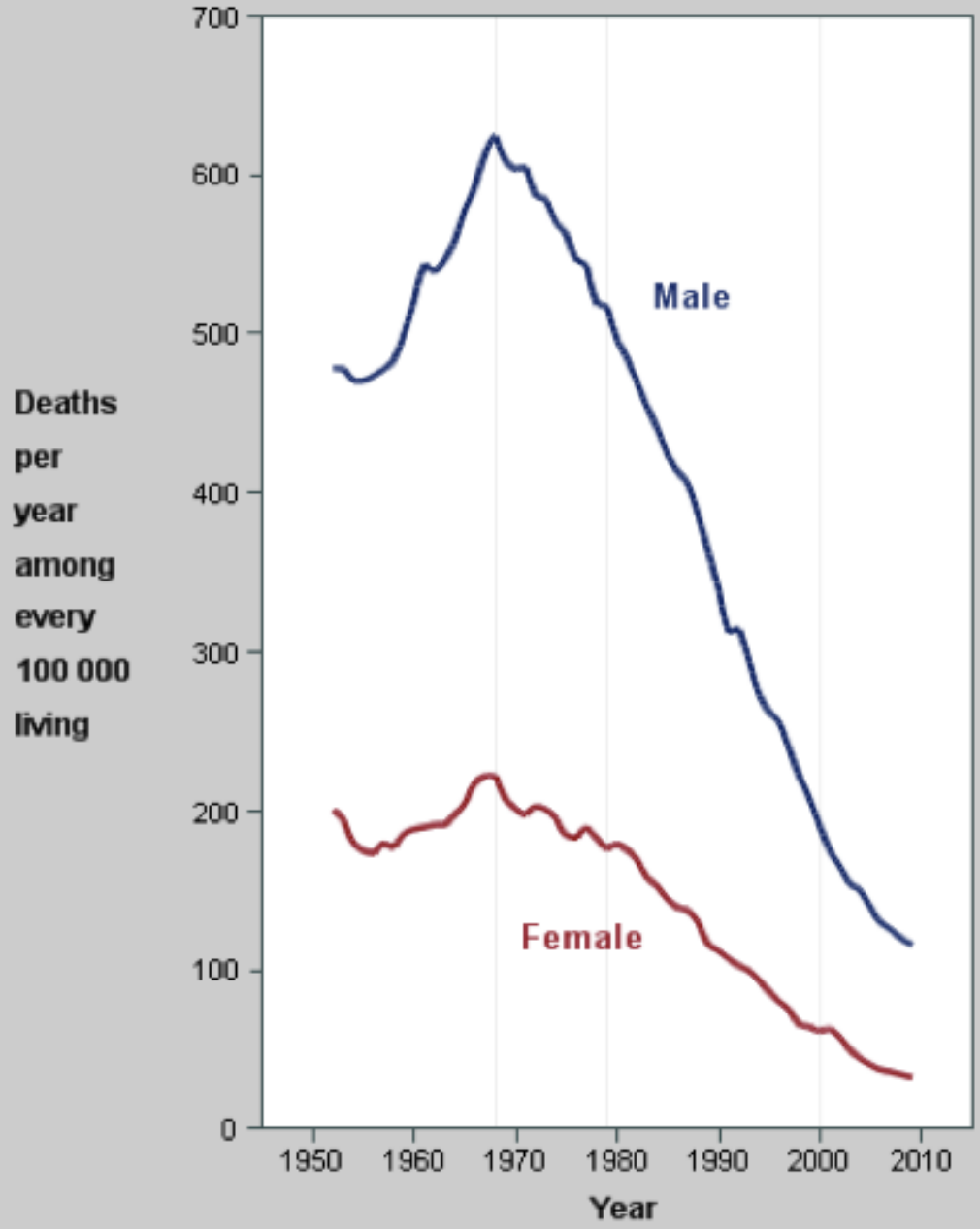
well-targeted primary prevention of cardiovascular disease: an underused high-value intervention?

Rod Jackson
University of Auckland, New Zealand
October 2015

Mortality trends for coronary heart disease: age 35-69 years, New Zealand (Aotearoa)



Male deaths from this cause at age 35-69 years in 2009:

- 845 (20% of deaths at this age)
- 116 out of every 100 000 males at this age, a rate which was:
  - → 39% less than in 2000 (rate: 190)
  - → 79% less than in 1975 (rate: 562)
  - → 75% less than in 1955 (rate: 470)

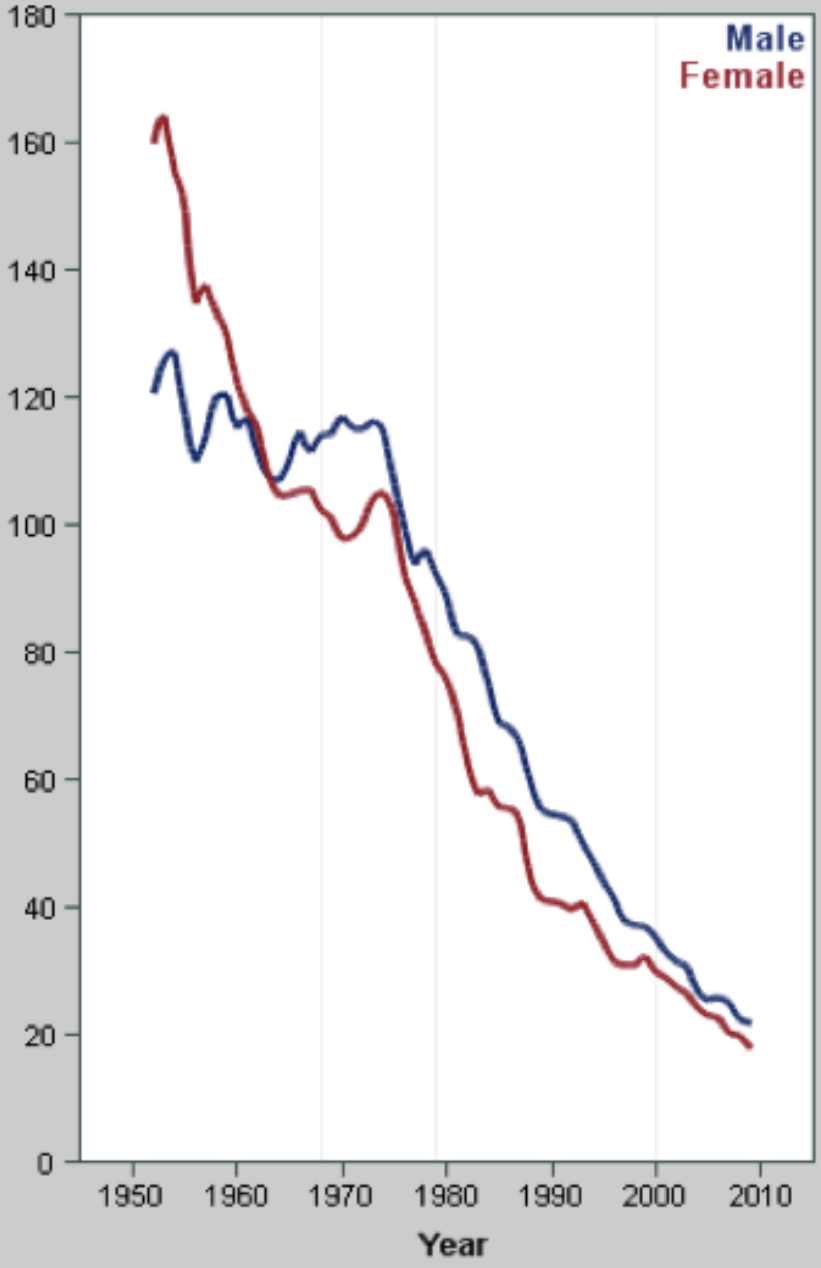
Female deaths from this cause at ages 35-69 years in 2009:

- 230 (8% of deaths at this age)
- 33 out of every 100 000 females at this age, a rate which was:
  - → 47% less than in 2000 (rate: 61)
  - → 82% less than in 1975 (rate: 184)
  - → 81% less than in 1955 (rate: 175)

Created: 17 May 2013, 4:34 pm
Males & females, ages 35-69 years
Coronary heart disease
New Zealand

www.mortality-trends.org

Mortality trends for stroke: age 35-69 years, New Zealand (Aotearoa)



Male deaths from this cause at age 35-69 years in 2009:

- 164 (4% of deaths at this age)
- 22 out of every 100 000 males at this age, a rate which was:
  - → 38% less than in 2000 (rate: 35)
  - → 79% less than in 1975 (rate: 106)
  - → 81% less than in 1955 (rate: 117)

Female deaths from this cause at ages 35-69 years in 2009:

- 134 (4% of deaths at this age)
- 18 out of every 100 000 females at this age, a rate which was:
  - → 40% less than in 2000 (rate: 30)
  - → 82% less than in 1975 (rate: 101)
  - → 88% less than in 1955 (rate: 149)

Created: 17 May 2013, 4:34 pm
Males & females, ages 35-69 years
Stroke
New Zealand

www.mortality-trends.org

Contribution of trends in survival and coronary-event rates to changes in coronary heart disease mortality: 10-year results from 37 WHO MONICA Project populations

Lancet 1999; 353: 1547-57

*Hugh Tunstall-Pedoe, Kari Kuulasmaa, Markku Mähönen, Hanna Tolonen, Esa Ruokokoski, Philippe Amouyel, for the WHO MONICA (monitoring trends and determinants in cardiovascular disease) Project**

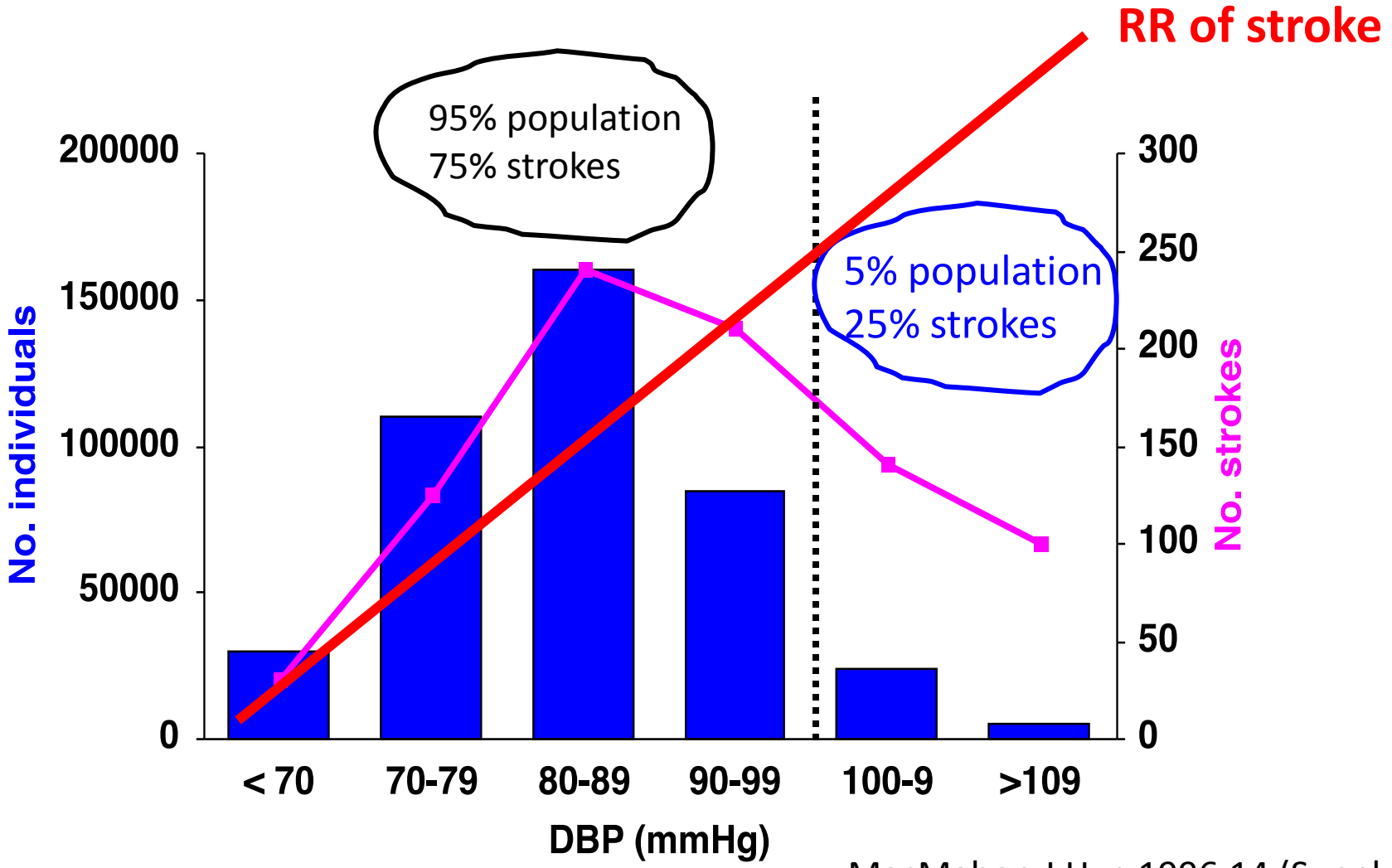
Findings: Contribution to changing CHD mortality varied, but in populations in which mortality decreased, coronary-event rates contributed two thirds and case fatality one third.

Interpretation: Over the decade studied *(1980-5 through 1991-5)*, the 37 populations in the WHO MONICA Project showed substantial contributions from changes in survival, but the major determinant of decline in CHD mortality is whatever drives changing coronary-event rates.

Rose's 'prevention paradox' the whole population risk axiom

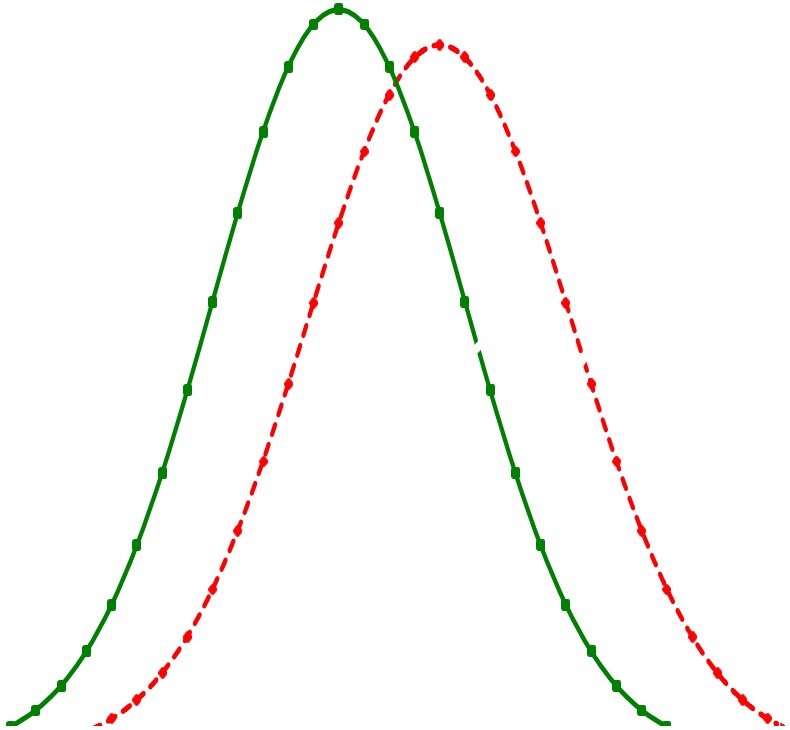
a large number of people at small risk may give rise to more cases in a population than a small number of people at high risk

rationale for a population-based approach: lowering blood pressure & stroke events



MacMahon J Hyp 1996;14 (Suppl 6)

population-based approach

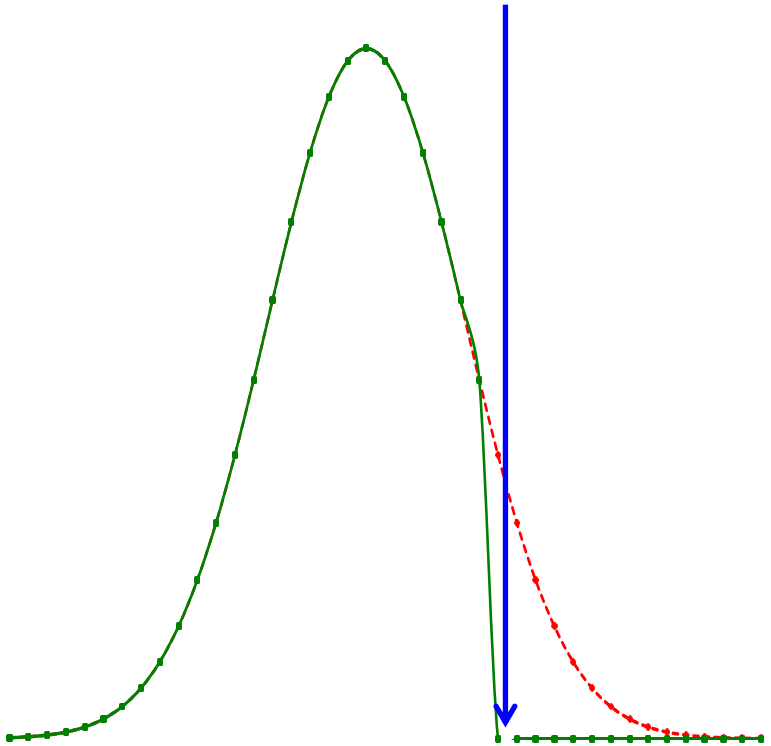


distribution shifting:

⇩BP or TC

population- wide

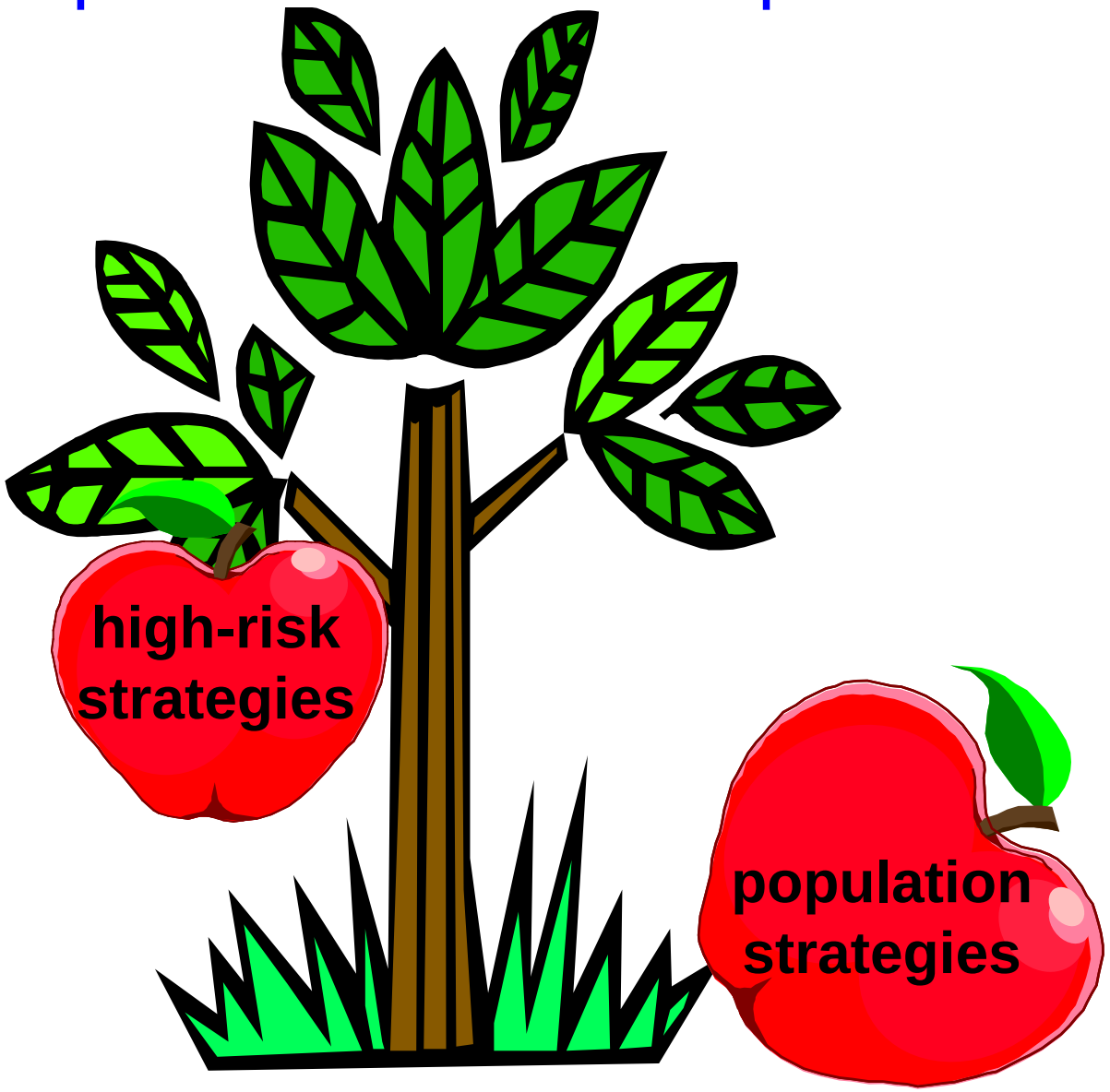
high-risk approach



treatment of high BP or TC:

⇩ only if high

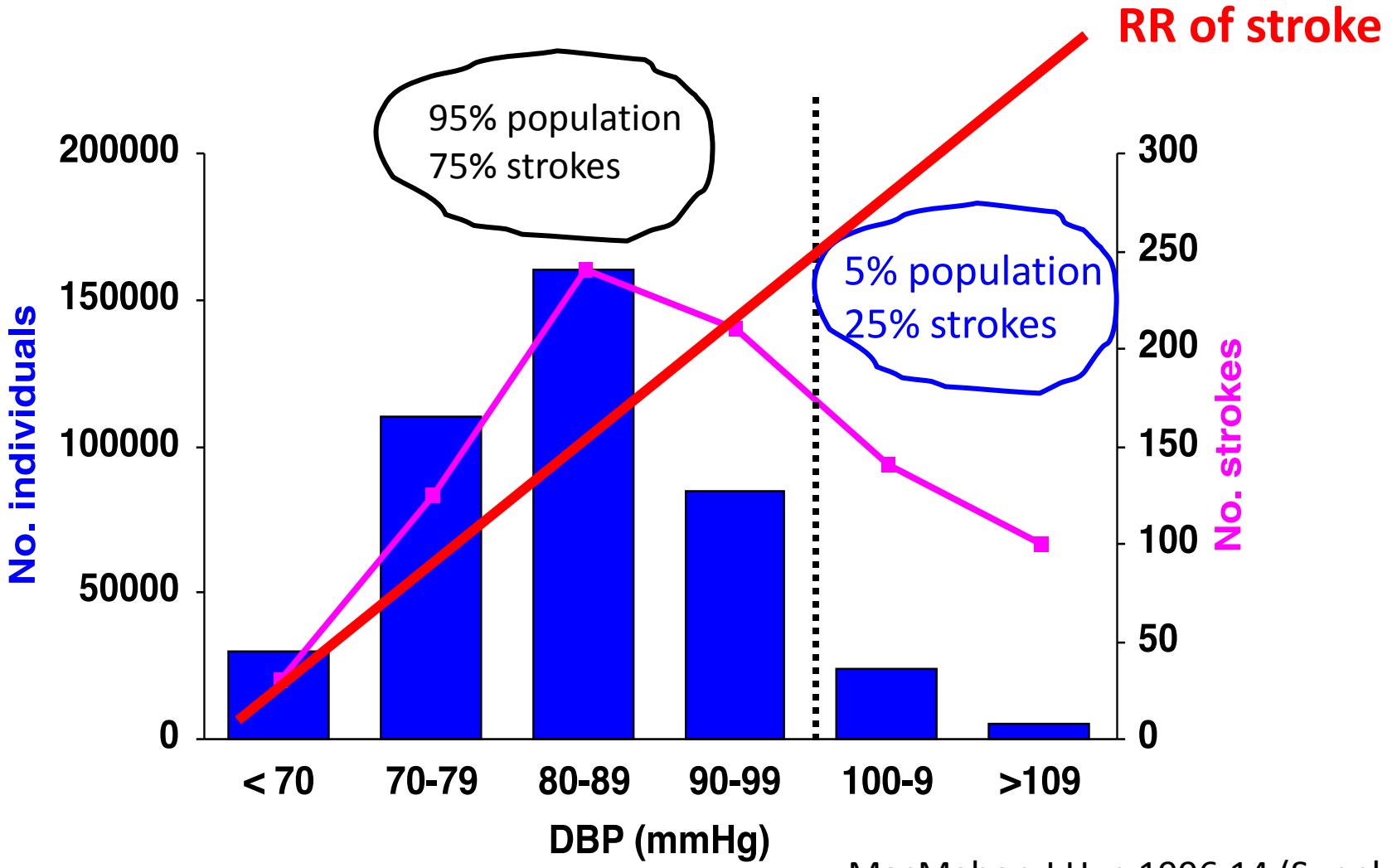
has the ‘low-hanging fruit’ of population-based CVD prevention all been picked?



