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Top 5 Ways to a Long and Healthy Life

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November 18, 2009



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Objectives

- **Be aware of important strategies for preventing cardiovascular disease**
- **Be aware of cardiovascular risk factors and their treatments**



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Prevention

Primary Prevention:

- Prevention of disease in healthy individuals

Secondary Prevention:

- Treatment to stop early, asymptomatic disease from progressing

Tertiary Prevention:

- Treatment to prevent further deterioration or reduce complications after a disease has declared itself



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Top 5 Healthy Habits

1. Maintain a healthy weight (BMI 18.5-29.9)
2. Be physically active
3. Don't smoke
4. Eat at least 5 servings of fruits and vegetables a day
5. Drink alcohol in moderation



Top 5 Risk Reduction Strategies for People with Diabetes

1. Hypertension/blood pressure control
2. Dyslipidemia/lipid management
3. Antiplatelet agents
4. Smoking cessation
5. Coronary heart disease screening and treatment



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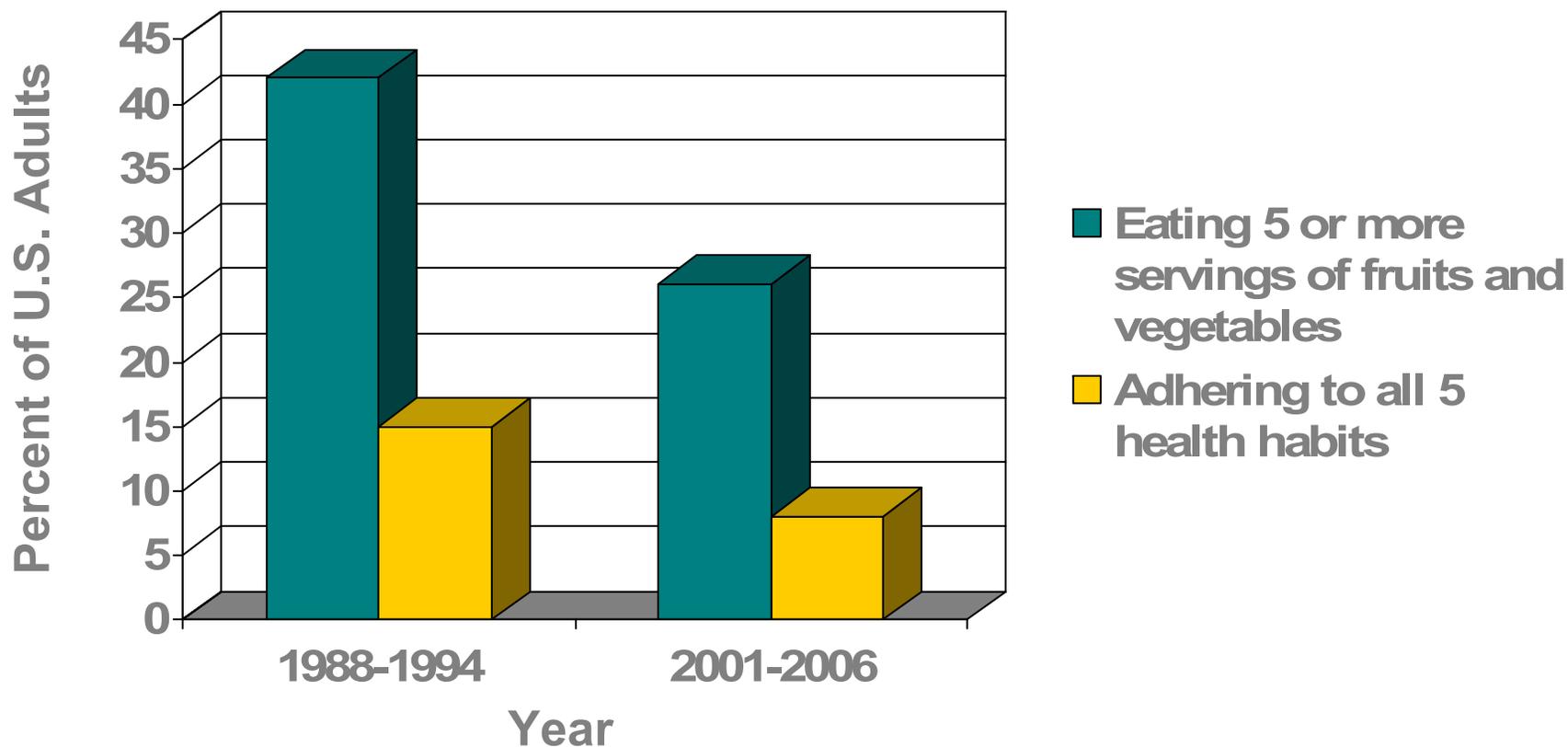
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How Are We Doing?

- Only 8.5% of middle-aged adults practice a healthy lifestyle that includes a diet high in fruits and vegetables, regular exercise, maintenance of a healthy weight (BMI 18.5-29.9), and not smoking
- Only 8.4% newly adopt such a lifestyle past age 45

NHANES Data

NHANES III [1988-1994] compared to NHANES 2001-2006





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Benefits of a Healthy Lifestyle

- **The Healthy Ageing: a Longitudinal study in Europe**
 - Mediterranean diet, moderate alcohol use, physical activity, and nonsmoking were associated with a 65% lower risk of all-cause mortality and a similar reduction in cardiovascular disease.
- **The Health Professionals Follow-Up Study**
 - 62% reduction in coronary events among men who maintained the healthy lifestyle (5 health factors) for 16 years

King DE et al. American Journal of Medicine, 2007



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Benefits of a Healthy Lifestyle

- **Nurses' Health Study**
 - 74% of cardiovascular disease cases, 82% of coronary heart disease cases, and 91% of diabetes cases in women could be prevented by not smoking, engaging in regular physical activity, maintaining a healthy weight, eating healthier food, and drinking moderate amounts of alcohol.



