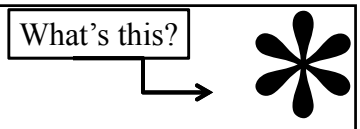
General Points



- The presentation of CAD in older adults can be atypical
- Few patients ≥ 80 y/o included in randomized trials
- Large % of eligible older patients not receiving evidence-based therapy
- Older adults often stand to benefit the most from therapy but also have increased risk from therapies

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Outline

Epidemiology
Manifestations--brief
Risk Factors & Risk Factor Management
Secondary Prevention
Acute Care

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Coronary Artery Disease Epidemiology

- Most preventable CVD; in the U.S. each year:
  - 403,000 deaths, of which 133,000 are due to MI
  - 1.2 million MIs, of which 700,000 are first infarctions
  - An economic burden of $133 billion
- ~16.3 million Americans have documented CHD, and asymptomatic disease is even more prevalent
- Estimated that by 2020, CHD will become the leading cause of death worldwide

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Roger, V. L. et al. Circulation 2011;123:e18-e209

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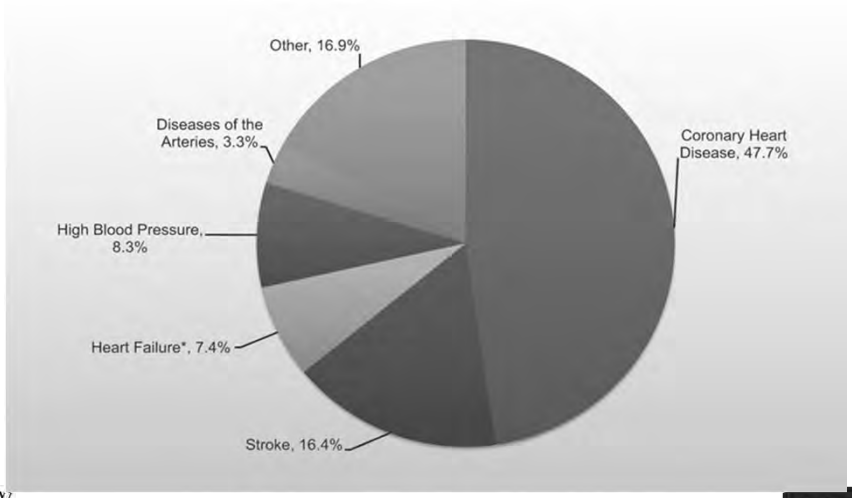
Percentage breakdown of deaths attributable to cardiovascular disease (United States: 2011)



HARBORVIEW American Heart Association.

Dariush Mozaffarian et al. Circulation. 2015;131:e29-e322

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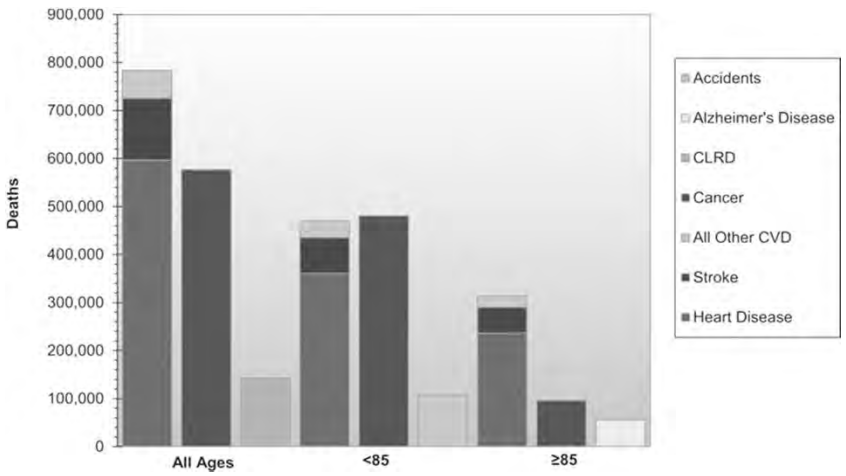
Cardiovascular disease (CVD) and other major causes of death: total, <85 years of age, and ≥85 years of age



HARBORVIEW American Heart Association.

Dariush Mozaffarian et al. Circulation. 2015;131:e29-e322

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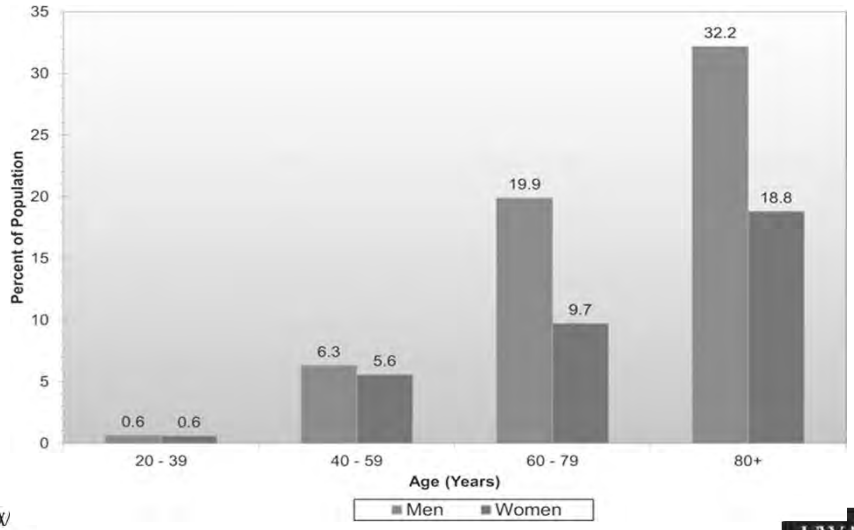
Prevalence of coronary heart disease by age and sex (National Health and Nutrition Examination Survey: '09–'12).



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Dariush Mozaffarian et al. Circulation. 2015;131:e29-e322

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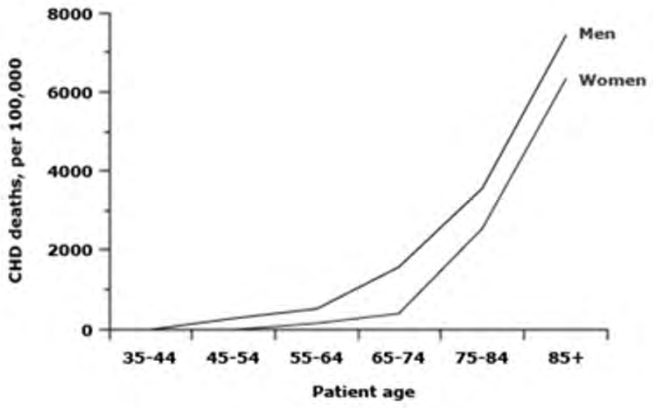
Increase in CAD deaths with age



Death rates from coronary heart disease (CHD) in men and women with increasing age. The mortality rate rises dramatically in the elderly.

