如何降低心臟血管疾病的風險
Reduce Your Risk of Coronary Artery Disease

阮建如醫師

David Juan M.D. Internal Medicine

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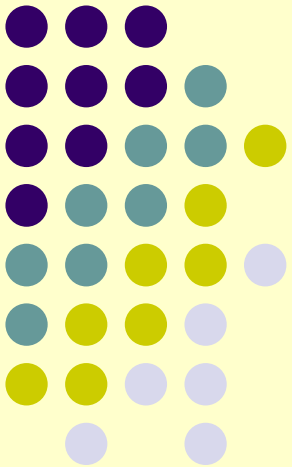
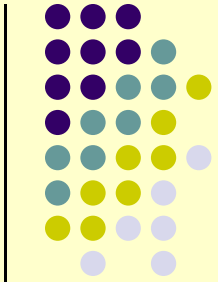
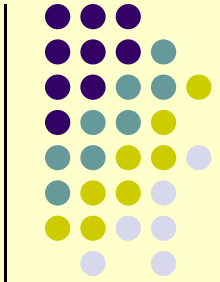


內容摘要
Outline



- 名詞定義及基本概念 (Definitions and Basic Concepts)
- 心血管疾病風險 (Cardiovascular Risks)
- 代謝綜合症候群 (Metabolic Syndrome)
- 前期糖尿病 (Prediabetes)
- 低密度脂蛋白膽固醇 (LDL Cholesterol)
- 高密度脂蛋白膽固醇 (HDL Cholesterol)
- 高感度C反應蛋白 (Highly Sensitive C Reactive Protein)
- 壓力和憂鬱 (Stress and Depression)
- 結論 (Conclusion)

醫學名詞 (1)

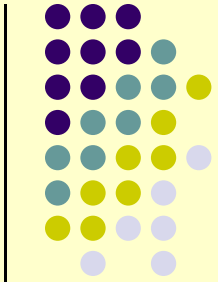


- Systolic blood pressure 收縮壓
- Diastolic blood pressure 舒張壓
- Total cholesterol 總膽固醇
- Low density lipoprotein (LDL) cholesterol (bad)
  低密度脂蛋白 (LDL) 膽固醇 (壞)
- High density lipoprotein (HDL)cholesterol (good)
  高密度脂蛋白 (HDL) 膽固醇 (好)
- Triglycerides 三酸甘油酯
- Relative risk 相對風險

醫學名詞 (2)

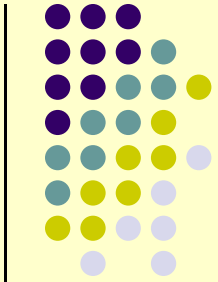
- Body Mass Index (BMI) 身体質量指数
- Diabetes 糖尿病　Prediabetes 前期糖尿病
- Hypertension 高血壓
  Prehypertension 前期高血壓
- Myocardial infarction (MI) 心肌梗塞
- Trans fat 反式脂肪　　Saturated fat 飽和脂肪
- Stroke 中風
- Metabolic syndrome 代謝症候群

醫學名詞 (3)



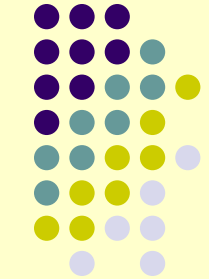
- Atherosclerosis 動脈硬化
- Coronary artery disease (CAD) 冠狀動脈疾病
- Framingham Heart Study
- Fasting blood sugar (glucose) 空腹血糖
- Insulin resistance 胰岛素抗性
- Hemaglobin A1C 糖化血色素
- Cardiovascular risks 心血管風險

胰岛素(Insulin)



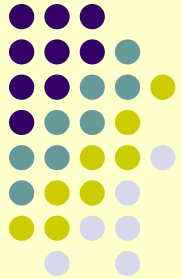
1. 胰島素是由胰臟β細胞分泌出來的激素，
2. 主要功能是促進血液中的葡萄糖進入肌肉或脂肪組織，提供人體所需的能量。
3. 當胰島素不能發揮作用時，血液中的葡萄糖便無法轉化爲人體所需的能量，導致血糖升高，糖尿病由此發生。而胰島素抗阻(insulinResistance)是指細胞不能有效利用胰島素甚至對胰島素的反應不再敏銳，這是造成糖尿病的最主要原因。

糖化血色素HemaglobinA1C



血色素(hemoglobin)是紅血球中的一種蛋白質其主要功能是將氧氣帶到身體各組織中並將二氧化碳帶離組織。葡萄糖(glucose)可通過紅血球並經化學作用而永久性的附著在血色素上，直到紅血球被破壞爲止，這種有葡萄糖附著的血色素稱爲糖化血色素(HbA1, HbA1c)。血糖愈高，則糖化血色素的值愈高由於紅血球的平均壽命約爲四個月，故糖化血色素的值可以反映過去三至四個月內糖尿病人的平均血糖控制情況

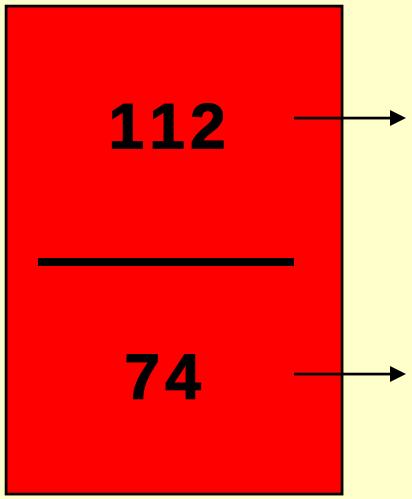
高.敏感C反應蛋白
hsCRP（High Sensitivity C- Reactive Protein）



- 炎症在粥狀動脈硬化的起始、形成、發展過程中扮演著重要角色

High Blood Pressure

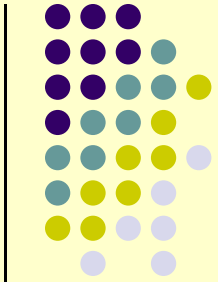
- Blood pressure is written as two numbers. For example your doctor may say, “one twelve over seventy-four”



Systolic pressure : this is the top number and it reflects the force exerted against your blood vessels when your heart pumps, or beats

Diastolic pressure : this is the bottom number and it is the force on your blood vessels when your heart is relaxing between beats

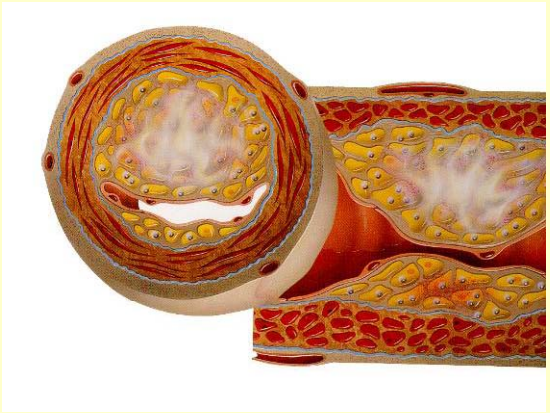
High Blood Pressure

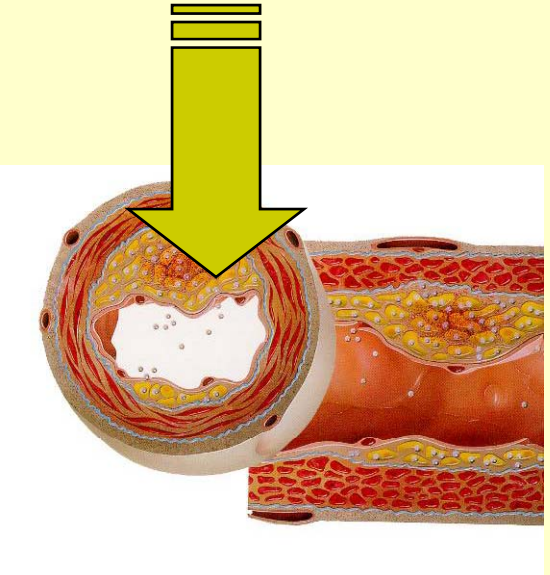


- **Normal blood pressure** -- less than 120/80 mm Hg.
- **Prehypertension** -- blood pressure between 120-139/80-89 mm Hg.
- **High blood pressure** -- the top number is 140 or higher. The lower number is 90 or higher or both.
- Diabetes or kidney disease? Blood pressure should be less than 130/80 mm Hg.

High Blood Cholesterol

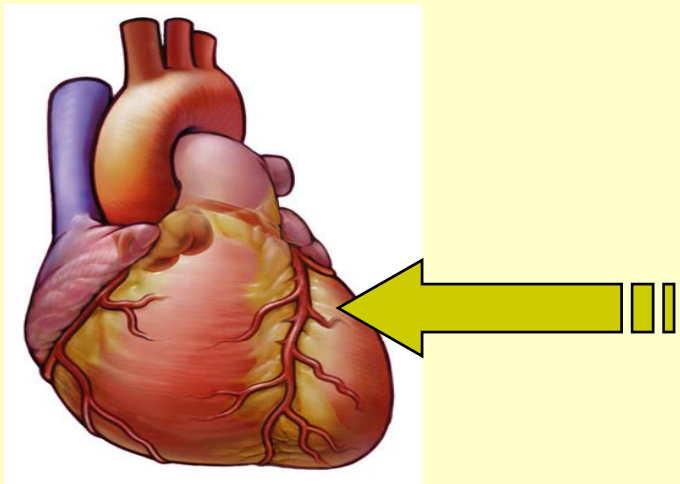
- There are two kinds of cholesterol — LDL “bad” and HDL “good”.
- High levels of low-density lipoprotein (LDL) cholesterol (the “bad” kind) can clog arteries that feed the heart and brain, causing a heart attack or stroke.

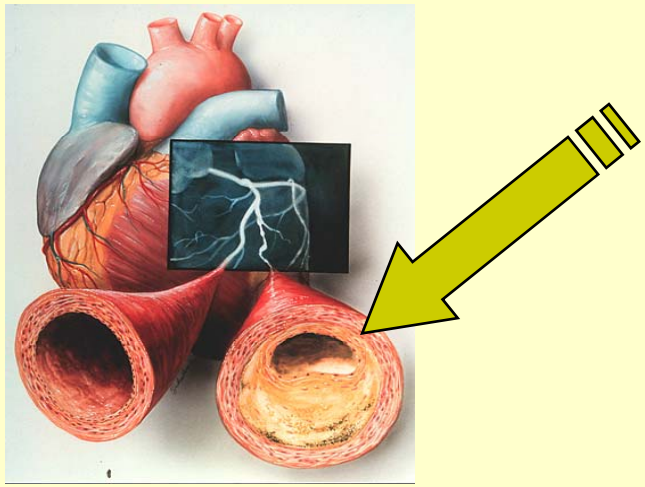




有關冠心病

- 冠狀動脈將血送到心臟的肌肉。
- 脂肪累積（硬塊）可以在這些動脈的內壁形成梗阻，減少血液的供應。
- 有些人因此感到心絞痛。





心臟病發的警訊

- 難受的壓迫感、擠壓、飽脹感、或胸口中間疼痛，這疼痛持續超過幾分鐘，或者消失了又回來。
- 一邊或雙臂、背部、脖頸、顎（牙關）或胃部感到痛楚或不適。
- 呼吸短促、同時胸口可能有或沒有難受感。
- 其他癥兆譬如突然出冷汗、嘔心、頭昏。
- 正如男性一般，女性心臟病發的最普遍癥狀是胸口疼痛或難受。但她們比男性悄可能經歷到其他常見的癥狀，特別是呼吸急促、嘔心、頭昏、背痛或顎痛。

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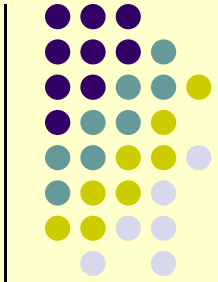