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Benefits of a Healthy Lifestyle

- **Adopting a Healthy Lifestyle in Middle Age**
 - Mortality and cardiovascular disease risk was significantly reduced (40% and 35% respectively) after only 4 years compared to people with less healthy lifestyles.

King DE et al. American Journal of Medicine, 2007

- **Exceptional Longevity in Men**
 - Modifiable healthy behaviors during early elderly years, including smoking abstinence, weight management, blood pressure control, and regular exercise, are associated not only with enhanced life span in men but also with good health and function during older age.

Yates LB et al. Archives of Internal Medicine, 2008



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Weight Categories

	BMI weight (kg) ÷ height (m) ²	Weight range 5'4"	Weight range 5'11"
Underweight	< 18.5	< 108 lbs	< 133 lbs
Normal weight	18.5 to 24.9	108 - 145 lbs	133 - 178 lbs
Overweight	25 to 29.9	146 - 174 lbs	179 - 214 lbs
Obese	≥ 30	≥ 175	≥ 215



Obesity

- People who are obese have a 13% increased mortality from cardiovascular disease compared to people of normal weight

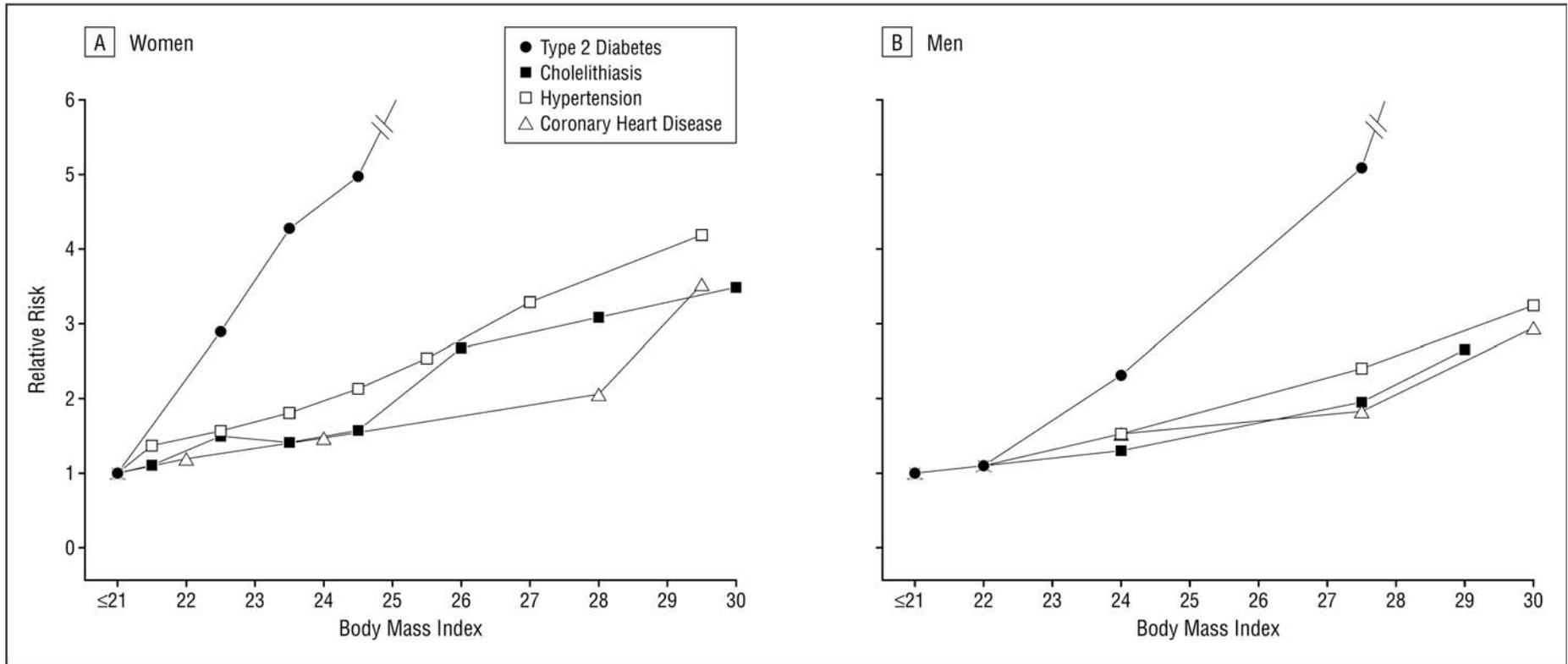


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Obesity

- **Abdominal obesity is an independent risk factor for ischemic stroke in all race/ethnic groups**
- **The odds ratio is three times when the first and fourth quartiles are compared**

Association between BMI & the Relative Risk of Several Diseases



Women in the Nurses' Health Study followed up for 18 years (A) and men in the Health Professionals Follow-up Study followed up for 10 years (B)