Data from Sullivan, JT, Prospect Biol Med 1983; 26:658.

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Coronary Artery Disease

- Atherosclerosis appears early in childhood and correlates with risk factors
- Autopsy studies of trauma victims have demonstrated fatty streaks in coronary atherosclerosis in a high % of young men
- The atherosclerotic process can be greatly slowed by preventive measures

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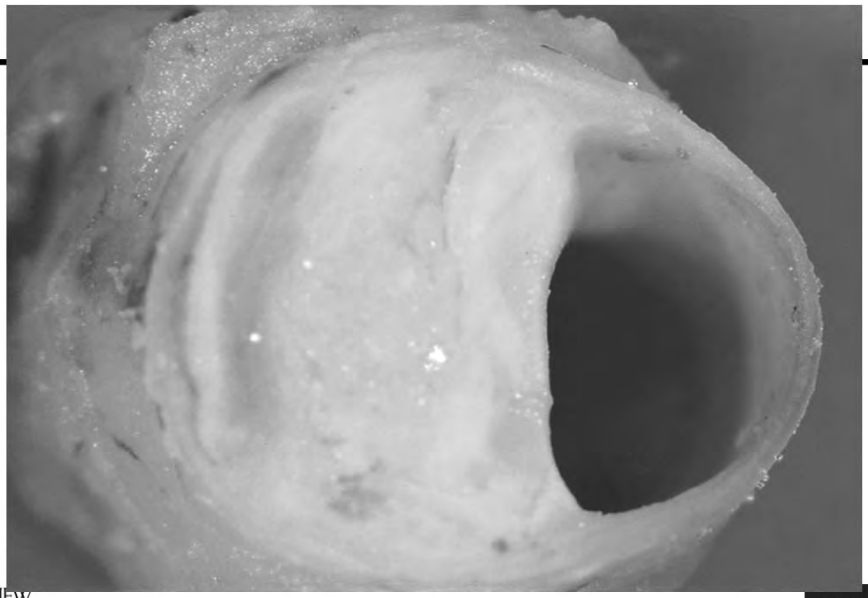

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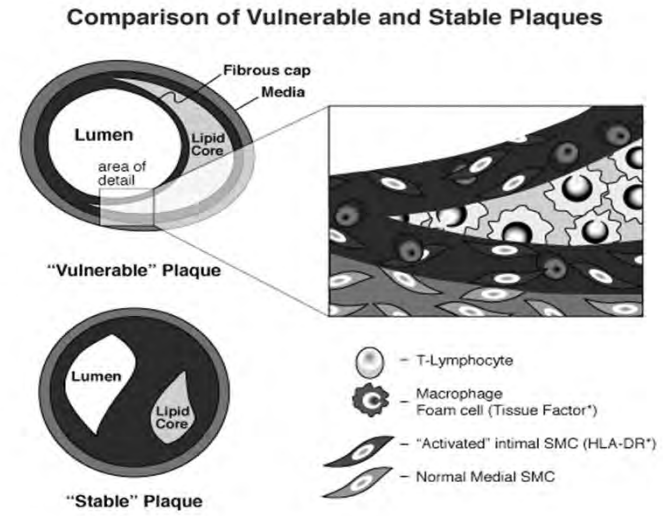
Coronary Artery Disease



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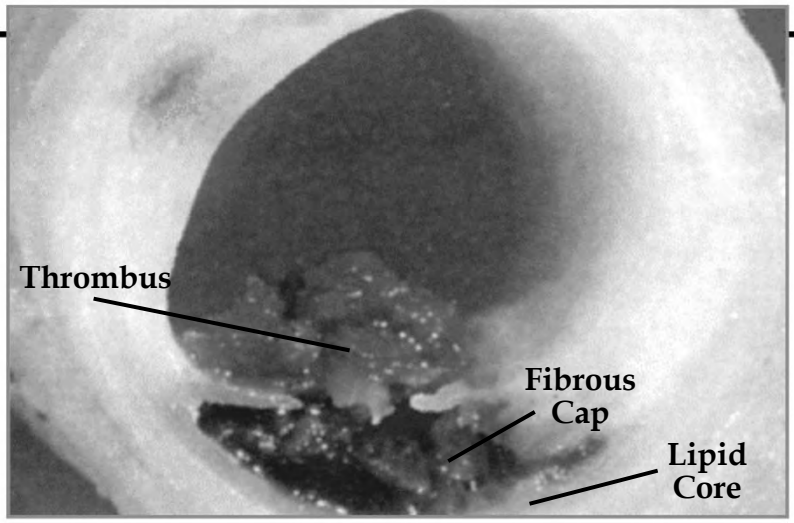

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Coronary Artery Disease
Clinical Manifestations

- **Angina Pectoris**
  - Pressure/Squeezing
  - Exertional
  - Relieved by rest or with nitroglycerin
- **Acute Coronary Syndromes**
  - **Unstable Angina**
    - Accelerating pain/Pain at rest
    - High risk for MI
- **Myocardial Infarction (MI)**
  - **Blood test evidence of myocardial necrosis**
  - **Non-ST elevation MI & ST elevation MI**

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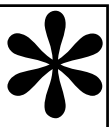
Question



- Which of the risk factors for CAD that has been identified in younger adults is NOT a risk factor in patients ≥ 75 years old?
  a) Hypertension
  b) Dyslipidemia (LDL, HDL, TG)
  c) Diabetes
  d) Cigarette Smoking
  e) Physical Inactivity
  f) Obesity

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Question

- Which of the risk factors for CAD that has been identified in younger adults is NOT a risk factor in patients ≥ 75 years old?
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  c) Diabetes
  d) Cigarette Smoking
  e) Physical Inactivity
  f) Obesity

All are risk factors

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Coronary Artery Disease
Risk Factors

- **Modifiable Risk Factors**
  - Hypertension
  - Dyslipidemia (LDL, HDL, TG)
  - Diabetes
  - Cigarette Smoking
  - Physical Inactivity
  - Obesity
- **Non-modifiable Risk Factors**
  - Family History (1°M<55, F<65)
  - Gender
  - Age (M ≥45, F ≥ 55)
- **Emerging Risk Factors**
  - Homocysteine
  - Inflammatory factors
    - C-reactive protein
    - LP-PLA2
  - Infectious factors

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Hypertension

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HTN & Older Adults

- HTN prevalence ~70% in those ≥ years of age, with a lifetime risk of 90%
- Most prevalent modifiable risk factor with greatest population attributable risk for CAD, Cerebrovascular disease and PAD
- > 70% of older adults with incident MI, stroke, acute aortic syndromes, and heart failure have HTN

Lloyd-Jones DM, et al. JAMA. 2005;294:466; Aronow WS, et al. Circulation. 2011;123:2434; RogerVL, et al. Circulation. 2012;125:e12.