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有關危險因素

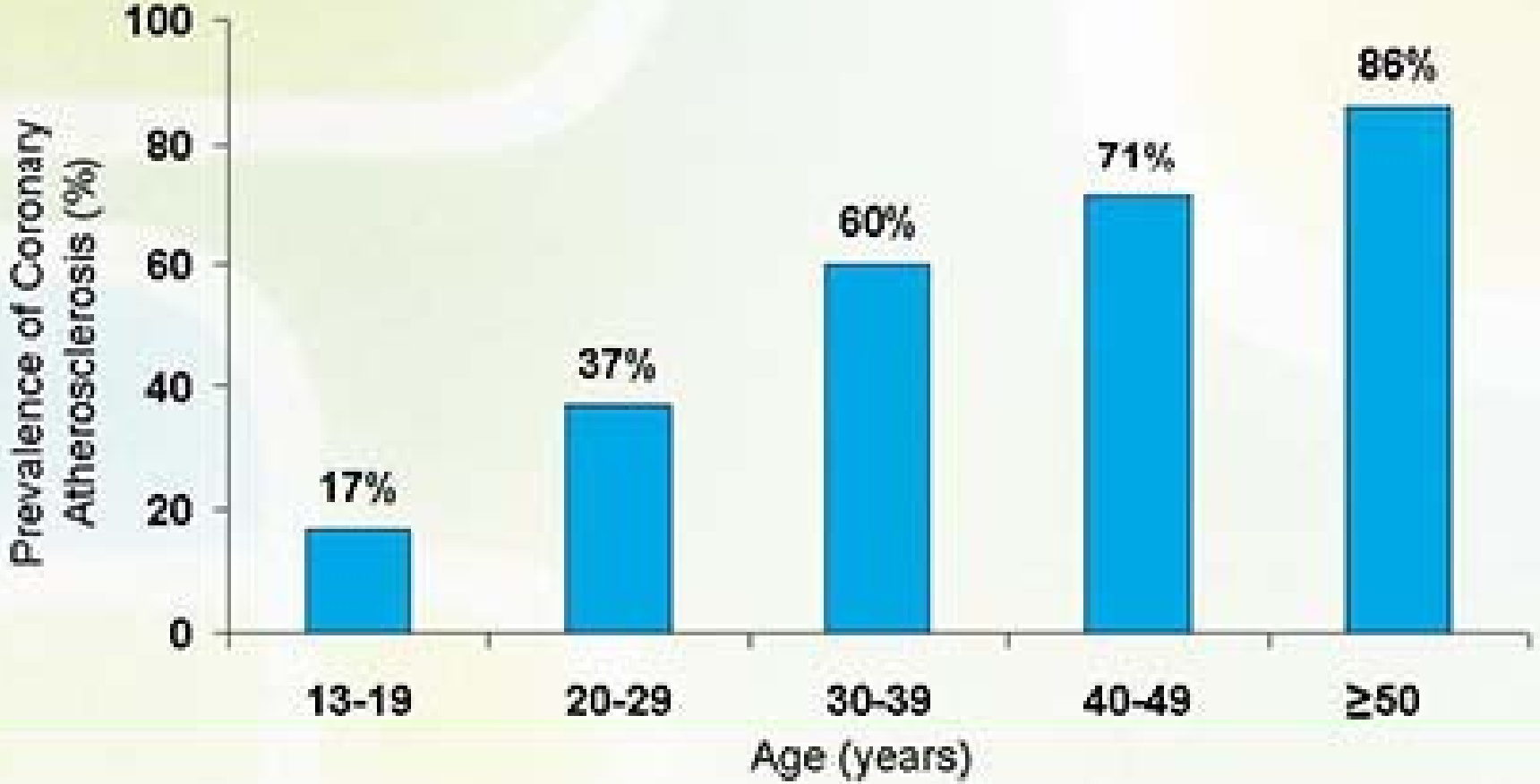
- 有兩種危險因素

您不能改變的因素：	您能夠改變的因素：
增長的年歲 性別 遺傳（包括種族） 曾中風或心臟病發 （今天講題的重點）	抽煙 高血壓 高膽固醇 少做體力活動 肥胖或過重 糖尿病 其他（中風）危險因素 （以後兩個講題的重點）

愈多危險因素，風險就愈大。
這表示如果您有任何不受您控制的因素，
就更需要盡力控制您能夠改變的各項因素。

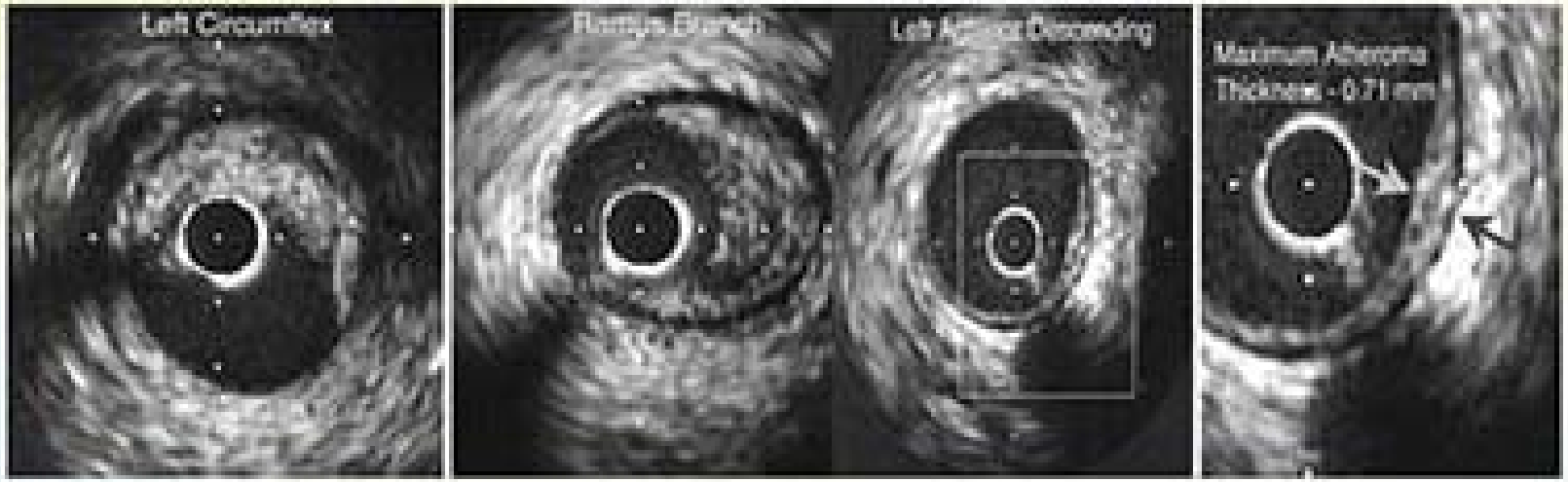
High Prevalence of Coronary Atherosclerosis in Teens and Young Adults

IVUS measurement of intimal thickness: 0.5 mm threshold



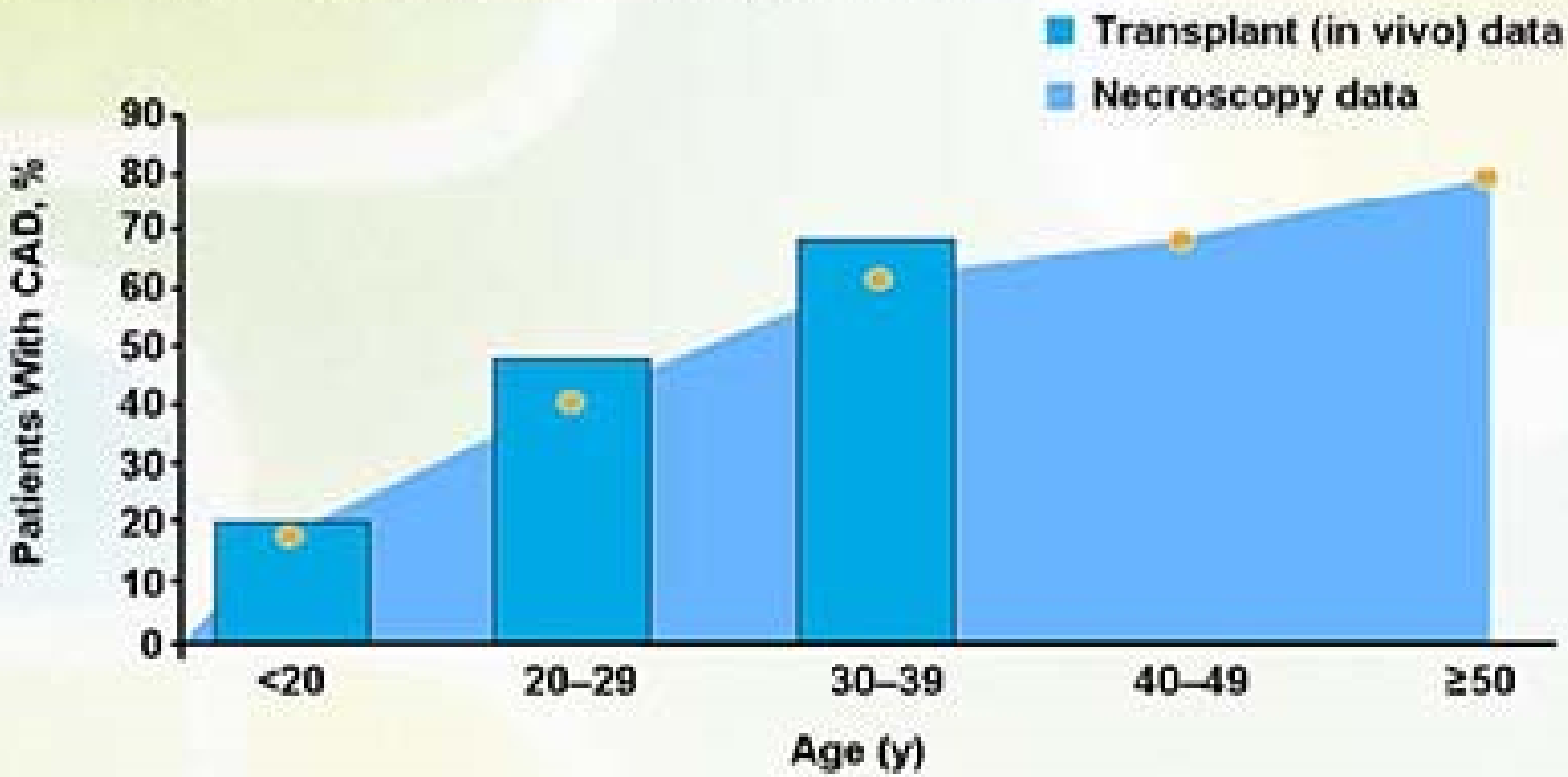
Tuzcu, et al. Circulation. 2001;103:2705-2710.

17% of Teenagers Are Already Affected by Atherosclerosis!



Natural History of CAD:
Consistent Evidence of Early Atherosclerosis

Coronary Atherosclerosis in Younger Patients



The disease begins earlier than often considered and is (eventually) systemic.

Berenson GS et al. *N Engl J Med.* 1998;338:1650-1656;
Tuzcu EM et al. *Circulation.* 1995;91:1706-1713.

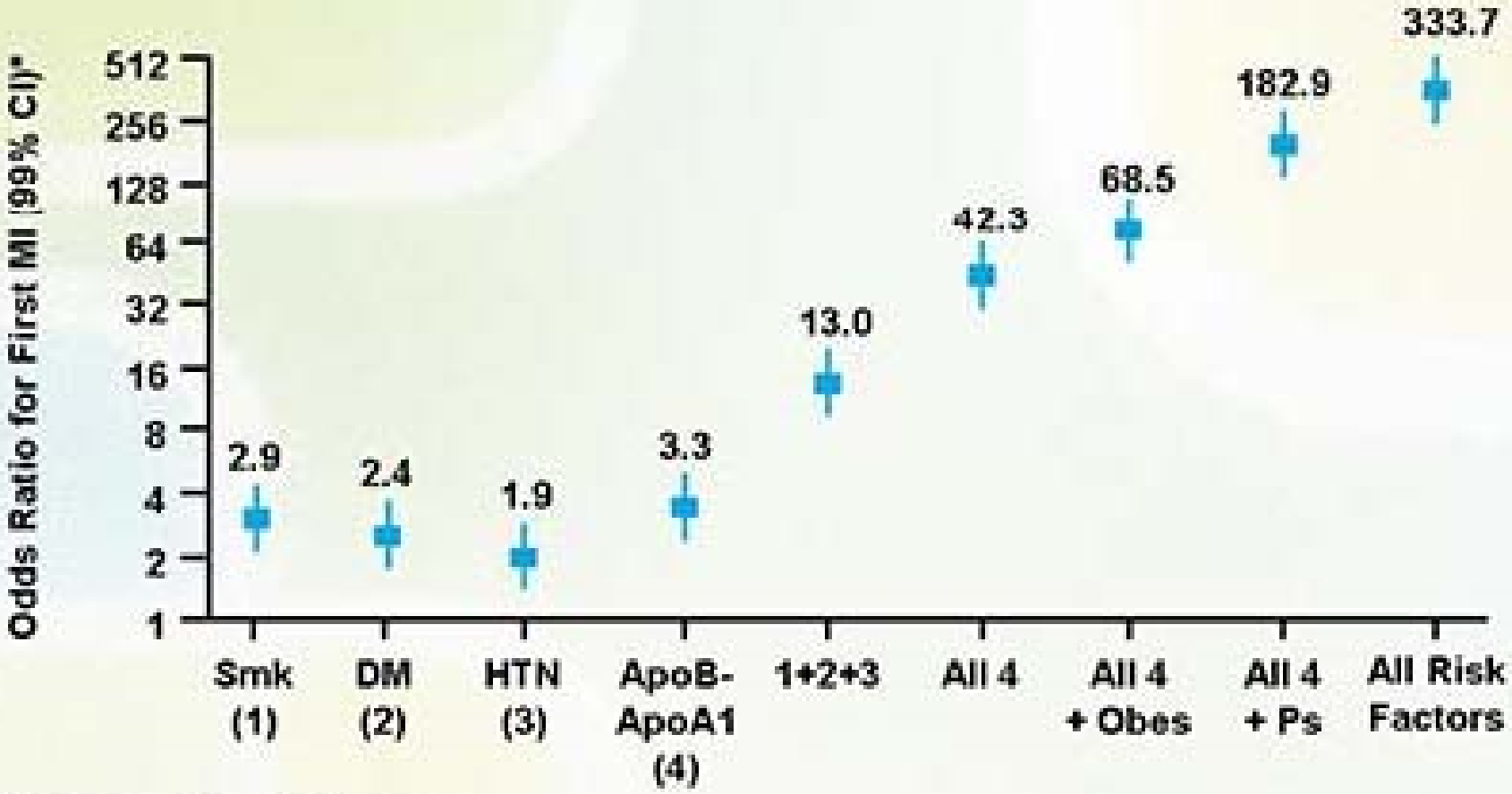
INTERHEART: Focus on 9 risk or protective factors

Design	Large international case-control study
Participants	12,461 cases; 14,637 controls; 52 countries
Objective	To determine association of first MI with: Smoking, Lipids, Hypertension Diabetes, Obesity, Diet Physical activity, Alcohol consumption, Psychosocial factors*
Follow-up	4 years, February 1999–March 2003

*eg, stress, depression

Yusuf S et al. Lancet 2004;364:937-952.