Rose's high-risk axiom

all policy *(including treatment)* decisions should be based on absolute measures of risk

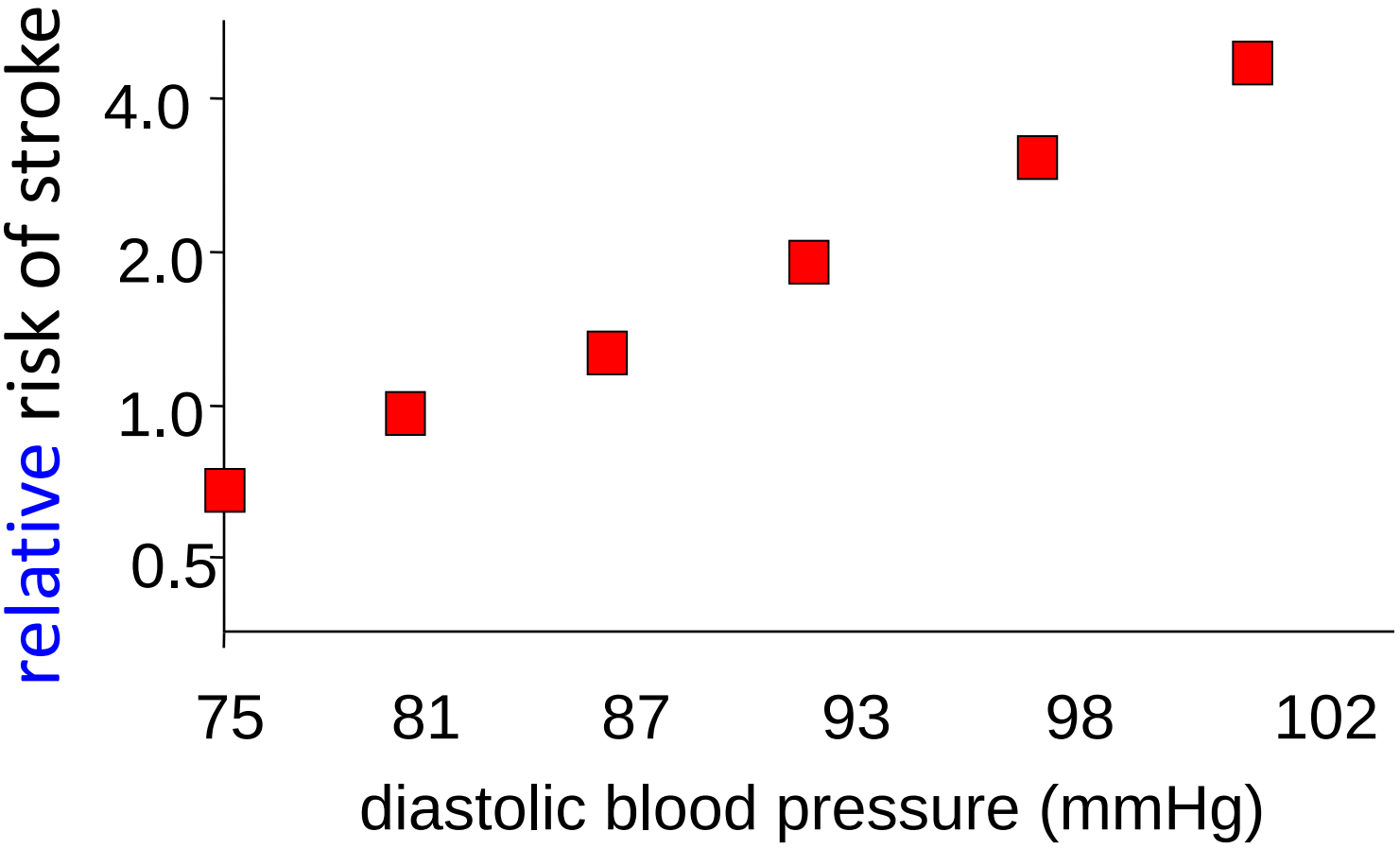
rationale for a population-based approach: lowering blood pressure & stroke events



MacMahon J Hyp 1996;14 (Suppl 6)

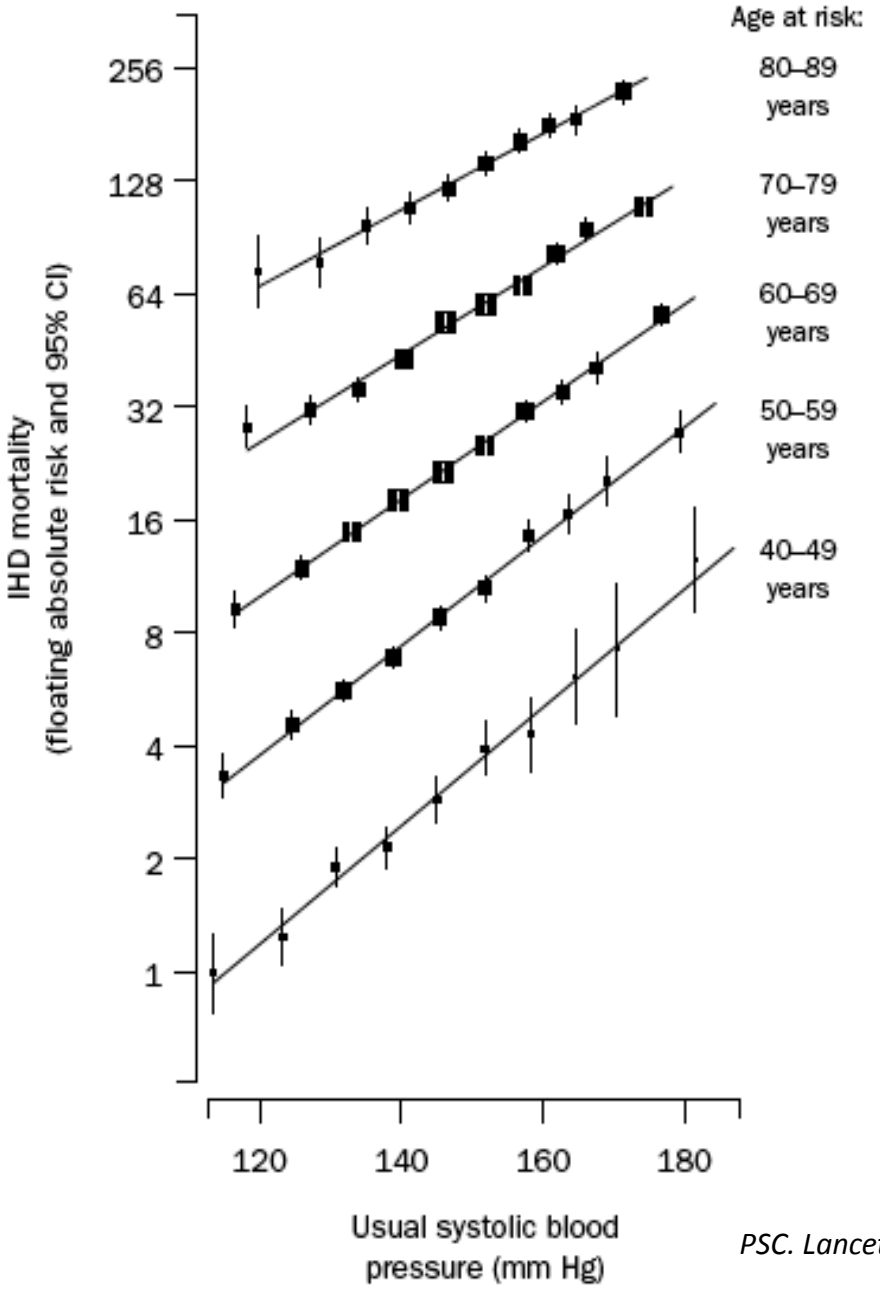
relative stroke risk and usual Blood Pressure

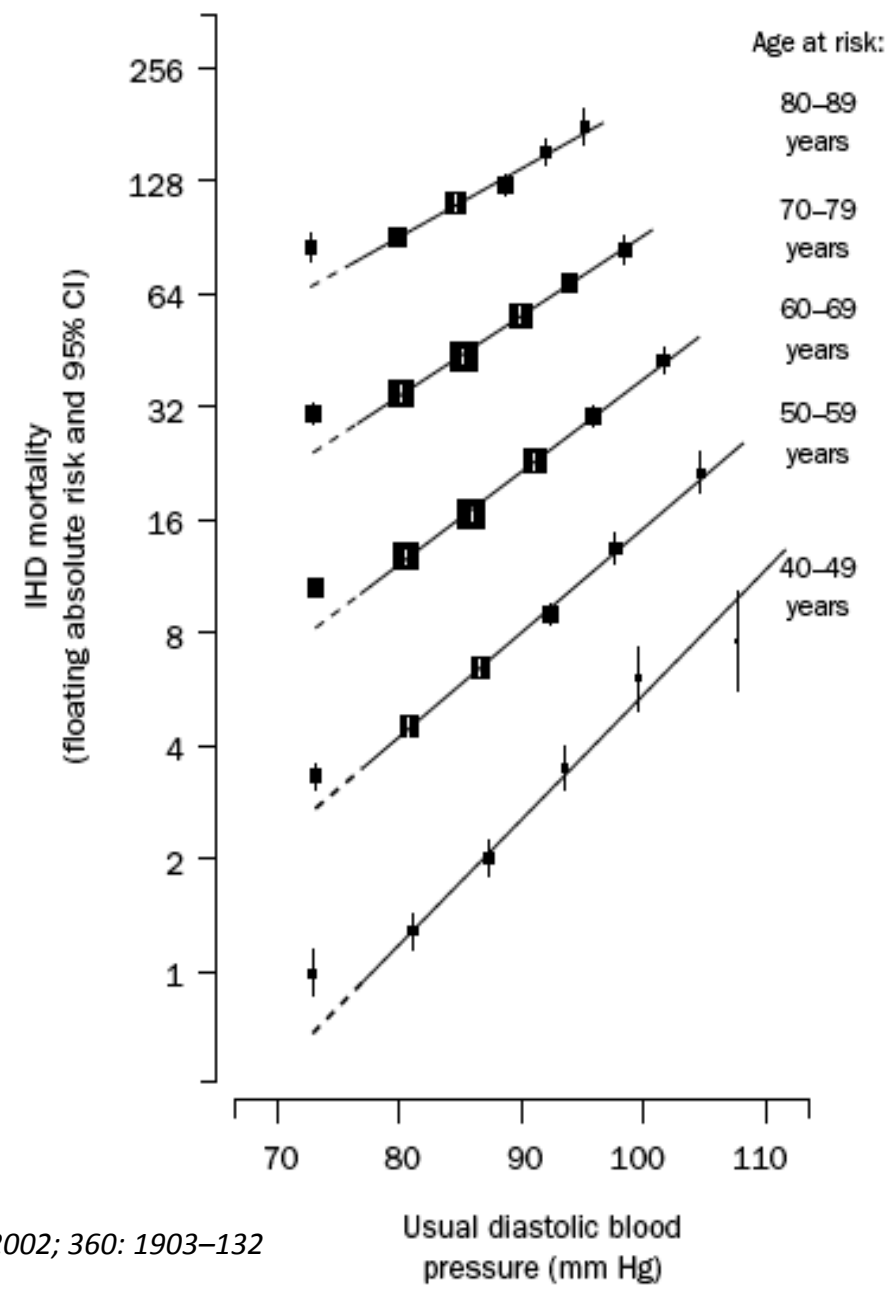
(45 prospective studies: 450,000 people 13,000 events)



PSC Lancet 1995;346:1647-53

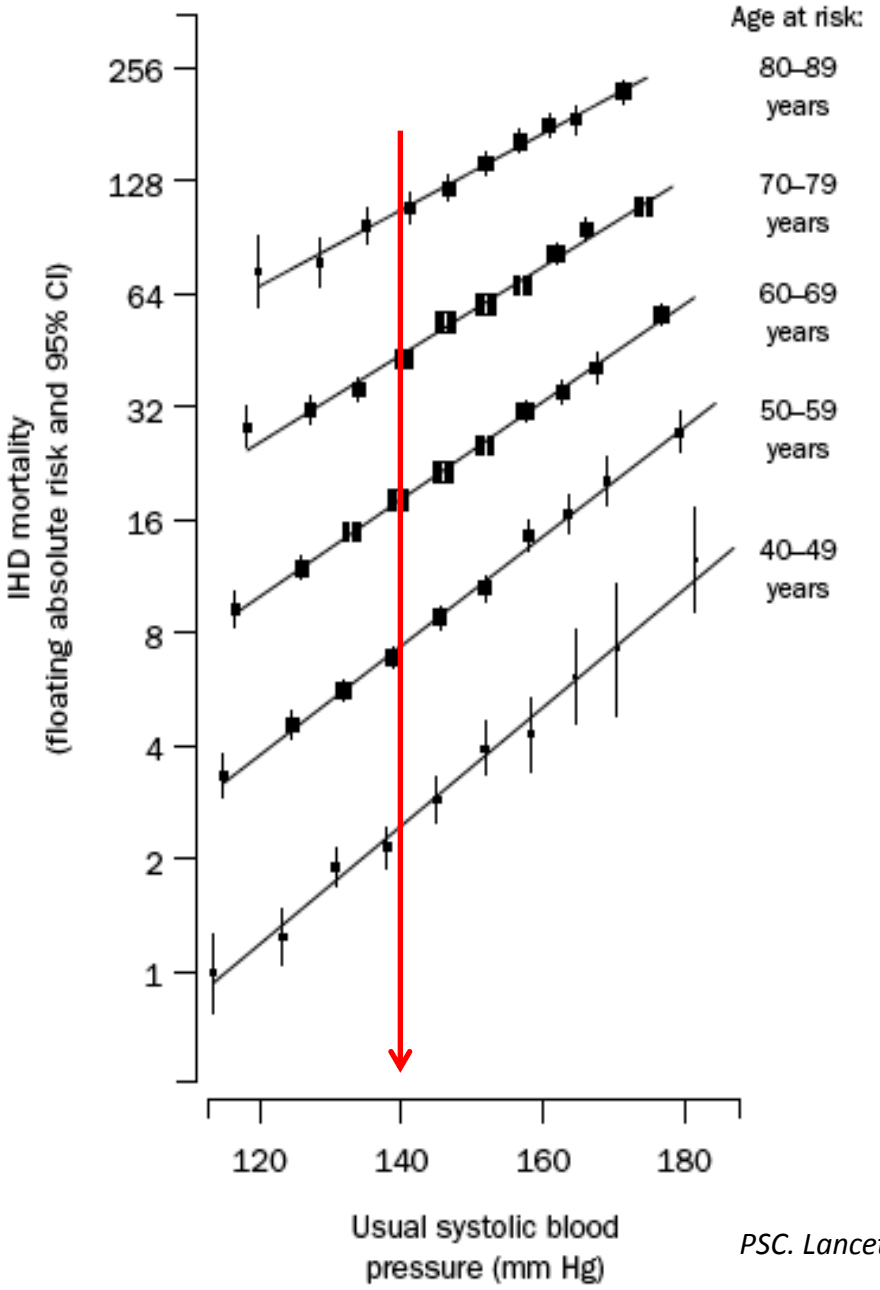
BP & absolute IHD mortality risk by age

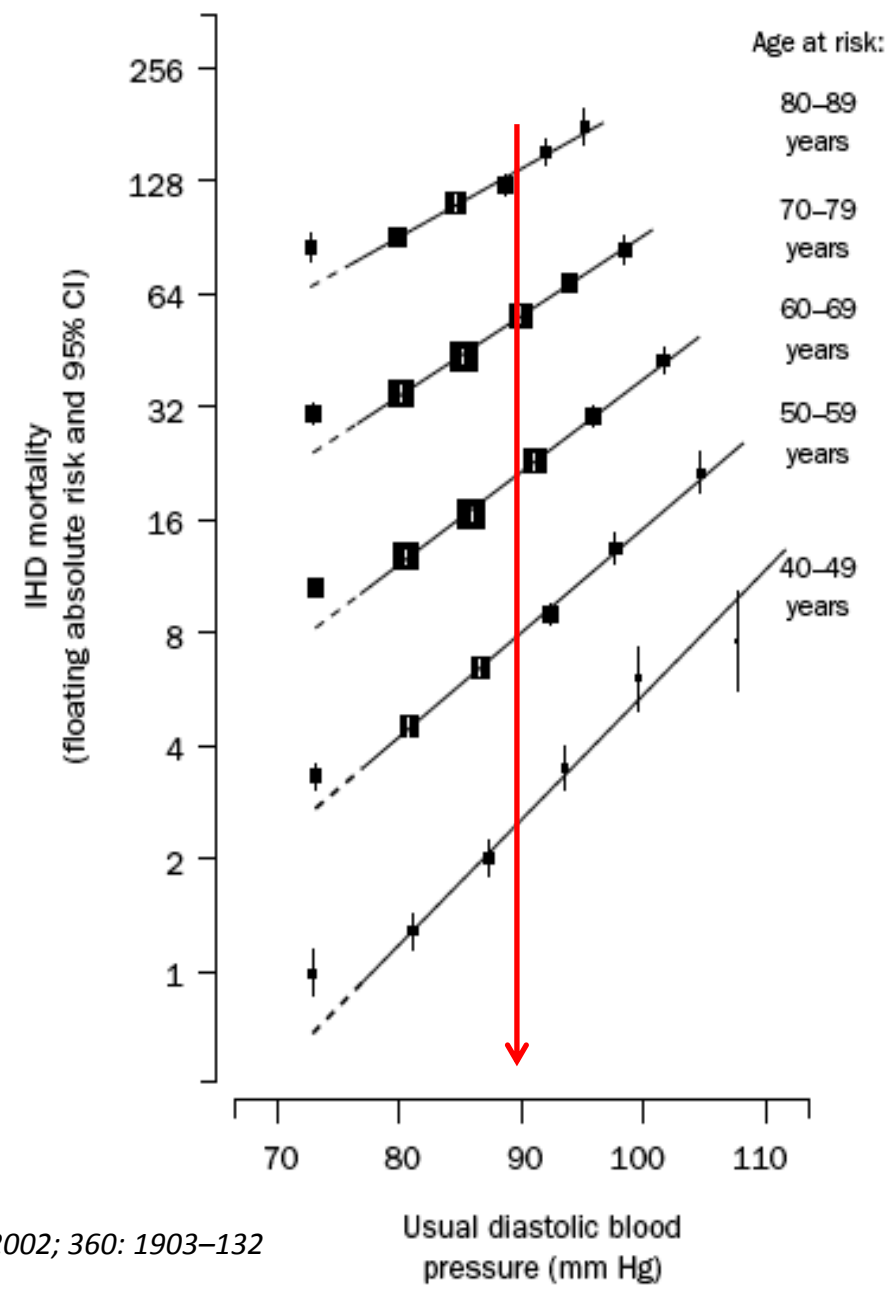




PSC. Lancet 2002; 360: 1903–132

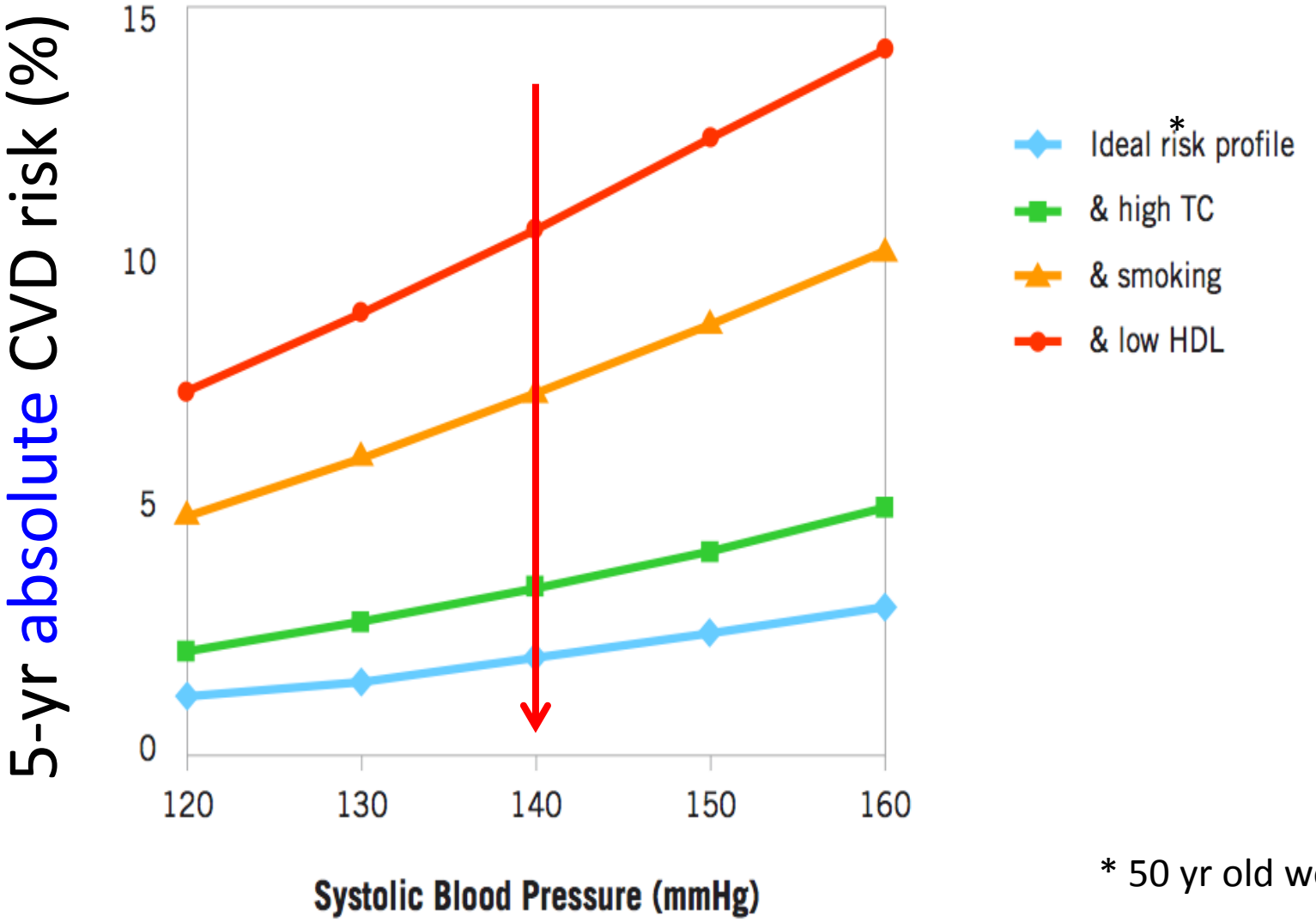
BP & absolute IHD mortality risk by age





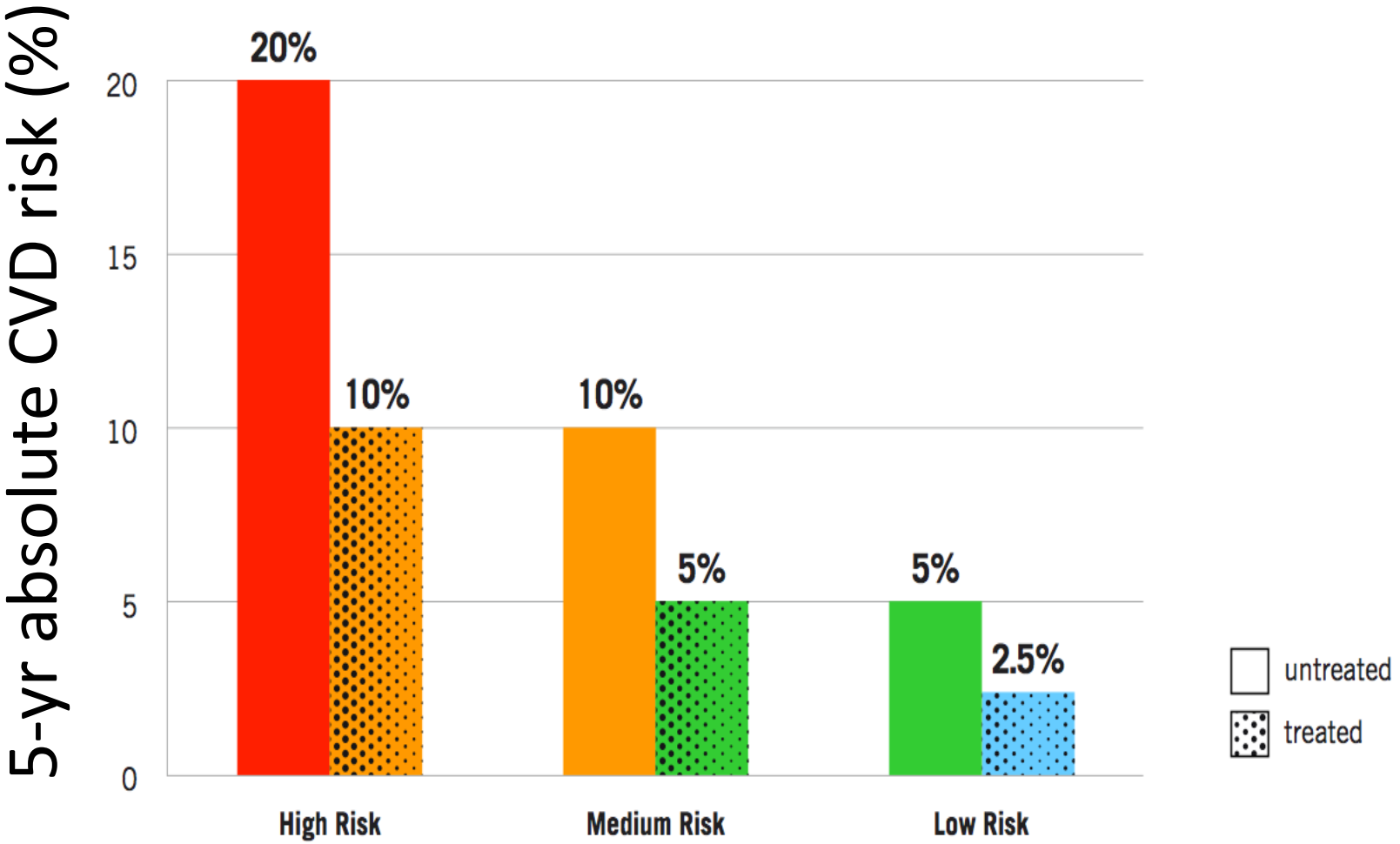
PSC. Lancet 2002; 360: 1903–132

clinical impact of a single risk factor depends on combined effect of multiple risk factors