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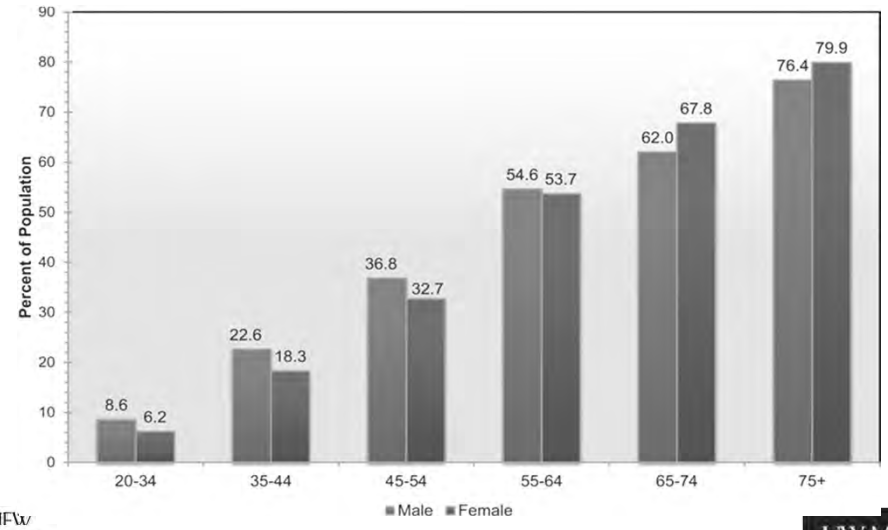
Prevalence of high blood pressure in adults ≥20 years of age by age and sex (NHANES Survey: 2007–2012)



HARBORVIEW American Heart Association. **Dariush Mozaffarian et al. Circulation. 2015;131:e29-e322**

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HTN & CVD Risk

- HTN prevalence: About 1/3 of adults
  - ~ 68 million people in the U. S.
- The BP relationship to risk of CVD is continuous, consistent, and independent of other risk factors
- Each increase of 20/10 mmHg doubles the risk of CV disease across the entire BP range starting from 115/75 mmHg

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CDC. Vital signs. *MMWR*. 2011;60(4):103-8. Lewington S, et al. Lancet. 2002;360:1903–1913.

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Benefits of Lowering BP

	Average % Reduction
Stroke incidence	35–40%
Myocardial infarction	20–25%
Heart failure	50%

In the HYVET trial of 3845 ≥ 80 y, with SBP ≥ 160mmHg, treatment was associated with:

39% decrease in fatal stroke
21% decrease in all cause mortality
64% decrease in heart failure

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Beckett NS. *NEJM*. 2008;358:1887.

Blood Pressure--Ranges

a. <120/80 is "normal" BP
b. 120-139/80-89 is pre-Hypertension
c. 140-159/90-100 is stage I Hypertension
d. ≥ 160 / ≥ 100 is stage II Hypertension

- JNC 8 guidelines (general population) suggest that for those **≥ 60** years a blood pressure <150/90 is the goal
- AHA/ACC/ASH HTN in CAD guidelines have a goal of <150/80 for those **> 80** y. For younger CAD patients (including 65-79y) the goal is <140/90 (allows for a goal of <130/80 for some younger, esp high risk patients)
- BP goals should be individualized

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JNC 8. JAMA 2014;311:507; Hypertension 2015: doi: 10.1161/HYP0000000000000018

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CDC. Vital signs. *MMWR*. 2011;60(4):103-8. Lewington S, et al. Lancet. 2002;360:1903–1913.

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Benefits of Lifestyle Modifications on Blood Pressure

Modification	Approximate SBP reduction
Weight reduction	5–20 mmHg/10 kg wt loss
Adopt DASH diet	8–14 mmHg
Sodium reduction	2–8 mmHg
Physical activity	4–9 mmHg
Moderation of EtOH consumption	2–4 mmHg

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Anti-HTN therapy for older adults based on comorbidities

Compelling Indication	Initial Therapeutic Choice
Heart failure	Thiazide, β-blocker, ACE inhibitor, angiotensin receptor antagonist, calcium channel blocker, aldosterone antagonist
Previous myocardial infarction	β-Blocker, ACE inhibitor, aldosterone antagonist, angiotensin receptor antagonist
CHD or high-risk CVD	Thiazide, β-blocker, ACE inhibitor, calcium channel blocker
Angina pectoris	β-Blocker, calcium channel blocker
Aortopathy/aortic aneurysm	β-Blocker, angiotensin receptor antagonist, ACE inhibitor, thiazide, calcium channel blocker
Diabetes mellitus	ACE inhibitor, angiotensin receptor antagonist, calcium channel blocker, thiazide, β-blocker
Chronic kidney disease	ACE inhibitor, angiotensin receptor antagonist
Recurrent stroke prevention	Thiazide, ACE inhibitor, angiotensin receptor antagonist, calcium channel blocker
Early dementia	Blood pressure control

Most patients will require combination therapy. ACE indicates angiotensin-converting enzyme; CHD, coronary heart disease; and CVD, cardiovascular disease.
Adapted from Aronow et al[37] with permission. © 2011, American Heart Association, Inc.

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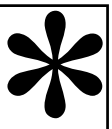
HTN & CVD in Older Adults: Pearls



- Because of physiologic changes in the arteries, systolic HTN in 90% of those >70y
- Older women's HTN is more difficult to control
- Most older adults will require at least 2 agents
- NSAID use & dietary indiscretion (Na^{2+}) can worsen control

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Lloyd-Jones DM, et al. *JAMA*. 2005;294:466.

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Lipids

"You haven't been taking your cholesterol medication, have you Mr. Grosshart?"

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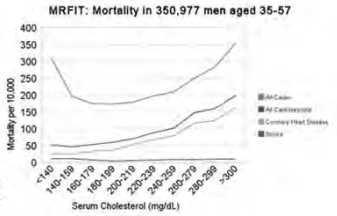
Lipids, CAD and Older Adults

- U shaped association between total cholesterol and total mortality
  - Exaggerated in the elderly



- Reason is an increase in cancer, malnutritic comorbidities
- LDL cholesterol is strongly associated with CAD events in older adults
  - Although relative risk decreases with age, absolute or attributable risk increases

Wong ND, et al. *Ann Intern Med*. 1991;115:687; Lewington S, et al. *Lancet*. 2007;370:1829–1839.