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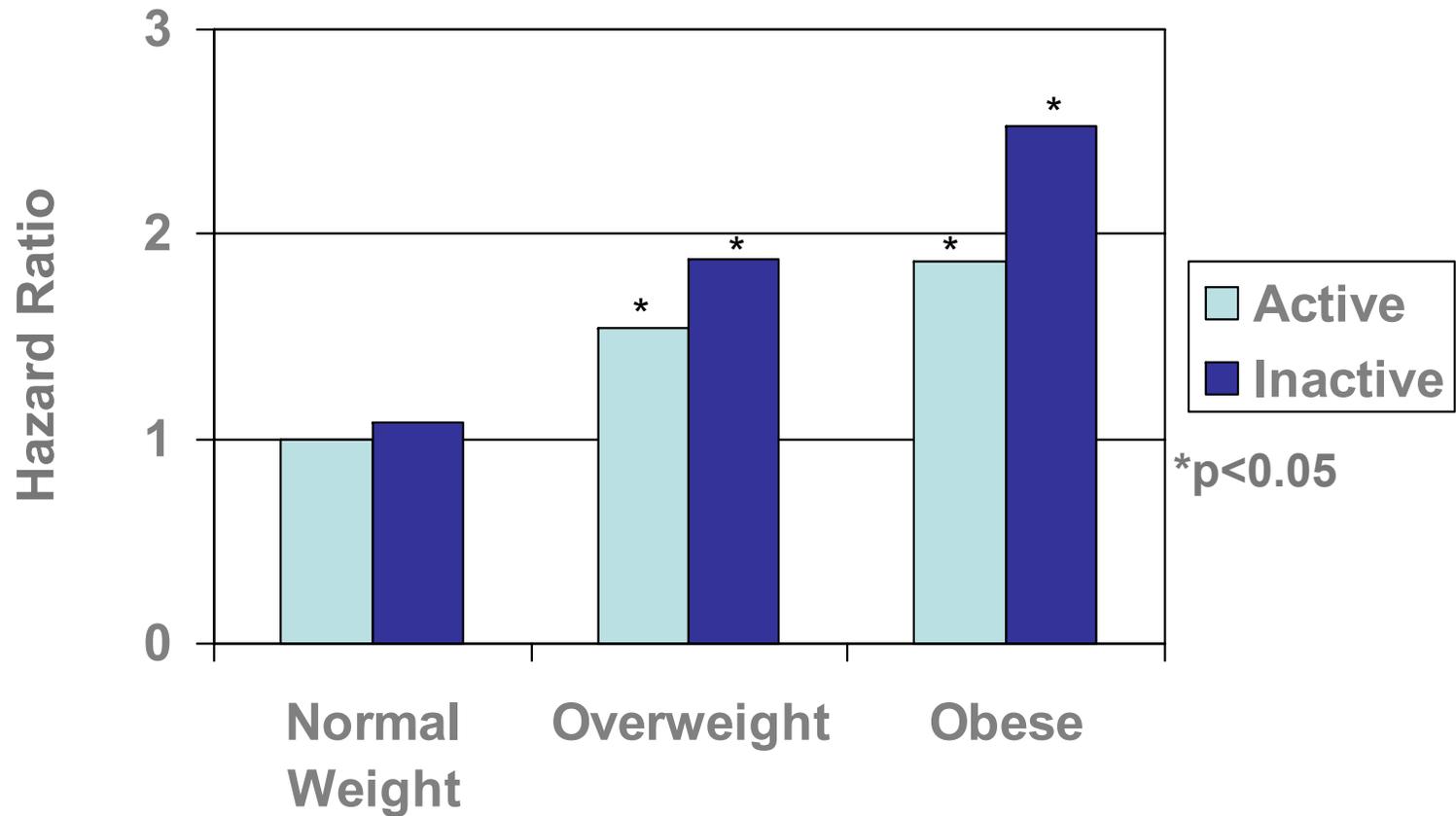