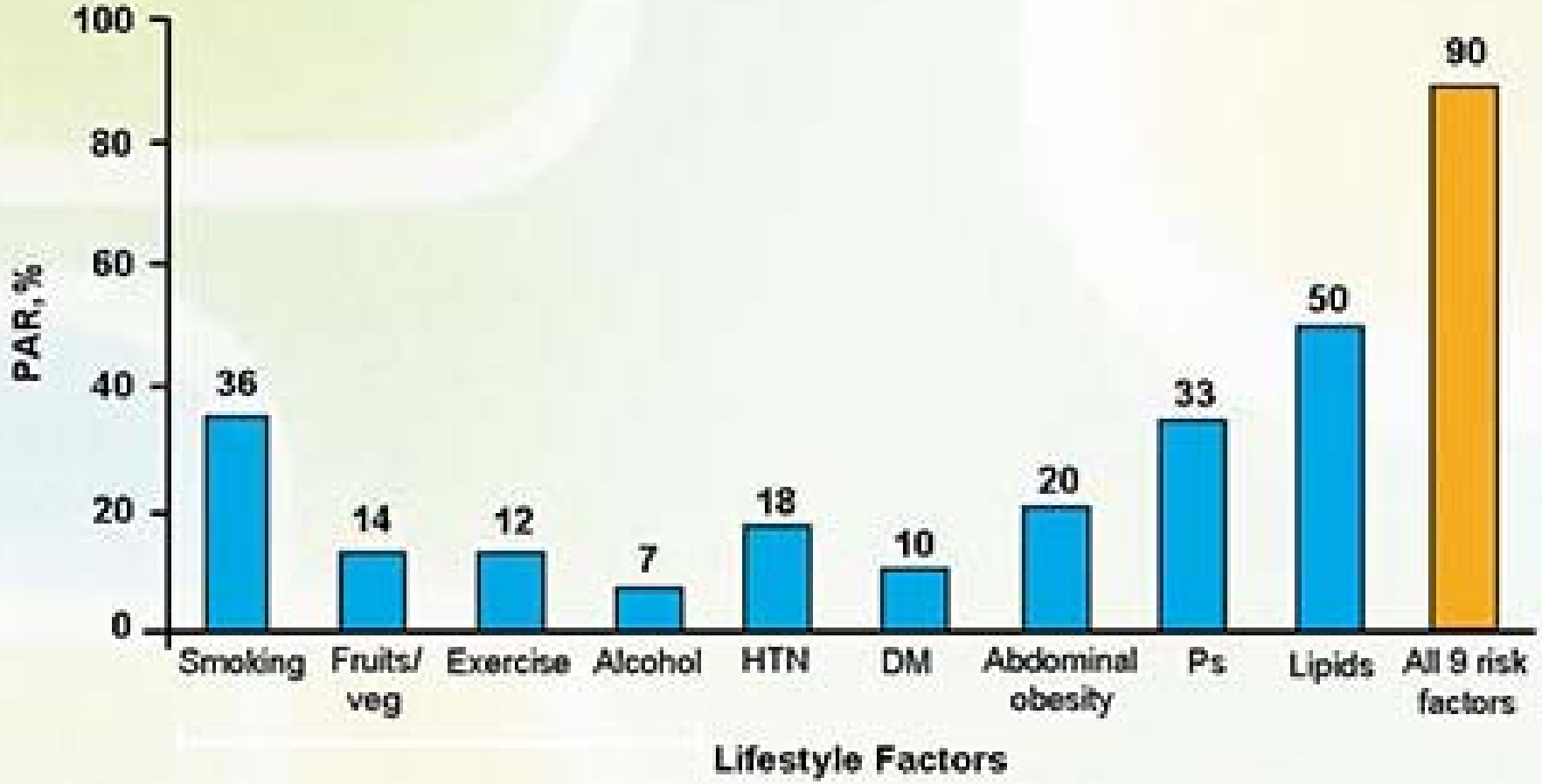
INTERHEART: Impact of Multiple Risk Factors on CV Risk



*Odds ratio plotted on a doubling scale.
CI = confidence interval; Smk = smoking; HTN = hypertension; Apo = apolipoprotein; Obes = obesity; Ps = psychosocial factors.

Yusuf S et al. Lancet 2004;364:937-952.

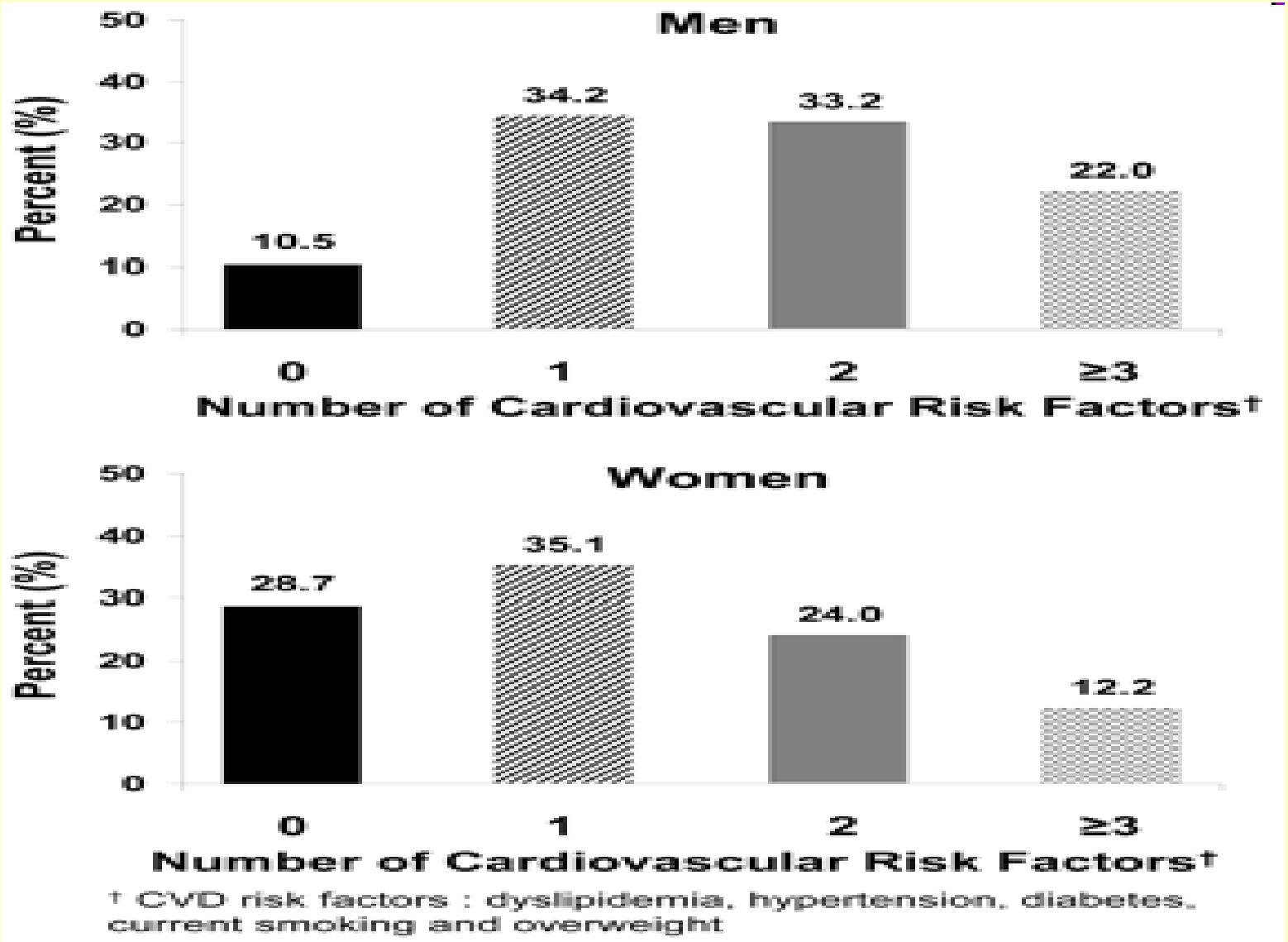
INTERHEART: 9 Modifiable Factors Account for 90% of First-MI Risk Worldwide



N=15,152 patients and 14,820 controls in 52 countries
PAR = population attributable risk, adjusted for all risk factors

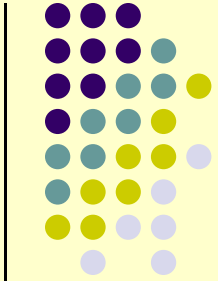
Yusuf S et al. *Lancet* 2004;364:937-52.

Age-standardized prevalence of CVD risk factors among Chinese men and women



† CVD risk factors : dyslipidemia, hypertension, diabetes, current smoking and overweight

中國男性心血管疾病風險因素人數比例統計表



% (Standard Error)	血脂肪異常	高血壓	糖尿病	目前吸煙	過重
男女合計	53.6 (0.6)	26.1 (0.5)	5.2 (0.2)	34.4 (0.5)	28.2 (0.5)
男性合計	53.8 (0.8)	27.6 (0.7)	4.9 (0.3)	60.6 (0.8)	26.1 (0.7)
35 – 44 歲	54.7 (1.2)	16.9 (0.9)	3.4 (0.4)	63.5 (1.2)	27.6 (1.1)
45 – 54 歲	54.3 (1.5)	27.4 (1.3)	5.2 (0.6)	62.1 (1.4)	28.4 (1.3)
55 – 64 歲	54.0 (1.7)	39.1 (1.7)	6.7 (0.8)	58.8 (1.7)	22.5 (1.3)
65 – 74 歲	48.8 (2.4)	46.5 (2.4)	6.8 (1.1)	49.9 (2.4)	21.0 (1.9)