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ATP III Classifications

Total Cholesterol (mg/dL)

<200	Desirable
200 – 239	Borderline
≥240	High

LDL Cholesterol (mg/dL)

<100	Optimal
100 – 129	Near optimal
130 – 159	Borderline
160 – 189	High
≥190	Very High

Triglycerides (mg/dL)

< 150	Normal
150-199	Borderline
200-499	High
500	Very high

HDL (mg/dL)

< 40	Low
>/= 60	High

TC = HDL + LDL + TG/5

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Trial (ref)	Intervention	Age Subgroup (n)	All-Cause Death RRR%/ARR%	CHD Death RRR%/ARR%	CHD Events RRR%/ARR%	Stroke RRR%/ARR%	Comment
4S[53]	S20-40 vs PL	65–70 (1021)	34/6.2*	43/6.0	34/13.3 33/7.1†	NR	↓CV admissions by 21%
LIPID[54]	P40 vs PL	65–75 (3514)	21/4.5	24/2.9*	26/3.3	12/1.3	
CARE[55]	P40 vs PL	65–75 (1283)	NR	45/4.5	32/9* 39/6.7‡	40/2.9	32% RRR/5.2% ARR for PCI/CABG
HPS[56]	S40 vs PL	70–80 (5806)	NR	NR	18/5.1‡	NR	9.2% ARR in primary end point in patients 75–80 y (n=1263)
PROSPER[57]	P40 vs PL	70–82 (5804)	NS	24/0.9	19/2.1‡	NS	25% ↑ cancer risk with P40
PROVE-IT TIMI 22[58]	A80 vs P40	≥70 (634)	NR	NR	40/8 LDL-C < 70 vs LDL-C ≥70 mg/dL (in death/MI/UAP*)	NR	AE rate similar to young
TNT[59]	A80 vs A10	65–75 (3809)	NS	NS	19/2.3* (A80 vs A10)	21/0.9-NS	↑LFTs w A80 vs A10
SAGE[60]	A80 vs P40	65–85 (893)	67/2.7	67/0.9 based on 8 deaths	29/3.1‡ (P=0.11)	Too few to compare	↑LFTs w A80 vs P40
Meta-analysis[61]		65–82 (19569)	22/3.1*	30/2.6	17/2.1‡ 26/2.3 NFMI	25/1.7	30%↓PCI/CABG

A indicates atorvastatin; AE, adverse events; ARR, absolute risk reduction; CABG, coronary artery bypass grafting; CARE, The Cholesterol and Recurrent Events; CHD, coronary heart disease; CV, cardiovascular; HPS, Heart Protection Study; LDL-C, low-density lipoprotein cholesterol; LIPID, Long-Term Intervention with Pravastatin in Ischaemic Disease; LFTs, liver function tests; MI, myocardial infarction; NFMI, nonfatal myocardial infarction; NR, not reported; NS, not significant; P, pravastatin; PCI, percutaneous coronary intervention; PL, placebo; PROSPER, PROspective Study of Pravastatin in the Elderly at Risk; PROVE IT–TIMI 22, Pravastatin or Atorvastatin Evaluation and Infection Therapy–Thrombolysis in Myocardial Infarction 22; S, simvastatin; w, with; RRR, relative risk reduction; SAGE, Study Assessing Goals in the Elderly; TNT, Treating New Targets; and UAP, unstable angina.

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Fleg JL, et al. Circ. 2013;128:1

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Lipids and CAD

- Good evidence for secondary prevention w/ medications to ~85y/o
  - Unless issues of polypharmacy, comorbidity, frailty make treatment seem unwise/unwanted
- RCT data suggest a 1-3 year lag time for benefits for CAD and stroke end points
- Statins also reduce stroke risk and PAD symptoms
- Case series suggest statins can contribute to cognitive dysfunction/memory loss

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Fleg JL, et al. Circ. 2013;128;1; Afilalo J, et al. JACC. 2008;51:37;Baigent C, et al.Lancet. 2010;376:1670.

Adverse Events

- Case series suggest statins can contribute to cognitive dysfunction/memory loss
- Many clinical trials did not find a difference in adverse events in older vs. younger
- Aggressive lipid lowering trials had higher rates of abnormal LFTs
- Muscle abnormalities (from myalgias to rhabdo) are difficult to tease out
  - Often dose related
  - More common in women, small stature/low BMI, use of fibrates, cytochrome p450 agents (lova,simva,atorva), use during surgery, with renal/hepatic dysfunction, fatty liver, hypothyroidism, DM, heavy EtOH use
- Avoid fibrates (esp. Gemfibrozil) + Statins

Roberts CG, et al. J Gerontol A Biol Sci Med Sci.2007;62:879; Tomaszewski M, et al.Pharmacol Rep. 2011;63:859; McKenney JM, et al. Am J Cardiol. 2006;97:89C.

Lipid Management

- Lifestyle modifications
  - Diet, Exercise (including Cardiac Rehab)
- New risk calculator (only up to age 79)
  - http://my.americanheart.org/cvriskcalculator

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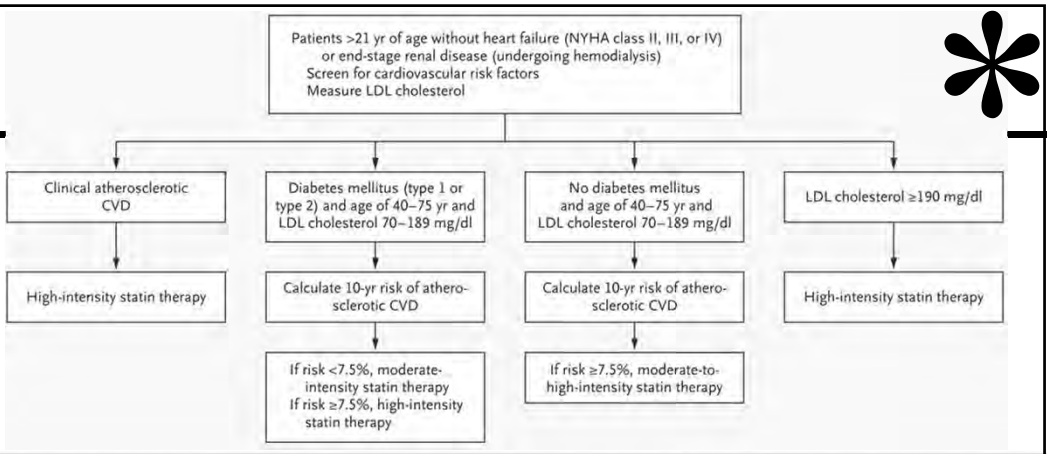

Figure 1. 2013 American College of Cardiology–American Heart Association Guidelines for Use of Statin Therapy in Patients at Increased Cardiovascular Risk.