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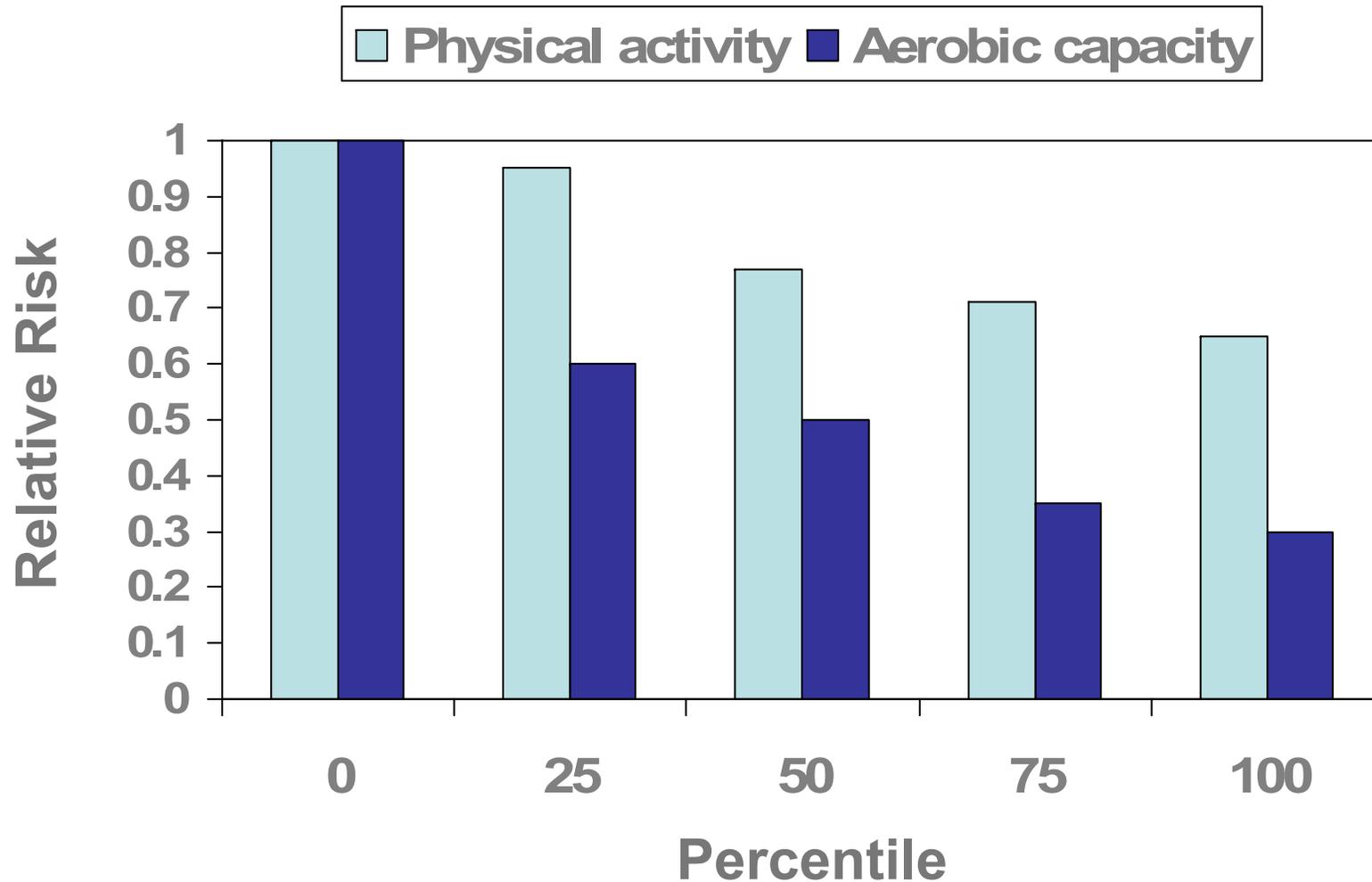
Physical Inactivity

- The relative risk of coronary heart disease associated with physical inactivity ranges from 1.5 to 2.4
- This is comparable to the relative risk for high cholesterol, hypertension, or cigarette smoking
- Moderate intensity physical activity, such as walking, is associated with a substantial reduction in risk of total and ischemic stroke