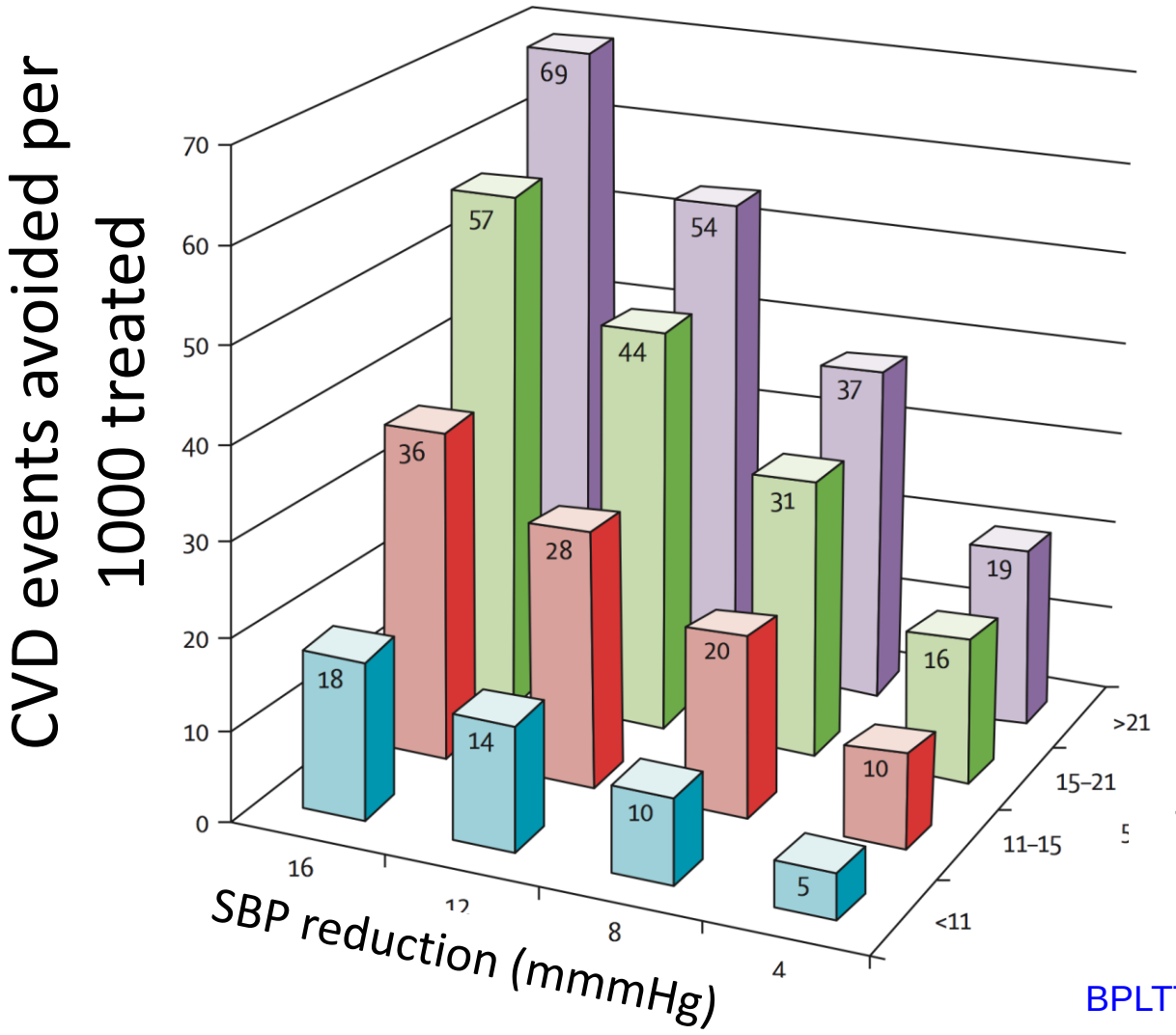


* 50 yr old woman

patients with high absolute risk benefit most from treatment

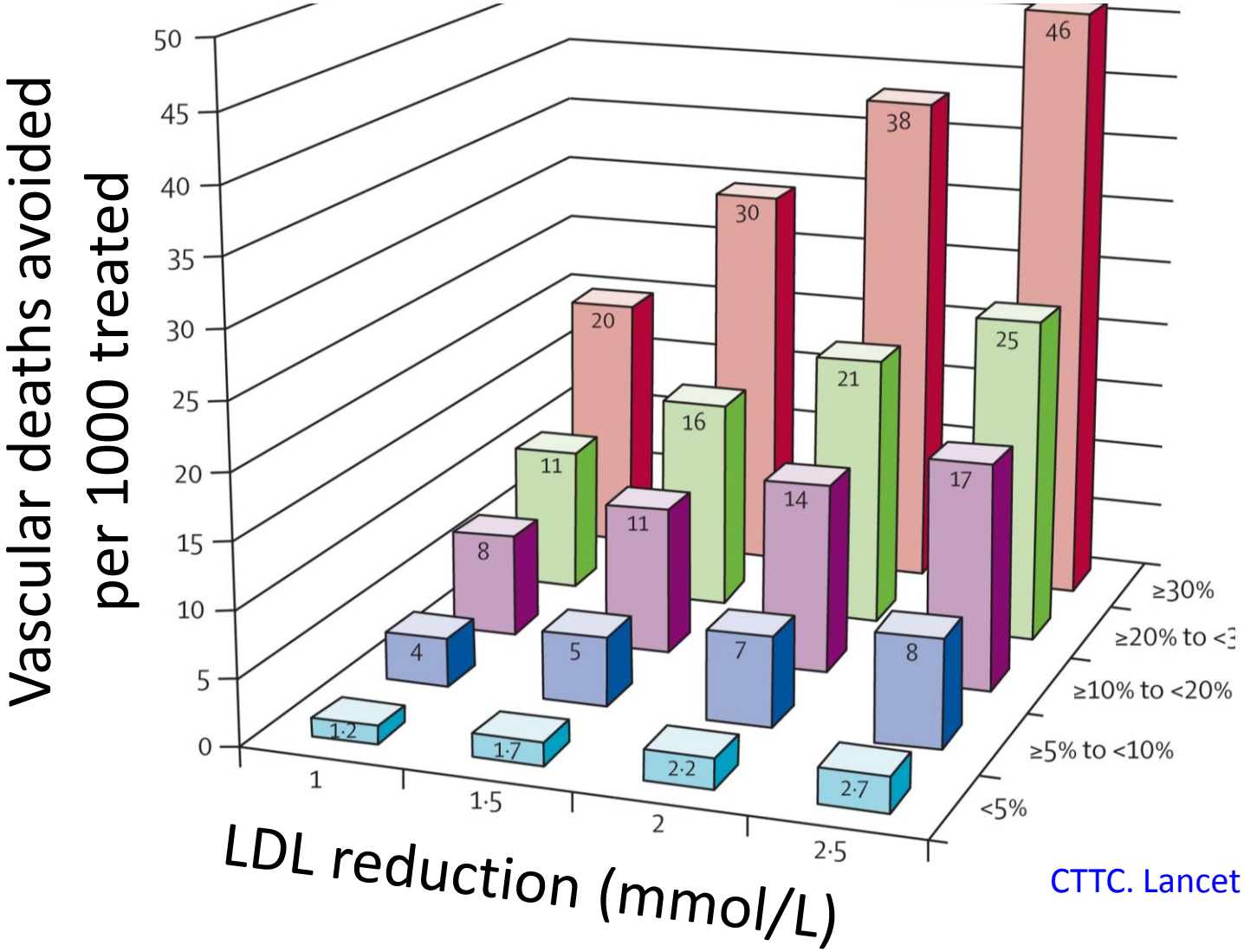


avoidable CVD events per 1000 treated by baseline combined risk and extent of systolic blood pressure-lowering



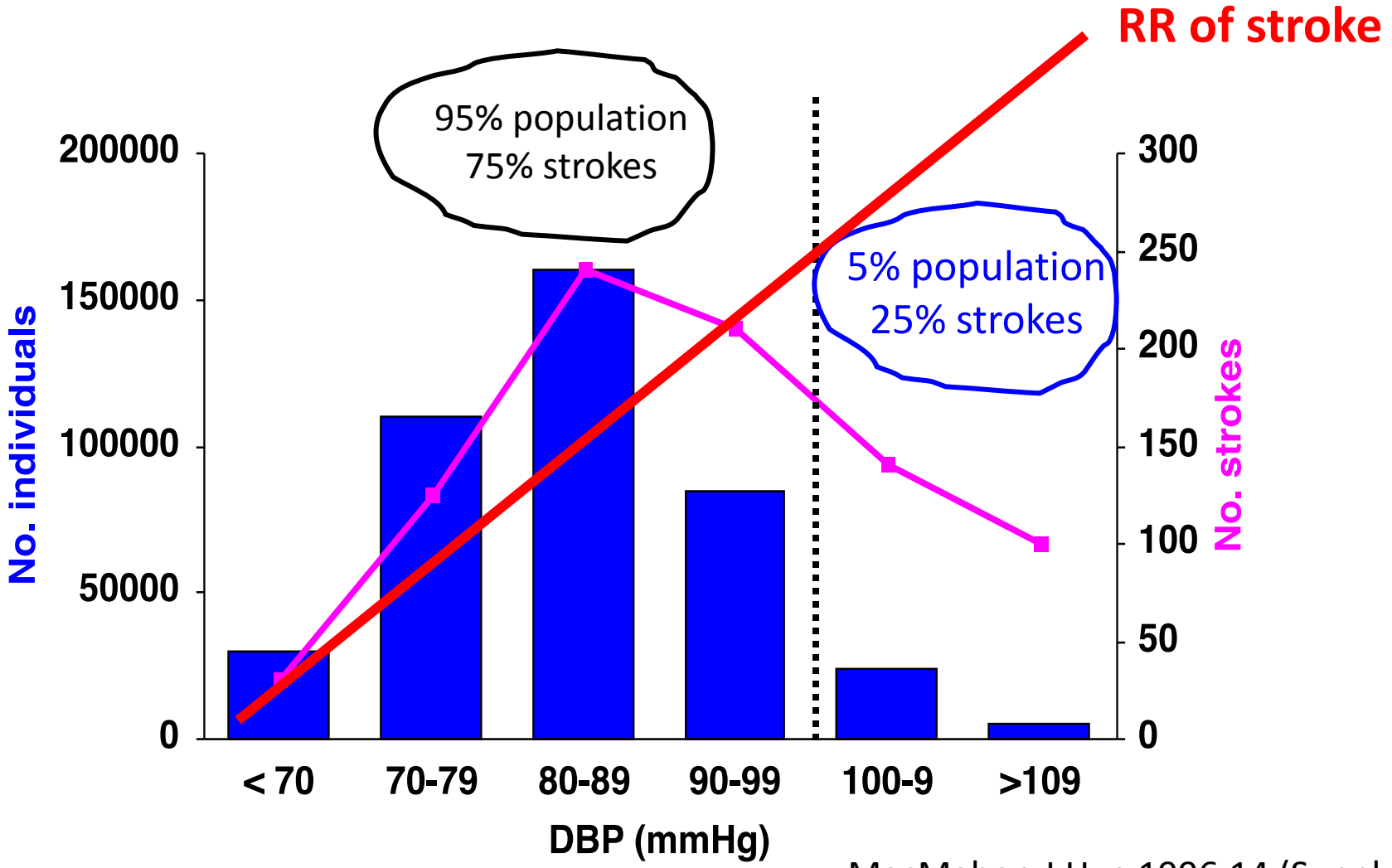
BPLTTC. Lancet 2014; 384: 591–98

avoidable vascular deaths per 1000 treated by baseline combined risk and extent of LDL lowering with statins



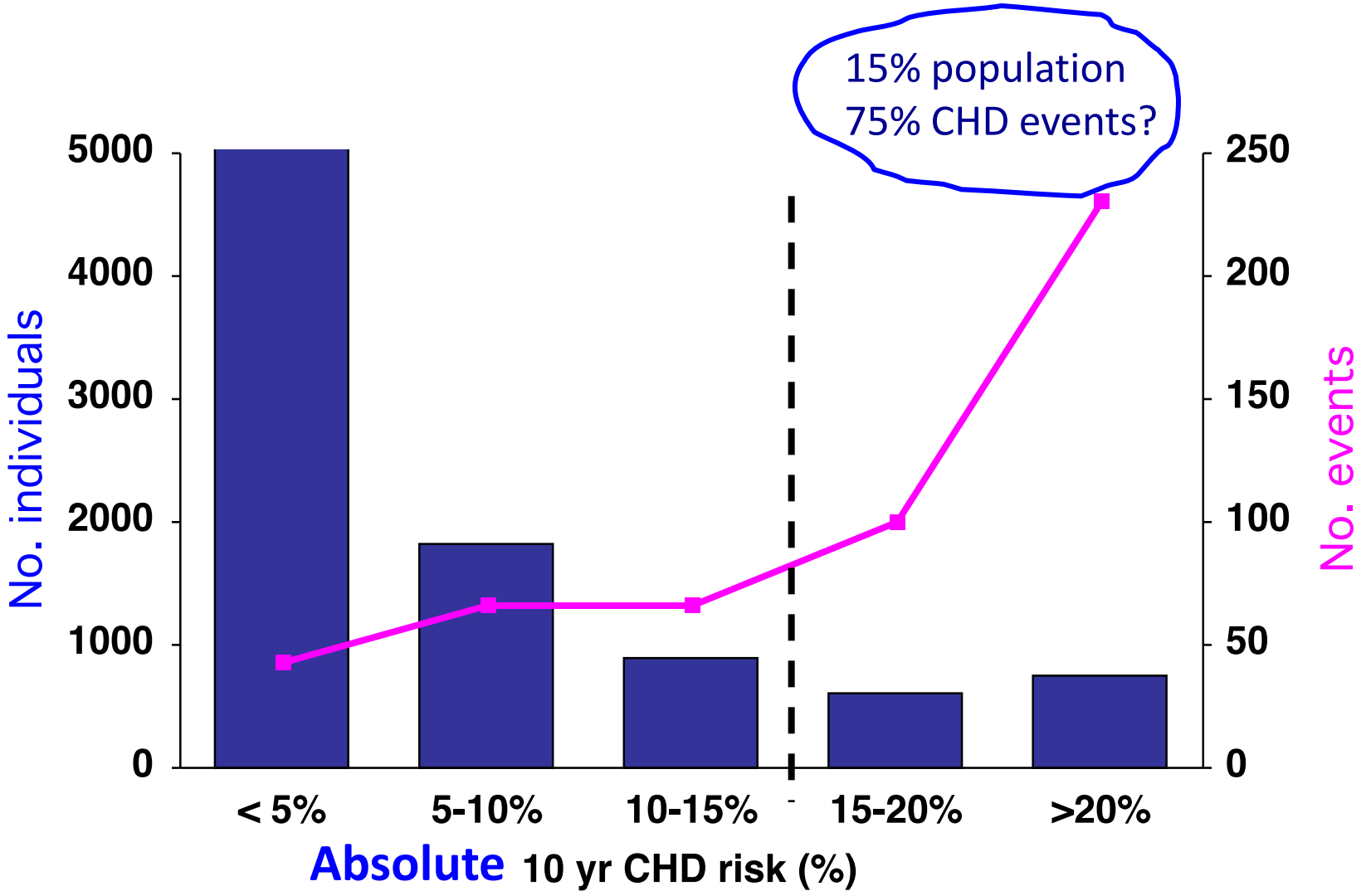
CTTC. Lancet 2012; 380: 581–90

rationale for a population-based approach: lowering blood pressure & stroke events



MacMahon J Hyp 1996;14 (Suppl 6)

rationale for high-risk approach: treating high absolute risk patients & CHD events



Voss et al. Int J Epidemiol 2002;31:1253-62

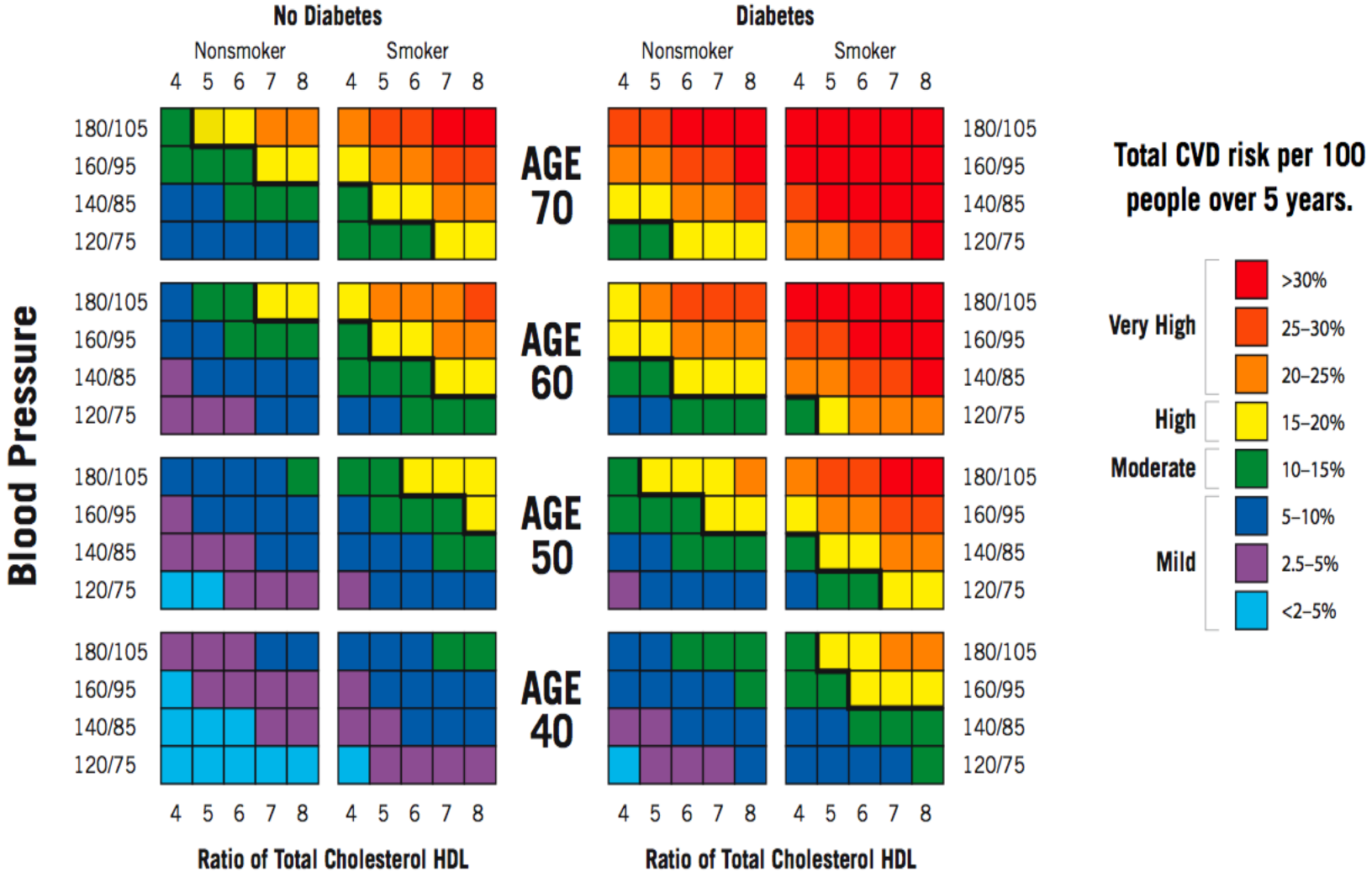
treat absolute risk not single risk factors

hypertension,
hypercholesterolemia
(and type-2 diabetes?)
are not clinically relevant
‘diagnoses’

only absolute risk is clinically relevant

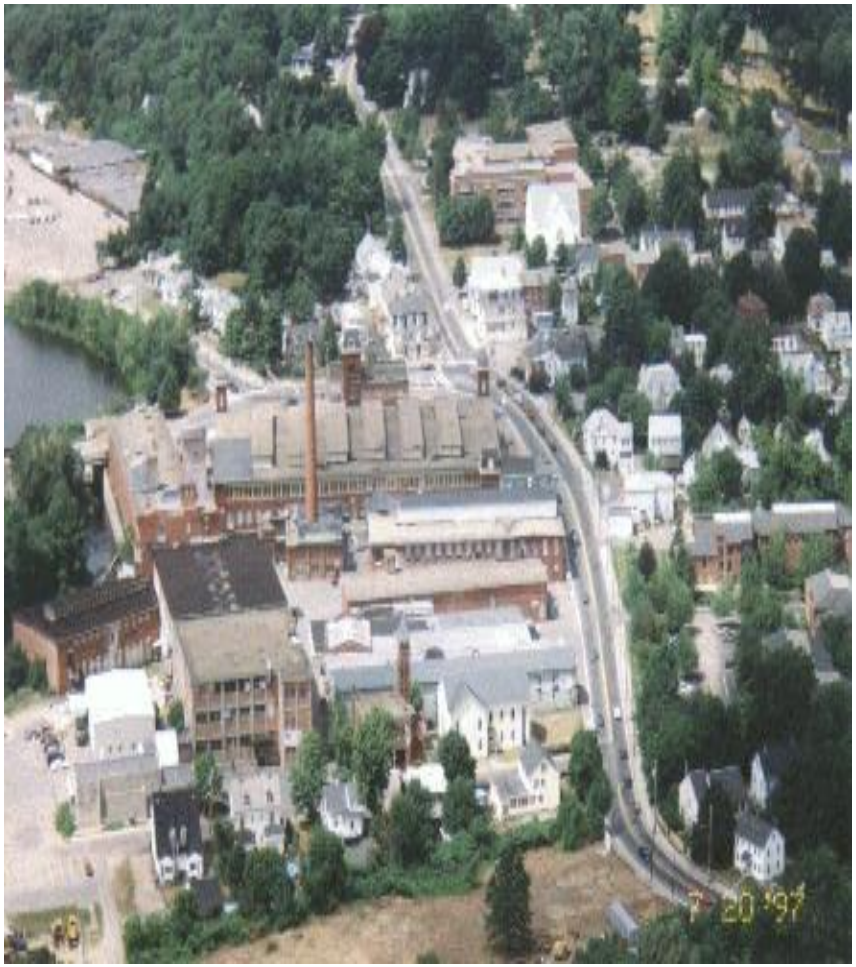
how can you measure a patient's absolute CVD risk?

NZ risk charts for estimating patients absolute risk (based on Framingham)



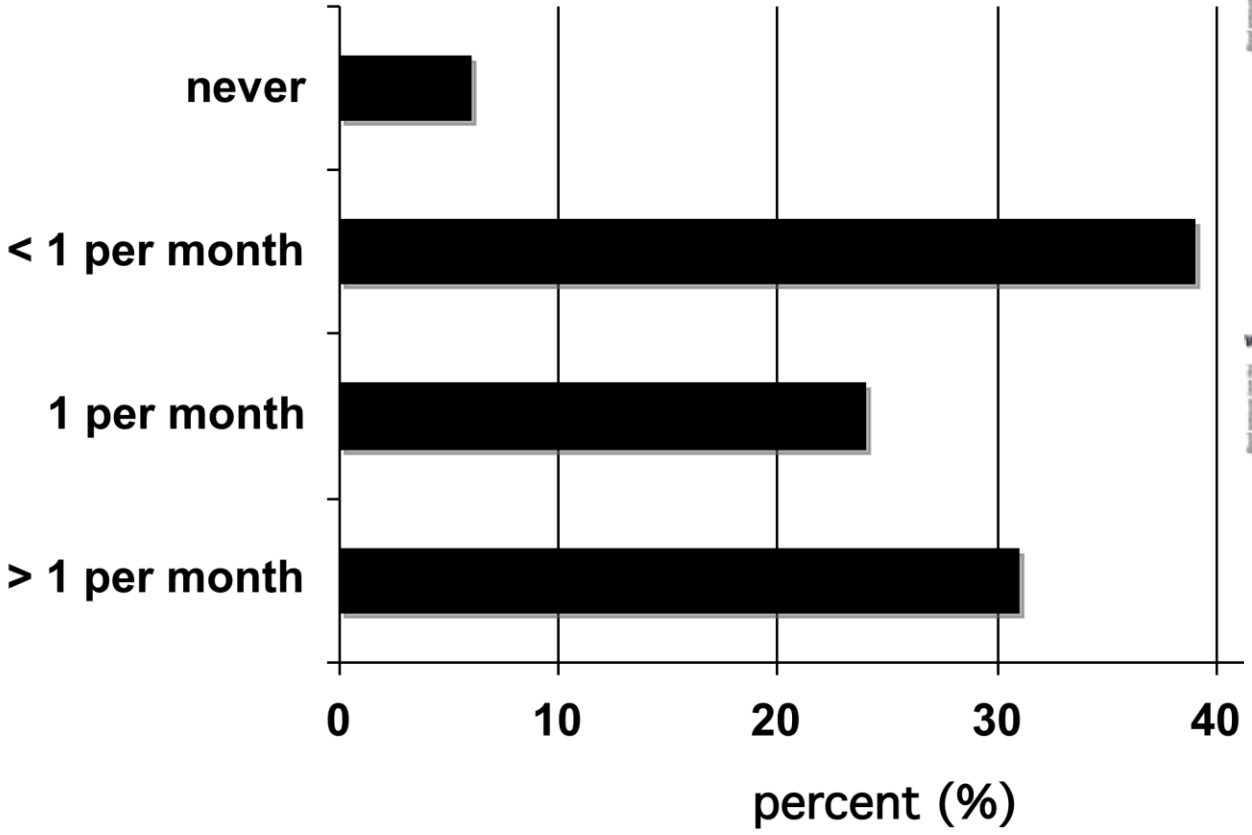
Jackson R. Br Med J. 2000;320:709-10.