Persons with clinical atherosclerotic cardiovascular disease (CVD) include those with an acute coronary syndrome and those with a history of myocardial infarction, stable or unstable angina, coronary or other arterial revascularization, or stroke, transient ischemic attack, or peripheral arterial disease that is presumed to be of atherosclerotic origin. High-intensity statin therapy is recommended for most patients meeting these criteria. Patients predisposed to adverse statin effects (including those with impaired renal or hepatic function, other serious coexisting conditions, a history of statin intolerance, concomitant use of drugs affecting statin metabolism, an age of >75 years, or unexplained elevations in alanine aminotransferase levels >3 times the upper limit of the normal range) should use moderate-intensity statin therapy when high-intensity statin therapy would otherwise be recommended. The 10-year risk of atherosclerotic CVD is calculated with the use of the new risk calculator available at http://my.americanheart.org/cvriskcalculator or at http://www.cardiosource.org/science-and-quality/practice-guidelines-and-quality-standards/2013-prevention-guideline-tools.aspx. LDL denotes low-density lipoprotein, and NYHA New York Heart Association.

Keaney JF, et al. NEJM 2014:370:275.

Table 1. **High-Intensity and Moderate-Intensity Statin Therapy, According to 2013 American College of Cardiology–American Heart Association (ACC-AHA) Cholesterol Guidelines.**

High-intensity statin therapy
Daily dose lowers LDL cholesterol level by approximately ≥50% on average
Recommended: atorvastatin, 40 to 80 mg; rosuvastatin, 20 to 40 mg
Moderate-intensity statin therapy
Daily dose lowers LDL cholesterol level by approximately 30 to <50% on average
Recommended: atorvastatin, 10 to 20 mg; rosuvastatin, 5 to 10 mg; simvastatin, 20 to 40 mg; pravastatin, 40 to 80 mg; lovastatin, 40 mg; extended-release fluvastatin, 80 mg; fluvastatin, 40 mg twice a day; pitavastatin, 2 to 4 mg

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Keaney JF, et al. NEJM 2014:370:275.

Diabetes

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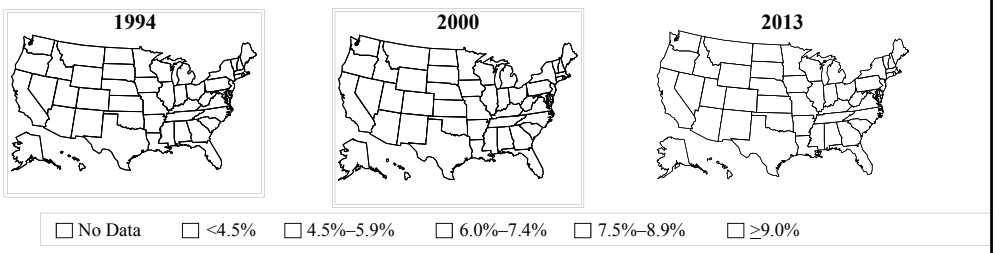
Age-adjusted Prevalence of Diagnosed Diabetes Among US Adults



- > 1/3 of all cases of diagnosed DM in those ≥ 65y
- ~27% (10.9 million) of those ≥ 65y have DM
  - ~15% of those ≥ 65y; +7% undiagnosed

CDC's Division of Diabetes Translation. National Diabetes Surveillance System available at http://www.cdc.gov/diabetes/statistics

Diabetes in Older Adults

- Increasing insulin resistance
  - Especially skeletal muscle, visceral adiposity and higher fat:lean body mass
- Decreasing insulin secretion
  - Low β-cell function
- 30% of older adults with DM have CAD 2x that of non-DM
- Especially high risk, but heterogeneous population, needing individualized care

Scheen AJ. Diabetes Metab. 2005;31(spec no 2):5S27; Røder ME, et al. J Clin Endocrinol Metab. 2000;85:2275; Selvin E, et al. Diabetes Care. 2006;29:2415.

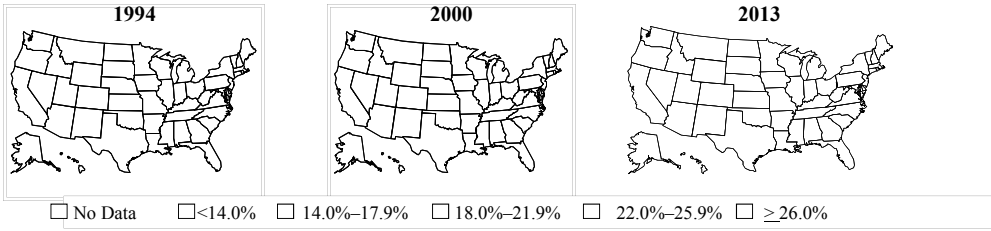
Diabetes in Older Adults--Management

- Lifestyle: weight loss, diet, exercise
- Due to risks associated w/ intensive control, HbA1c target of 7-7.9% for most, especially those w/ comorbidities
  - Even higher in especially frail, short life expectancy
- Medication choices: Renal, hepatic disease, heart failure
  - Metformin favored, then glipizide, repaglinide
  - Insulin: ultra long-acting and very short acting prandials
- Control of concurrent HTN and dyslipidemia is critical

Ismail-Beigi F, et al. Ann Intern Med. 2011;154:554; Lee SJ, et al. J Am Geriatr Soc. 2011;59:666; Soe K, et al. Maturitas. 2011;70:151.

Obesity

Age-adjusted Prevalence of Obesity Among US Adults (BMI ≥ 30kg/m^2)



- > 1/3 of those ≥ 65y and over were obese in 2007–2010
- Obesity prevalence was higher among those aged 65–74 compared with those aged 75 and over in both men and women
- Between 1999–2002 and 2007–2010, the prevalence of obesity among older men increased
- Additionally ~33% overweight (BMI 25-30kg/m^2)
  - So nearly 2/3 of seniors are either overweight or obese

CDC's Division of Diabetes Translation. National Diabetes Surveillance System available at http://www.cdc.gov/diabetes/statistics; Fakhouri THI, et al. HCHS Data brief, Sept. 2012. No. 106:1.

Obesity in Older Adults

- Decreased metabolic rate + eating habits
- Reduced physical activity
- Medications associated with weight gain
  - Hypoglycemic drugs, anti-depressants, steroids
- Obesity also associated with other RF (HTN, HLP, DM)
- Complex association with total mortality, stronger <85y, as well as cardiovascular mortality

Poirier P, et al. Circulation. 2006;113(6):898; Roger VL, et al. Circulation. 2012;125;e12.

Obesity in Older Adults--Management

- Lifestyle: Diet, exercise
- Benefits of weight loss
  - HTN control, dyslipidemia, glucose control
  - Improved physical function, QOL
- Dietary only weight loss risks loss of muscle mass (esp. in Women)
- Exercise, including resistance training should accompany dietary changes
- Maintenance challenging

Beavers KM, et al. Am J Clin Nutr. 2011;94:767; Whelton PK, et al. JAMA. 1998;279:839; Williamson DA, et al. Arch Intern Med. 2009;169:163; Houston DK, et al. Obes Res. 2005;13:1793.

