

Cardiovascular Risk Stratification in Metabolic Syndrome

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Metabolic Syndrome

Characterized by five major abnormalities

- Obesity (central body and visceral)
- Hypertension
- Insulin resistance (hyperinsulinemia)
- Glucose intolerance
- Dyslipidaemia

Clinical Identification

- Abdominal Obesity
- Atherogenic dyslipidaemia
- Hypertension
- Glucose intolerance

Obesity

Reduces life expectancy by

7.1 yrs. in men
5.8 yrs. in women } **Non-smoker**

13.7 yrs. In men
13.3 yrs. In women } **Smoker**

Coronary heart disease is the major cause of death

Hypertension

- Atherosclerosis increases as BP rises
- Anti hypertensive therapy reduces the risk of
 - ✓ Stroke by 30%
 - ✓ Coronary heart disease by 20%

Diabetes

- Potent risk factor for CHD
- 70% of diabetic patient die of cardiovascular diseases

Assessing CHD Risk in Men

Step 1: Age

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

Step 2: Total Cholesterol

TC (mg/dL)	Points at Age 20-39	Points at Age 40-49	Points at Age 50-59	Points at Age 60-69	Points at Age 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

Step 3: HDL-Cholesterol

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

Step 4: Systolic Blood Pressure

Systolic BP (mm Hg)	Points if Untreated	Points if Treated
<120	0	0
120-129	0	1
130-139	1	2
140-159	1	2
≥160	2	3

Step 5: Smoking Status

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

Step 6: Adding Up the Points

Age	_____
Total cholesterol	_____
HDL-cholesterol	_____
Systolic blood pressure	_____
Smoking status	_____
Point total	_____

Step 7: CHD Risk

Point Total	10-Year Risk	Point Total	10-Year Risk
<0	<1%	11	8%
0	1%	12	10%
1	1%	13	12%
2	1%	14	16%
3	1%	15	20%
4	1%	16	25%
5	2%	≥17	≥30%
6	2%		
7	3%		
8	4%		
9	5%		
10	6%		

Note: Risk estimates were derived from the experience of the Framingham Heart Study, a predominantly Caucasian population in Massachusetts, USA.

Step 1: Age

Men

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

Women

Years	Points
20-34	-7
35-39	-3
40-44	0
45-49	3
50-54	6
55-59	8
60-64	10
65-69	12
70-74	14
75-79	16

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

Step 2: Total Cholesterol

Men

TC (mg/dL)	Points at Age 20-39	Points at Age 40-49	Points at Age 50-59	Points at Age 60-69	Points at Age 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

Women

TC (mg/dL)	Points at Age 20-39	Points at Age 40-49	Points at Age 50-59	Points at Age 60-69	Points at Age 70-79
<160	0	0	0	0	0
160-199	4	3	2	1	1
200-239	8	6	4	2	1
240-279	11	8	5	3	2
≥280	13	10	7	4	2

Note: TC and HDL-C values should be the average of at least two fasting lipoprotein measurements.
Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. *JAMA*. 2001;285:2486-2497.

ATP III Framingham Risk Scoring

Step 3: HDL-Cholesterol

Men

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

Women

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

Note: HDL-C and TC values should be the average of at least two fasting lipoprotein measurements.

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Step 4: Systolic Blood Pressure

Men

Systolic BP (mm Hg)	Points if Untreated	Points if Treated
<120	0	0
120-129	0	1
130-139	1	2
140-159	1	2
≥160	2	3

Women

Systolic BP (mm Hg)	Points if Untreated	Points if Treated
<120	0	0
120-129	1	3
130-139	2	4
140-159	3	5
≥160	4	6

Note: The average of several BP measurements is needed for an accurate measurement of baseline BP. If an individual is on antihypertensive treatment, extra points are added.

Step 5: Smoking Status

Men

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

Women

	Points at Age 20-39	Points at Age 40-49	Points at Age 50-59	Points at Age 60-69	Points at Age 70-79
Nonsmoker	0	0	0	0	0
Smoker ⁹	7	4	2	1	

Note: Any cigarette smoking in the past month.