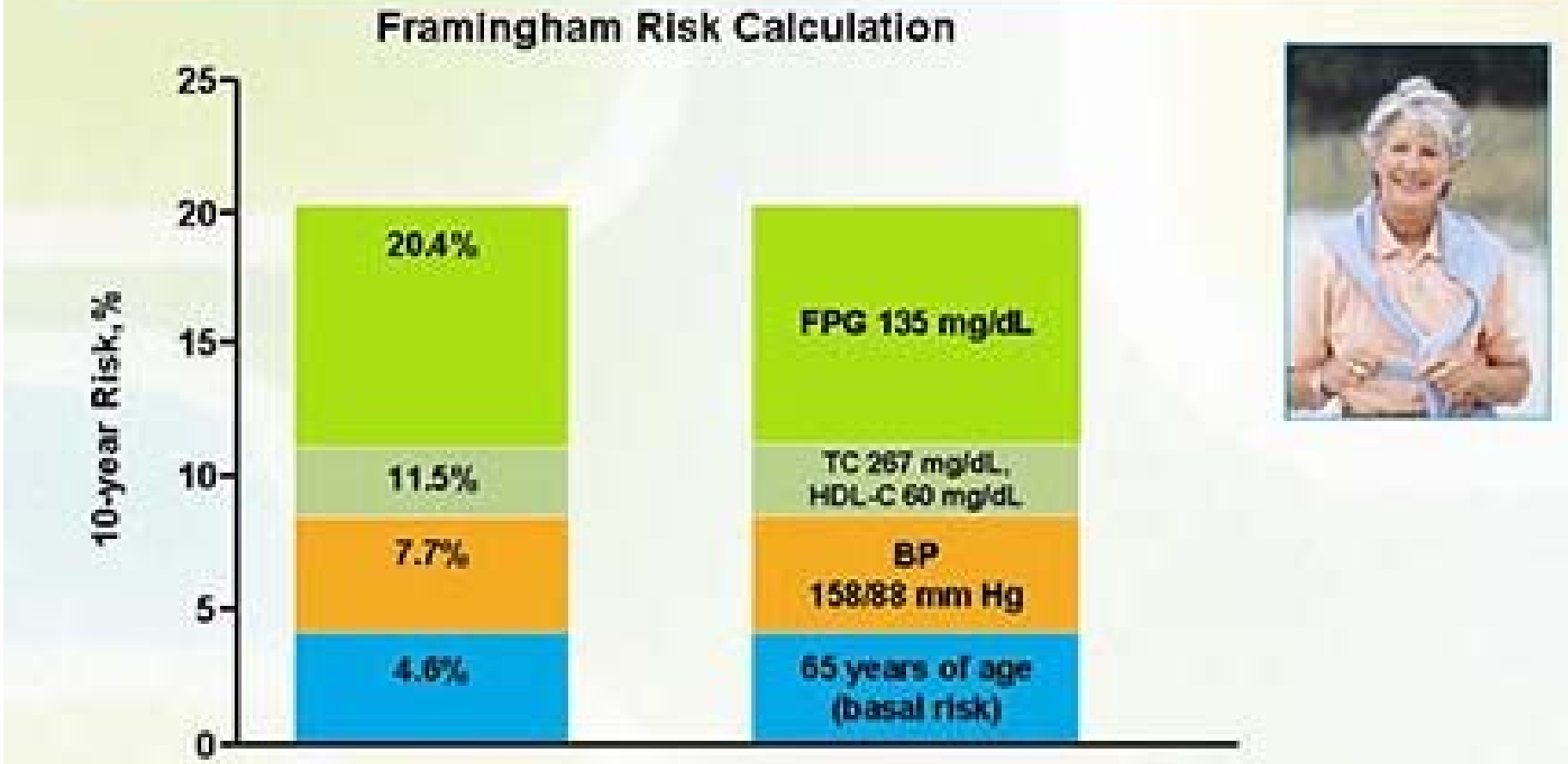
中國女性心血管疾病風險因素人數比例統計表

% (Standard Error)	血脂肪異常	高血壓	糖尿病	目前吸煙	過重
男女合計	53.6 (0.6)	26.1 (0.5)	5.2 (0.2)	34.4 (0.5)	28.2 (0.5)
女性合計	53.4 (0.8)	24.6 (0.6)	5.4 (0.3)	6.8 (0.4)	30.5 (0.7)
35 – 44 歲	43.4 (1.2)	10.4 (0.7)	2.8 (0.4)	4.6 (0.6)	26.3 (1.1)
45 – 54 歲	54.9 (1.4)	25.9 (1.3)	5.5 (0.7)	6.7 (0.9)	35.7 (1.4)
55 – 64 歲	64.0 (1.7)	37.7 (1.7)	8.8 (1.0)	8.7 (1.0)	32.9 (1.6)
65 – 74 歲	67.4 (2.2)	49.0 (2.3)	8.8 (1.1)	11.0 (1.5)	27.7 (2.0)

中國及美國人心血管疾病風險因素>=1人數比例統計表

風險因素 >= 1 SE - Standard Error	中　　國		美　國
	農村 % (SE)	城市 % (SE)	% (SE)
合　計	79.9 (0.5)	83.1 (0.5)	93.1 (1.1)
35－44 歲	74.5 (0.9)	73.4 (0.9)	88.7 (2.1)
45－54 歲	82.5 (0.9)	86.4 (0.8)	93.2 (1.6)
55－64 歲	83.6 (1.1)	92.7 (0.7)	98.1 (0.7)
65－74 歲	85.7 (1.4)	92.9 (1.1)	99.6 (0.3)
男　　性	88.8 (0.6)	92.3 (0.5)	96.3 (0.8)
女　　性	70.4 (0.8)	73.7 (0.8)	90.3 (1.5)

Substantial *Amplification* of Risk Factors in Primary Prevention



Risk of developing CAD over 10 years, according to specified BP levels, other risk factors, calculations based on Framingham Heart Study computer program, which includes variables for SBP, DBP, TC, HDL-C, left ventricular hypertrophy by electrocardiogram, cigarette smoking, glucose intolerance. Following remained constant unless otherwise indicated: TC 180 mg/dL; HDL-C 55 mg/d; nonsmoker.

National Institutes of Health. Available at: www.nhlbi.nih.gov/about/framingham/index.html.

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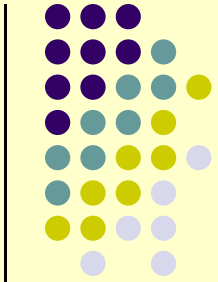

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Criteria for Clinical Identification of the Metabolic Syndrome According to ATP III

1. Waist circumference >40 in (men), or >35 in (women)
2. Triglycerides ≥150 mg/dL
3. HDL-C <40 mg/dL (men) or <50 mg/dL (women)
4. BP ≥130/≥85 mm Hg
5. FBG ≥110 mg/dL

3 of 5 required for diagnosis

ATP III = National Cholesterol Education Program Adult Treatment Panel III

Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults (ATP III). JAMA. 2001;285:2486-2497.

IDF Ethnicity- and Sex-specific Criteria for Central Obesity

	Waist Circumference (in)	
	Men	Women
European Sub-Saharan African Middle Eastern	≥37	≥32
South Asian South/Central American	≥35	≥32
Chinese	≥35	≥32
Japanese	≥34	≥35

The IDF consensus worldwide definition of the metabolic syndrome. Available at: www.idf.org/webdata/docs/metabolic_syndrome_definition.pdf. Accessed July 28, 2007.

IDF = International Diabetes Federation

Body Mass Index: Proposed Asian Criteria

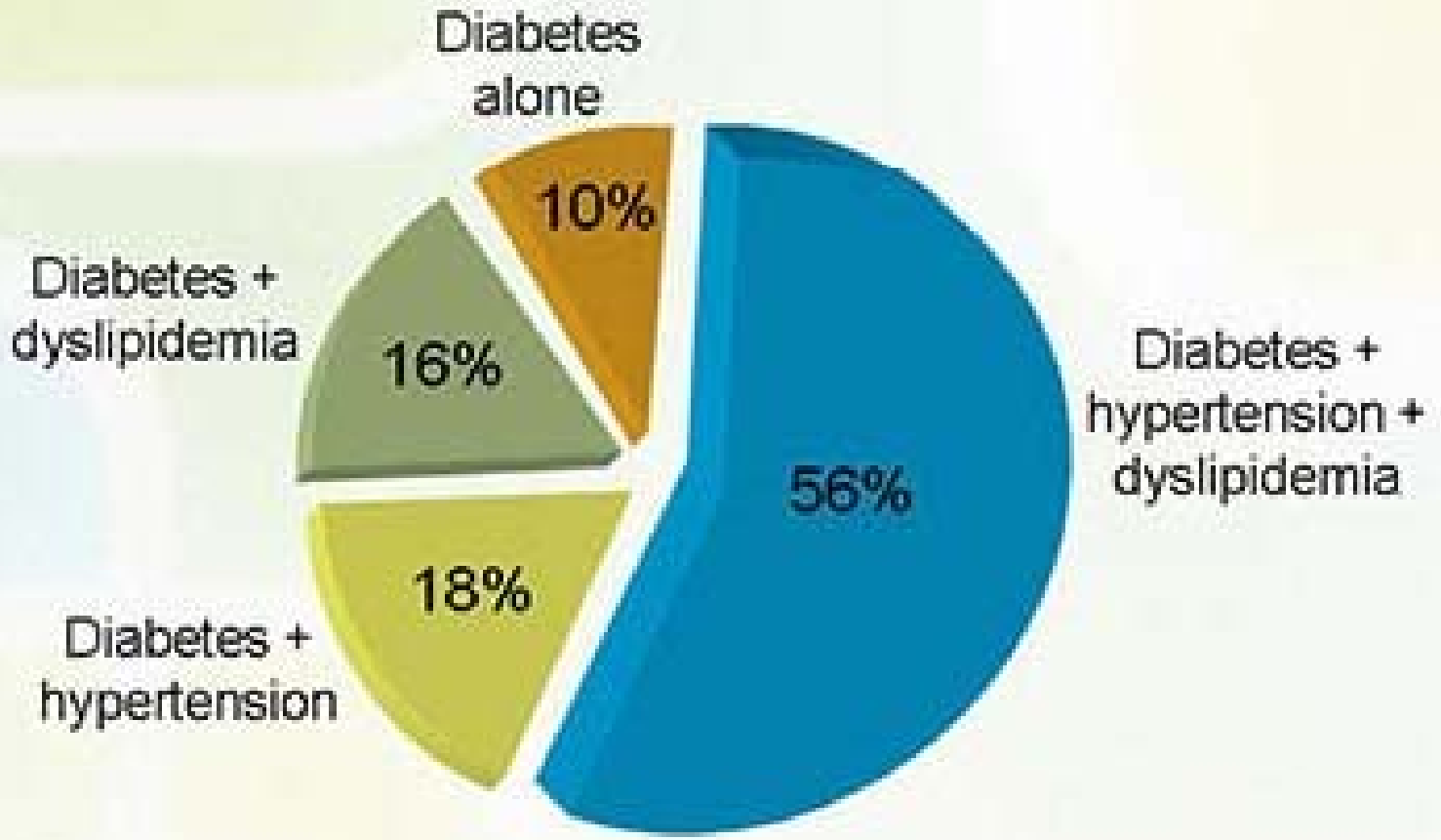
Classification of Obesity	BMI (kg/m^2)	
	Proposed Asian Criteria	Previous WHO Criteria
Underweight	<18.5	<18.5
Normal range	18.5 to <23	18.5 to <25
Overweight	23 to <25	25 to <30
Obese	≥25	≥30

Adapted from Joslin Diabetes Center. What is the best body mass index for Asians and Pacific Islanders to prevent diabetes? Available at: http://www.joslin.org/api/bodymass.shtml. Accessed July 28, 2007.

WHO = World Health Organization.

At Least 50% of Persons With Diabetes Have Concomitant Hypertension and Dyslipidemia

137,745 managed-care enrollees



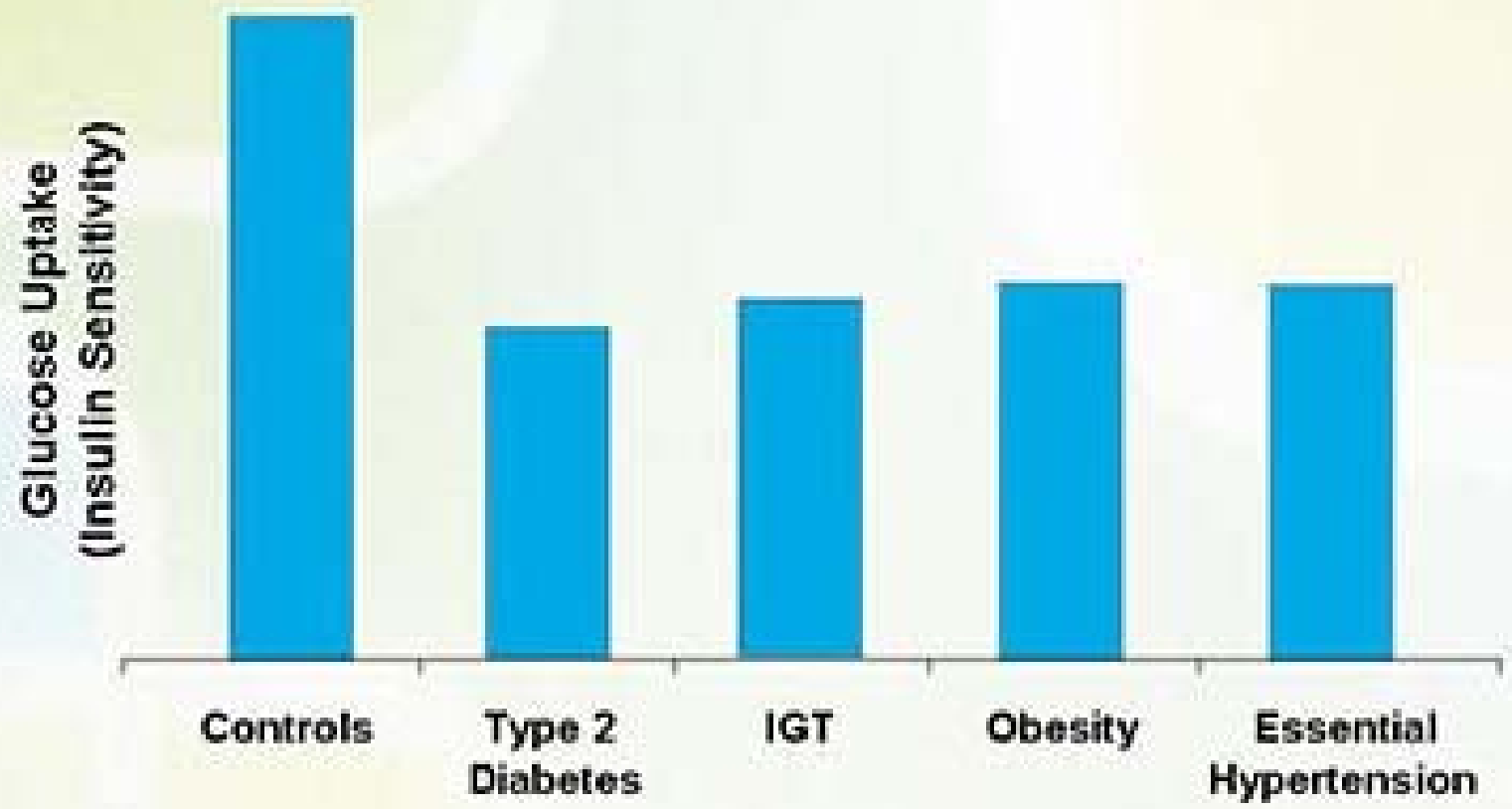
Selby JV et al. *Am J Manag Care*. 2004;10(part 2):163-70.

Is There a Single Unifying Etiopathology to the Metabolic Syndrome?