Tobacco

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Smoking & Smoking Cessation

- 8.8% of those ≥ 65y current smokers (about ½ of younger adults)
- ~50% of men and 30% of women are former smokers
- Risk for recurrent CAD and other vascular events
- Quitting reduces
  - Mortality by 36% and nonfatal MI by 32%
  - Sudden death
  - New/recurrent stroke
  - Claudication symptoms
  - Decline in pulmonary function
- Benefits of quitting even in those ≥ 80y

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See next slide for references

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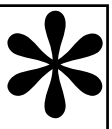
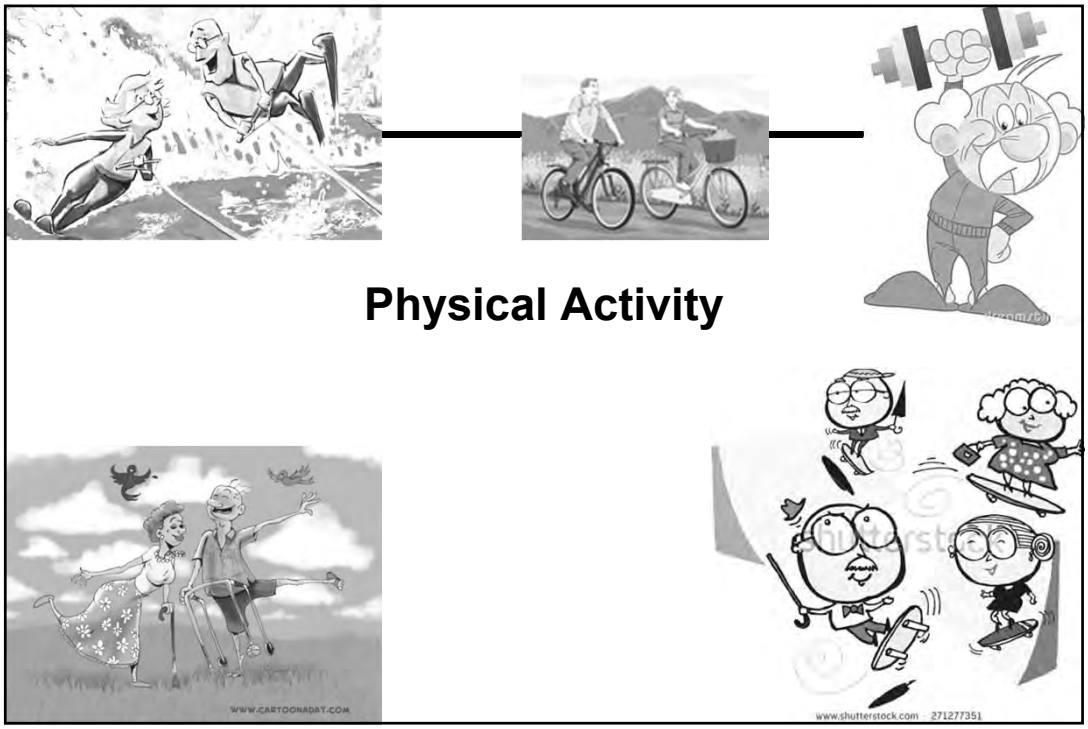
Smoking & Smoking Cessation



- CV risk reduction dramatic in first 1-2 years post quitting
  - Risk of stroke falls to/near a never smoker 2-5 years post quit
- Most effective cessation programs involve structure & group support, and the use of nicotine substitutes and other medications
  - Limited data in very old

CDC. Morbidity and Mortality Weekly Report 2014;63(47):1108; Critchley JA, et al.JAMA. 2003;290:86; Gellert C, et al. Arch Intern Med.2012;172:837; Alvarez LR, et al. Eur J Prev Cardiol. 2013;20:486; Goldenberg I, et al. Arch Intern Med. 2003;163:2301; Lee PN, et al. BMC Med. 2010;8:84.



Physical Activity

- Low rates of regular physical activity in older adults
- Physical activity favorably influences CAD risk factors and improves prognosis in those with disease
- Benefits cognitive function, falls reduction, mental health and QOL
- Combinations of aerobic/endurance type training and strength training may be ideal

Thompson PD, et al.Circ. 2003;107:3109; Physical Activity Guidelines Advisory Committee. Physical Activity Guidelines Committee Report. 2008. Washington, DC: US DHHS; 2008; Audelin MC, et al. J Cardiopulm Rehabil Prev. 2008;28:163.

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Cardiac Rehabilitation

- Systematized multi-modality approach to CV risk reduction
- Usually done after a cardiac event (MI, Stenting, Valve/CABG surgery, Heart transplantation, Angina)
- Phase I, II, III
- Benefits (meta-analysis)
  - 20% reduction in all-cause mortality
  - 25% reduction in cardiac mortality

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Mechanisms of Benefit for Exercise in CHD

Anti-atherosclerotic
Improved lipid profile
Lower BP
Reduced adiposity
↑ Insulin sensitivity
↓ Inflammation

Anti-thrombotic
↓ Platelet adhesiveness
↑ Fibrinolysis
↓ Fibrinogen
↓ Blood viscosity

Anti-ischemic
↓ Myocardial O2 demand
↑ Coronary flow
↓ Endothelial dysfunction

Anti-arrhythmic
↑ Vagal tone
↓ Adrenergic tone
↑ HR Variability

Other benefits
Psychosocial

↑ Exercise Capacity
↑ Skel. Musc. Cap Density
↑ SV, CO, EF

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Cardiac Rehabilitation

- Referral and participation rates low
  - 20% referral rate
  - Medicare participation ~12% of eligible
  - Automated/protocol driven referrals are most effective
- Covered diagnoses
  - Myocardial infarction < 12 months
  - s/p Coronary artery bypass grafting
  - Stable Angina
  - s/p Valve repair or replacement
  - s/p Coronary angioplasty or stenting
  - s/p Heart or heart-lung transplant
  - Stable chronic heart failure

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Acute Coronary Syndromes

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Case Presentation

- 84 y/o woman presents to the ER brought in by her family after experiencing 2 days of nausea and belching. She only informed her family of this on day 2 when she began to also have some left jaw discomfort which was worse when walking around her apartment.

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Case Presentation, continued

- She has a past medical history of hypertension, hyperlipidemia, “borderline” diabetes, osteoarthritis, osteoporosis, recent c/o memory problems.
- On presentation, after 2 sl. NTG, ASA 325mg po and supplemental O2, she reports feeling better with resolved symptoms.