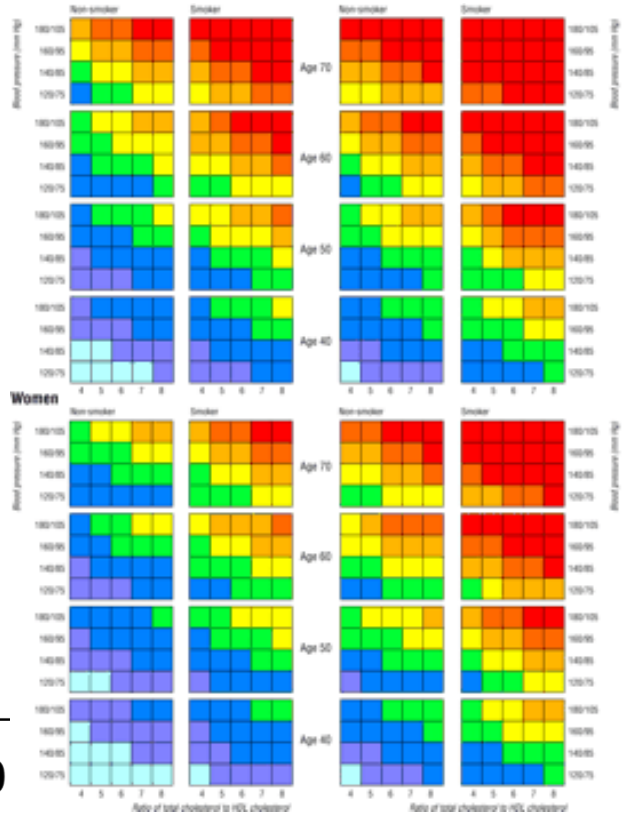
Framingham cohort



- 5,215 US White men and women
- Aged 30 to 74
- 1971 to 1983 (12 yrs)
- BP, Smoking, DM, TC, HDL
- CHD events

how often do you use the CVD risk charts? NZ GPs 1999: (n=500, resp. rate=83%)*

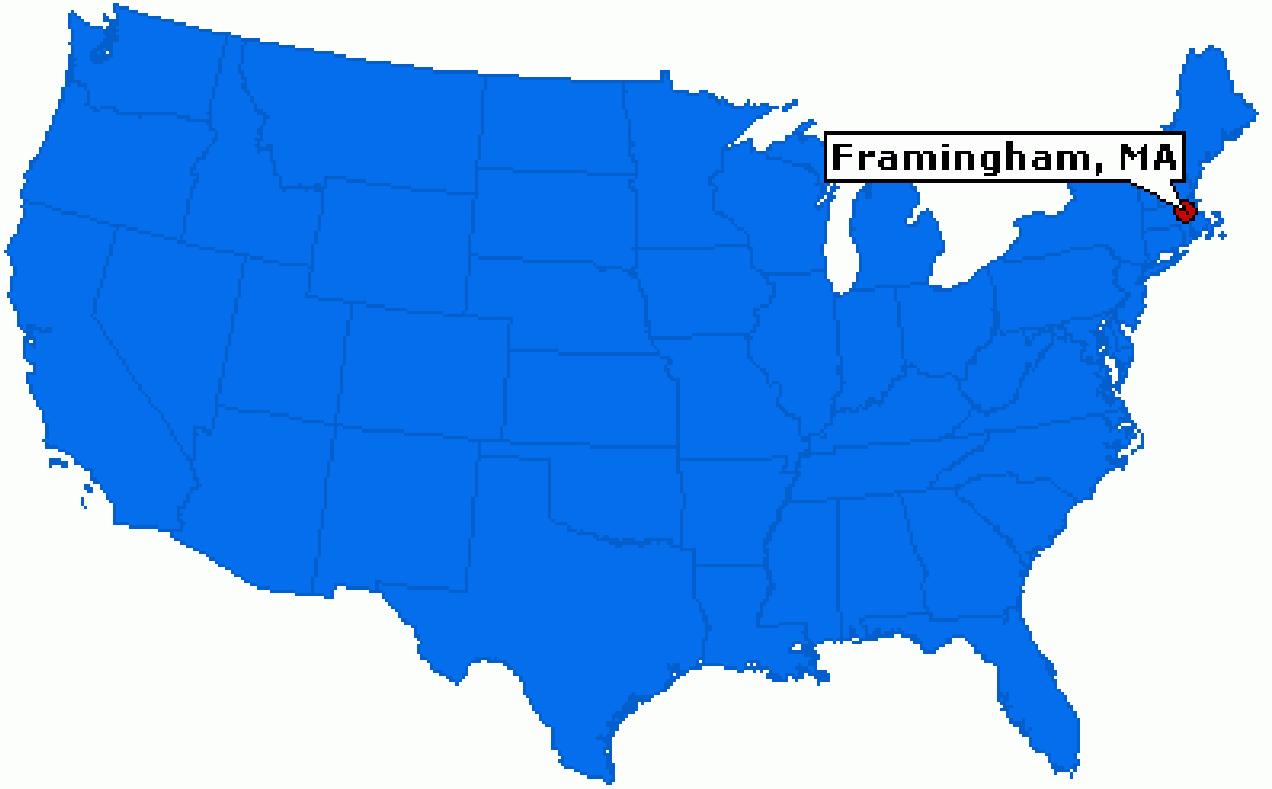




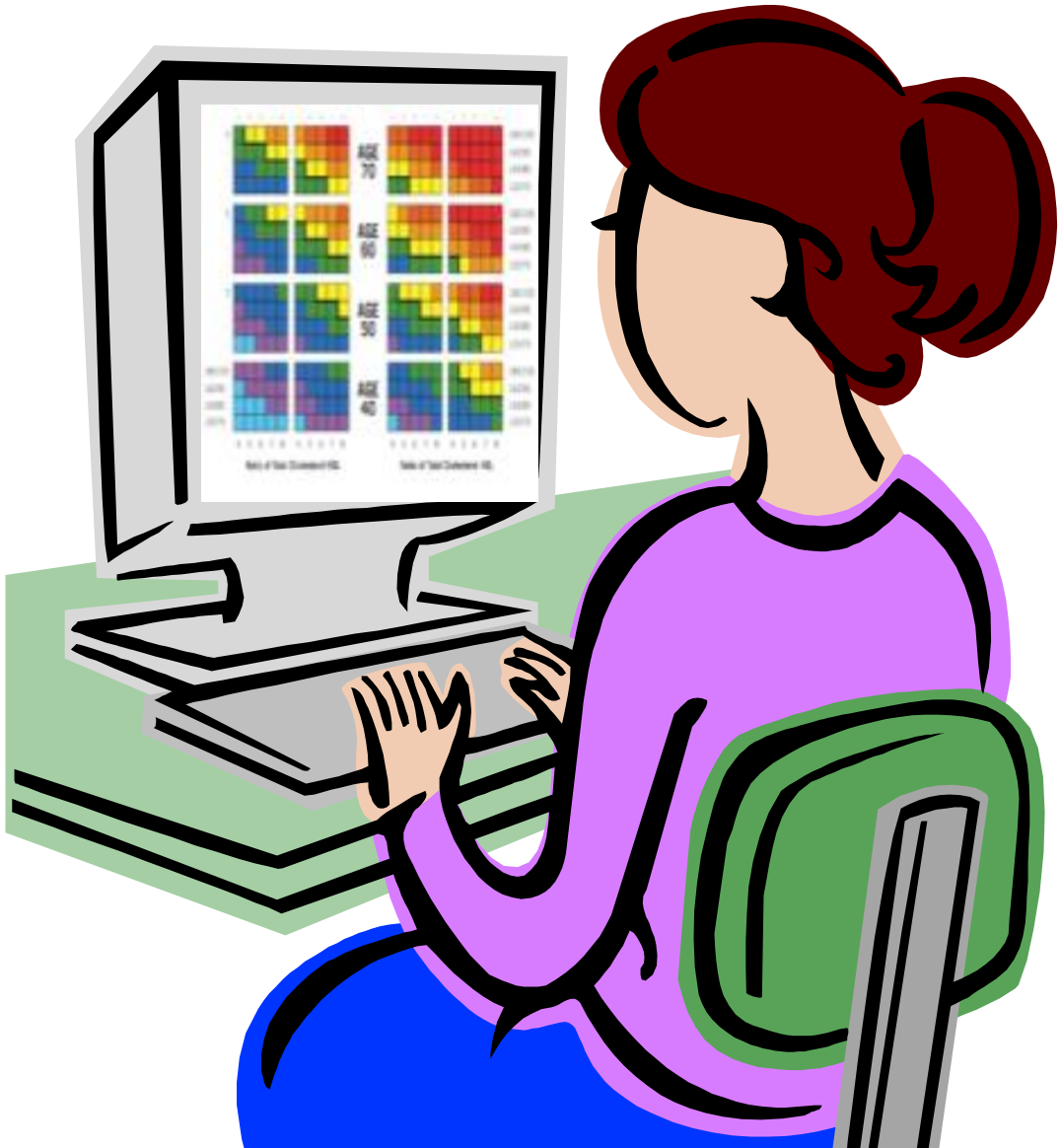
*after 5 years of intensive nation-wide education & distribution of multiple risk charts

Arroll et al. NZ Family Physician 2002:29:177-83

how relevant is a US CVD risk prediction study from the 1970s to a multi-ethnic NZ populations in the 21st century?



PREDICT in PHOs: electronic decision support for CVD risk prediction & management



2002

PREDICT™
CLINICAL EXPERT SYSTEMS

NZ CVD / DIABETES PROGRAMME

DEMOGRAPHICS | CVD RISK ASSESSMENT | CVD RISK MANAGEMENT | DIABETES MANAGEMENT

Practitioners details

NZMC / NZNC number

Demographics (All to be prepopulated from PMS)

First name

Last name

NHI

DHB Catchment: Please Select

Quintile of deprivation

Meshblock geocode

Date of birth: dd/mm/yyyy

Age: Years

Gender: Please Select

Ethnic Group (1 or more self-identified ethnic group may be chosen): Not Stated

Ethnic Group 2: Not Stated

Ethnic Group 3: Not Stated

NEXT ...

DEMOGRAPHICS | **CVD RISK ASSESSMENT** | CVD RISK MANAGEMENT | DIABETES MANAGEMENT

This page should be completed for all patients. All underlined items are required.

After submitting this form, additional follow up management forms become available to you. The secondary Diabetes management form will become available dependant upon the status of the Diabetes field on this form.

NOTE: It is inappropriate to do CVD risk assessment in pregnancy.

ASSUME NEGATIVE DEFAULTS

Clinical History

Family History of Premature CVD: Yes - No

Angina/MI: Yes - No

PTCA/CABG: Yes - No

Ischaemic Stroke or TIA: Yes - No

PVD: Yes - No

Diabetes: Please select

ECG confirmed Atrial Fibrillation: Yes - No

Diagnosed Genetic Lipid Disorder: Please select

Diagnosed metabolic syndrome: Yes - No

Smoking History: Please select

Pregnant? Yes - No

Examination

Most recent BP (Sitting): / mmHg

Previous BP (Sitting): / mmHg

TC/HDL ratio: - Date: dd/mm/yyyy

Total Cholesterol: mmol/L - Date: dd/mm/yyyy

This data is the patient's real clinical information Yes - No

Risk Assessment:

This page was made specifically for **Joe Bloggs *(ABC1235)***: 09-Aug-2006 10:37 hrs

Estimated risk of having a CVD event in the next 5 years: 18%

Estimated risk level: 5-year CV risk (fatal and non-fatal)	**Estimated Benefits: NNT for 5 years to prevent one event** (CVD events prevented per 100 people treated for 5 years)		
	1 intervention (25% risk reduction)	**2 interventions (45% risk reduction)**	**3 interventions (55% risk reduction)**
18%	22 (4.5 per 100)	12 (8.1 per 100)	10 (9.9 per 100)

Based on the conservative estimate that each intervention: aspirin, blood pressure treatment (lowering systolic blood pressure by 10 mm Hg) or lipid modification (lowering LDL-C by 20%) reduces CV risk by about 25% over 5 years.

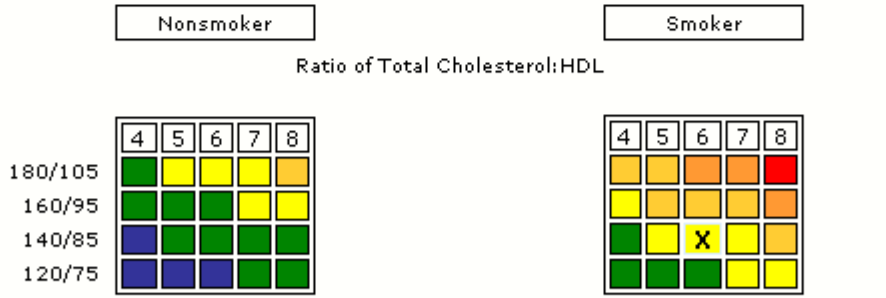
CVD risk has been moved up one risk category (5%), as cardiovascular risk may be underestimated in the Framingham risk equation; based on:

- family history of premature coronary heart disease or ischaemic stroke in a first-degree male relative before the age of 55 years or a first-degree female relative before the age of 65 years
- Maori or Pacific ethnicity or people from the Indian subcontinent
- metabolic syndrome

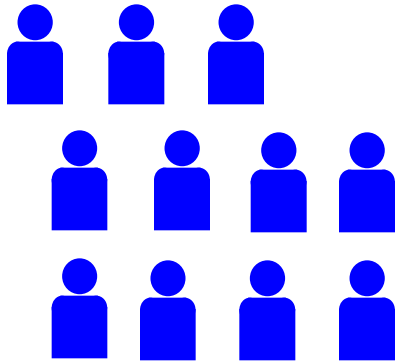
Cardiovascular Disease: Baseline Risk and Treatment Benefit

NO DIABETES

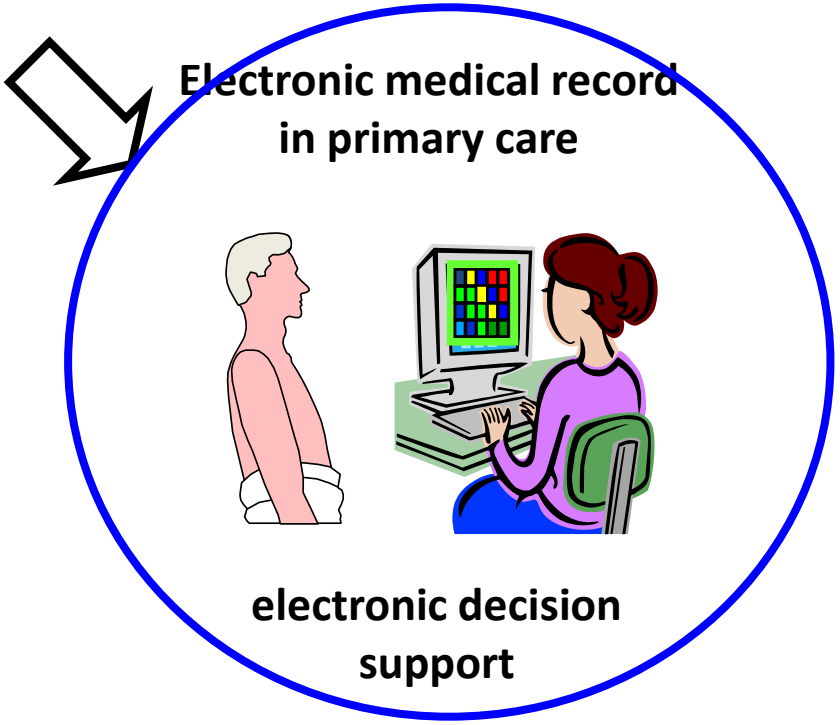
(With a 5% upward risk adjustment applied)



PREDICT was designed to:

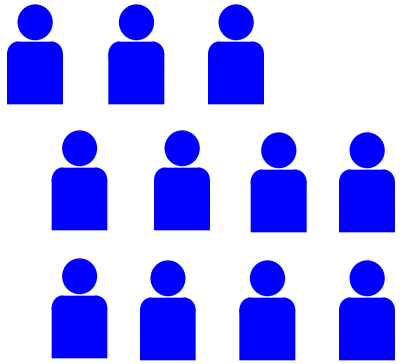


Patient population



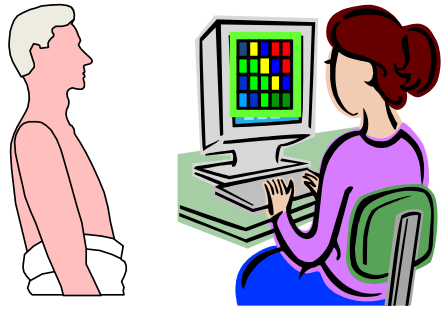
get current best evidence on risk & management into clinical practice

& to simultaneously generate new evidence on risk from clinical practice



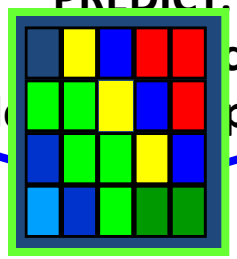
Patient population

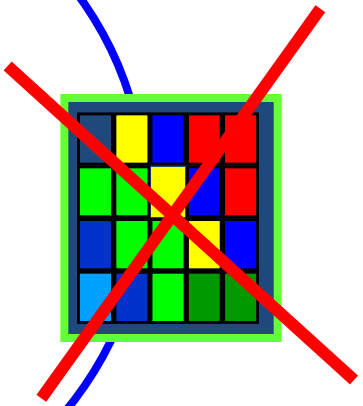
Electronic medical record in primary care



PREDICT:

d port





NHI

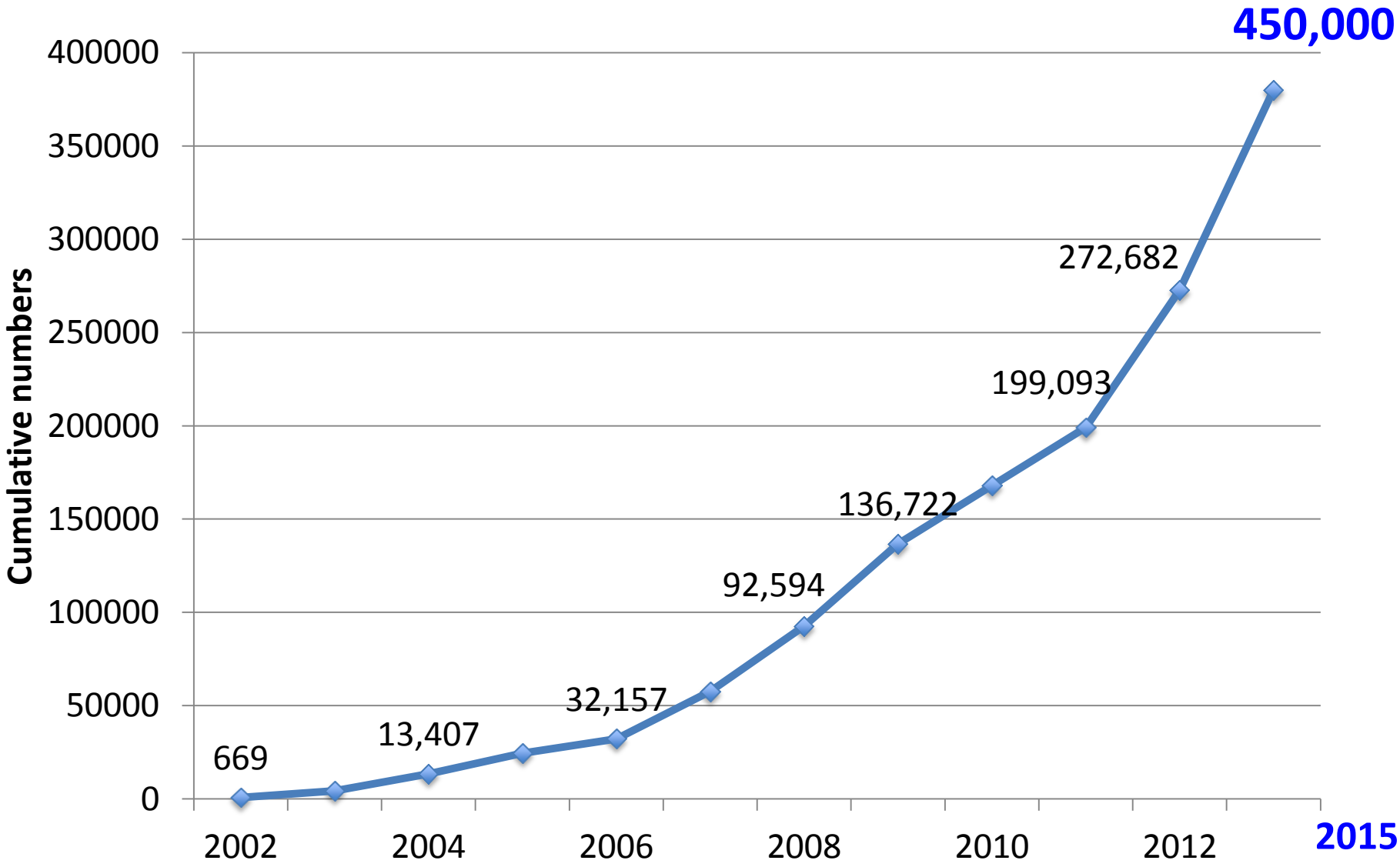
NHI

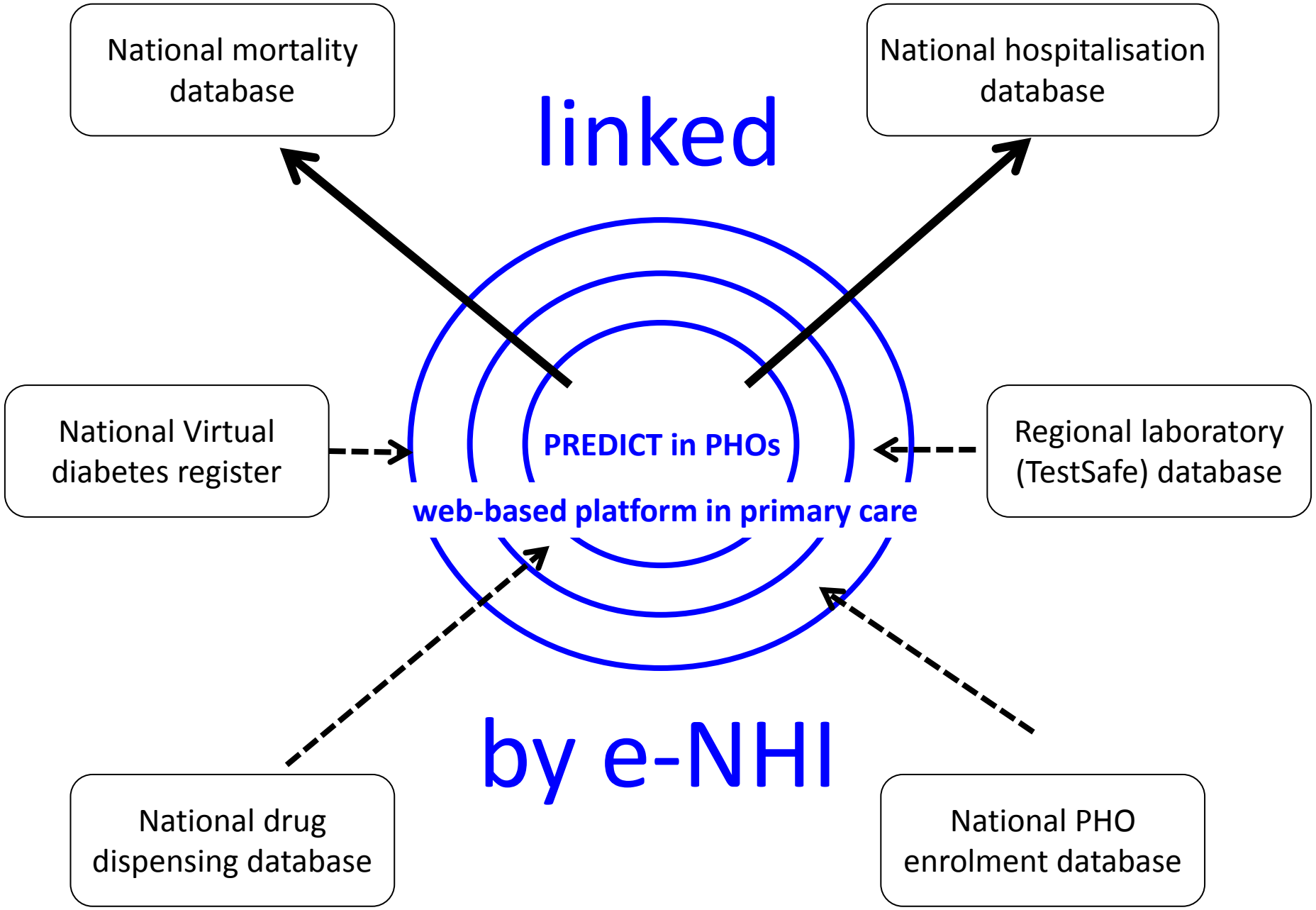
patient-specific outcomes: hospital admissions, deaths

patient-specific CVD risk factor profiles

encrypted NHI

PREDICT 1° care recruitment 2002-15




National mortality database
National hospitalisation database
linked
National Virtual diabetes register
PREDICT in PHOs
web-based platform in primary care
Regional laboratory (TestSafe) database
by e-NHI
National drug dispensing database
National PHO enrolment database

1° prevention cohort by ethnicity aged 30-74 years: 2002-2012

	Men	Women
Total (205,274)	**114,463**	**90,811**
European/other	74,002	57,757
Maori	14,142	12,583
Pacific	16,372	13,490
Indian	9,947	6,981

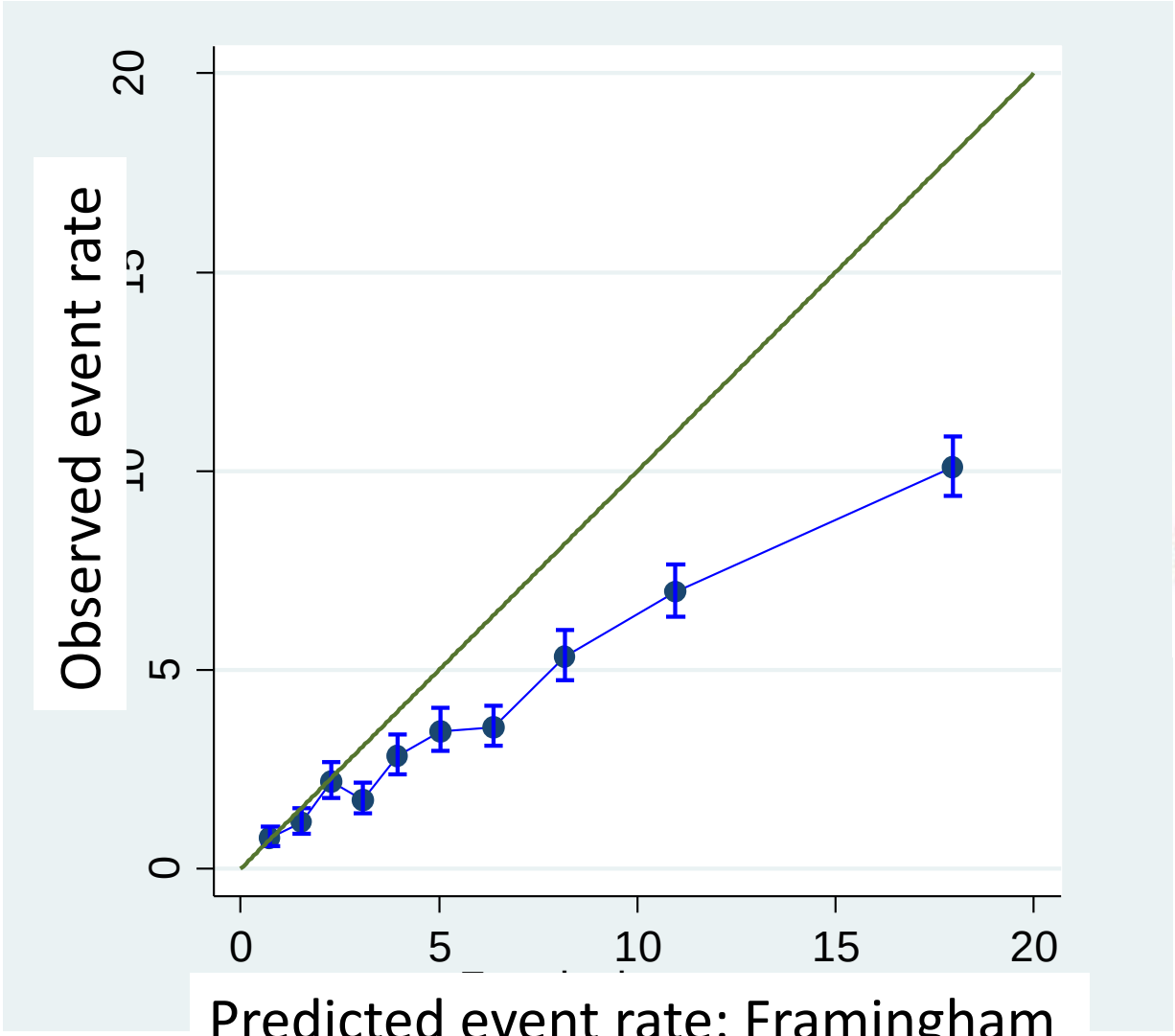
with no hx of CVD, renal disease or AF

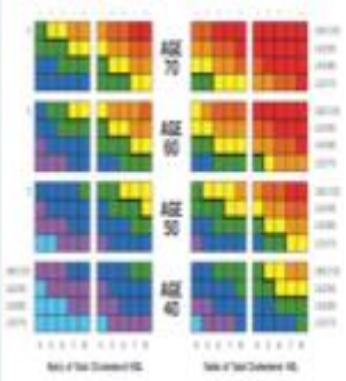
1° prevention cohort events by type

	non fatal	fatal
All CVD (4,595)	**4,188**	**404**
MI	1,428	92
Other CHD	1,128	152
Stroke	723	110
TIA	309	0
PVD	281	22
CHF	466	28
Coronary procedures	116	0
Peripheral procedures	37	0