Step 6: Adding Up the Points (Sum From Steps 1–5)

Age	_____
Total cholesterol	_____
HDL-cholesterol	_____
Systolic blood pressure	_____
Smoking status	_____
Point total	_____

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Step 7: CHD Risk for Men

Point Total	10-Year Risk	Point Total	10-Year Risk
<0	<1%	11	8%
0	1%	12	10%
1	1%	13	12%
2	1%	14	16%
3	1%	15	20%
4	1%	16	25%
5	2%	≥17	≥30%
6	2%		
7	3%		
8	4%		
9	5%		
10	6%		

Note: Determine the 10-year absolute risk for hard CHD (MI and coronary death) from point total.

Assessing CHD Risk in Men

Step 1: Age

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

Step 4: Systolic Blood Pressure

Systolic BP (mm Hg)	Points if Untreated	Points if Treated
<120	0	0
120-129	0	1
130-139	1	2
140-159	1	2
≥160	2	3

Step 6: Adding Up the Points

Age	8
Total cholesterol	4
HDL-cholesterol	2
Systolic blood pressure	3
Smoking status	3
Point total	20

Step 2: Total Cholesterol

TC (mg/dL)	Points at Age 20-39	Points at Age 40-49	Points at Age 50-59	Points at Age 60-69	Points at Age 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

Step 3: HDL-Cholesterol

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

Step 5: Smoking Status

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

Step 7: CHD Risk

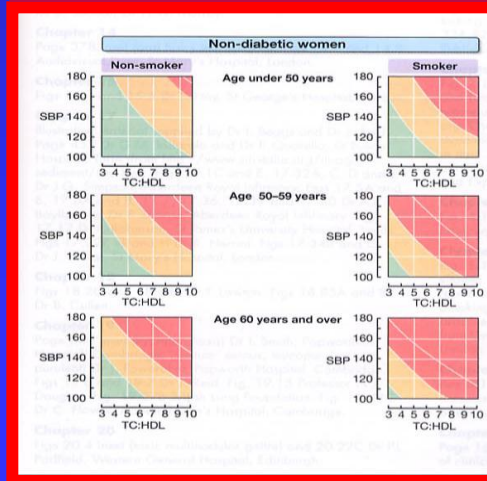
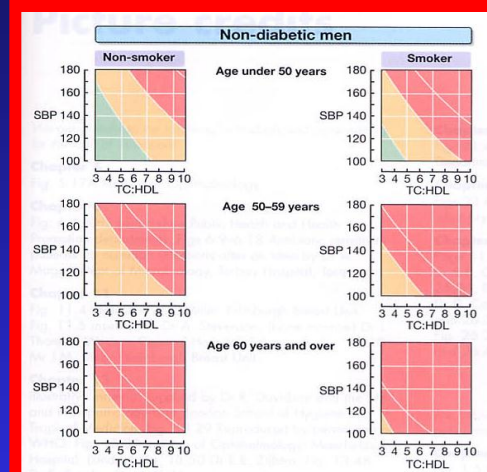
Point Total	10-Year Risk	Point Total	10-Year Risk
<0	<1%	11	8%
0	1%	12	10%
1	1%	13	12%
2	1%	14	16%
3	1%	15	20%
4	1%	16	25%
5	2%	≥17	≥30%
6	2%		
7	3%		
8	4%		
9	5%		
10	6%		

Note: Risk estimates were derived from the experience of the Framingham Heart Study, a predominantly Caucasian population in Massachusetts, USA.