Not well defined, but a major factor underlies most of the criteria of the syndrome:

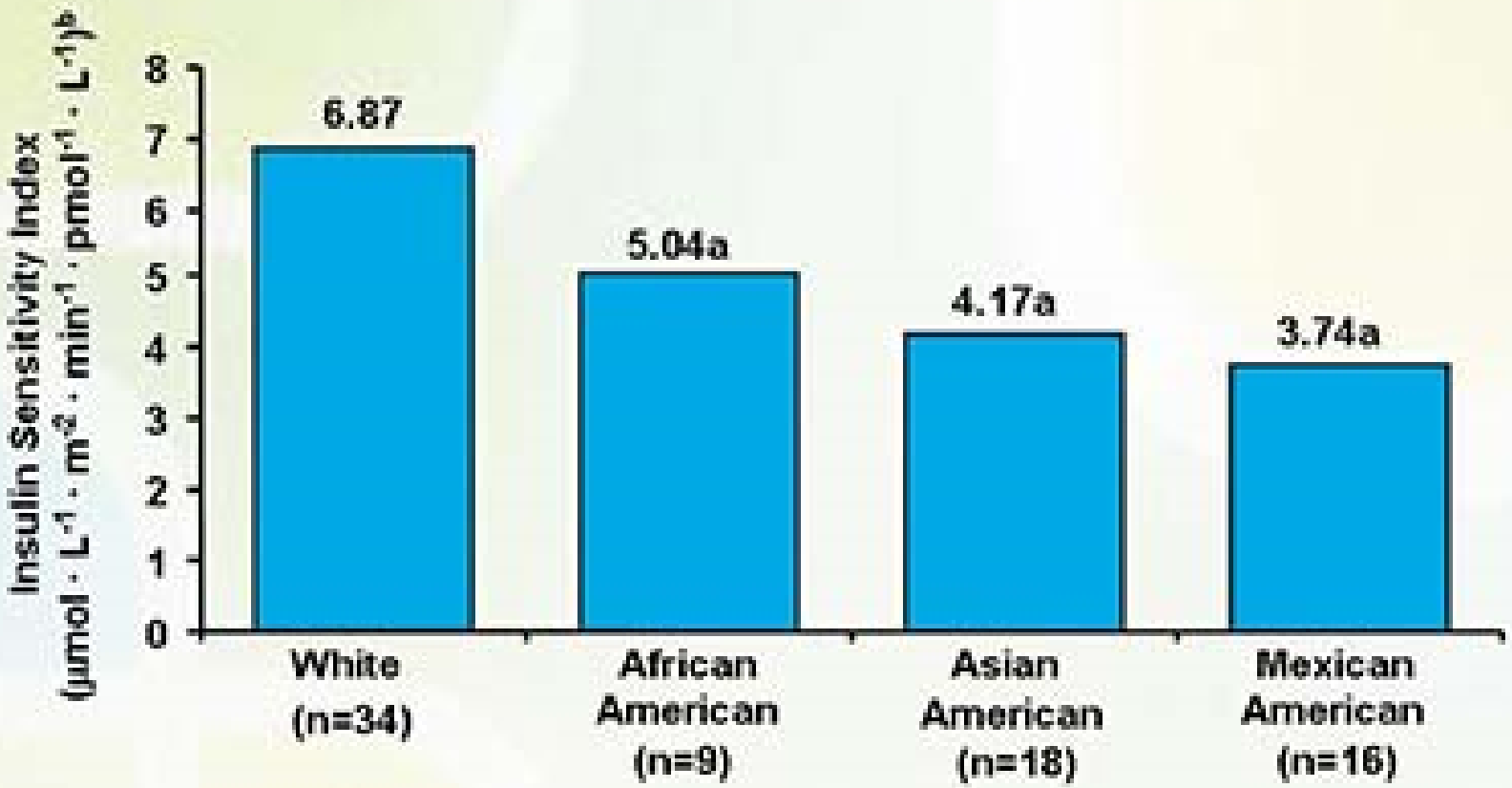
INSULIN RESISTANCE!

Insulin Sensitivity in Various Clinical States



DeFronzo RA et al. *Diabetes Care*. 1992;15:318-368;
DeFronzo RA et al. *Diabetes Care*. 1991;14:173-194;
Cavaretti M et al. *Diabetes*. 1998;47:244-247;
Ferrannini E. *Metabolism*. 1995;44:15-17.

Ethnic Groups Have Lower Insulin Sensitivity Vs Whites Among Healthy Subjects

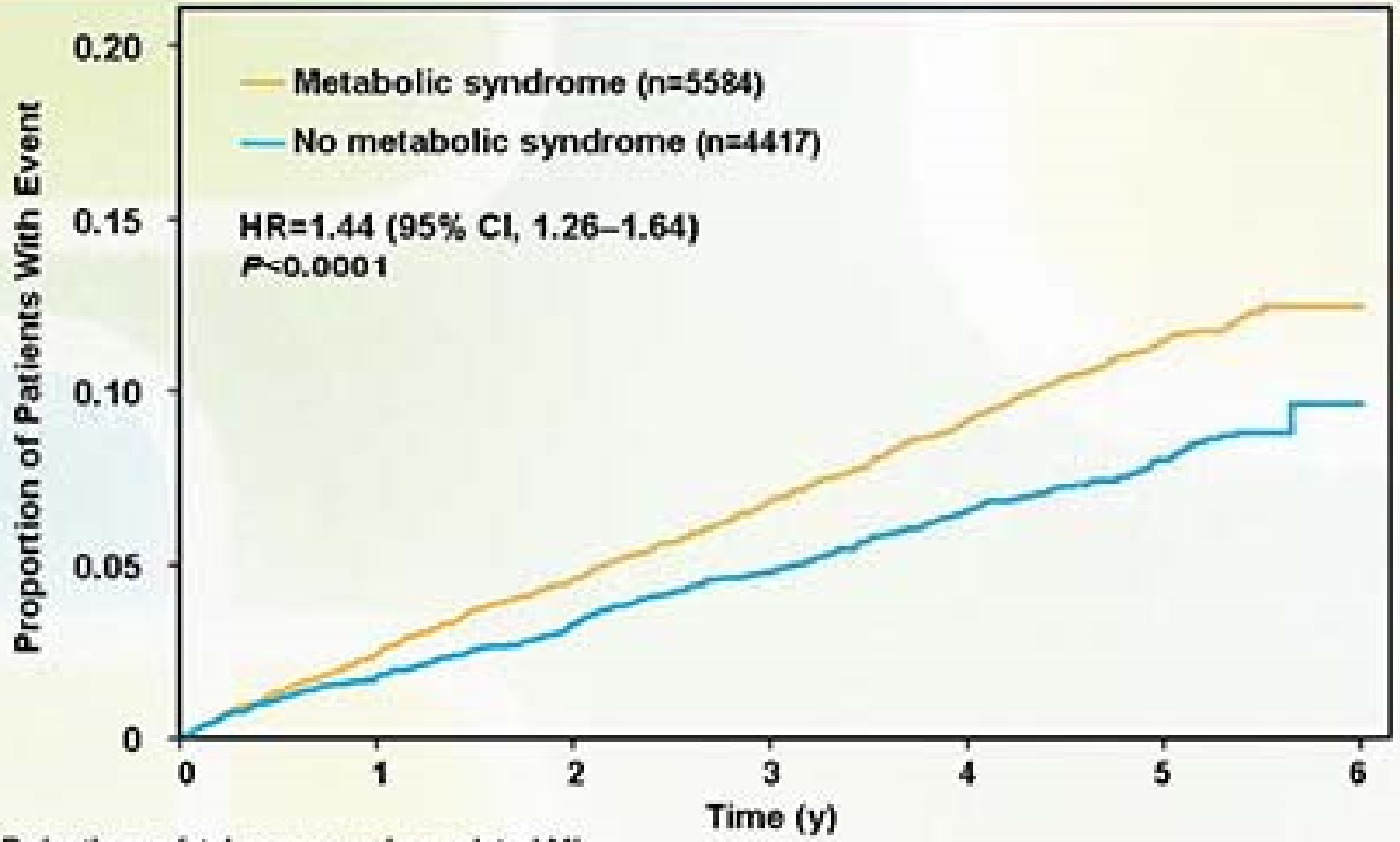


[a]P=0.0023 vs whites.

[b]Data are geometric means. There was no statistical difference in BMI among groups at baseline. Data were assessed using a hyperglycemic clamp method.

Adapted from Chiu KC et al. *Diabetes Care*. 2000;23:1353-1358

Major Cardiovascular Events* by Metabolic Syndrome Status



*CHD death; nonfatal, nonprocedure-related MI; resuscitated cardiac arrest; fatal or nonfatal stroke.

Deedwania P et al. *Lancet*. 2006;368:919-928.

Who Is the Intermediate (or clandestine high-risk) Patient?

Case: 51-year-old East Indian Woman

- Strong family history of diabetes (DM), heart disease; nonsmoker
- No specific complaints; seen for an executive physical
- Height, 5 ft 1 in; weight,128 lb; BMI, 24 kg/m^2; waist, 33 in
- BP,138/82 mm Hg; HR, 84 bpm
- Liver edge 1 cm below costal margin; rest normal
- FBG, 96 mg/dL; normal renal function; TSH, 2.4 mIU/L; HbA1c, 5.8%
- TC, 209 mg/dL; HDL-C, 52 mg/dL; TG, 225 mg/dL; LDL-C, 112 mg/dL

Does this "healthy" patient have metabolic syndrome?

BMI = body mass index; BP = blood pressure; HR = heart rate; bpm = beats per minute; FBG = fasting blood glucose; TSH = thyroid-stimulating hormone; HbA1c = hemoglobin A1c; TC = total cholesterol; HDL-C = high-density lipoprotein cholesterol; TG = triglycerides; LDL-C = low-density lipoprotein cholesterol

Case: NCEP/Framingham Estimate of 10-year CHD Risk (Women)

Age, y	20-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79
Points	-9	-4	0	3	6	8	10	11	12	13

Total Cholesterol (mg/dL)	Points (Age, y) 20-39	40-49	50-59	60-69	70-79
<160	0	0	0	0	0
160-199	4	3	2	1	0
200-239	7	5	3	1	0
240-279	9	6	4	2	1
≥280	11	8	5	3	1

HDL-C (mg/dL)	Points
≥60	-1
50-59	0
40-49	1
<40	2

Age (y)	Points 20-39	40-49	50-59	60-69	70-79
Nonsmoker	0	0	0	0	0
Smoker	8	5	3	1	1

Systolic BP (mg/dL)	Points Untreated	Treated
<120	0	0
120-129	0	1
130-139	1	2
140-159	1	2
>160	2	3

Point total:	<0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	>17
10-year risk:	<1	1	1	1	1	1	2	2	3	4	5	6	8	10	12	16	20	25	≥30

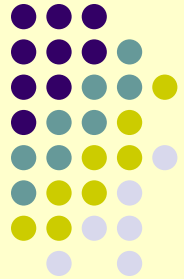
NCEP = National Cholesterol Education Program

Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (ATP III). *JAMA*. 2001;285:2486-2497.

Some Considerations for the Intermediate-risk Patient

- Many intermediate-risk patients are simply young high-risk patients
- Treating intermediate-risk patients before they become high-risk might reduce their lifetime risk
- Atherosclerosis develops for decades before symptoms occur; cholesterol-lowering therapy slows the progression of atherosclerosis

中新網:”代謝綜合症纏擾上班族”
--健康生活方式



1. 與肥胖決裂
2. 不多吃一口，不少走一步
3. 不吸菸、不喝酒、不熬夜
4. 定期檢查血壓、查血糖、查血脂、查血粘度
5. 減肥不求速成，每月減1-2公斤即可
6. 七八分飽：飲食上要「總量控制、結構調整、吃序顛倒」，即每餐只吃七八分飽，以素爲主，營養均衡，進餐時先吃青菜，快飽時再吃些主食、肉類
7. 遠離西式快餐。

運動對健康有什麼好處？

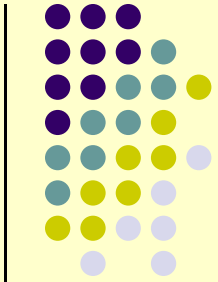
- 心臟病和中風
- 高血壓
- 非胰島素依賴型糖尿病
- 肥胖
- 背部疼痛
- 骨質疏鬆症
- 緩和並控制情緒

作安全和成功的運動計劃

一個好的運動規畫必須考慮其安全性，爲了確定自己是否處於良好的健康狀態，在開始運動之前應先回答下列問題：

1. 是否曾有醫師診斷你有心臟方面的問題？
2. 你的胸部是否時常疼痛？
3. 是否曾有醫師診斷出你有高血壓？
4. 你是否時常感覺到暈眩或模糊的意識？
5. 是否曾有醫師告訴你你的骨頭和關節有問題像關節炎，會因運動而惡化？
6. 你的年齡是否大於65歲而不適於運動？
7. 你是否服藥如降血壓藥？
8. 是否有醫藥上的理由而使的你不能運動？