612,000 person-years follow-up; average 3 years & range 0-10 years

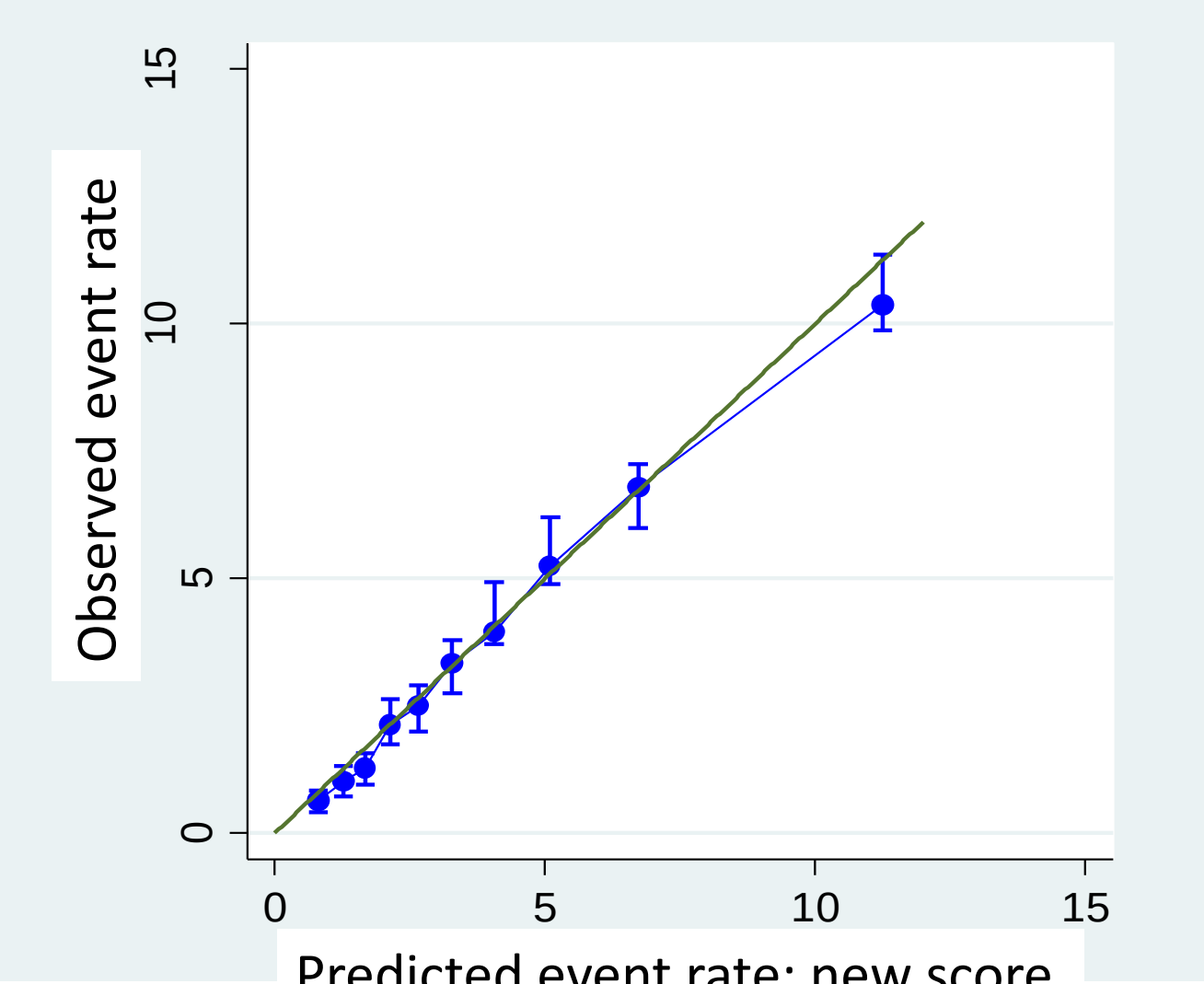
observed vs predicted risk: Framingham score





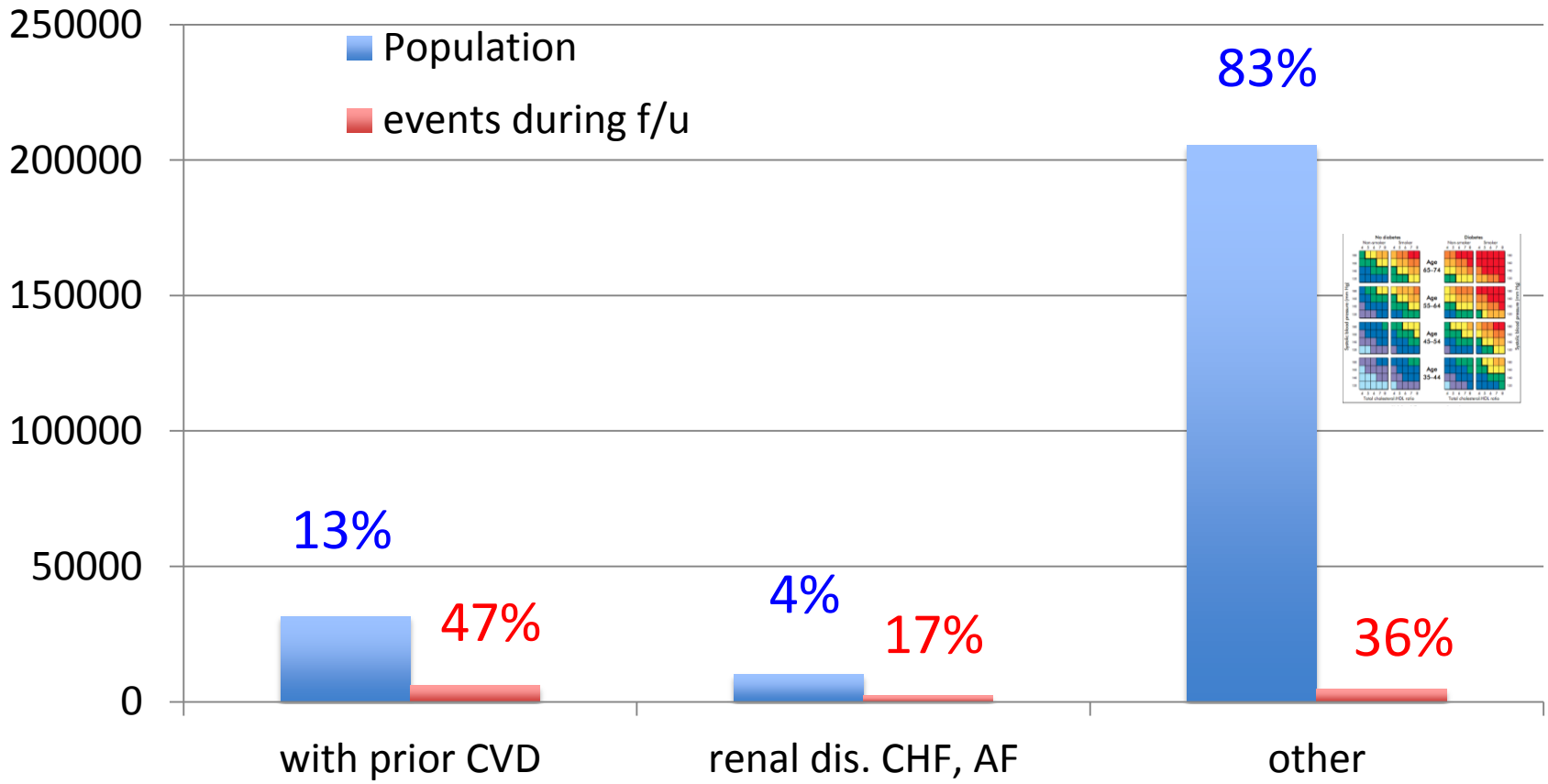
1° prevention score

observed vs predicted risk: PREDICT score



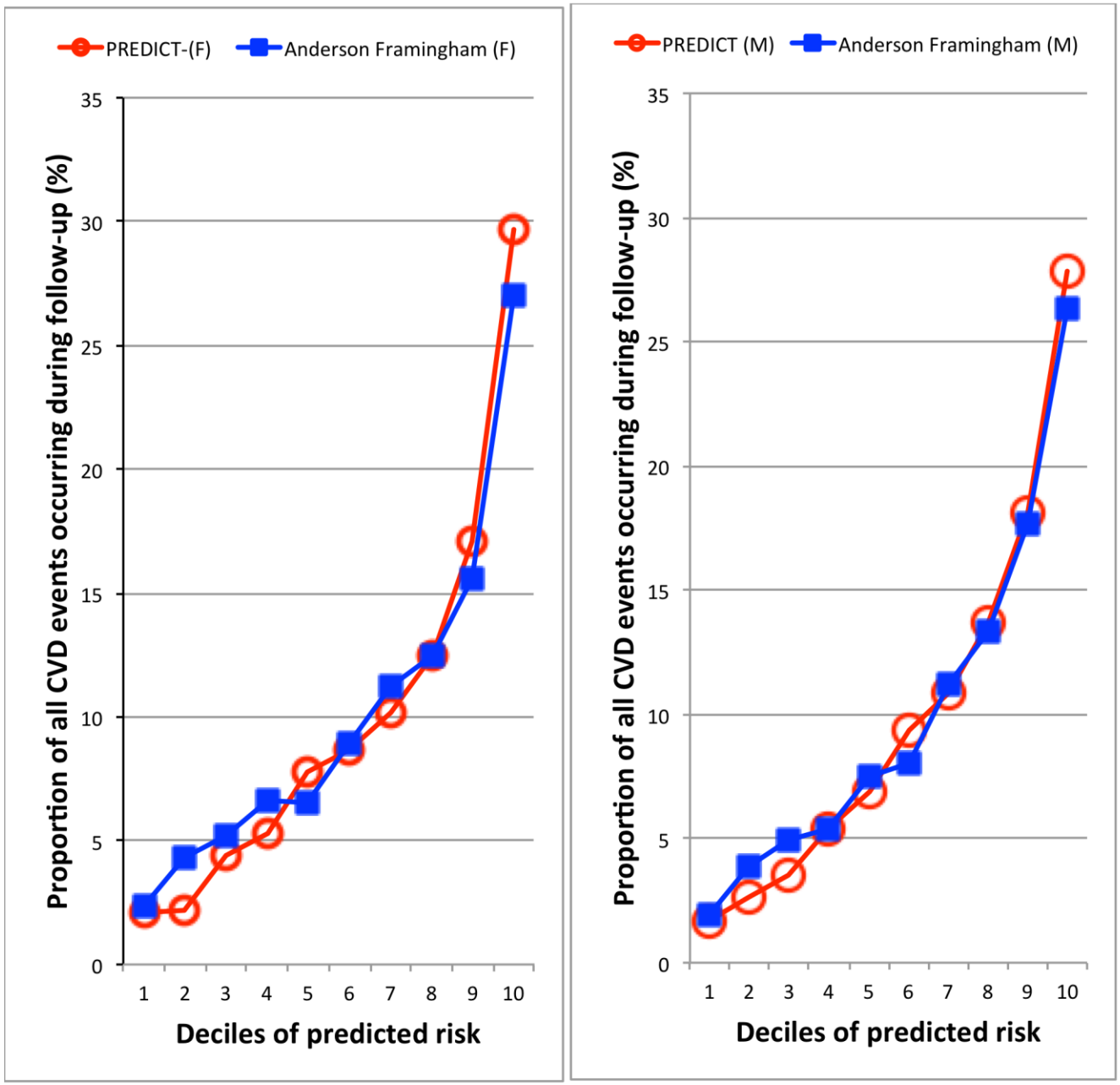
1° prevention score

CVD events during follow-up in PREDICT population 30-74 years, by clinical history



2002-2012

Figure 3a & b: Discrimination plots* of proportions of CVD events occurring during follow-up by decile of risk predicted using PREDICT-CVD 1° & Anderson Framingham models in women (a) and men (b)



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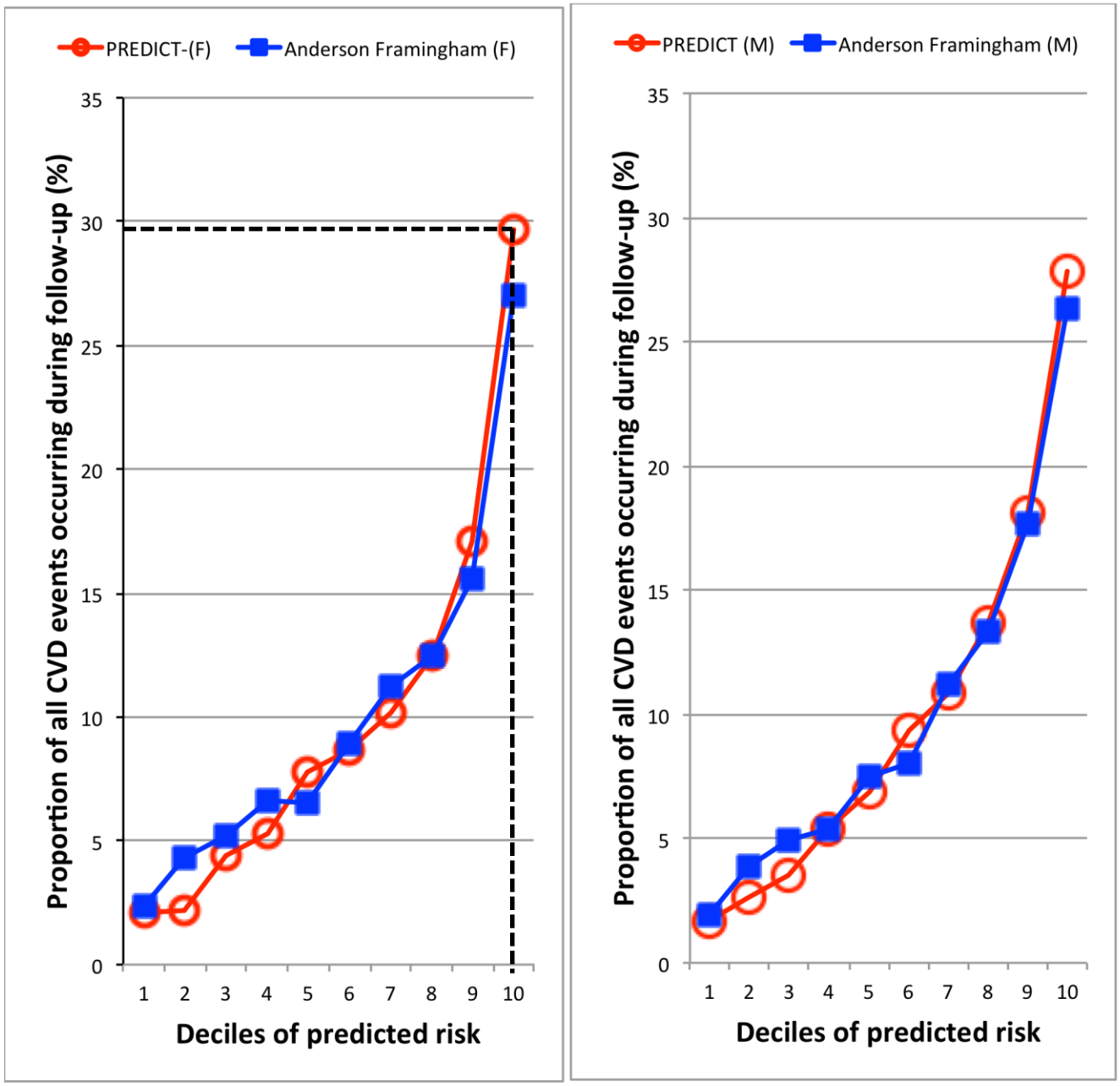

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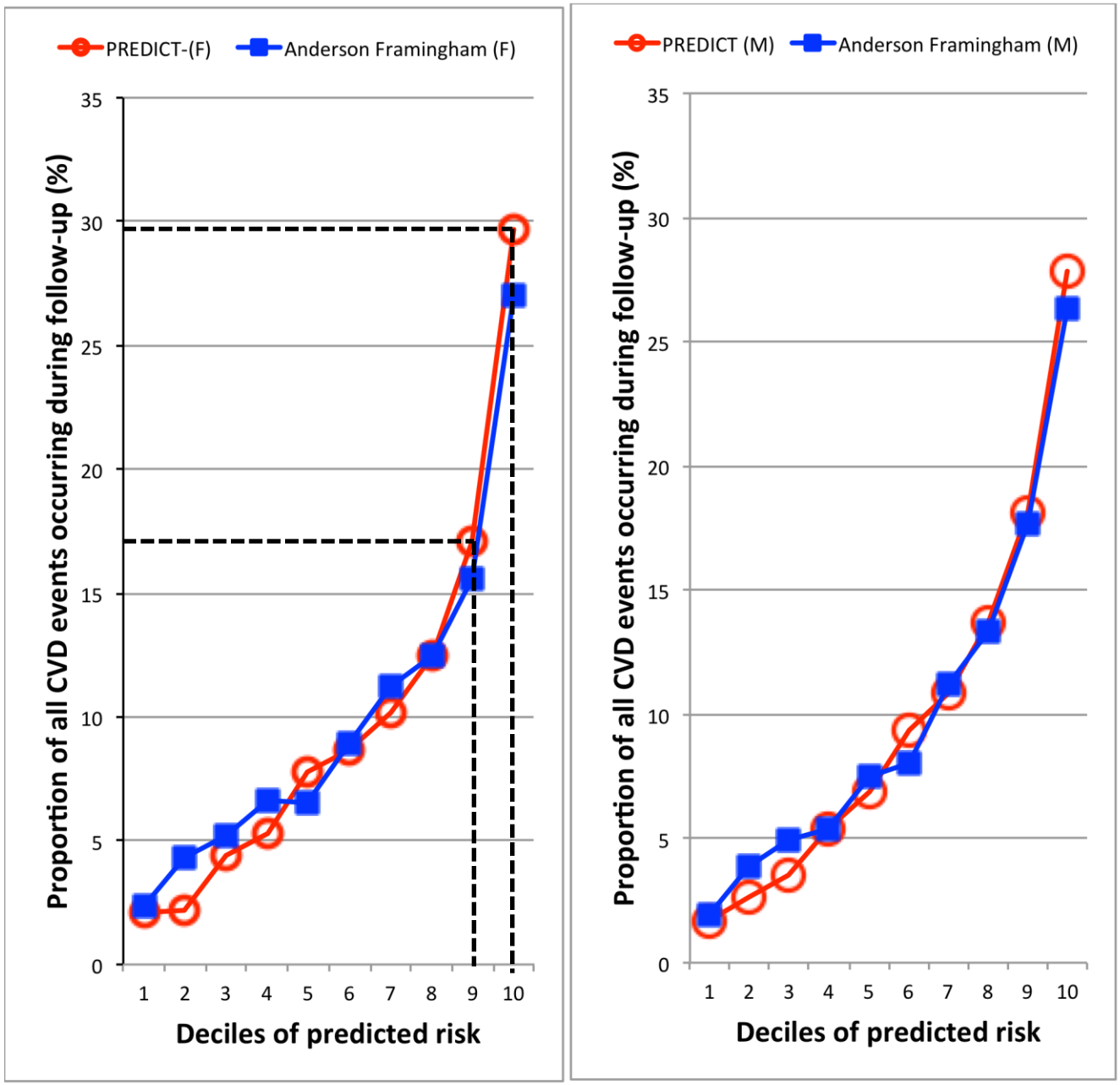
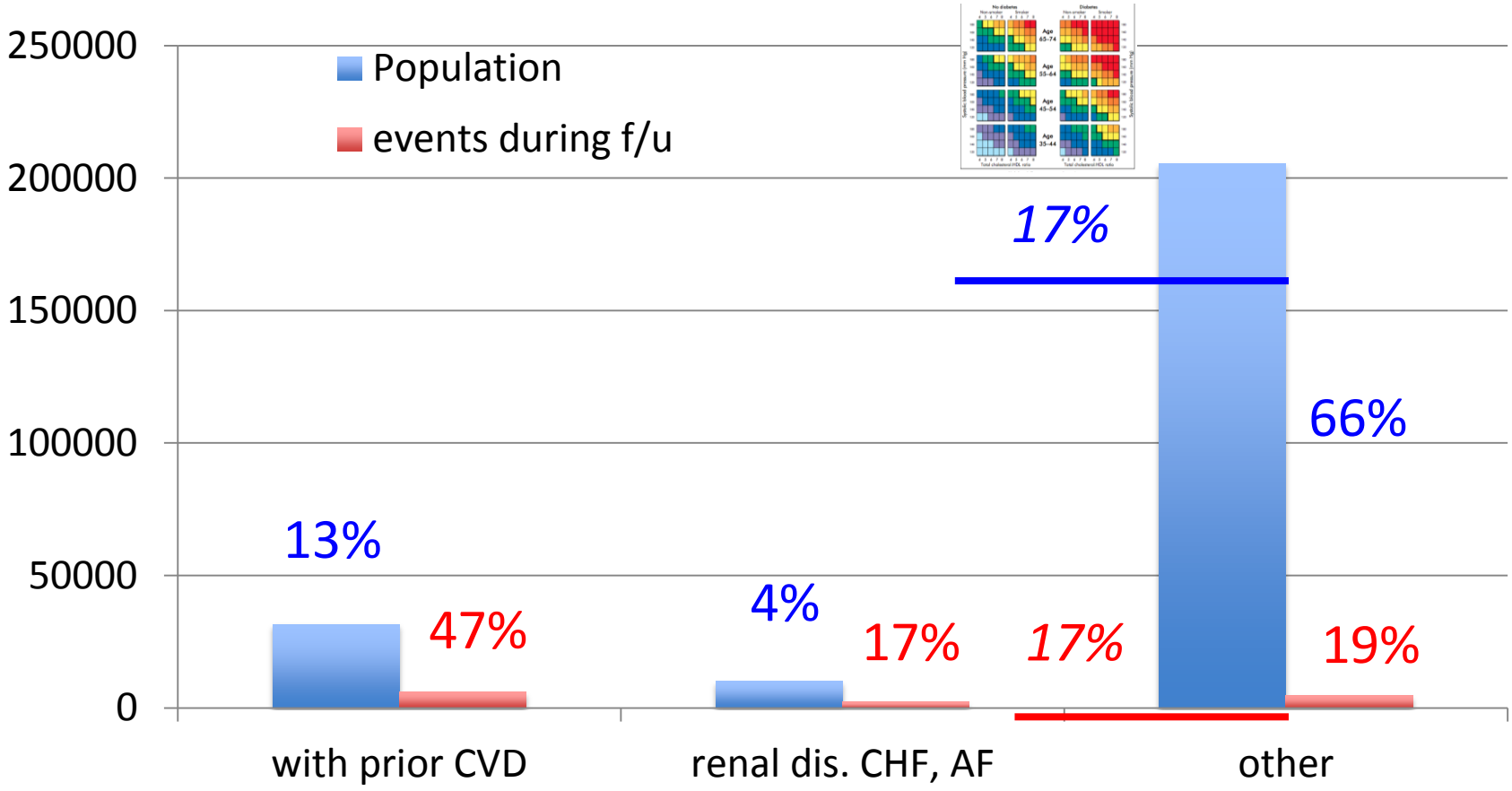
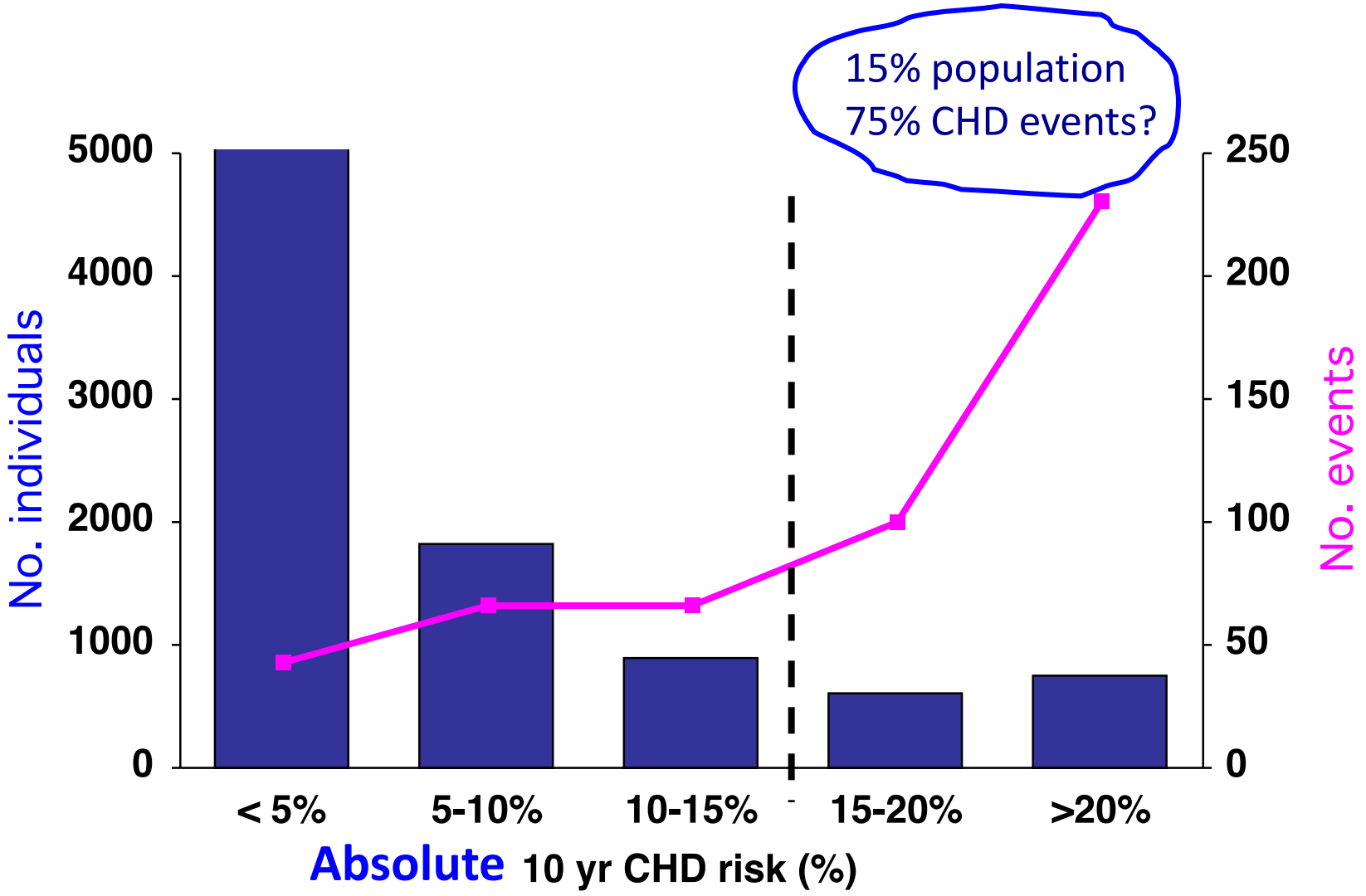


CVD events during follow-up in PREDICT population 30-74 years, by clinical history