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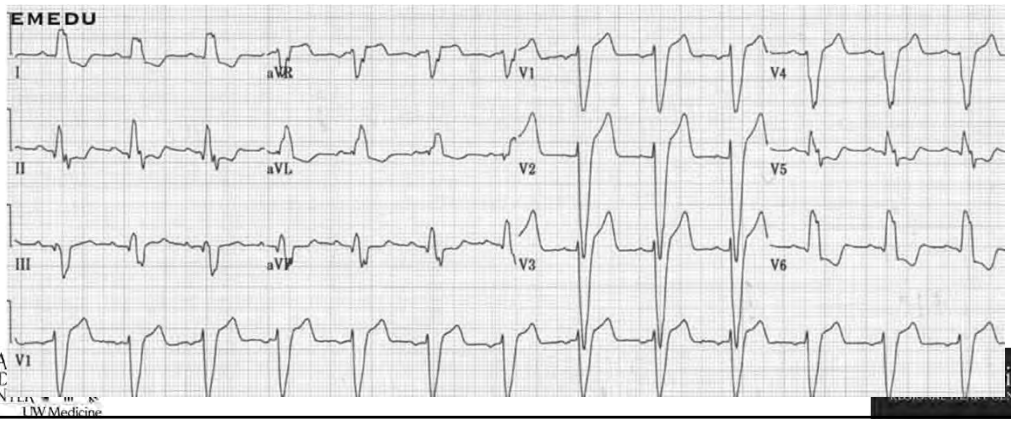
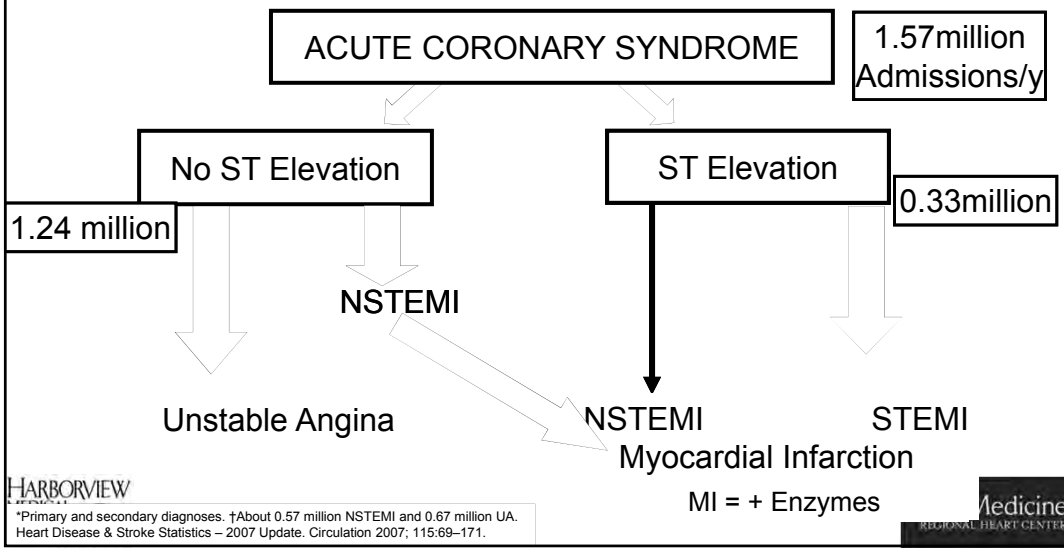
Case Presentation, continued

- Vitals: HR 94 BP 117/66 RR 15 O2sat 98% on 2L NC



Definitions



*Primary and secondary diagnoses. †About 0.57 million NSTEMI and 0.67 million UA.
Heart Disease & Stroke Statistics – 2007 Update. Circulation 2007; 115:69–171.

Case, continued

- Patient brought to Coronary Intensive Care Unit for monitoring
- Echocardiogram
- Treatment included:
  - Aspirin & Plavix
  - Metoprolol
  - Lisinopril
  - Atorvastatin
- Cath discussed but patient declined
  - Counseling regarding smoking cessation
  - Referral to cardiac rehabilitation for further risk factor modification

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CAD in Older Adults

- More calcified, tortuous and multi-vessel CAD
- Higher rates (~25%) of peripheral arterial disease
- More comorbidities
  - Renal dysfunction
- Procedural success rates high
  - E.g. PCI >90% in older adults
  - Complication rates higher (e.g. bleeding, vascular complications)
- Revascularization with PCI or CABG can have benefits
  - MACE, QOL, Anginal class, health status (TIME, COURAGE)
  - Surgical complications: prolonged intubation, inotropic dependence, IABP, afib, bleeding, renal failure, delirium, cognitive dysfunction
    - RF's: Increasing age, DM, low SES, adverse op events
- CABG vs. PCI in those >75 y is not well studied

HARBORVIEW MEDICAL

Pfisterer M et al. Circulation. 2004;110:1213; Boden WE, et al. N Engl J Med. 2007;356:1503.

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Question

- 83 y/o W presents as an urgent visit to her regular PCP's office complaining of dyspnea on exertion that began this morning. HR 90bpm, BP 130/70, 94% on RA. You obtain an ECG which shows 2mm of lateral ST depression. You transfer her to the ER where her troponin is mildly positive, and she is hospitalized for NSTEMI. Identify the true statement:

- A. Left bundle branch block is more common in middle aged than elderly patients
- B. Type II MI ("supply-demand mismatch") is less common in the elderly
- C. Because of an increased risk of catheter related complications, lytics are preferred to cath/percutaneous intervention in the very elderly
- D. In a large database, 77% of pts. <65 y/o had chest pain on presentation but only 40% of those ≥ 85 y/o
- E. In the elderly, STEMI is more common than NSTEMI

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Answer

- 83 y/o W presents as an urgent visit to her regular PCP's office complaining of dyspnea on exertion that began this morning. HR 90bpm, BP 130/70, 94% on RA. You obtain an ECG which shows 2mm of lateral ST depression. You transfer her to the ER where her troponin is mildly positive, and she is hospitalized for NSTEMI. Identify the true statement:

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Epidemiology

- ACS: 35% of all deaths ≥ 65 y in the US
- Among people dying of ischemic heart disease, 83% are > 65y
- 60% of MI related deaths occur in the 6% of population >75y
- Age is a major predictor of mortality in ACS
- Adjusted odds for in-hospital death increases by 70% for each 10-year increase in age

HARBORVIEW

Alexander, K. P. et al. Circulation 2007;115:2549-2569

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ACS—Data/Research

- Many CAD trials have enrolled **no** pts. ≥ 75y
- Data available from
  - Some Randomized trials
  - Large (international) community registries
- Clinical Trials Population vs. Community
  - Younger, more often male, had less: renal dysfunction, HF, CVA. and renal dysfunction, as well as lower presenting HR & BP vs. community
  - Renal dysfunction (Cr ≥2mg/dL): 9% in CRUSADE, 0.6% in VIGOUR trials

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Alexander, K. P. et al. Circulation 2007;115:2549.