内容摘要
Outline



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- 代謝綜合症候群 (Metabolic Syndrome)
- 前期糖尿病 (Prediabetes)
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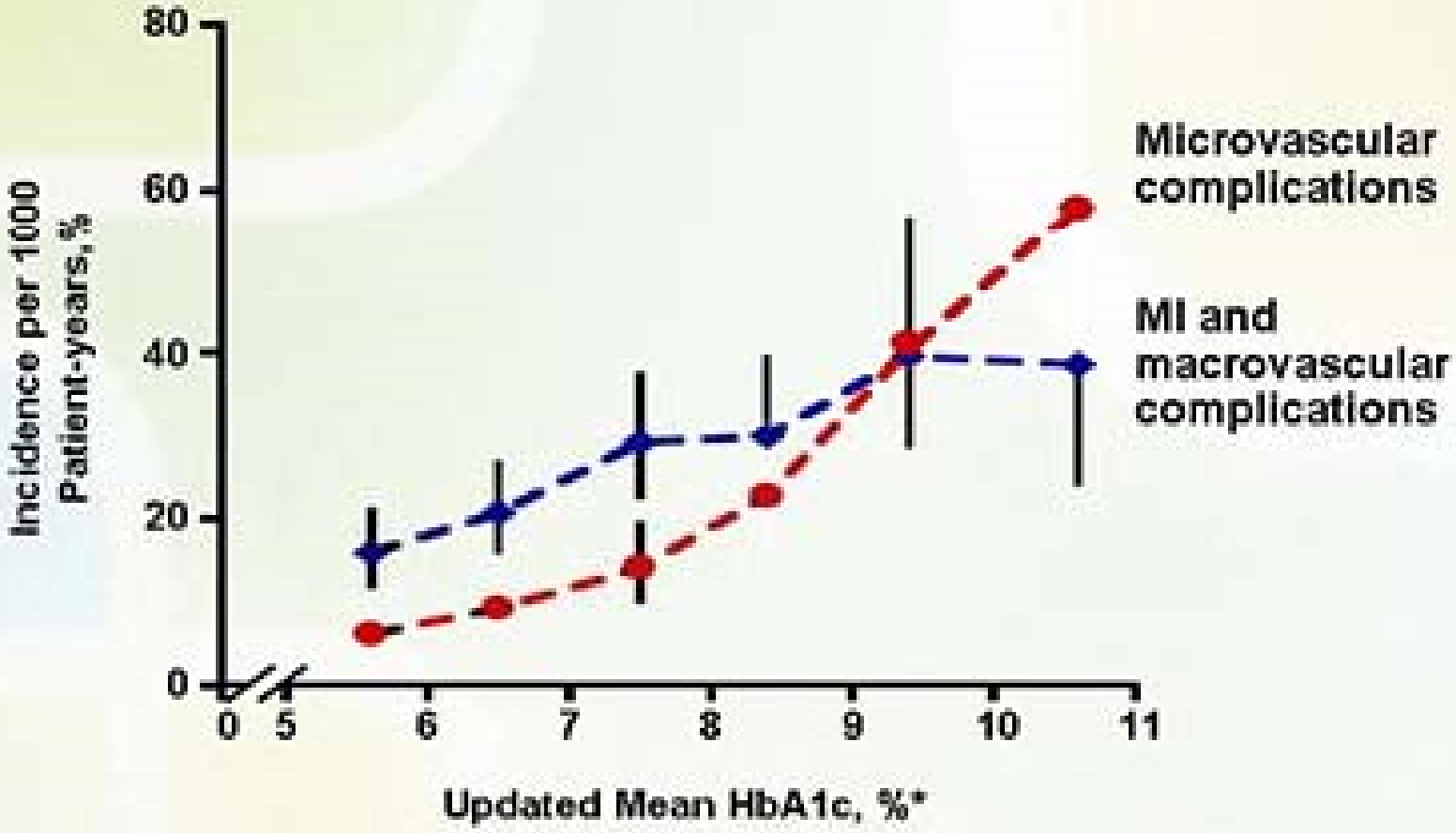
- 壓力和憂鬱 (Stress and Depression)
- 結論 (Conclusion)

Increasing HbA1c Increases Vascular Event Risk

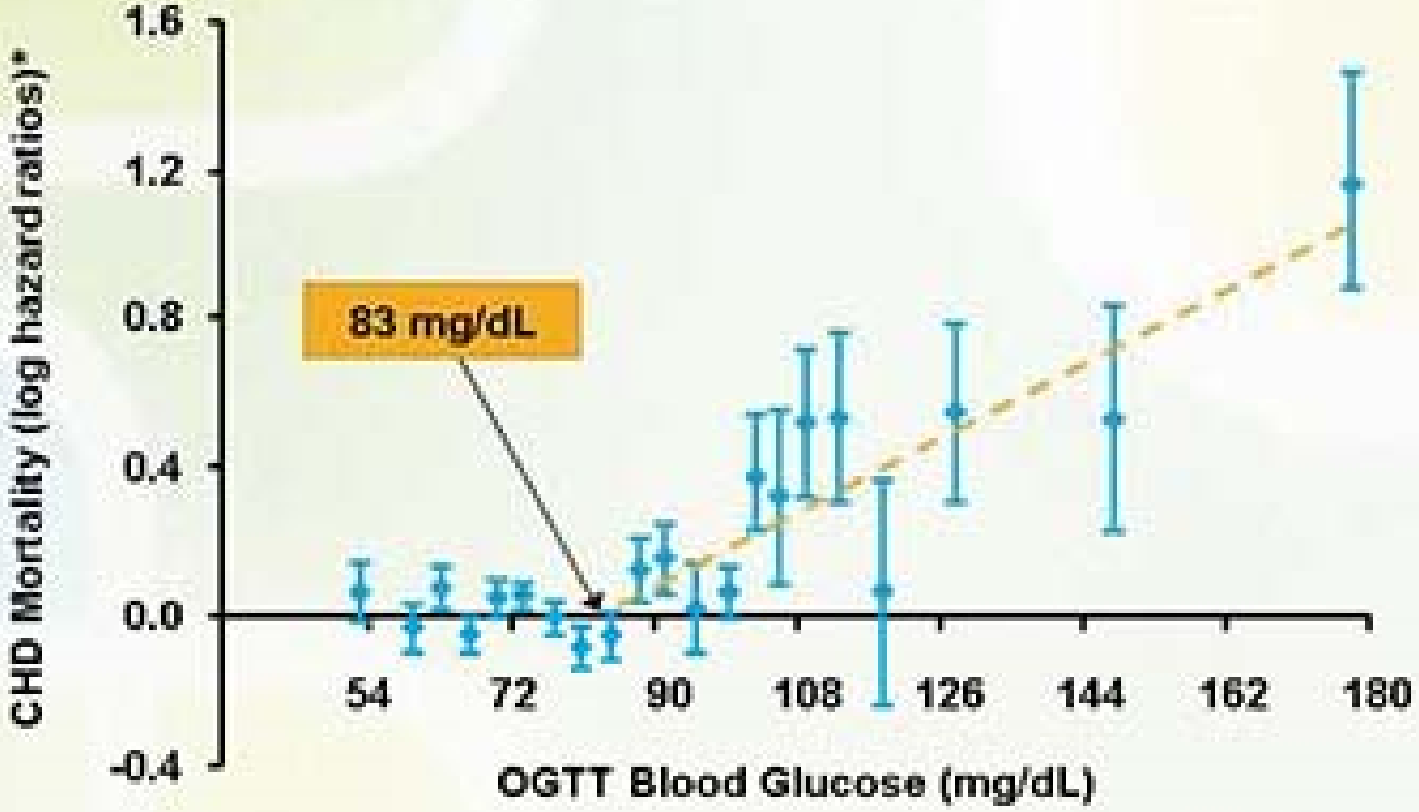


*Updated mean HbA1c is adjusted for age, sex, and ethnic group.
MI = myocardial infarction.

Stratton IM et al. *BMJ*. 2000;321:405-412.

CHD Risk Appears to Begin at "Low" Fasting Glucose Levels

N=17,869 men 40–64 years of age; follow-up 33 years



*Relative to baseline group of all men with blood glucose <83 mg/dL.
OGTT = oral glucose tolerance test.

Brunner EJ et al. *Diabetes Care*. 2006;29:26-31.

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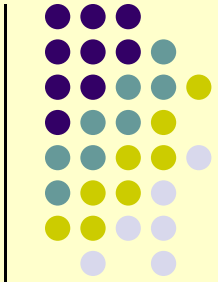

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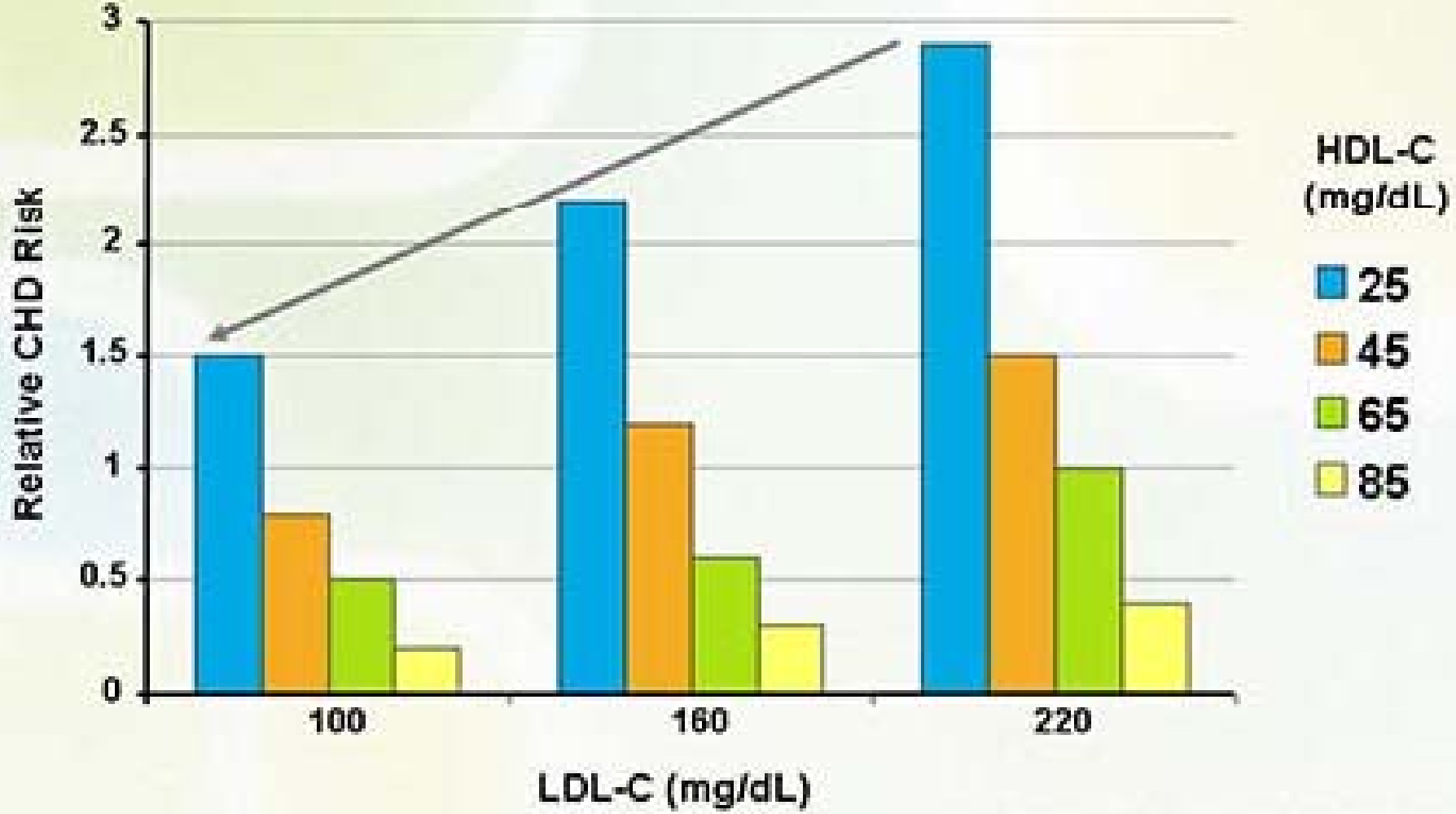
NCEP ATP III: Risk Reduction Targets

ATP III Classification of LDL-C, TG, and HDL-C (mg/dL)

Primary:	**LDL-C**	
	< 100	Optimal
	100–129	Near optimal/above optimal
	130–159	Borderline high
	160–189	High
	≥ 190	Very high
Secondary:	**TG**	
	< 150	Desirable
	150–199	Borderline high
	200–499	High
	≥ 500	Very high
	HDL-C	
	< 40	Low
	≥ 60	High

Adapted from NCEP ATP III. *Circulation.* 2002;106:3143-3421.

Framingham Heart Study: 4-year CHD Risk in Men 50–70 Years Old by LDL-C and HDL-C



Castelli WP et al. JAMA 1986;256:2835-2838.