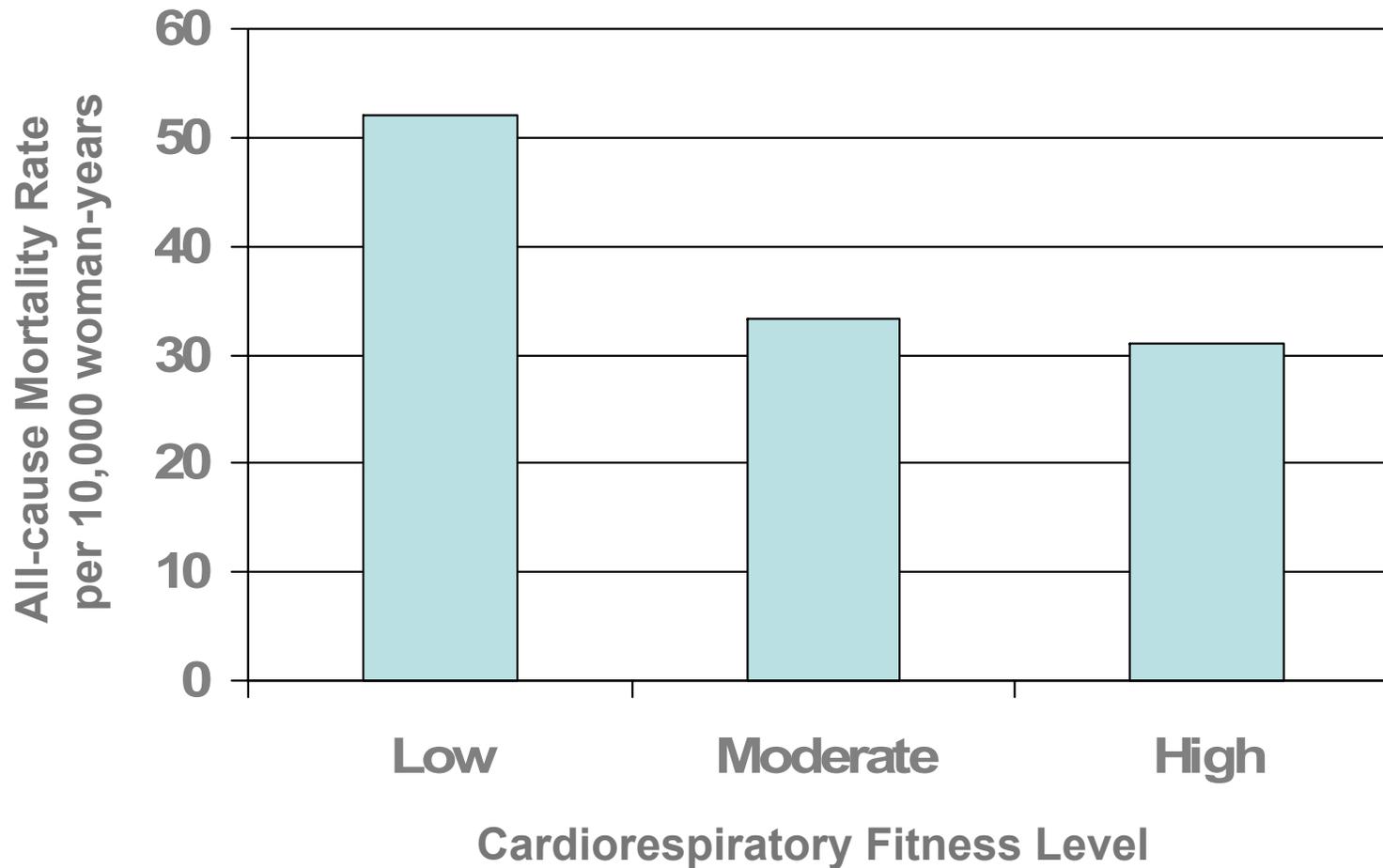
Hazard Ratios of Coronary Heart Disease



Risk of Coronary Heart Disease by Physical Activity & Aerobic Capacity



Cardiorespiratory Fitness and Mortality in Women with Impaired Glucose Metabolism





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Tobacco Use

- **Toxins in the blood from smoking cigarettes contribute to the development of atherosclerosis.**
- **Inflammation of the artery wall and the development of blood clots can obstruct blood flow and cause heart attacks or strokes.**



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Tobacco Use

- Cigarette smoking results in a 2- to 3-fold increased risk of dying of coronary heart disease
- The risk of heart attack rises proportionally with the number of cigarettes smoked up to a risk of 74.6 for those smoking 40 cigarettes per day.
- Smokers are more than 10 times as likely as nonsmokers to develop peripheral vascular disease.
- Cigarette smoking approximately doubles a person's risk for stroke.

Centers for Disease Control



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Tobacco Cessation

- The risk of cardiovascular disease decreases steadily after smoking cessation.
- Former smokers have the same risk as nonsmokers after 5 to 15 years.

Great American Smokeout November 19, 2009

Quitline: 1-800-QUIT-NOW (1-800-784-8669),
www.quitnownm.com





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Fruits & Vegetables

- People who eat generous amounts of fruits and vegetables as part of a healthful diet are likely to have reduced risk of chronic diseases, including stroke and perhaps other cardiovascular diseases, type 2 diabetes, and cancers in certain sites (oral cavity and pharynx, larynx, lung, esophagus, stomach, and colon-rectum)
- Diets rich in foods containing fiber, such as fruits, vegetables, and whole grains, may reduce the risk of coronary heart disease



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Fruits & Vegetables

- Nutrients should come primarily from foods
- Fruits and vegetables contain not only the vitamins and minerals that are often found in supplements, but also other naturally occurring substances that may help protect you from chronic diseases



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Cardiovascular Disease Prevention Strategies

1. Hypertension/blood pressure control
2. Dyslipidemia/lipid management
3. Antiplatelet agents
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Hypertension & Diabetes

- Hypertension affects the majority of people with diabetes and is 1.5 to 3 times more common in people with diabetes than in those who don't have diabetes
- People with diabetes and hypertension have twice the risk of coronary artery disease as those with hypertension but no diabetes
- Hypertension also increases the risk of nephropathy and retinopathy in people with diabetes

Diabetes in America, 1995



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Hypertension & Diabetes

- In type 1 diabetes, hypertension is often the result of underlying nephropathy
- In type 2 diabetes, hypertension usually co-exists with other cardiometabolic risk factors such as obesity and dyslipidemia



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Diagnosis of Hypertension

- Blood pressure should be measured at every routine diabetes visit
- Patients found to have a systolic blood pressure of ≥ 130 mmHg or a diastolic blood pressure of ≥ 80 mmHg should have blood pressure confirmed on a separate day
- Repeat systolic blood pressure of ≥ 130 mmHg or diastolic blood pressure of ≥ 80 mmHg confirms a diagnosis of hypertension.

American Diabetes Association



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Blood Pressure Goal

Systolic Blood Pressure: <130

Diastolic Blood Pressure: <80



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Risks of Hypertension

- **Cardiovascular disease**
 - Heart attack
- **Cerebrovascular disease**
 - Stroke
- **Microvascular disease**
 - Kidney and eye disease
- **Peripheral vascular disease**
 - Circulation in the extremities