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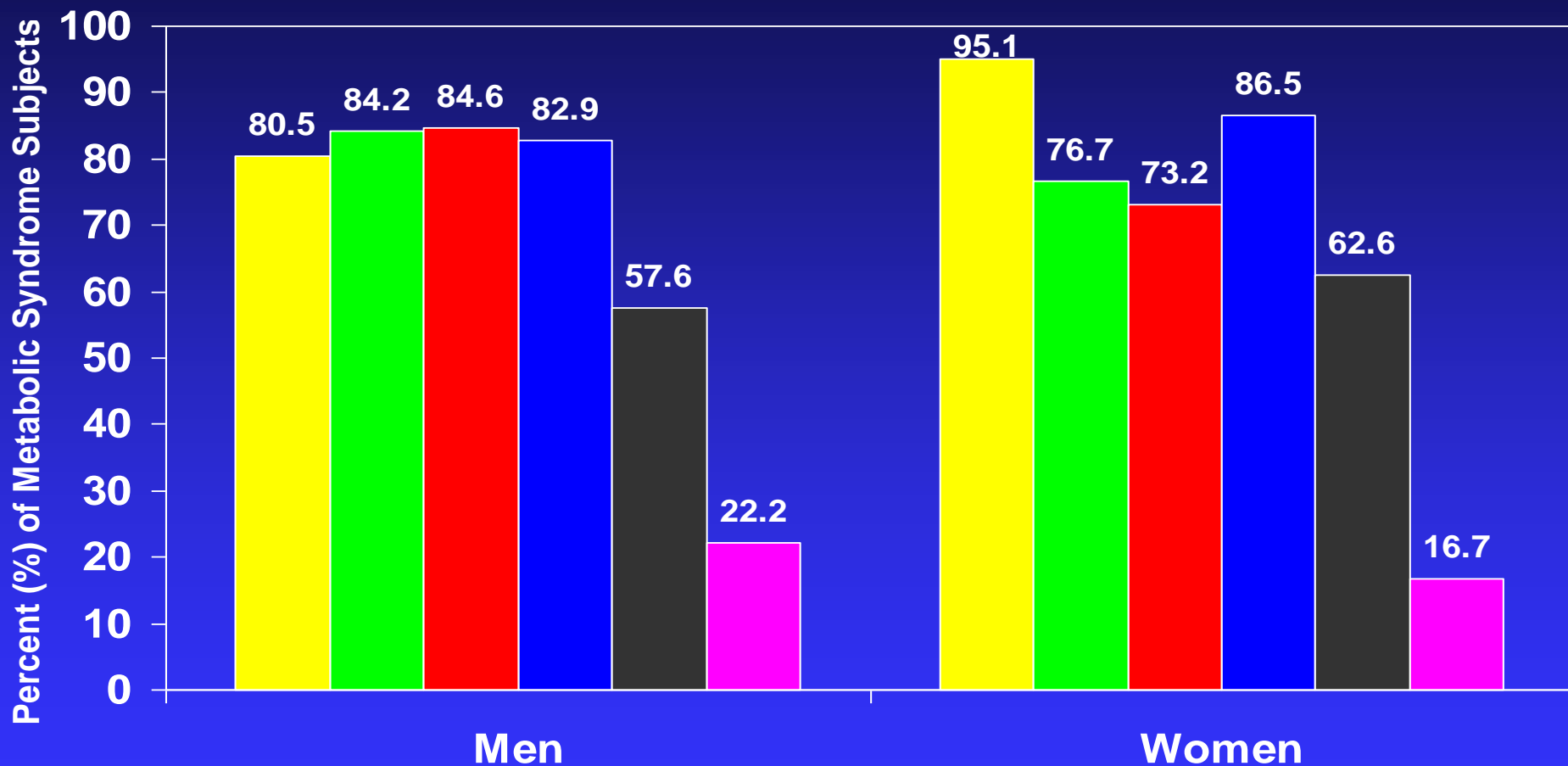
Cardiovascular risk chart developed by: British Joint Societies



■ CVD risk < 10% over next 10 years
■ CVD risk 10-20% over next 10 years
■ CVD risk > 20% over next 10 years
 SBP = systolic blood pressure mmHg
 TC:HDL = serum total cholesterol to HDL cholesterol ratio
 CVD risk over next 10 years: 10% 20% 30%

Prevalence of Selected Risk Factors in US Adults with the Metabolic Syndrome (without Diabetes)