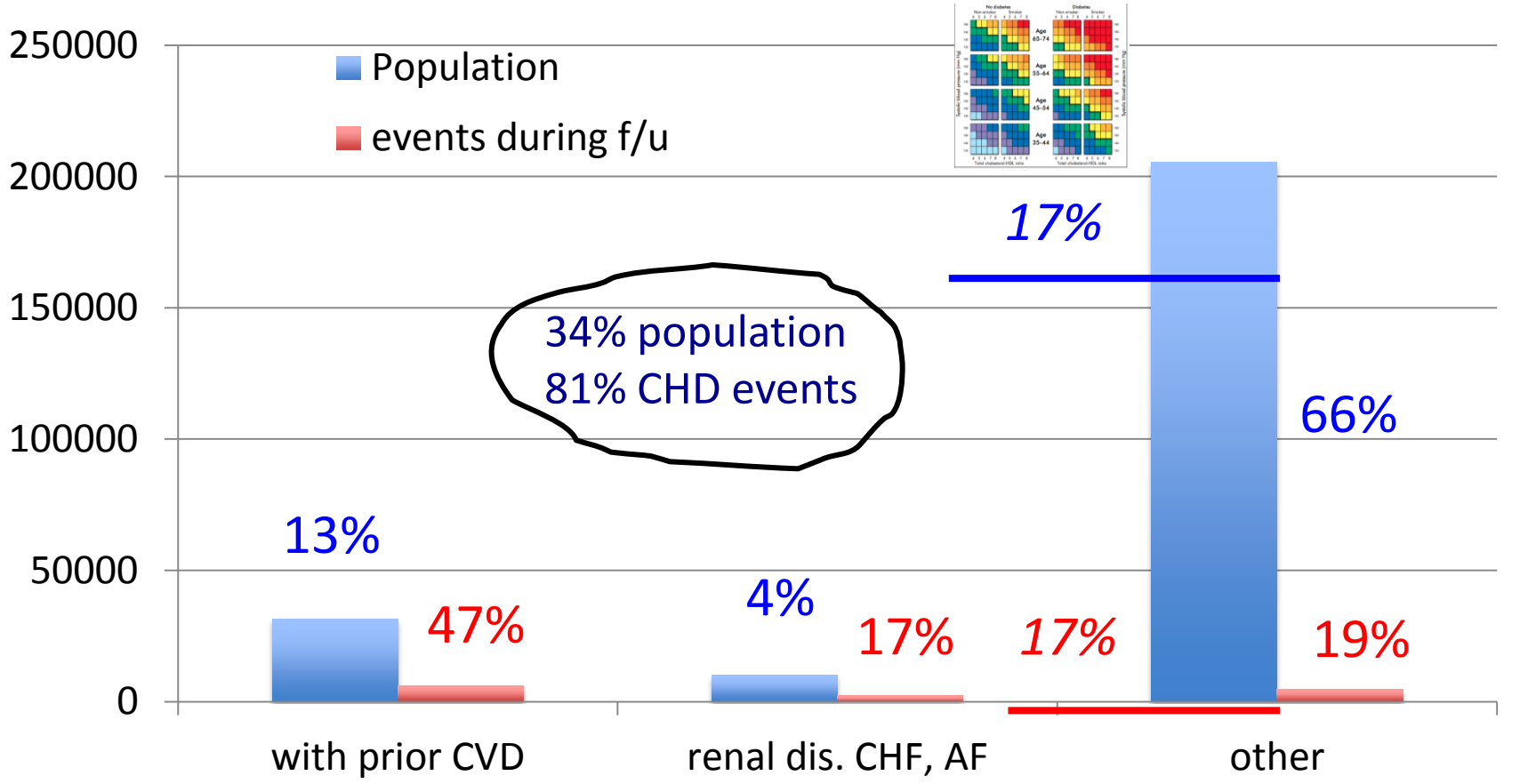
2002-2012

rationale for high-risk approach: treating high absolute risk patients & CHD events



Voss et al. Int J Epidemiol 2002;31:1253-62

CVD events during follow-up in PREDICT population 30-74 years, by clinical history



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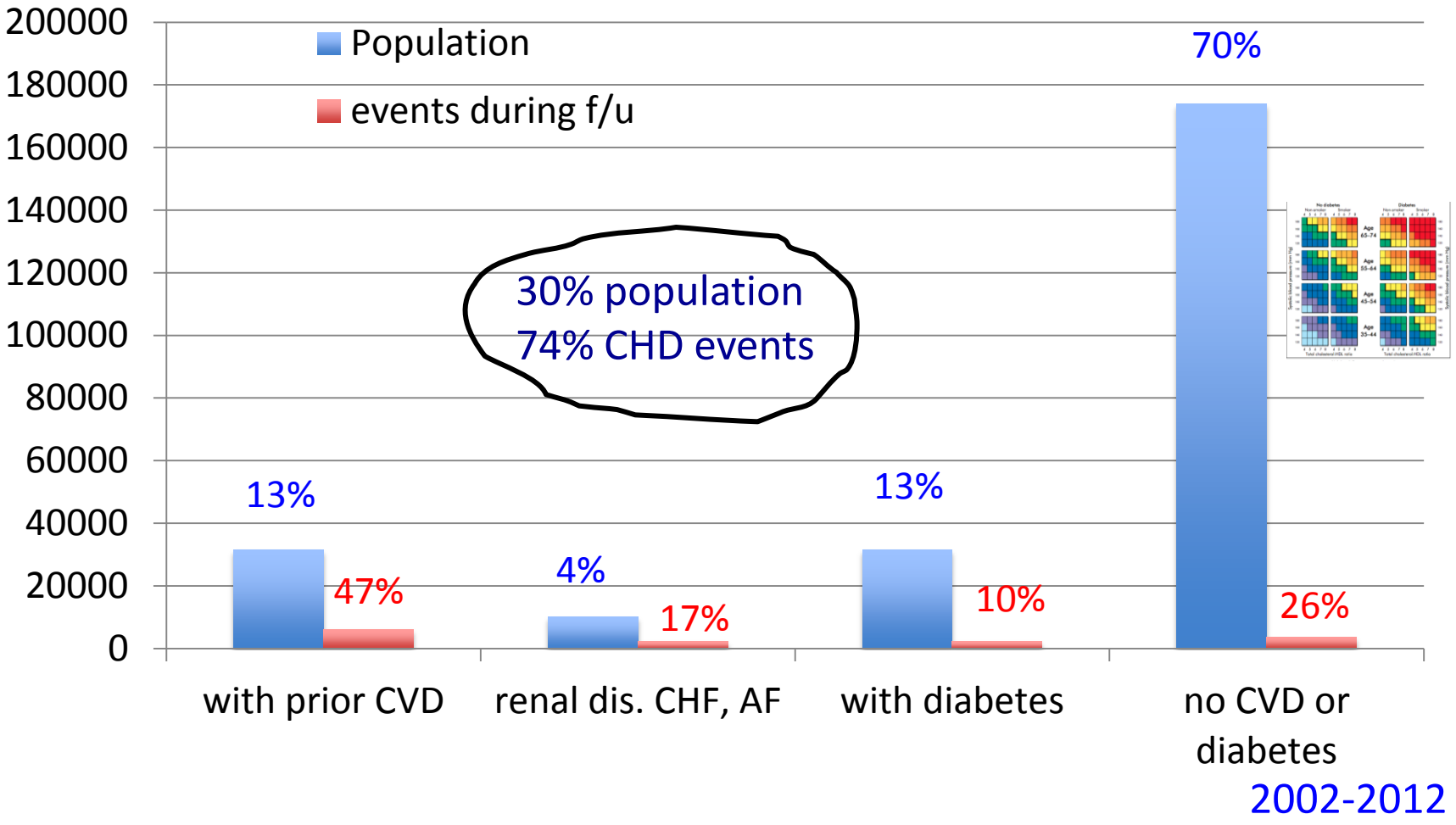


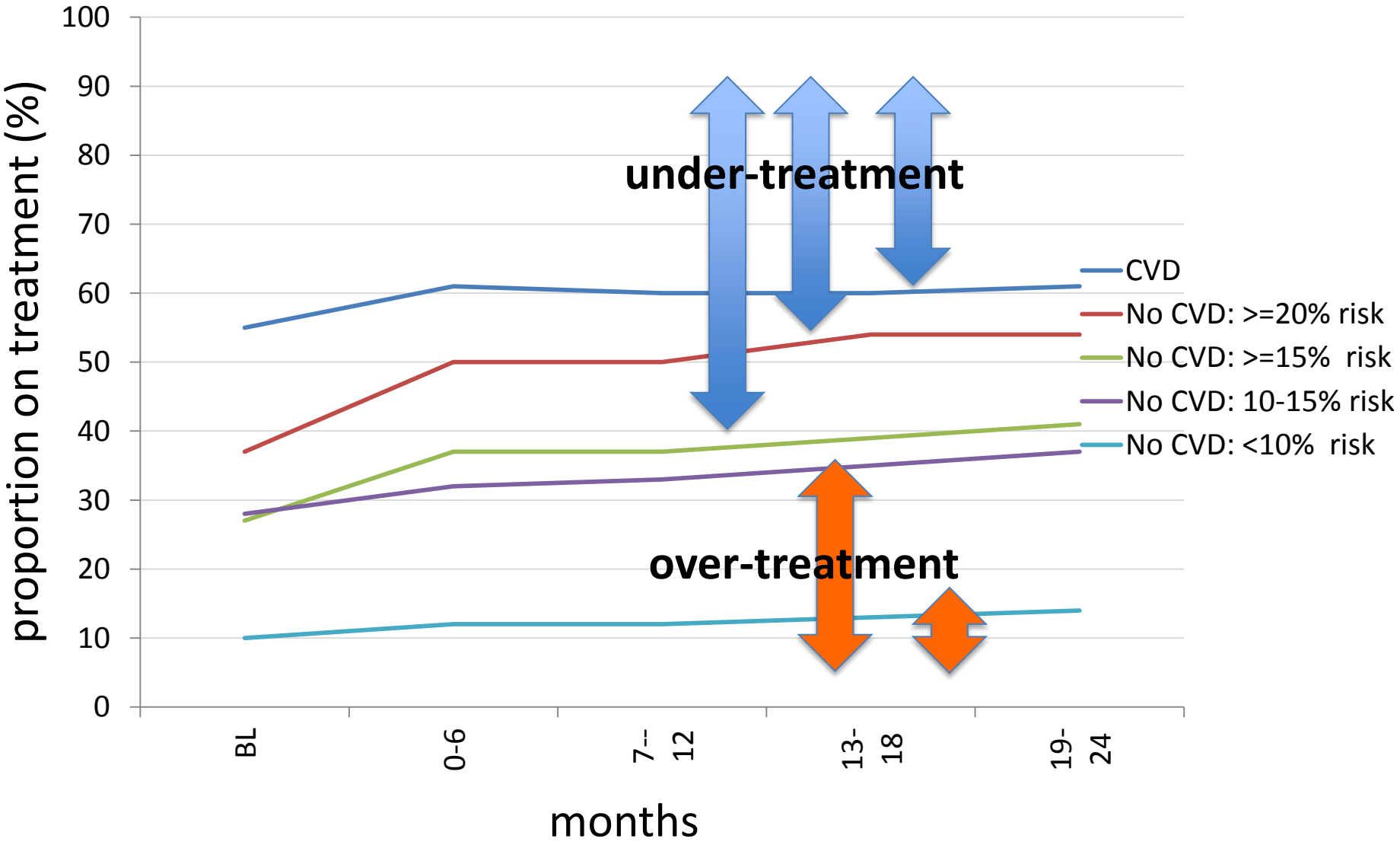
Rose's 'prevention paradox' the whole population risk axiom

a large number of people at small risk may give rise to more cases in a population than a small number of people at high risk

well-targeted ~~primary~~ prevention of cardiovascular disease: an underused high-value intervention?

Rod Jackson
University of Auckland, New Zealand
October 2015

vascular risk management: Auckland 2006-9



Mehta et al. Eur J Prevent Cardiol. 2014;21:192–202

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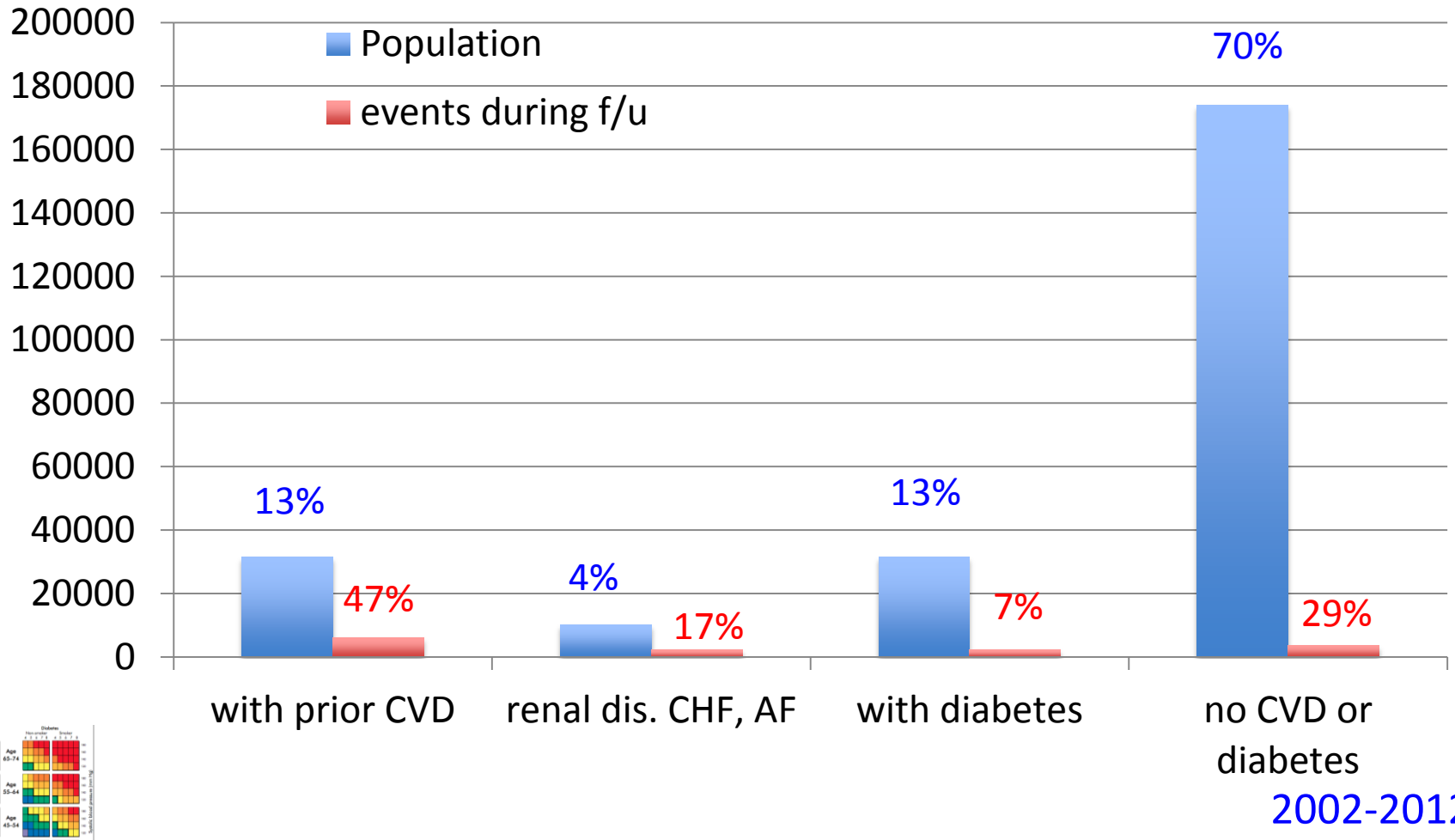

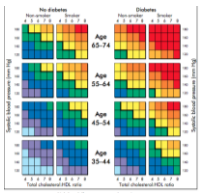

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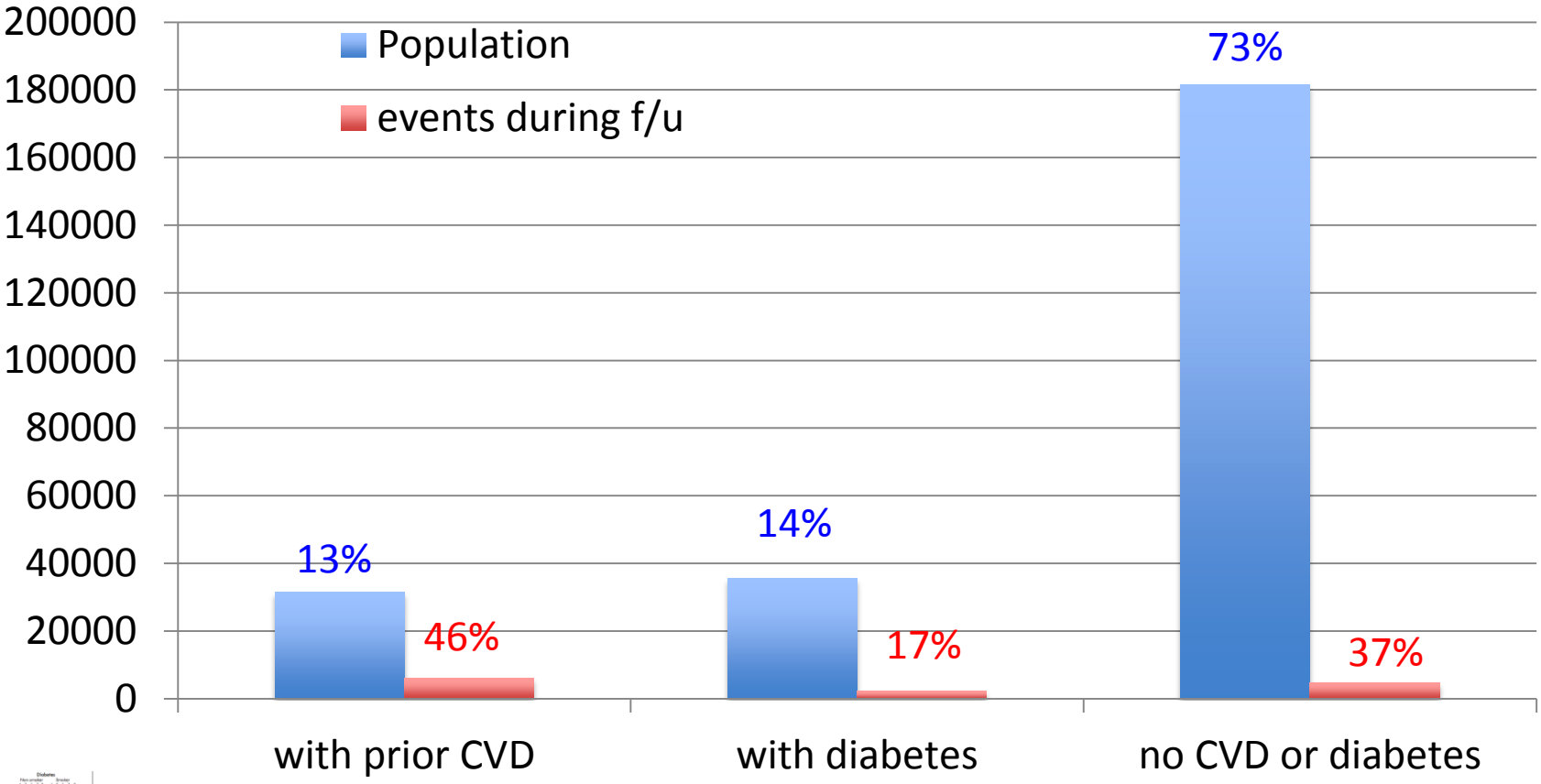
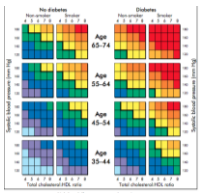
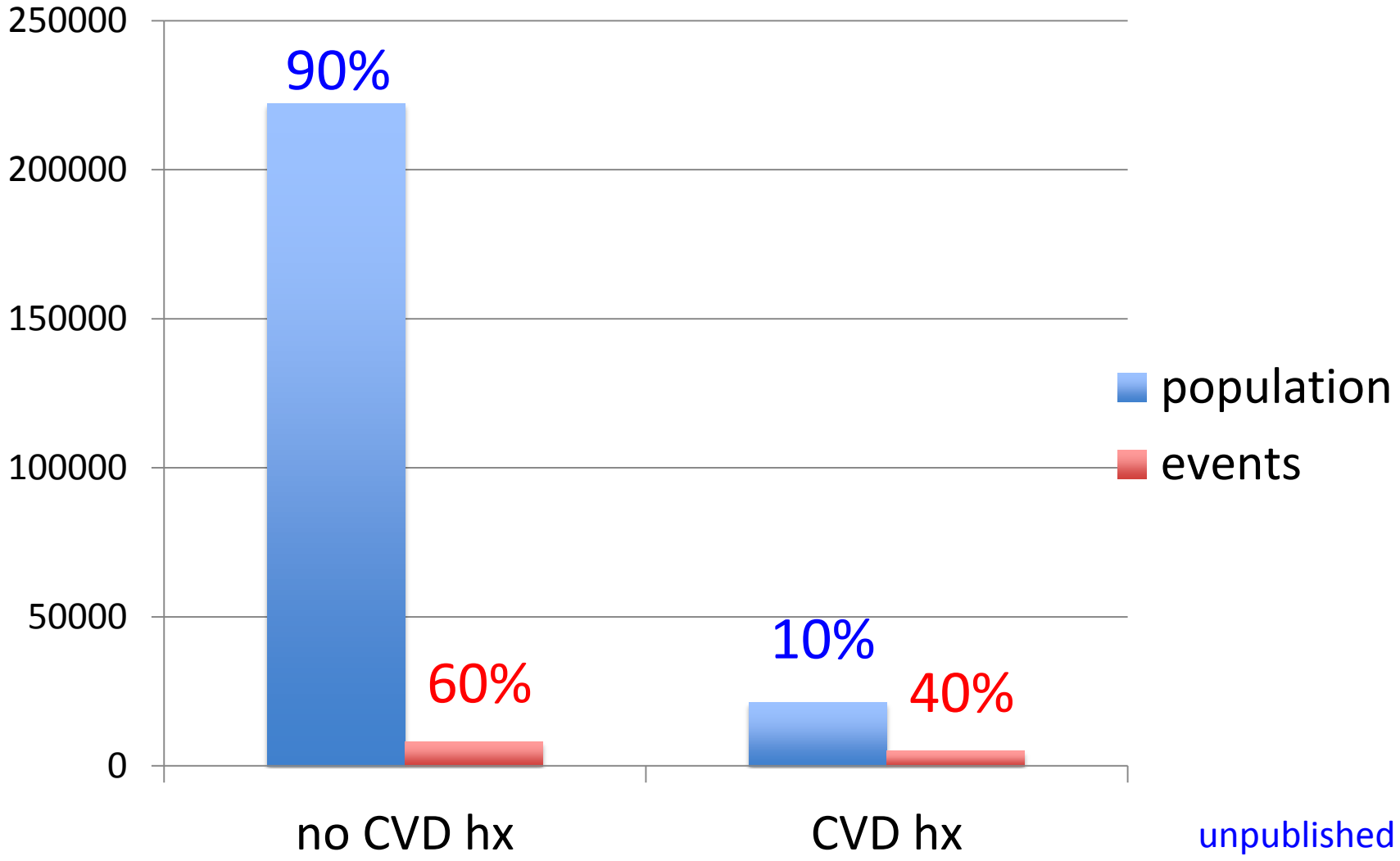




2002-2012

CVD events by history of CVD in NZ: 2002-12 (PREDICT n=270,000)



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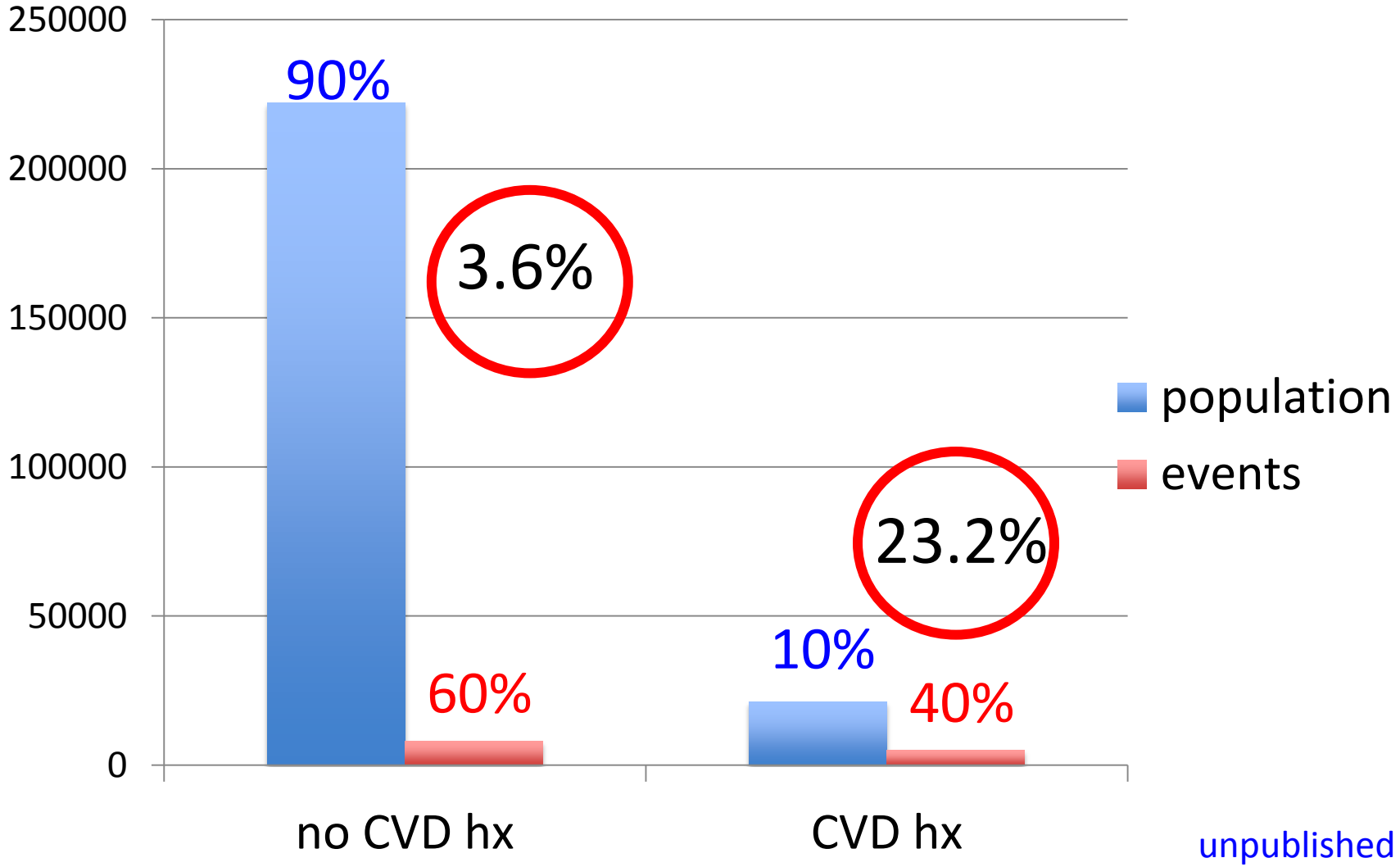