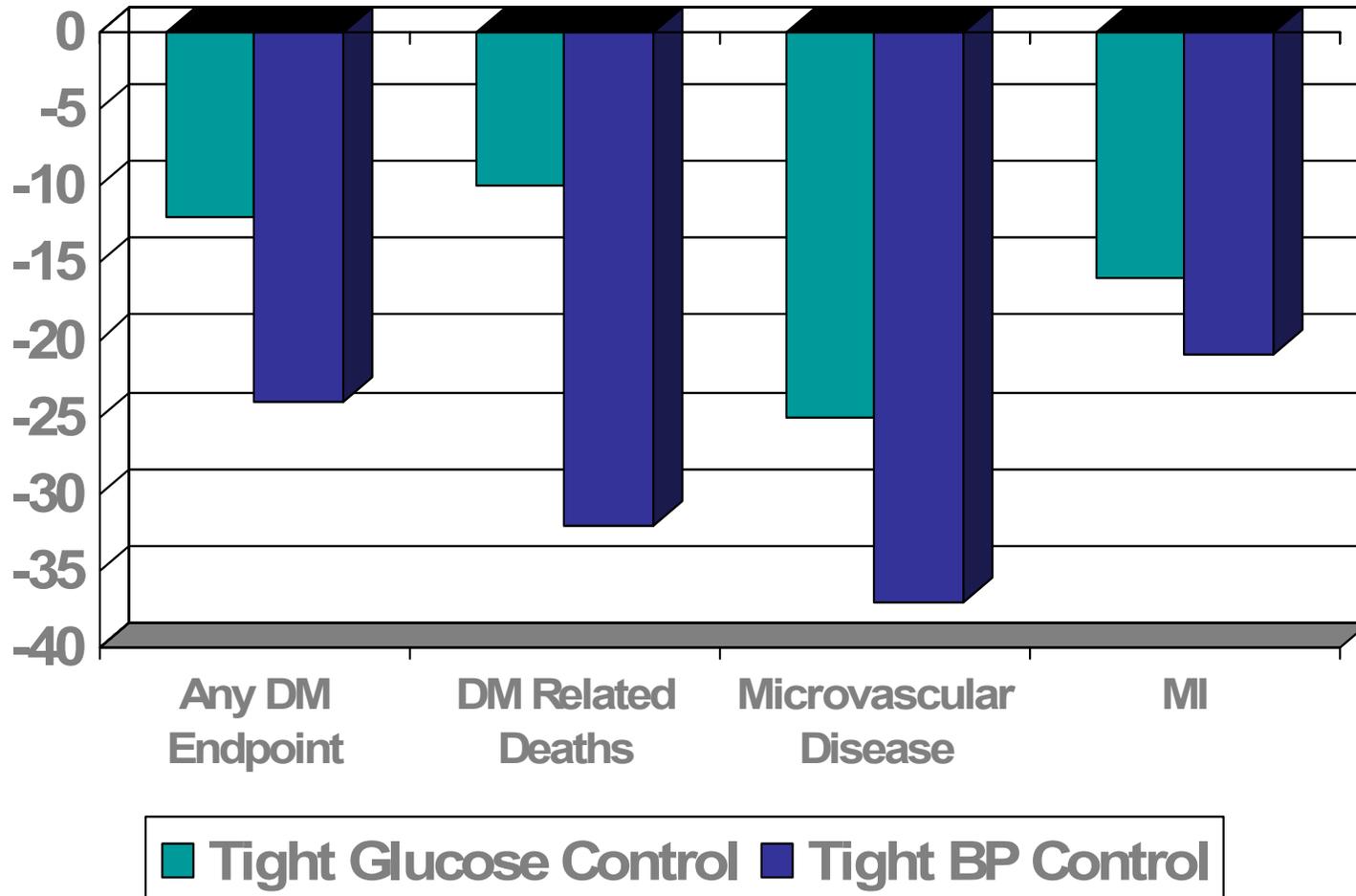
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Blood Pressure Control

- Lowering blood pressure can decrease the risk of stroke by 35-40% and heart attack by 20-25%
- People with diabetes have a greater decrease in risk of heart disease from lowering blood pressure than do people who don't have diabetes
- Lowering blood pressure decreases the risk of microvascular complications

UKPDS 38 BMJ 1998; UKPDS 36, BMJ 2000; HOT Trial, Lancet 1998; SHEP, JAMA 1996, Syst-Eur, NEJM 1999

Glucose vs. Blood Pressure Control



Bakris, Arch Int Med, 2001



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Treatment of Hypertension

- **Lifestyle modification**
 - Smoking cessation
 - Increased physical activity
 - Limitation of alcohol intake
 - Maintenance of a healthy body weight
 - Diet comprised of healthy foods
- **Pharmacotherapy (medications)**

Lifestyle Modification

Modification	Recommendation	Approximate drop in SBP
Weight reduction	Maintain normal body weight	5-10 mmHg/ 10kg weight loss
DASH eating plan	Rich in fruits, vegetables, low fat dairy; reduced saturated & total fat	8-14 mmHg
Less dietary sodium	No more than 2.4 g sodium/day	2-8 mmHg
Physical activity	Aerobic activity for 30 minutes at least 5 days/week	4-9 mmHg
Alcohol in moderation	No more than 2/day for men No more than 1/day for women	2-4 mmHg



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Diet and Blood Pressure

- Several research studies have shown beneficial effects of diets rich in magnesium, potassium, calcium, fiber, and protein
- Studies looking at supplementation of individual nutrients have not shown much improvement in blood pressure



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DASH Clinical Trial

Compared three different diet patterns:

- **Control diet**
 - Typical “American” diet
- **Fruits and vegetables diet**
 - High amount of fiber
 - More fruits and vegetables and fewer snacks and sweets than control diet, but was otherwise similar
- **Combination diet**
 - High amounts of fiber and protein
 - Rich in fruits, vegetables, and low fat dairy foods
 - Reduced amount of saturated fat, total fat, and cholesterol