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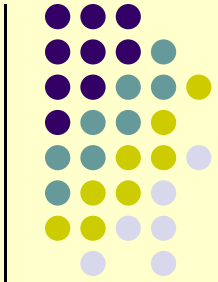

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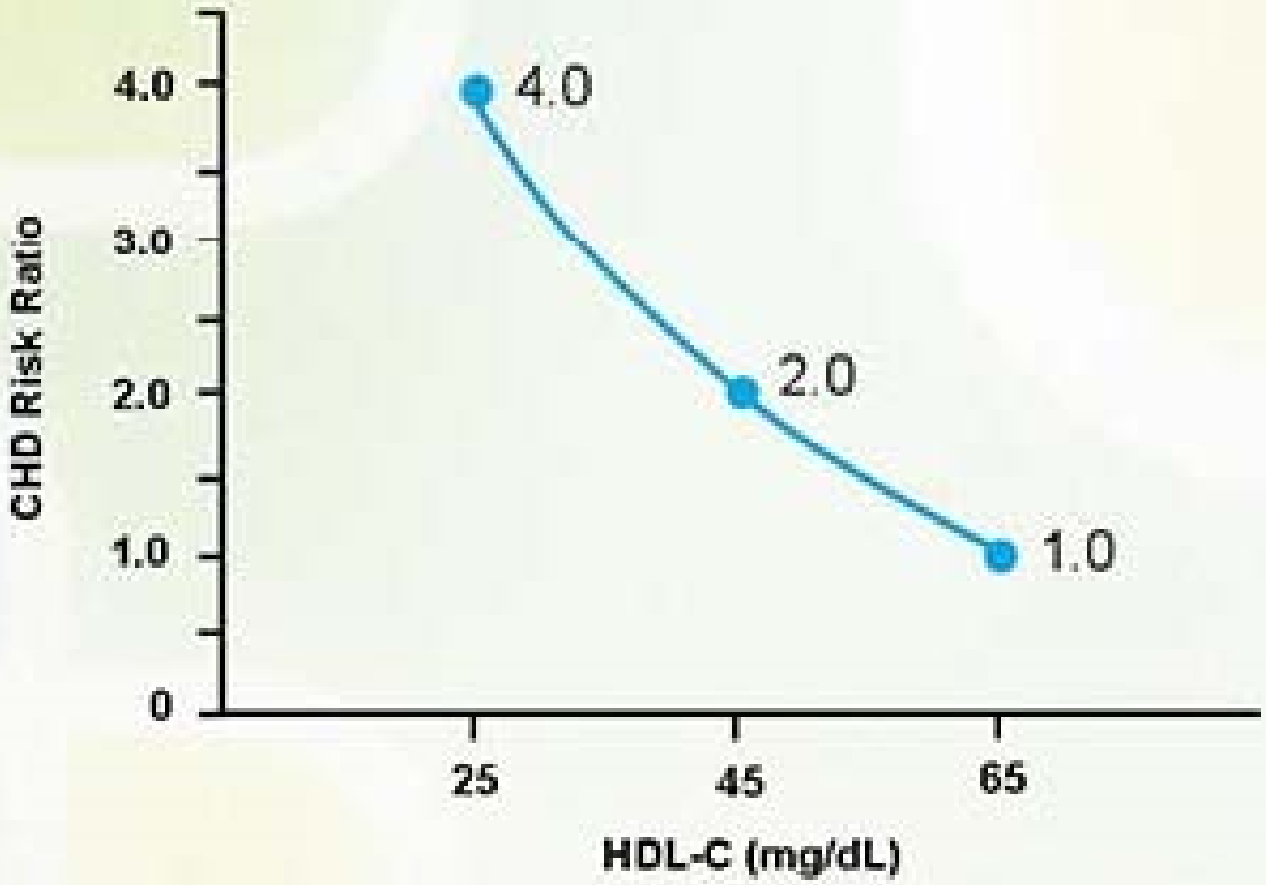
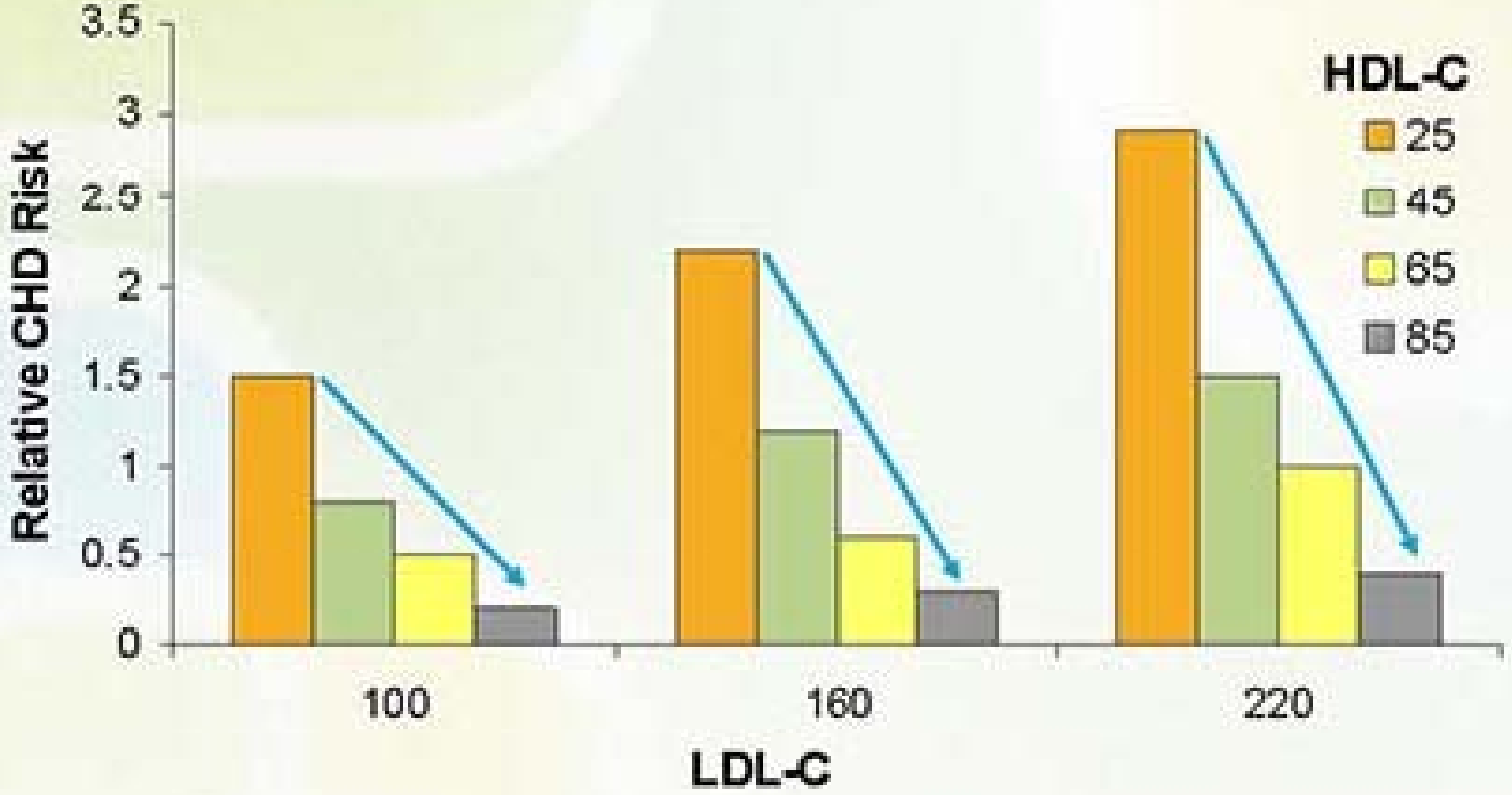
CHD Risk According to HDL-C Levels Framingham Study



Kannel WB. *Am J Cardiol* 1983;52:9B–12B. Copyright ©1983, with permission from Excerpta Medica Inc.

Framingham Heart Study: 4-Year CHD Risk in Men 50-70 Years Old by LDL-C and HDL-C



Castelli WP et al. JAMA. 1986;256:2835-2838.

Causes Of Low HDL Levels

- Genetic Apo A-1 deficiency (impaired synthesis)
- Familial HDL deficiency and Tangier disease (increased catabolism)
- Enzyme changes affecting HDL metabolism (genetic; acquired)
  - Increased CETP activity
  - Lipoprotein lipase deficiency
  - Increased hepatic lipase activity
  - LCAT deficiency
  - Insulin resistance/metabolic syndrome
  - Drugs: β-blockers, benzodiazepines, anabolic steroids

LCAT = lecithin-cholesterol acyltransferase

Other Methods That Raise HDL

Beneficial:

- Exercise
- Niacin
- Statins

Non-beneficial:

- Insulin
- Steroids
- Torcetrapib

Questionable:

- Alcohol
- Estrogen
- Fibrates
- TZDs

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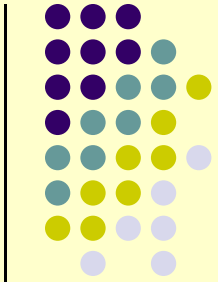

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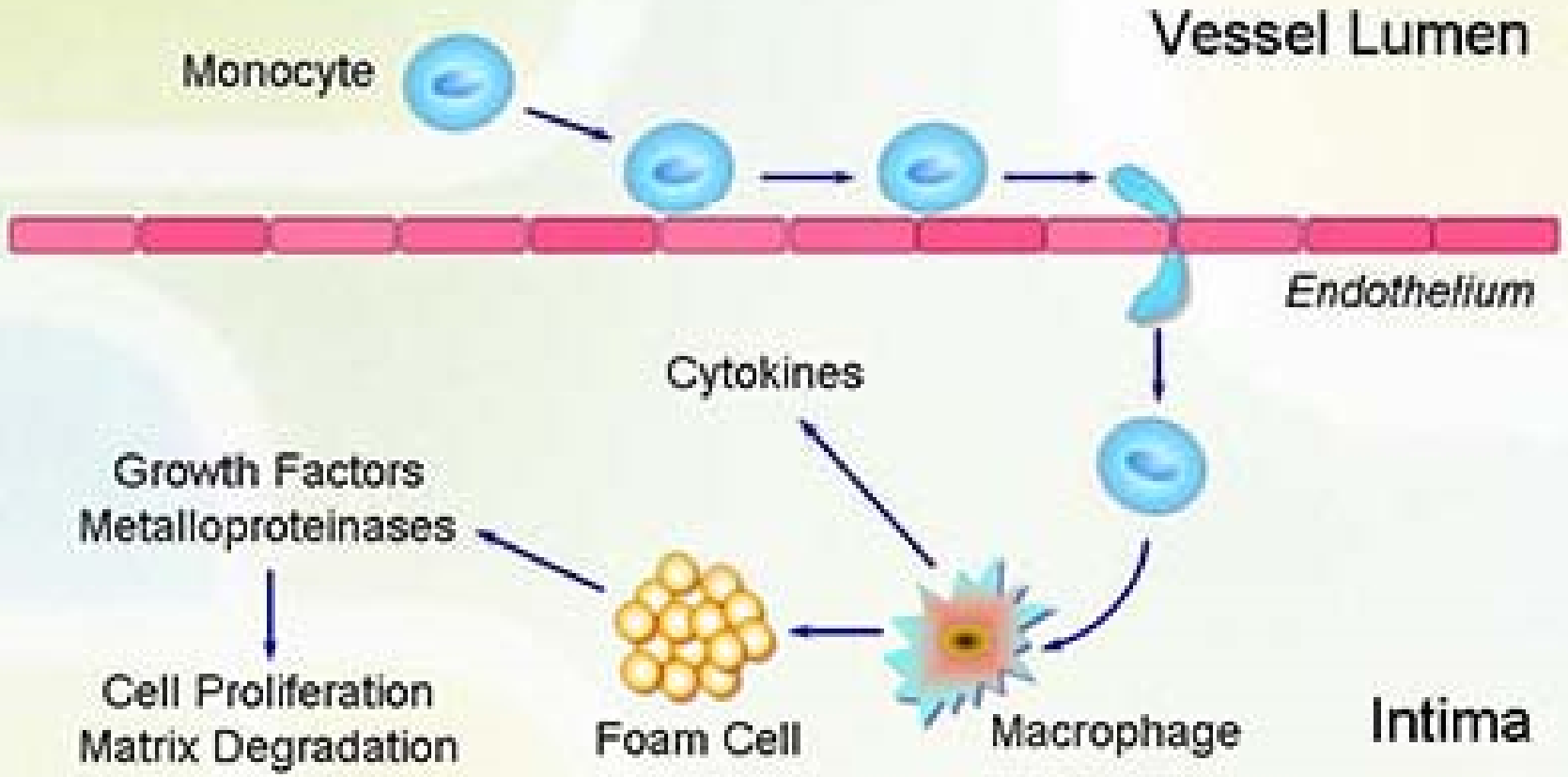
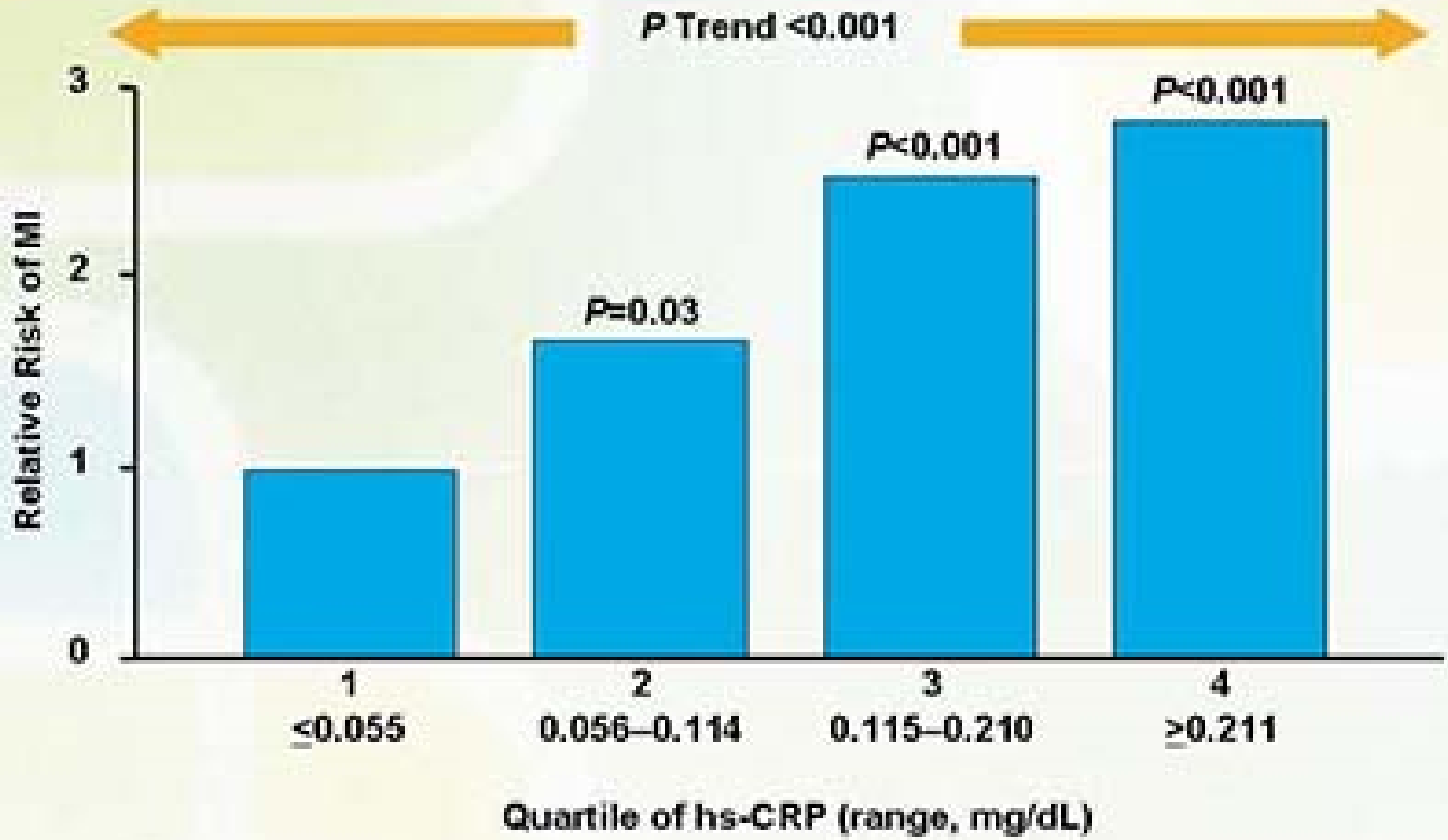
Atherosclerosis Is an Inflammatory Disease