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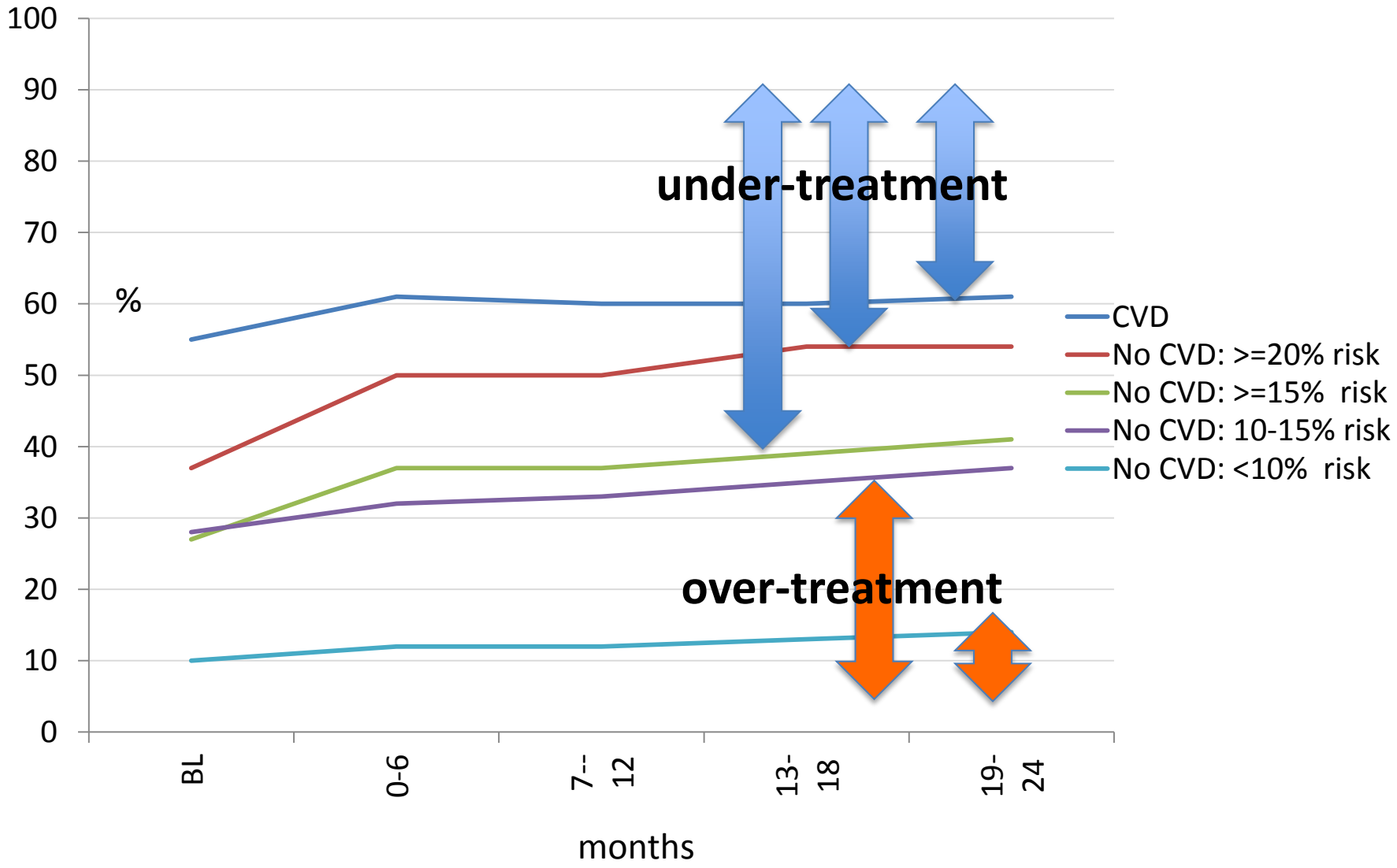
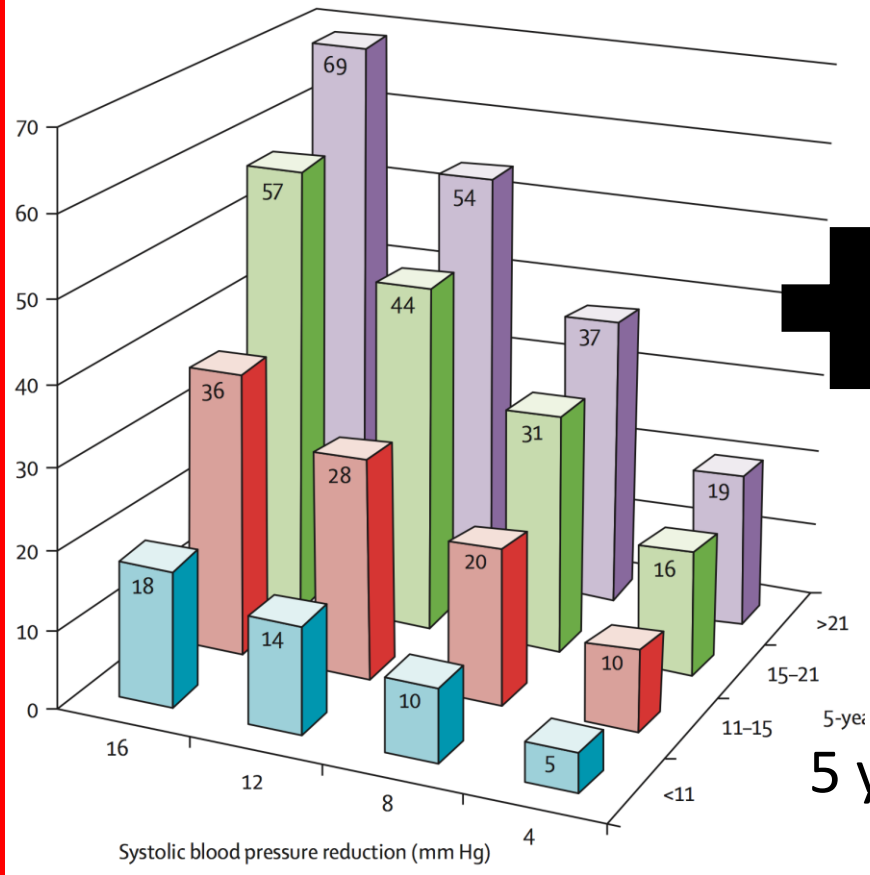
vascular risk management: Auckland 2006-9



Mehta et al. Eur J Prevent Cardiol. 2014;21:192–202

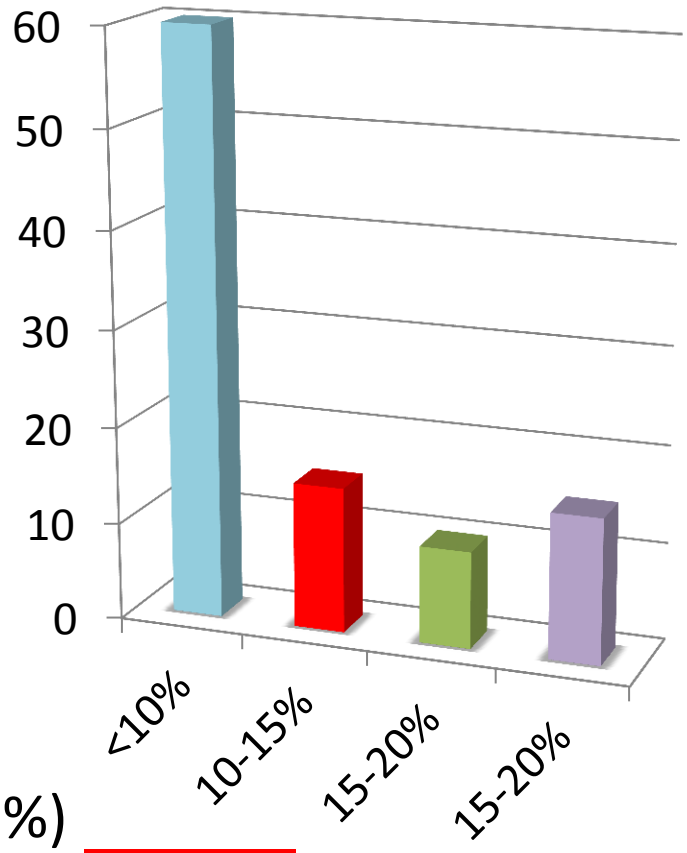
how should we choose treatment thresholds?

CVD events avoided per 1000 treated



+

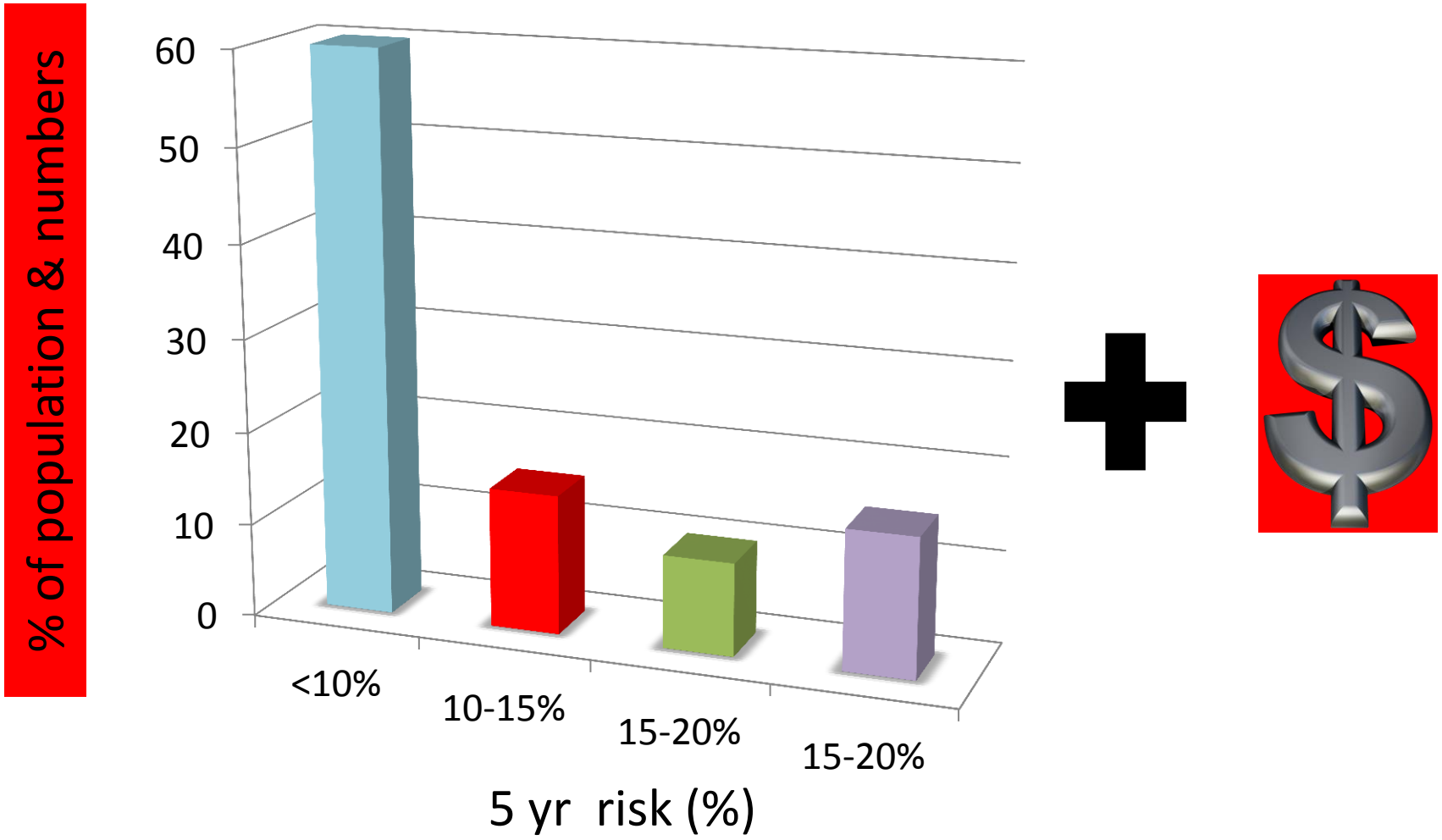
% of population & numbers



5 yr risk (%)

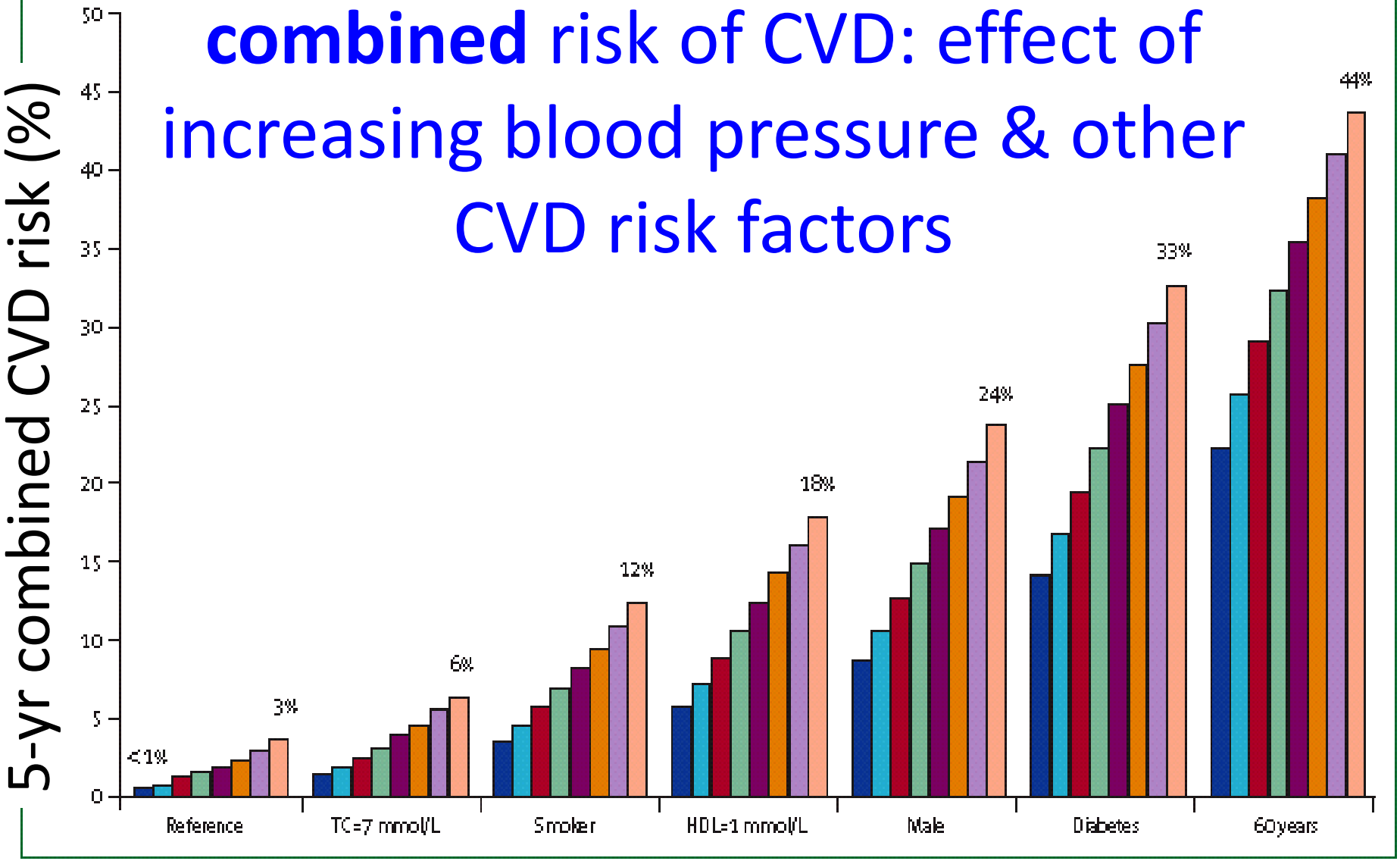
+

who should have their risk predicted?



choose the most efficient way of identifying those meeting treatment criteria (e.g. by age, sex, medical hx)

combined risk of CVD: effect of increasing blood pressure & other CVD risk factors



Reference: 50 yr old females

Jackson et al. Lancet 2005. 365:434-41

key questions on CVD risk prediction

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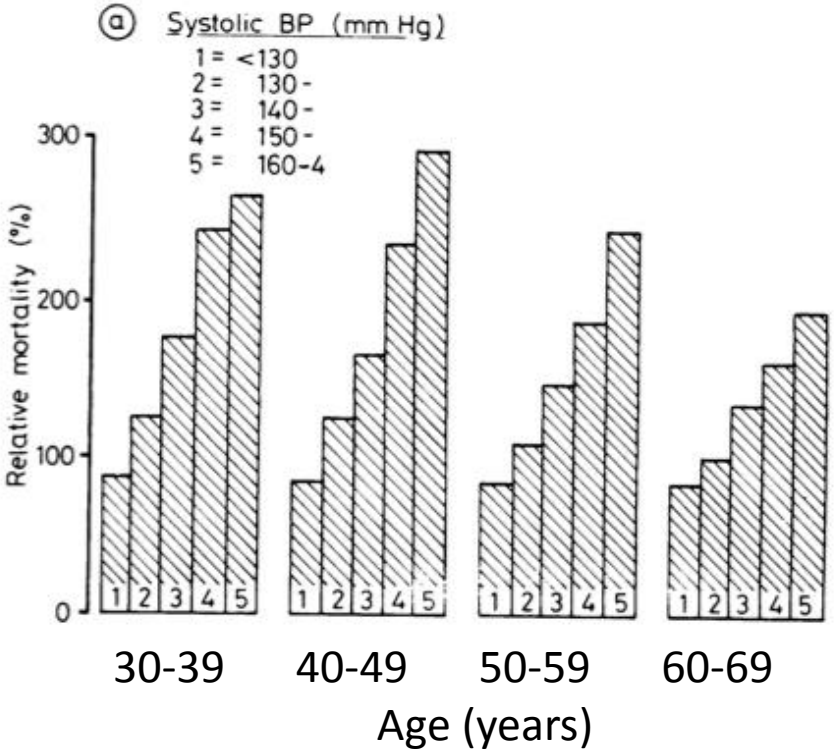
age-specific mortality in men according to SBP & age: relative risk of death

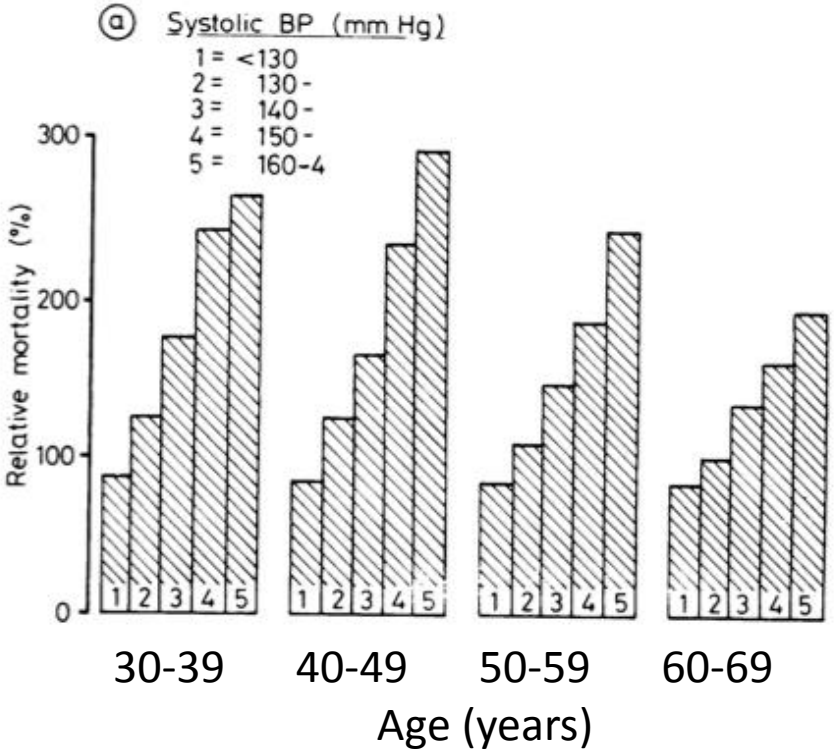
relative risk of death



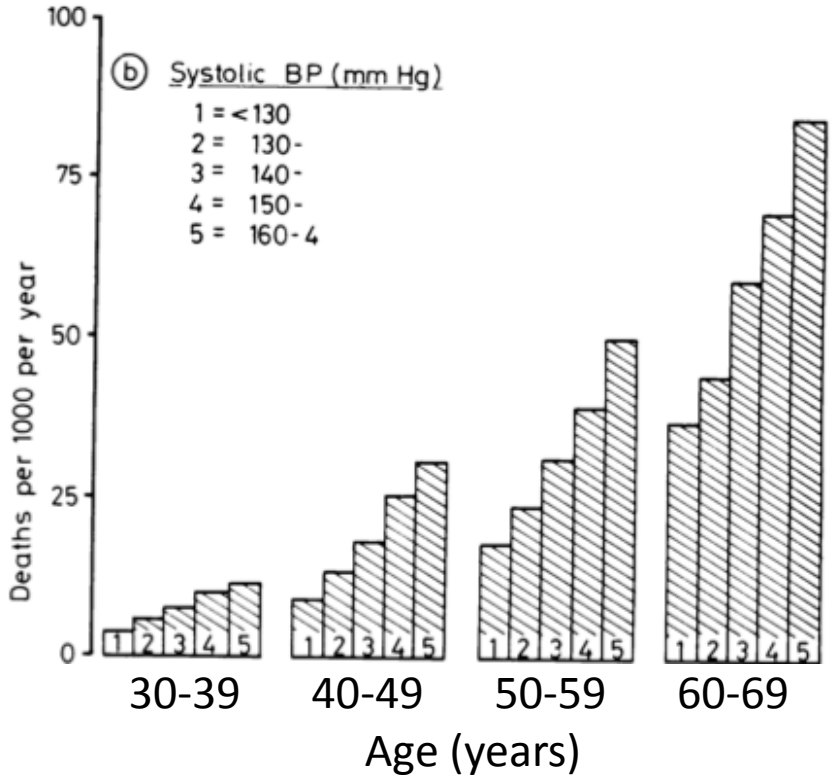
Geoffrey Rose. BMJ 1981;282:1847-51

age-specific mortality in men according to SBP & age: (a) relative & (b) absolute risk

relative risk of death



absolute risk of death



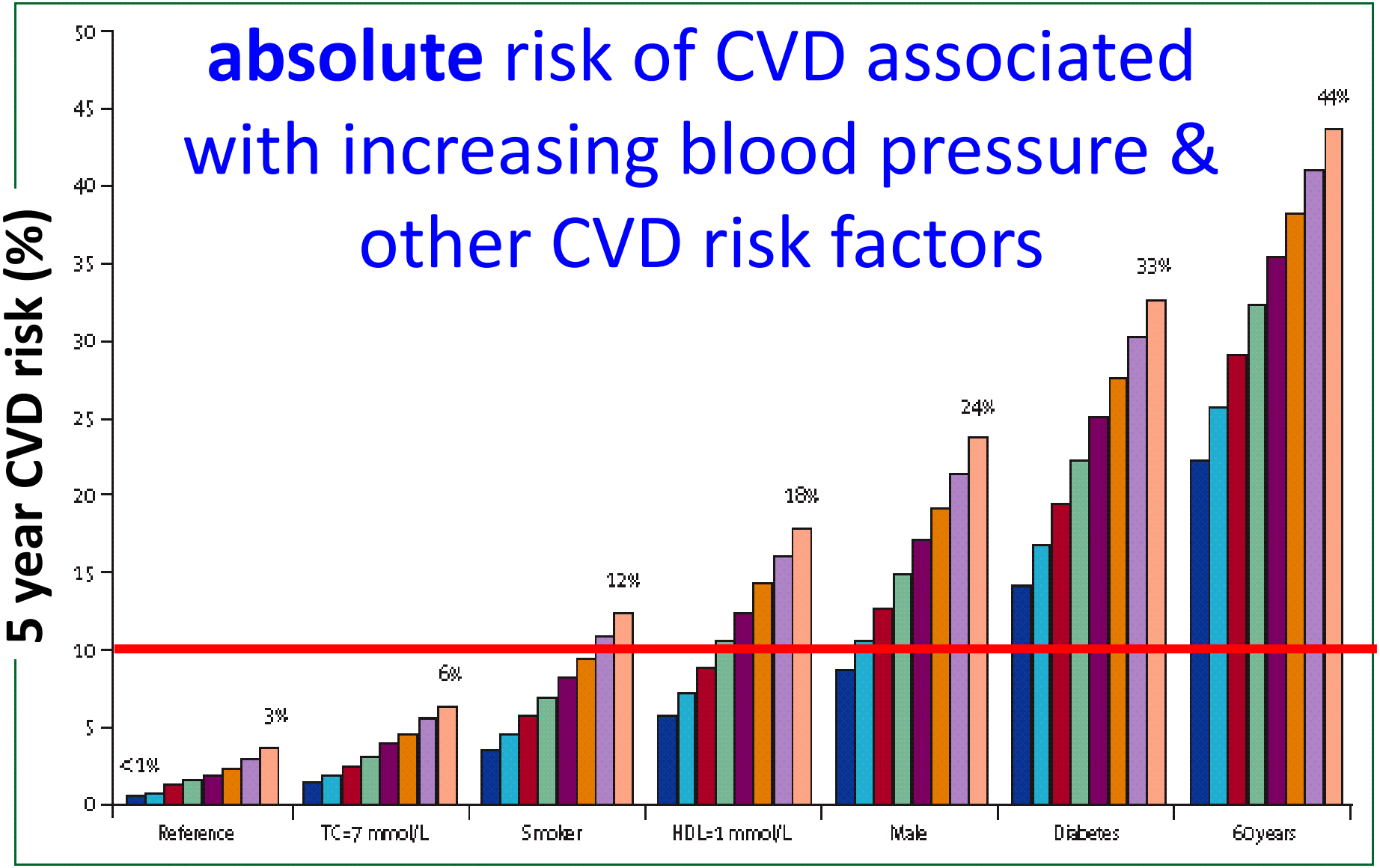
Geoffrey Rose. BMJ 1981;282:1847-51

relative & absolute benefits from treating hypertension according to age & presence of CV-renal abnormality

Age (yr)	Cardiovascular-renal abnormality	Relative treatment effectiveness (%)	Lives saved per 100 treated (absolute)
< 50	-	59	6
	+	62	14
> 50	-	50	15
	+	60	29