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DASH Clinical Trial

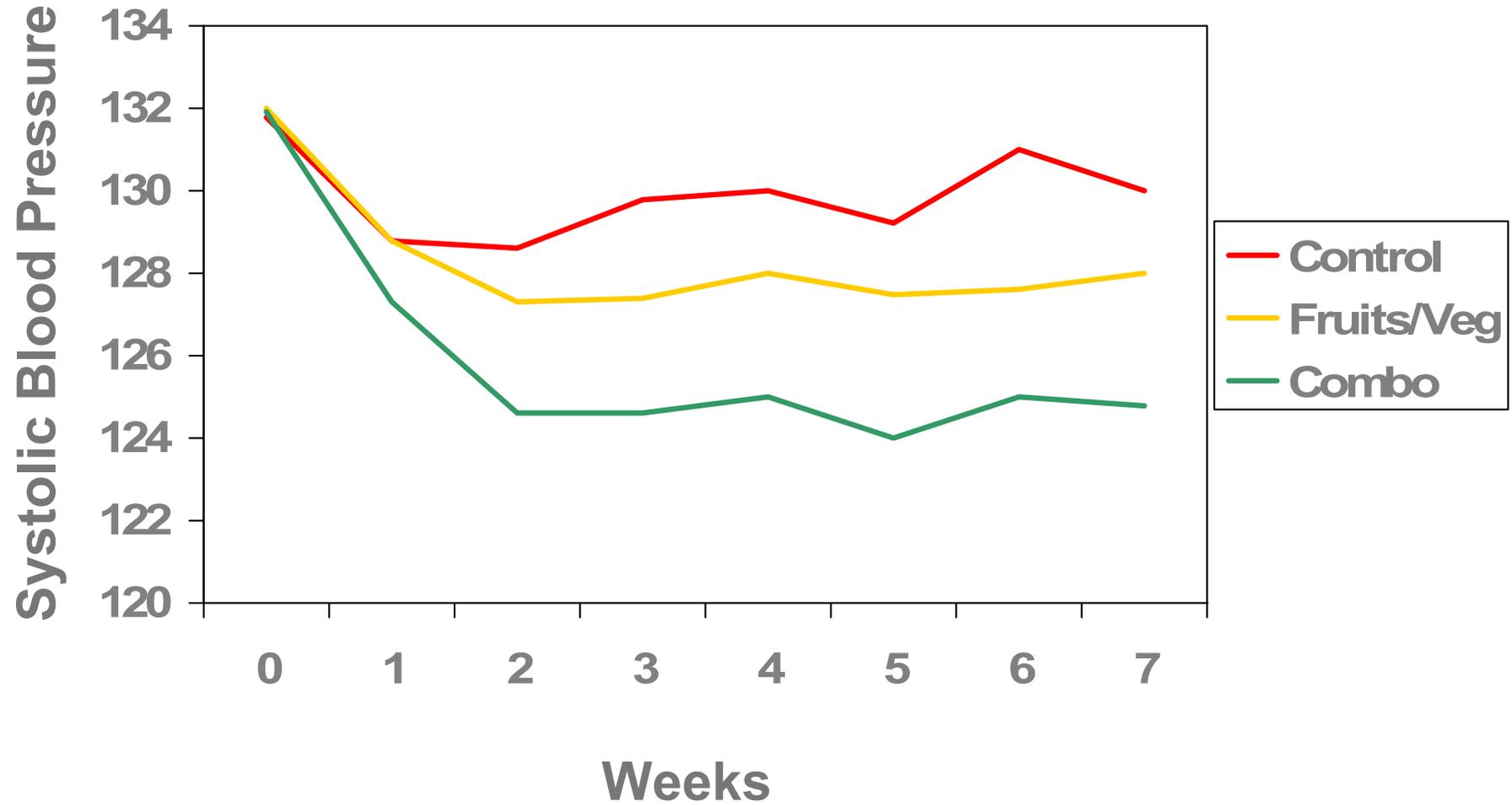
- Study subjects were provided with meals that were prepared in research kitchens
- All diets contained approximately 3 grams sodium per day
- Each subject was given the appropriate calories to maintain weight and diet was adjusted for weight loss or weight gain

DASH Clinical Trial Results

(Change in SBP/Change in DBP)

Category	Combo – Control	Combo – Fruits/Veg	Fruits/Veg – Control
All subjects	-5.5/-3.0	-2.7/-1.9	-2.8/-1.1
Men	-4.9/-3.3	-1.6/-1.3	-3.3/-2.0
Women	-6.2/-2.7	-3.9/-2.5	-2.3/-0.2
HTN	-11.4/-5.5	-4.1/-2.6	-7.2/-2.8
No HTN	-3.5/-2.1	-2.7/-1.8	-0.8/-0.3

DASH Clinical Trial Results





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Pharmacotherapy

- People with diabetes often require 2-4 antihypertensive medications to meet blood pressure goals
- Low dose combination therapy may provide more benefit than high dose monotherapy

Bakris, Arch Int Med, 2001



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Cardiovascular Disease Prevention Strategies

1. Hypertension/blood pressure control
2. **Dyslipidemia/lipid management**
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Lipid Management

- People with type 2 diabetes have an increased prevalence of lipid abnormalities, contributing to their high risk of CVD
- Lipid abnormalities in type 1 diabetes appear to be related to weight

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Association Between BMI & Total Cholesterol in People With Type 1 Diabetes