(Wong et al., Am J Cardiol 2003, in press)



■ Waist Cir >40cm M/>35 cm W

■ Fasting Trig. \geq 150 mg/dl

■ LDL-C \geq 130 mg/dl

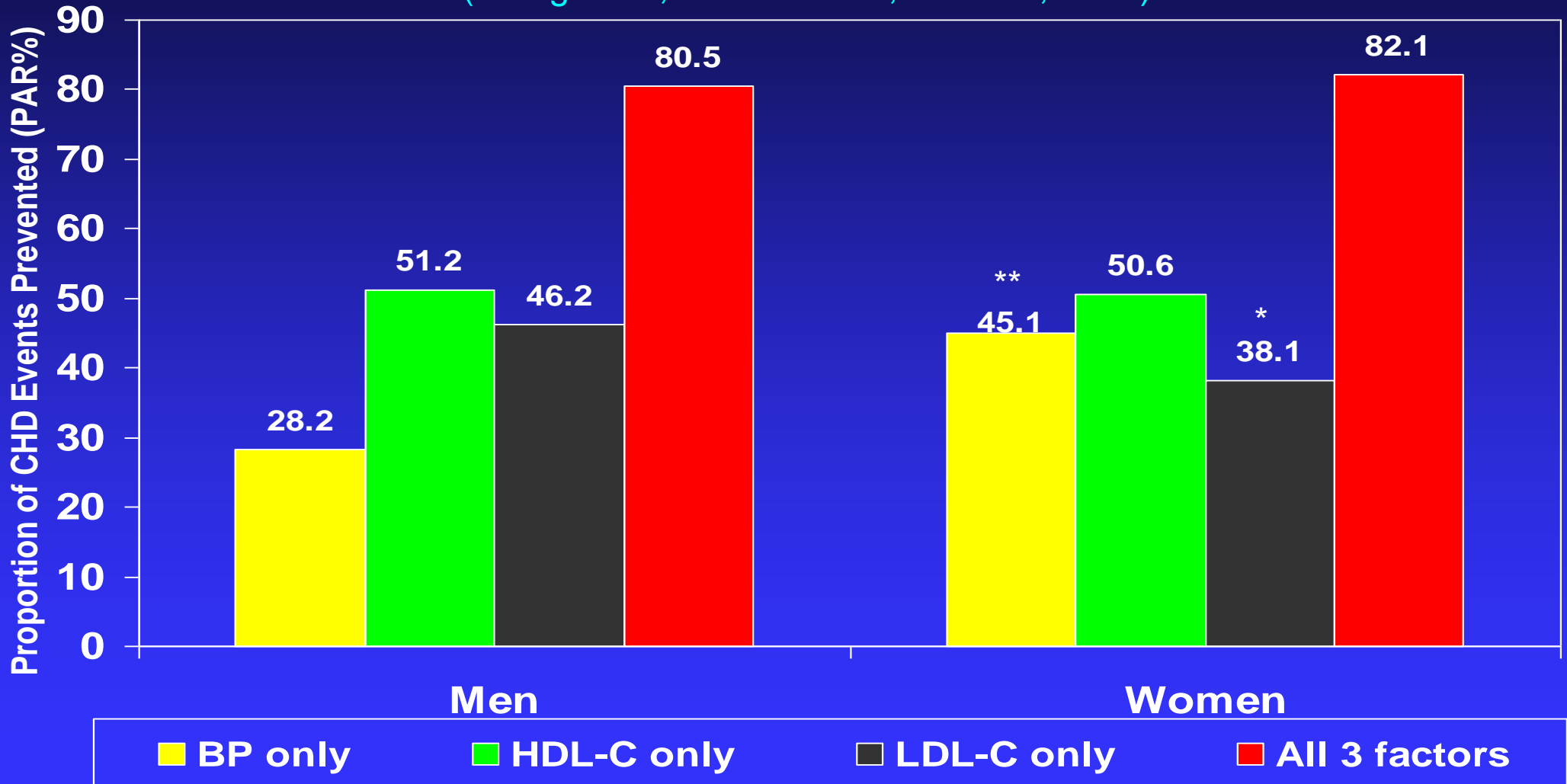
■ Blood Pressure \geq 130/85 or Rx

■ HDL-C <40 mg/dl M/<50 mg/dl W