Ross R. *N Engl J Med* 1999;340:115-126.

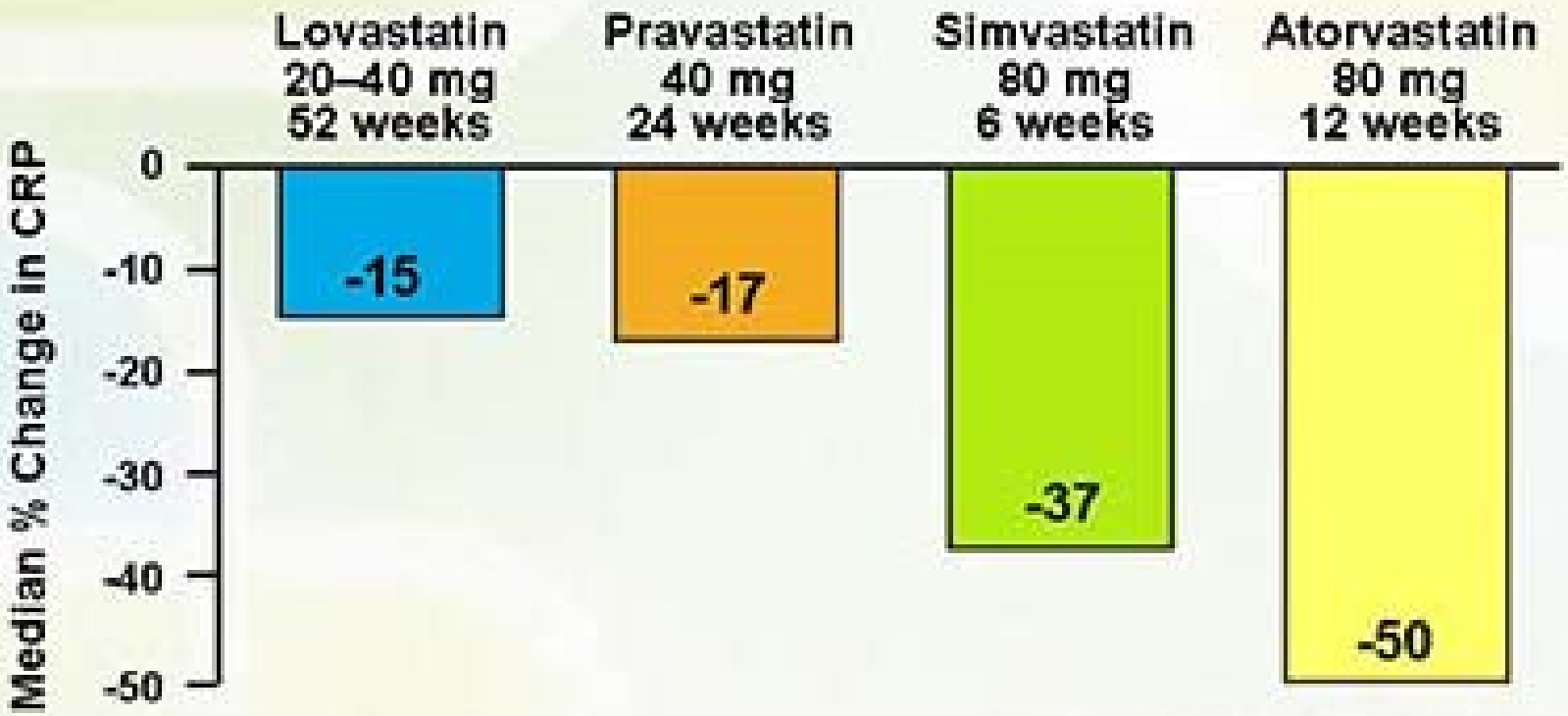
hs-CRP and Risk of Future MI in Apparently Healthy Men



Ridker PM et al. *N Engl J Med* 1997;336:973-979.

Statins Reduce C-Reactive Protein

Median Change in Placebo-controlled Trials With Hypercholesterolemic Patients



Ridker PM et al. N Engl J Med. 2001;344:1959-1965.
Albert MA et al. JAMA. 2001;286:64-70.
Bays HE et al. Am J Cardiol. 2002;90:942-946.
Ballantyne CM et al. Circulation. 2003;107:2409-15.

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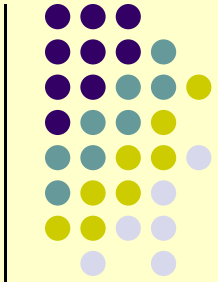

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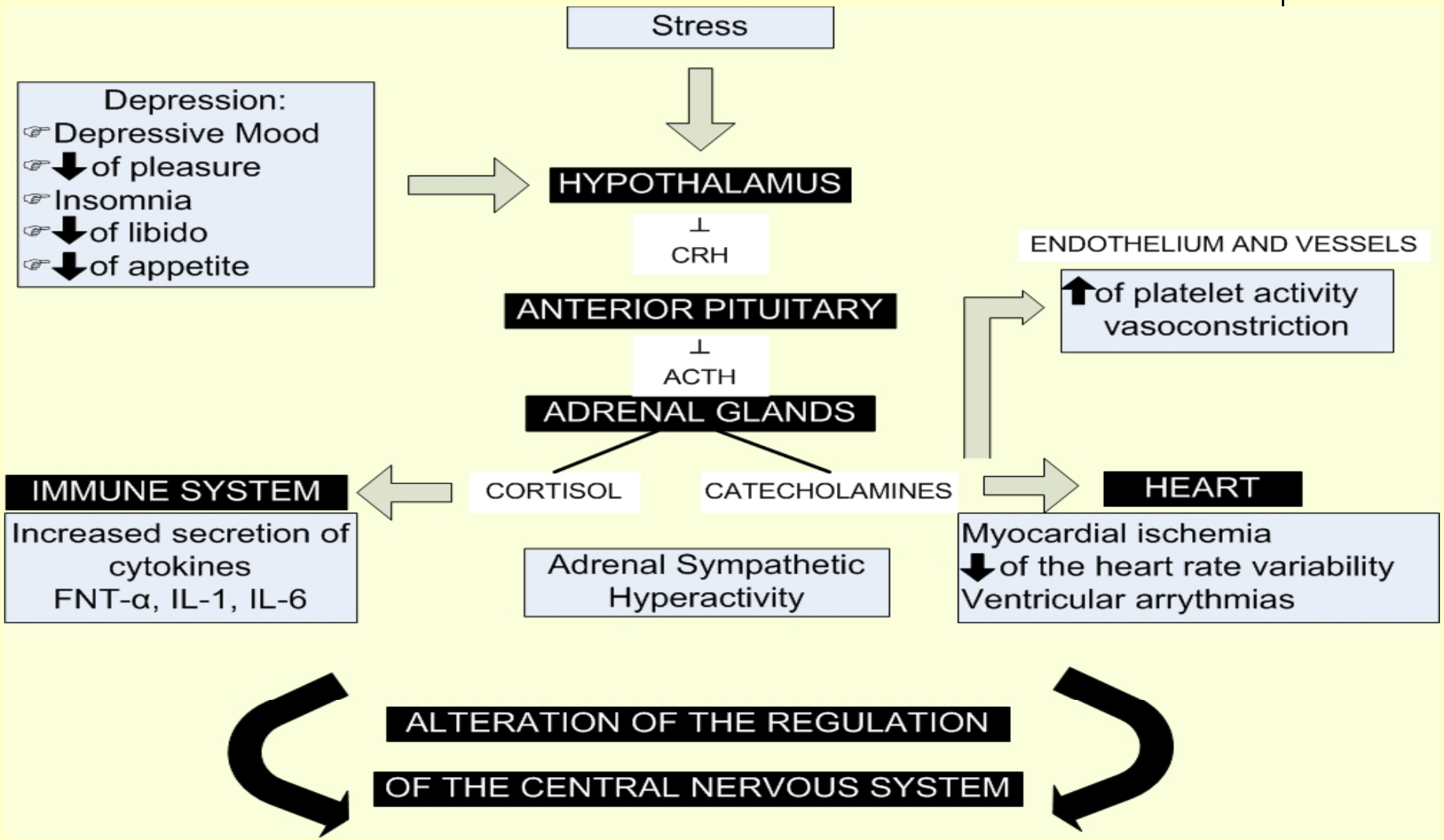
憂鬱症與心血管疾病的關係
Relationship between major depression and cardiovascular disease



心血管疾病工作危險因子

- 超時工作
- 輪班工作或夜班工作
- 期限壓力或隨時間變動的工作量
- 靜態性工作
- 多份工作：除正職外另有兼職
- 多變的職務內容或勤務地點
- 海外出差（特別是有時差之出差）
- 需持續高度警戒之工作
- 發生意外或企業改造等突發性之高度緊張事件
- 睡眠時間
- 通勤時間

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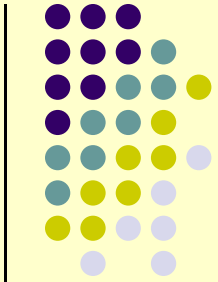

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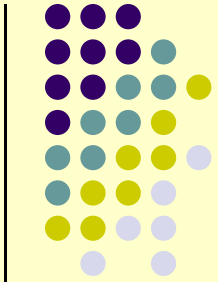
預防心臟病、中風及心臟病發作的要點

避免吸煙

注意營養

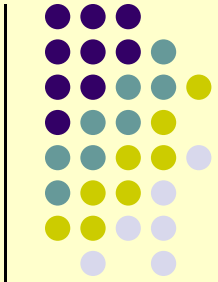
積極運動

如何在2009年降低心血管疾病風險



- 20—40歲:建立基本血脂肪資料
- 男性40歲女性45歲以上:
  - 建立基本資料.每5年檢查身体質量指数,腰圍,糖尿病,血脂肪,及評估心血管疾病風險.
  - 如風險指數在10%-15%,加測高感度C反應蛋白
- 多吃水果和蔬菜,少吃肉類
- 每天運動

如何養成每天走路的習慣



- 攜帶計步器，每天走10,000步 (5英哩)
- 將每天的目標寫下，貼在冰箱上
- 找一位一起走路的夥伴
- 儘可能在清早或午休時間走
- 在達到目標體重後，給自己適當的獎勵