* P<0.0001 compared to <23 and 23-25

Rai et al. Endocrine Journal 2008



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Diagnosis of Dyslipidemia

- In most adults with diabetes, a fasting lipid profile should be measured annually
- In adults with low-risk lipid values (LDL cholesterol <100 mg/dl, HDL cholesterol >50 mg/dl, and triglycerides <150 mg/dl), lipid assessments may be repeated every 2 years

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Lipid Goals

Lipid		Goal
LDL	Without overt CVD	<100mg/dL
	With overt CVD	<70mg/dL (optional)
HDL	Men	>40mg/dL
	Women	>50mg/dL
Triglycerides		<150mg/dL

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Lipid Goals

- If drug-treated patients do not reach the above targets on maximal tolerated statin therapy, a reduction in LDL cholesterol of approximately 30–40% from baseline is an alternative therapeutic goal



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Lipid Management

- People with diabetes and CVD benefit from lipid lowering with statin therapy
- People with diabetes and no CVD benefit from lipid lowering with statin therapy irrespective of their initial cholesterol concentrations

Scandinavian Simvastatin Survival Study 1997, CARE 1998, Heart Protection Study 2003, Treating to New Targets 2006



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Lipid Improvement Strategies

- **Lifestyle modification:**
 - Reduced saturated fat intake
 - Limited (if any) trans fat intake
 - Weight loss
 - Increased physical activity
- **Pharmacotherapy (medications)**

Therapeutic Lifestyle Changes (TLC) Diet

Nutrient	Recommended Intake (% Total Calories)
Total fat	25-35%
Saturated	Less than 7%
Polyunsaturated	Up to 10%
Monounsaturated	Up to 20%
Carbohydrate	50-60% mainly from foods rich in complex carbohydrates such as whole grains, fruits, and vegetables
Protein	Approximately 15%
Cholesterol	<200 mg per day
Total Calories	Balance intake and expenditure to maintain a healthy weight and prevent weight gain



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Lipid Lowering Strategies

- **Statin therapy should be added to lifestyle therapy, regardless of baseline lipid levels, for diabetic patients:**
 - with overt cardiovascular disease (CVD)
 - without CVD who are over the age of 40 and have one or more other CVD risk factors
- **For lower-risk patients than the above, statin therapy should be considered in addition to lifestyle therapy if LDL cholesterol remains above 100 mg/dl or in those with multiple CVD risk factors**



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Aspirin Therapy

- Aspirin should be used for primary prevention in people with type 1 or type 2 diabetes who are over 40 years of age or who have additional CVD risk factors such as family history of CVD, hypertension, smoking, dyslipidemia, or albuminuria
- Aspirin should be used as a secondary prevention strategy in those with diabetes with a history of CVD
- Aspirin therapy is not recommended in people under 30 years of age due to lack of evidence of benefit

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Estimates of Benefits & Harms of Aspirin Given for 5 Years to 1000 People in Each Risk Group

	Baseline Risk for Coronary Heart Disease over 5 Years		
Benefits & Harms	1%	3%	5%
Total mortality	No effect	No effect	No effect
Coronary heart disease events	1-4 avoided	4-12 avoided	6-20 avoided
Hemorrhagic stroke	0-2 caused	0-2 caused	0-2 caused
Major gastrointestinal bleeding events	2-4 caused	2-4 caused	2-4 caused



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Smoking Cessation

- Advise all patients not to smoke
- Include smoking cessation counseling and other forms of treatment as a routine component of diabetes care

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Smoking

Smoking is associated with:

- **Poorer glycemic control**
- **Premature development of nephropathy and neuropathy**
- **Increased risk of morbidity and premature death due to cardiovascular disease**

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Smoking Cessation

- **Stop smoking classes**
 - Offered in community and through health care organizations
 - Care givers and significant others should be encouraged to attend
- **Medications**
 - Effective as adjunct to education for cessation
 - May have side effects/risks in elderly



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5. **Coronary heart disease screening and treatment**



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Coronary Heart Disease Screening

- In asymptomatic patients, evaluate risk factors to stratify patients by 10-year risk, and treat risk factors accordingly
- In all patients with diabetes, cardiovascular risk factors should be assessed at least annually. These risk factors include dyslipidemia, hypertension, smoking, a positive family history of premature coronary disease, and the presence of micro- or macroalbuminuria.

Framingham Risk Calculator

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			
120-129	0 pts			
130-139			1	
140-159				2
>160				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 Caucasian population in Massachusetts, USA

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)

CHD Risk	
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



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Coronary Heart Disease Screening

- **Candidates for cardiac testing include:**
 - Those with typical or atypical cardiac symptoms
 - Those with an abnormal resting electrocardiogram (ECG)



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Coronary Heart Disease Screening

- The screening of asymptomatic patients remains controversial
- Intensive medical therapy indicated in diabetic patients at high risk for CVD has an increasing evidence base for providing equal outcomes to invasive revascularization, including in diabetic patients
- A recent randomized observational trial demonstrated no clinical benefit to routine screening of asymptomatic patients with type 2 diabetes and normal ECGs
 - Despite abnormal myocardial perfusion imaging in more than one in five patients, cardiac outcomes were essentially equal (and very low) in screened versus unscreened patients

American Diabetes Association



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Summary

Stay Healthy & Prevent Coronary Heart Disease

- **Maintain a healthy weight**
- **Be physically active – exercise, exercise, exercise**
- **Don't smoke**
- **Eat at least 5 servings of fruits and vegetables daily**
- **Drink alcohol in moderation**
- **Treat hypertension**
- **Use statin therapy**
- **Use aspirin therapy**