■ Fasting Glucose 110-125 mg/dl

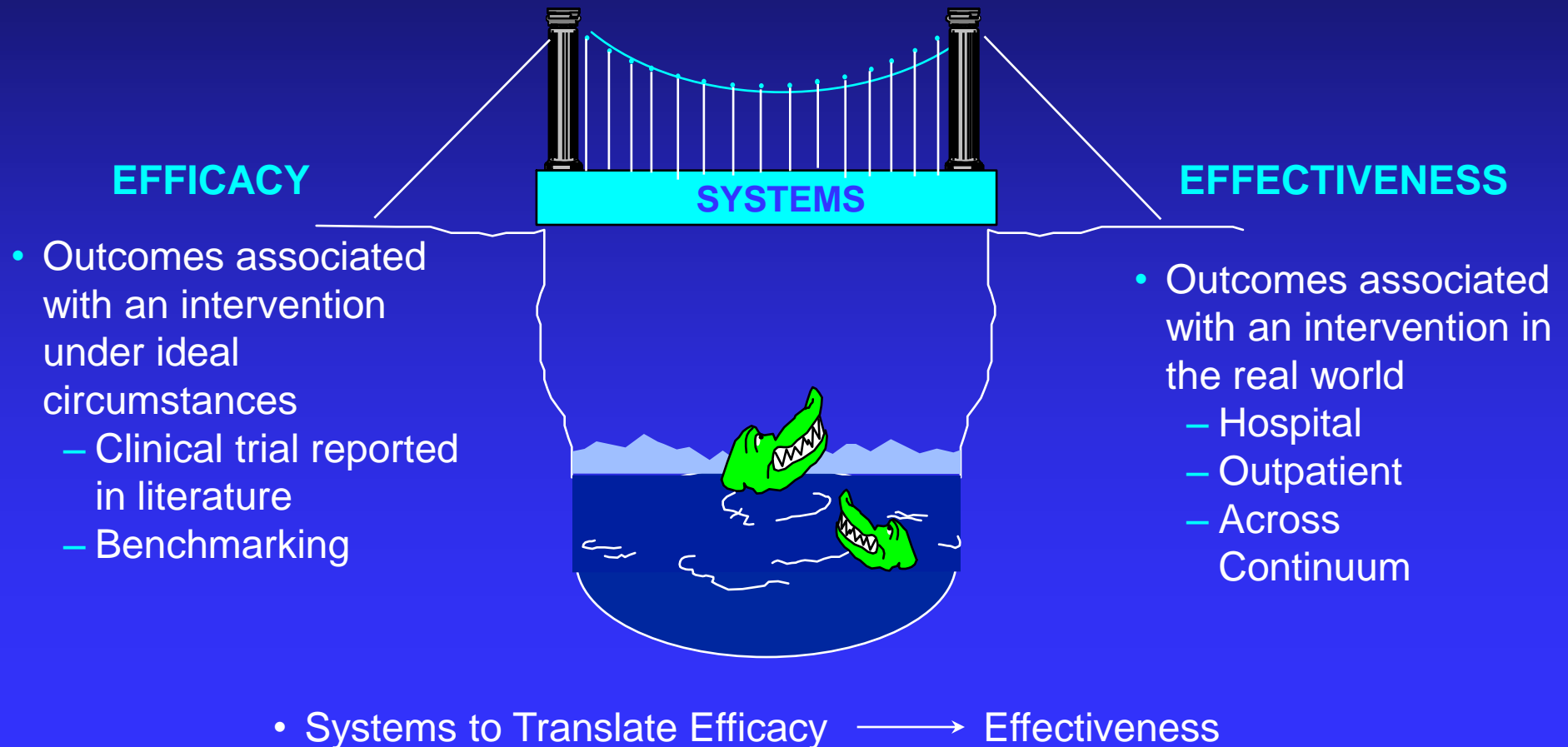
Estimated Proportion of CHD Events Preventable by Control of Blood Pressure, HDL-C, LDL-C, and All 3 Factors to “Optimal” Levels in Persons with the Metabolic Syndrome