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Presentation & Outcomes

- Atypical symptoms common
  - CP in only ~50% of those >85y (vs. 77-90% in <65y)
  - 1° complaint Elderly: 49% Dyspnea, 26% Diaphoresis, 24% N/V, 19% Syncope
  - Silent MIs account > 60% of MIs in those > 85y
- Elderly present later (♀, non-whites, 1st cardiac event)
- LBBB much more common in elderly (33.8% ≥85y; 5% <65y)
- ACS is more likely associated with another condition
  - "Demand Ischemia" or Type II MI
- Atypical presentation→worse prognosis (risk of in-hospital death, 13% vs. 4%)
  - Guidelines: 10-minutes to ECG for sg/sx of MI
    - CRUSADE: Ave 40 min, 7 min longer in ≥ 85y vs. <65y
    - 43% of ≥ 85y had non-diagnostic ECG (vs. 23% <65y)

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Alexander, K. P. et al. Circulation 2007;115:2549.

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Presentation & Outcomes

- Heart failure & Shock rates increase with age
- Free wall rupture in STEMI
  - Elderly who present late and get lytics—17%
- Minor and major bleeding also increased with age
  - Many elderly (>65% in ≥75y) are given doses that are too high (esp. Renally cleared) and this increases bleeding
  - Risk of ICH increased in >75y with STEMI
    - High risk for ICH: >75, W, AA, low BMI (<65kg W; <80kg M), prior CVA, SBP >160, tPA (vs. other agents)

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Alexander, K. P. et al. Circulation 2007;115:2549.

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Therapy-NSTEMI

- Risk-Treatment Paradox
  - Patients at the highest risk are treated less aggressively
  - STEMI reperfusion rates are lower in elderly, even if "ideal"
    - 80,456 Medicare pts. >65, <12h o/w eligible, 74% no RP <6h, 68% never
  - Factors associated with lack of reperfusion
    - Age ≥75y, ♀, no CP, CHF, patient preference, contraindications
- Aspirin
  - Absolute and relative benefits greater in highest risk patients (including elderly)
  - Prescribed less often (GRACE 95% <65y vs. 87% ≥85y)
  - 24% of eligible Medicare patients not on ASA

HARBORVIEW

Alexander, K. P. et al. Circulation 2007;115:2549-2569

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Question

Which of the following is a Class III (Harm) recommendations (LOE B) in the 2014 NSTE-ACS Guidelines section on Medical Therapies in Early Hospital Care?

A) Nitrates should not be administered to patients with NSTE-ACS who recently received a phosphodiesterase inhibitor, especially within 24 hours of sildenafil or vardenafil, or within 48 hours of tadalafil.

B) Nonsteroidal anti-inflammatory drugs (NSAIDs) (except aspirin) should not be initiated and should be discontinued during hospitalization for NSTE-ACS because of the increased risk of MACE associated with their use.

C) Administration of intravenous beta blockers is potentially harmful in patients with NSTE-ACS who have risk factors for shock.

D) Immediate-release nifedipine should not be administered to patients with NSTE-ACS in the absence of beta-blocker therapy.

E) All of the above.

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Correct Answer: E

- ACC/AHA NSTE-ACS Guidelines (2014)
  - Early hospital Care
    - Class III, LOE B: NSAIDs (except ASA) should not be initiated and should be discontinued during hospitalization for NSTE-ACS because of the increased risk of MACE associated with their use.
- Associated with bleeding and CV events post MI
  - Nationwide registry in Denmark, 61,971 patients post 1st MI
  - Risk of bleeding w/ NSAID vs. no NSAID, HR 2.02[95%CI, 1.81-2.26]
  - CV risk increased, HR 1.40 [95%CI, 1.3-1.4]
  - Regardless of anti-thrombotic treatment, type of NSAID, or duration of use

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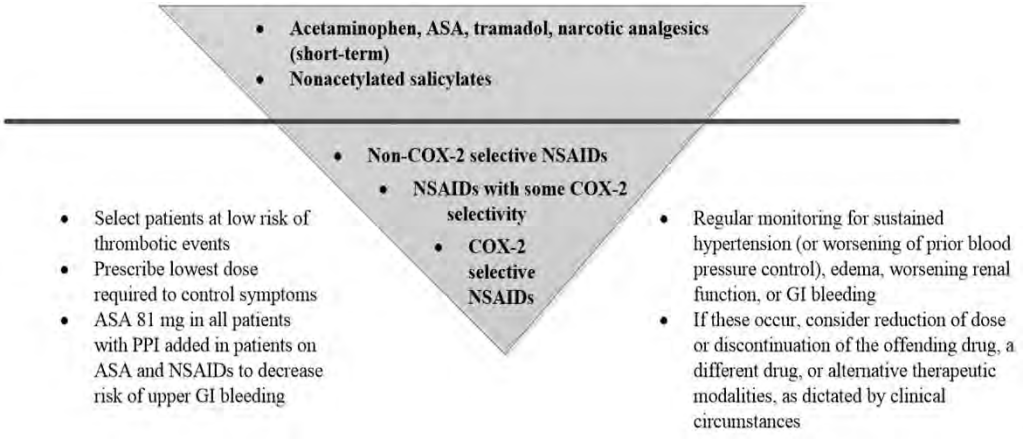
Schjerning Olsen A, et al. JAMA 2015;314(8):805;AHA/ACC 2014 NSTE-ACS Guidelines; McGettigan P, et al. JAMA 2006;296: 1633.

Stepped-Care Approach to Pharmacologic Therapy for MS symptoms in Patients with known CV Disease or risk factors for Ischemic HD



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Antman EM, et al. Circulation 2007;115:1634–42.

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Tailored Care

- Pharmacotherapy in older patients* with MI should be individualized and dose adjusted by weight and/or CrCl to reduce adverse events caused by age-related changes in pharmacokinetics/dynamics, volume of distribution, comorbidities, drug interactions, and increased drug sensitivity.
- Management decisions for older patients* with MI should be patient centered, considering patient preferences/goals, comorbidities, functional and cognitive status, and life expectancy.

*>75y

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Amsterdam EA, et al. J Am Coll Cardiol 2014;64:e139.

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Summary

- The presentation of CAD in older adults can be atypical
- Few patients ≥ 80 y/o included in randomized trials
- Large % of eligible older patients not receiving evidence-based therapy
- Older adults often stand to benefit the most from therapy but also have increased risk from therapies
- Secondary prevention efforts are critical in reducing the burden of CAD on patients

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Key Reference

- Fleg JL, Forman DE, Berra K, Bittner V, Blumenthal JA, Chen MA, Cheng S, Kitzman DW, Maurer MS, Rich MW, Shen WK, Williams MA, Zieman SJ; on behalf of the American Heart Association Committees on Older Populations and Exercise Cardiac Rehabilitation and Prevention of the Council on Clinical Cardiology, Council on Cardiovascular and Stroke Nursing, and Council on Lifestyle and Cardiometabolic Health. Secondary prevention of atherosclerotic cardiovascular disease in older adults: a scientific statement from the American Heart Association. *Circulation*. 2013;128:•••–•••.

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The End

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