(Wong et al., Am J Cardiol, June 15, 2003)



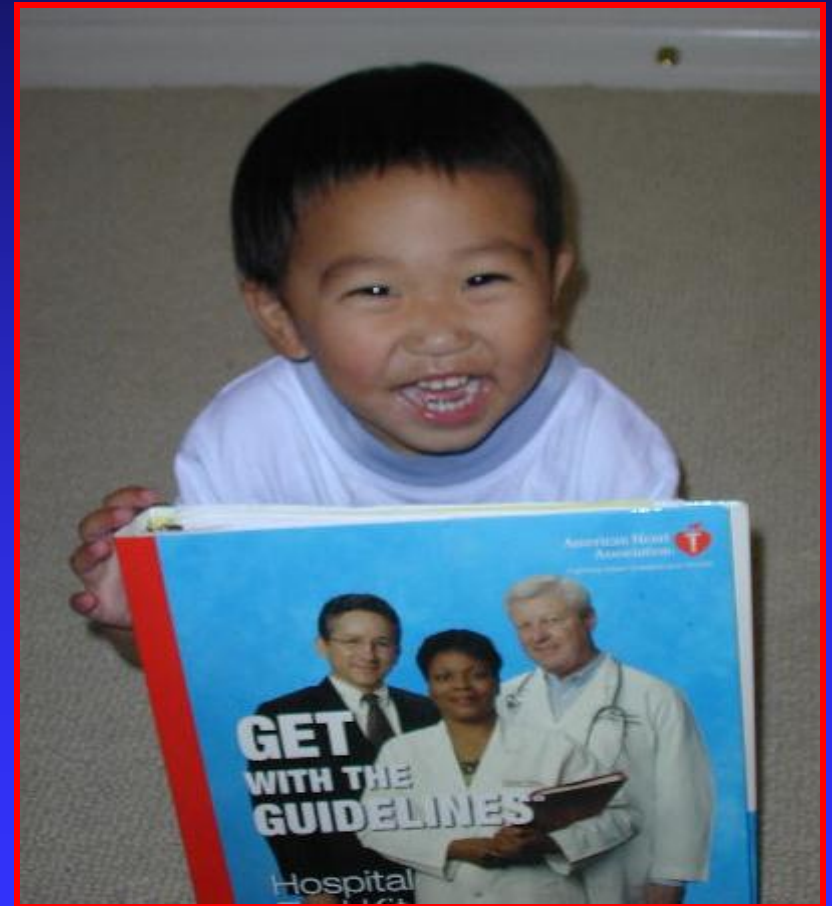
* p<0.05, ** p<0.01 compared to men

Bridging the Gap Between Efficacy and Effectiveness



It's never too early to *Get With The Guidelines!*

If *Get With The Guidelines* is implemented, more than 40,000+ lives could be saved every year!



Thank You



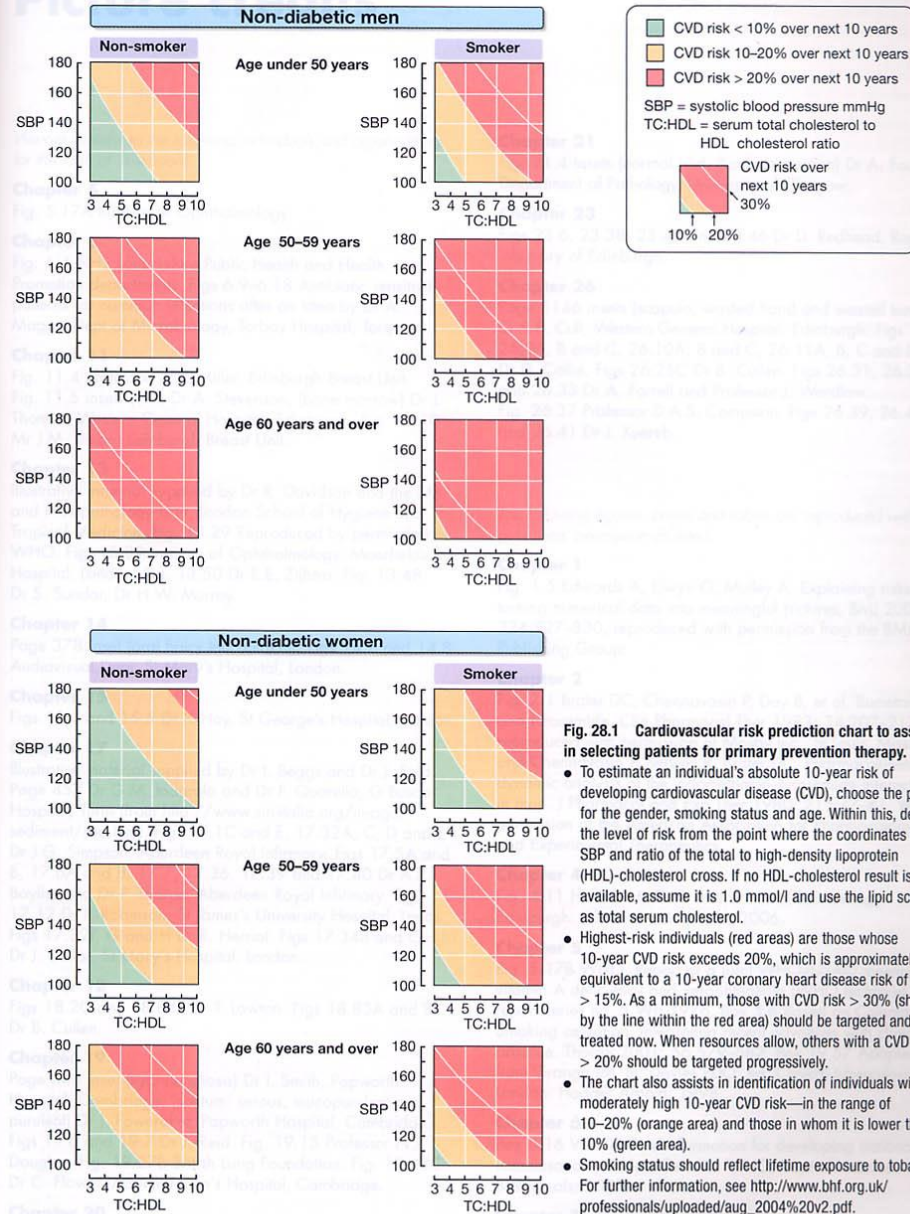


Fig. 28.1 Cardiovascular risk prediction chart to assist in selecting patients for primary prevention therapy.

- To estimate an individual's absolute 10-year risk of developing cardiovascular disease (CVD), choose the panel for the gender, smoking status and age. Within this, define the level of risk from the point where the coordinates for SBP and ratio of the total to high-density lipoprotein (HDL)-cholesterol cross. If no HDL-cholesterol result is available, assume it is 1.0 mmol/l and use the lipid scale as total serum cholesterol.
- Highest-risk individuals (red areas) are those whose 10-year CVD risk exceeds 20%, which is approximately equivalent to a 10-year coronary heart disease risk of > 15%. As a minimum, those with CVD risk > 30% (shown by the line within the red area) should be targeted and treated now. When resources allow, others with a CVD risk > 20% should be targeted progressively.
- The chart also assists in identification of individuals with a moderately high 10-year CVD risk—in the range of 10-20% (orange area) and those in whom it is lower than 10% (green area).
- Smoking status should reflect lifetime exposure to tobacco. For further information, see http://www.bhf.org.uk/professionals/uploaded/aug_2004%20v2.pdf.