Geoffrey Rose. BMJ 1981;282:1847-51

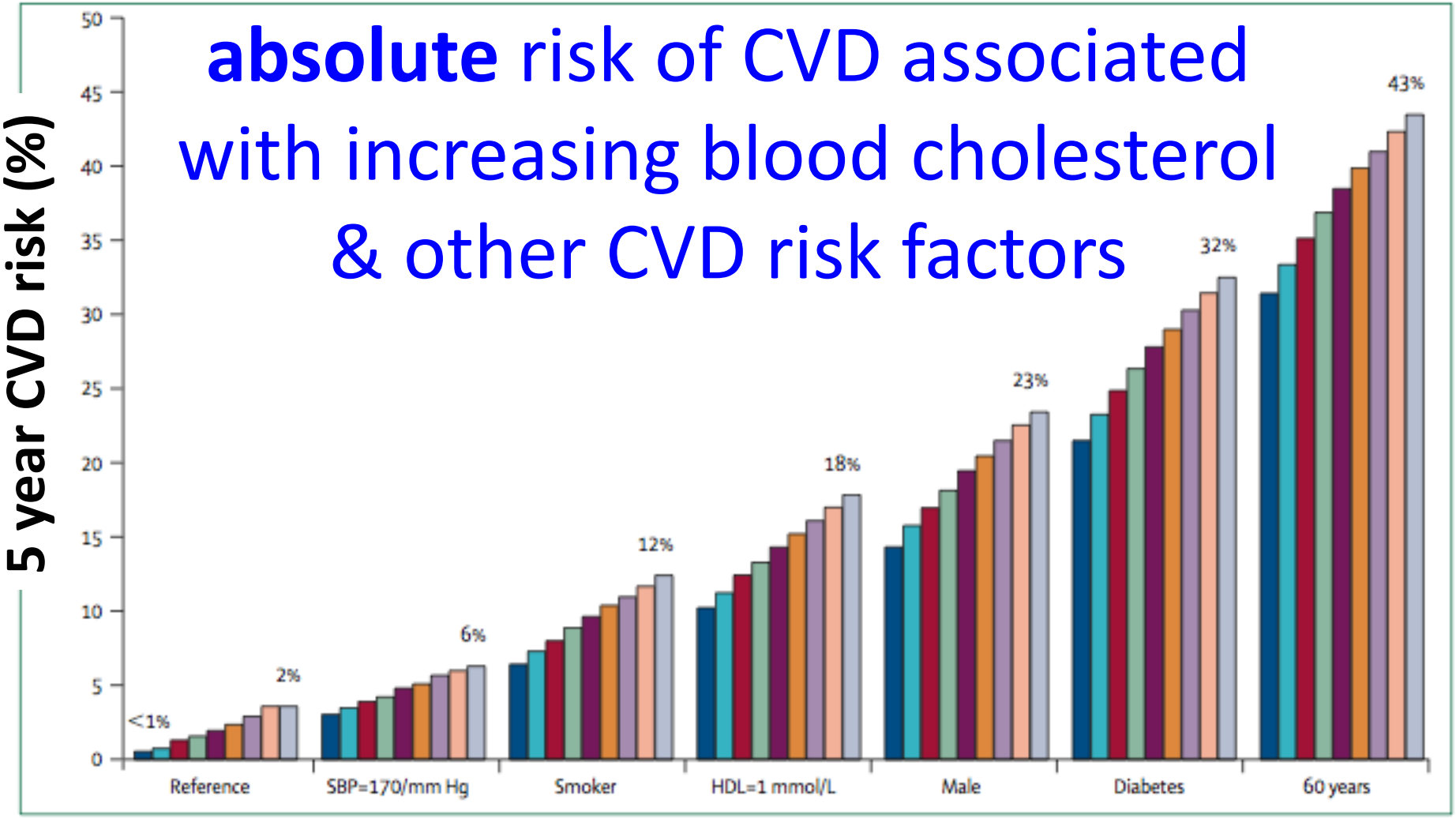
absolute risk of CVD associated with increasing blood pressure & other CVD risk factors



Reference: 50 yr old females

Jackson et al. Lancet 2005. 365:434-41

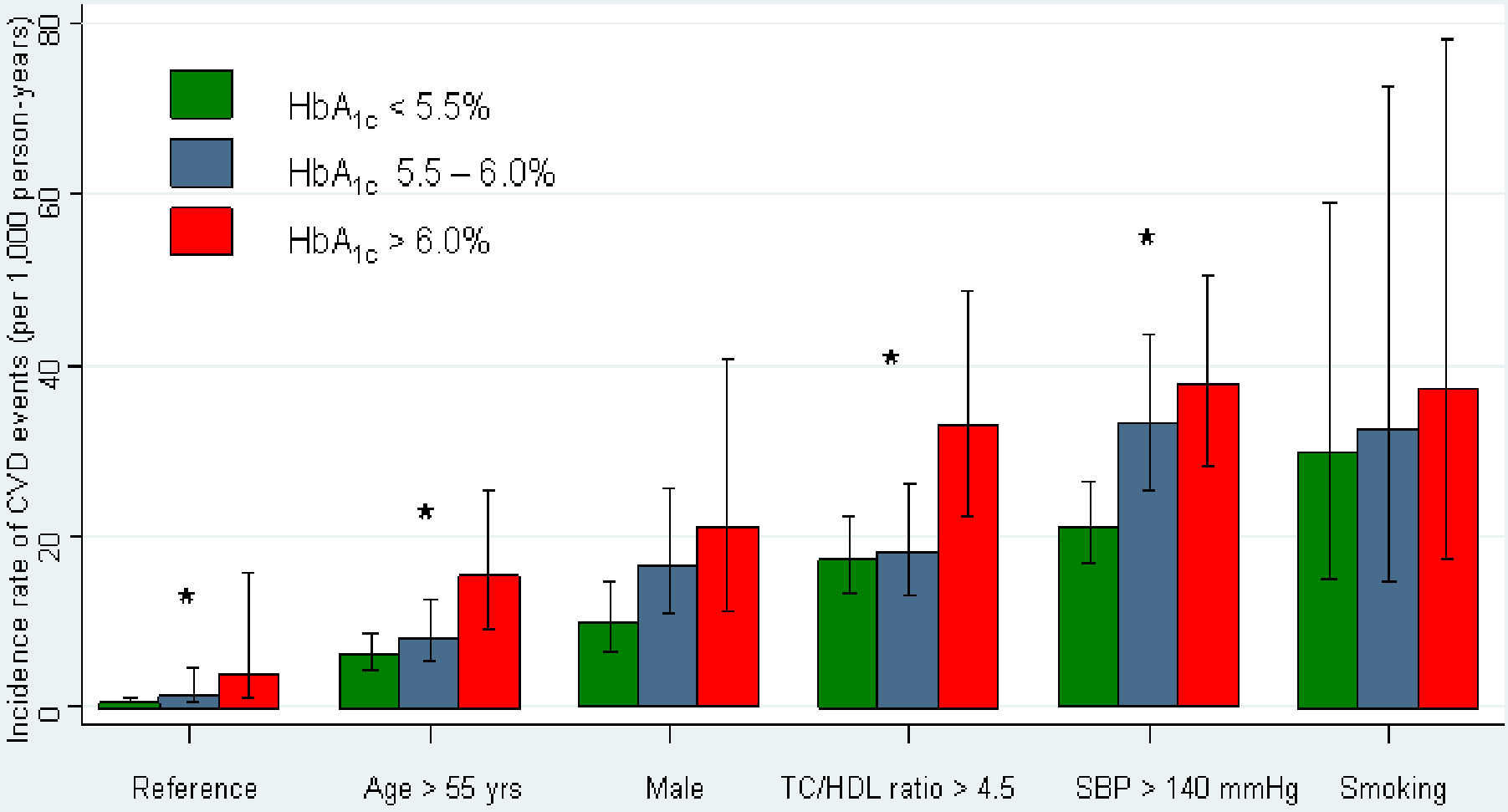
absolute risk of CVD associated with increasing blood cholesterol & other CVD risk factors



Reference: 50 yr old females

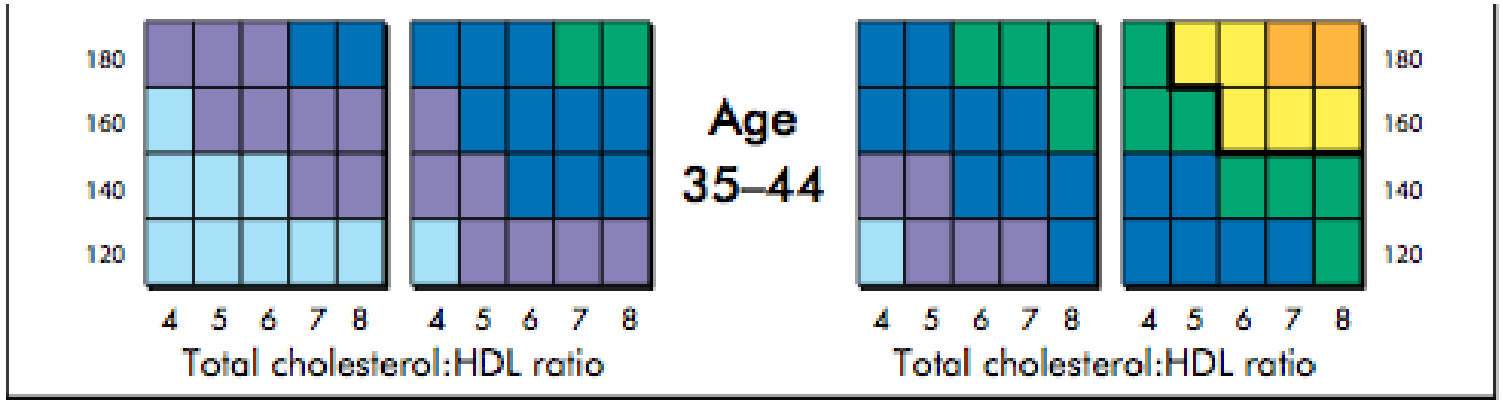
Jackson et al. Lancet 2005. 365:434-41

absolute CVD risk & glycaemia: HbA1c ± other CVD risk factors

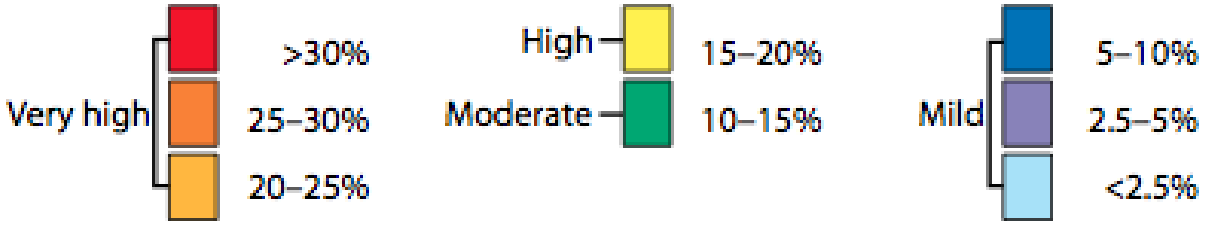


Ref: non- smoking, non-diabetic woman, 55 years, TC:HDL <4.5, SBP <140 mmHg

Epic Norfolk unpublished

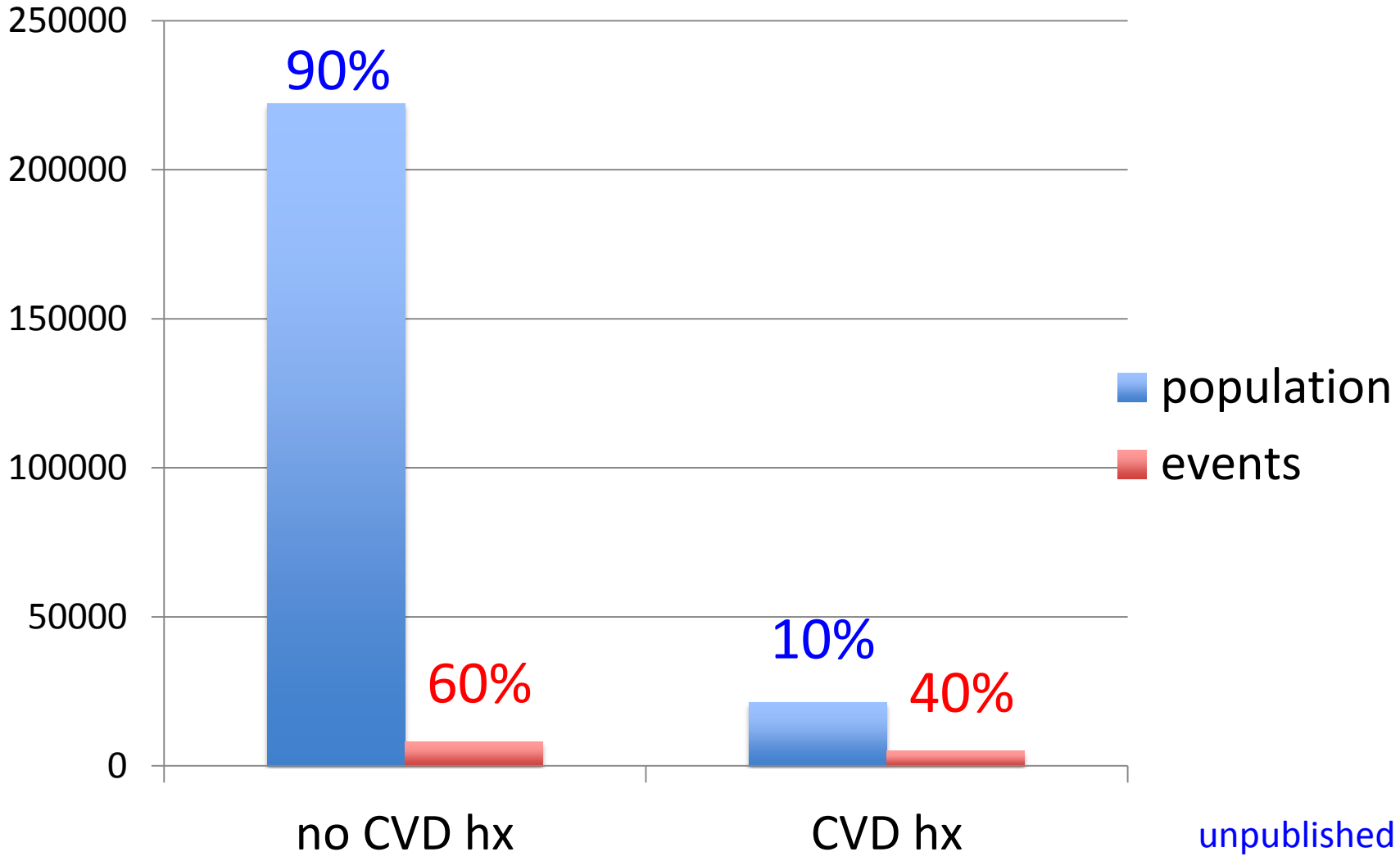


Risk level (for women and men)
5-year cardiovascular disease (CVD) risk (fatal and non-fatal)



Risk level: 5-year CVD risk (fatal and non-fatal)	**Benefits: NNT for 5 years to prevent one event** (CVD events prevented per 100 people treated for 5 years)		
	1 intervention (25% risk reduction)	**2 interventions (45% risk reduction)**	**3 interventions (55% risk reduction)**
30%	13 (7.5 per 100)	7 (14 per 100)	6 (16 per 100)
20%	20 (5 per 100)	11 (9 per 100)	9 (11 per 100)
15%	27 (4 per 100)	15 (7 per 100)	12 (8 per 100)
10%	40 (2.5 per 100)	22 (4.5 per 100)	18 (5.5 per 100)
5%	80 (1.25 per 100)	44 (2.25 per 100)	36 (3 per 100)

CVD events by history of CVD in NZ: 2002-12 (PREDICT n=270,000)



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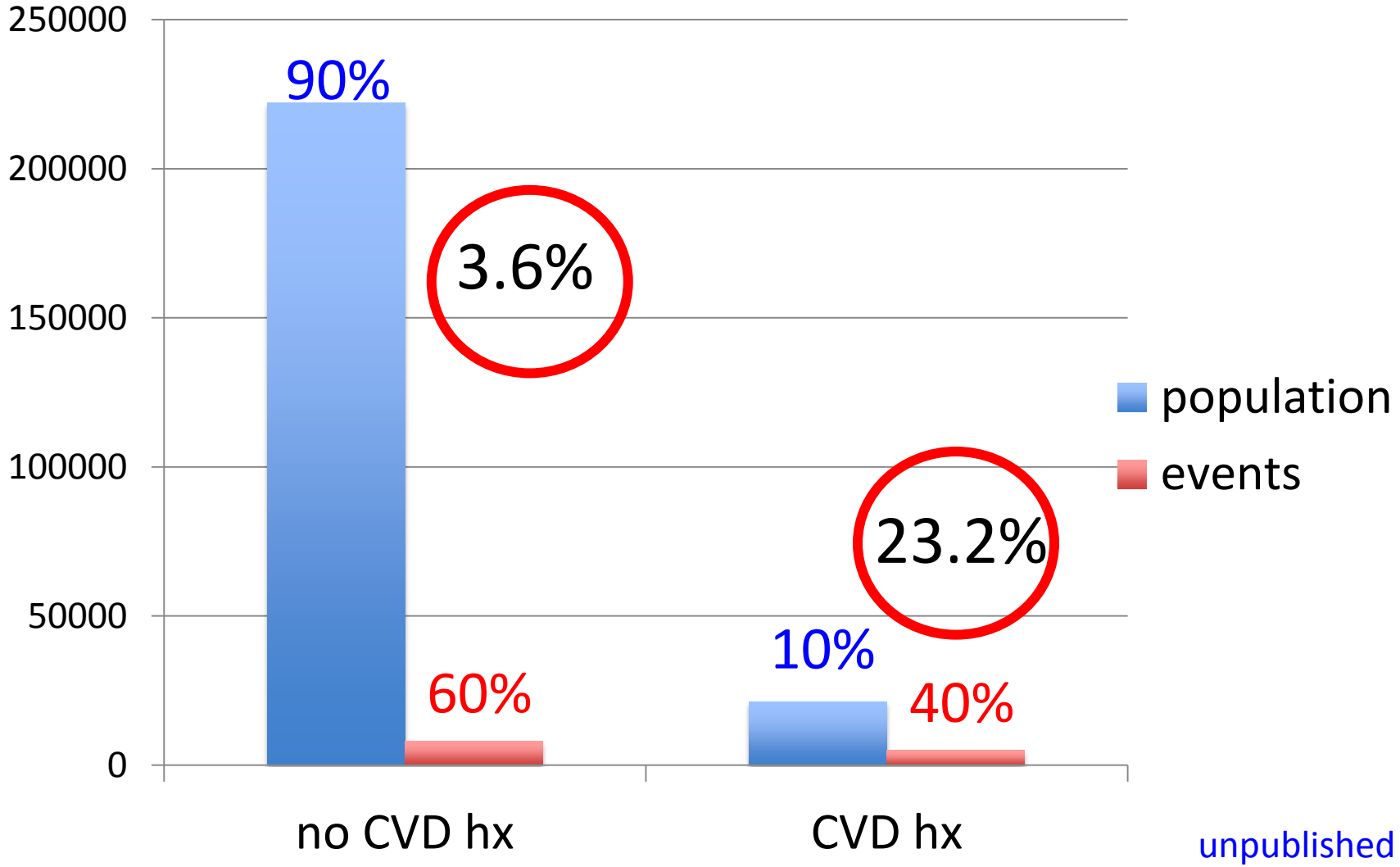
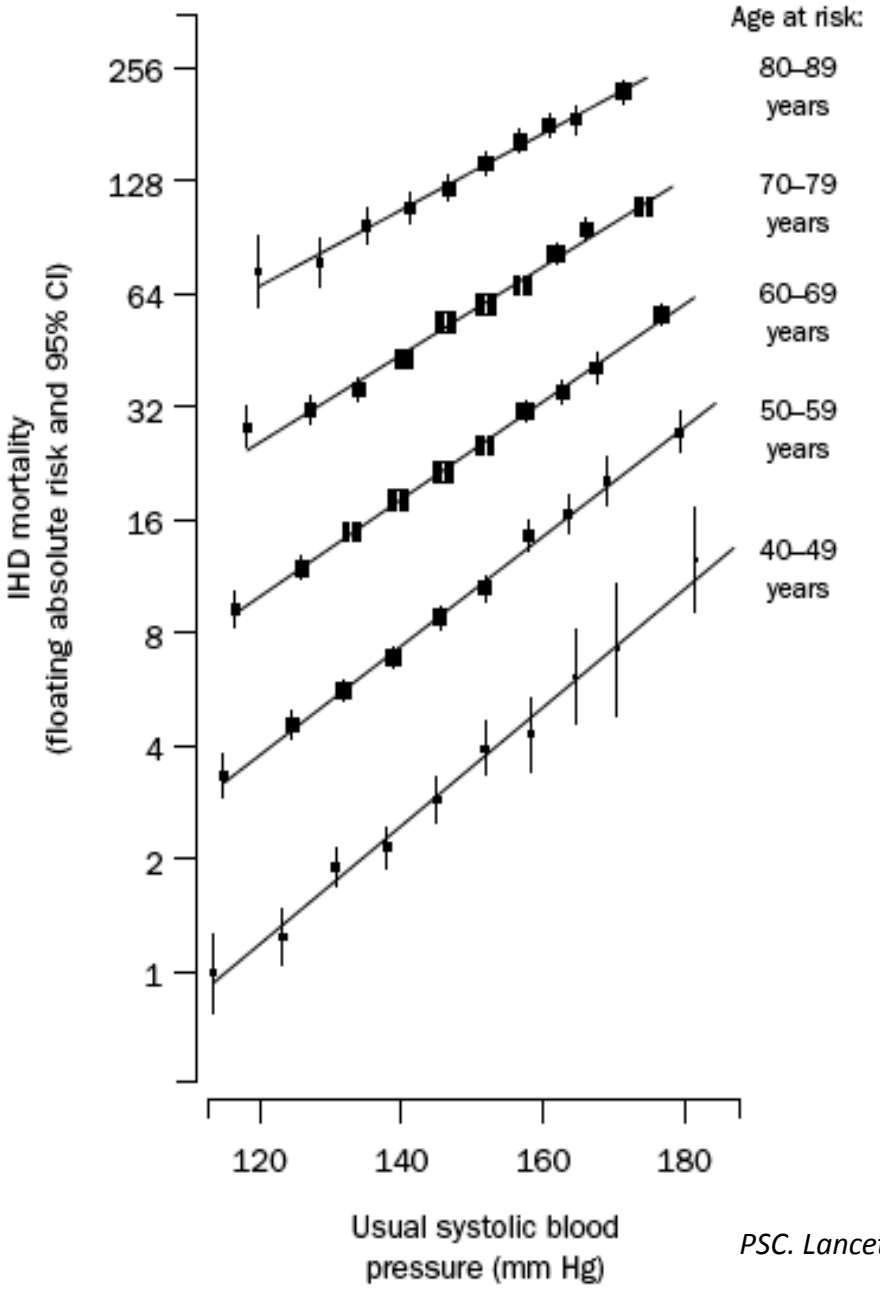
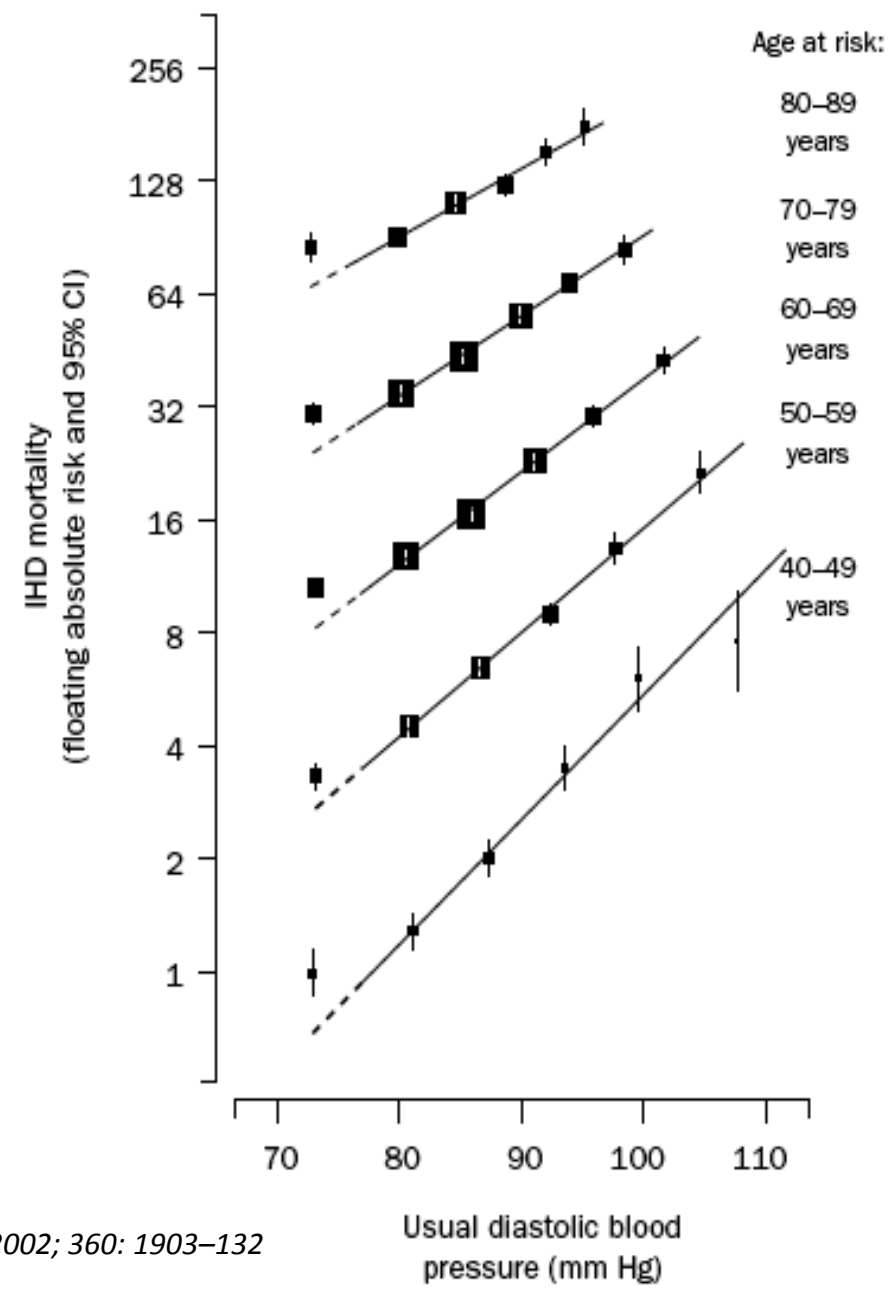


unpublished

blood pressure & IHD mortality by age





PSC. Lancet 2002; 360: 1903–132

key questions on CVD risk prediction

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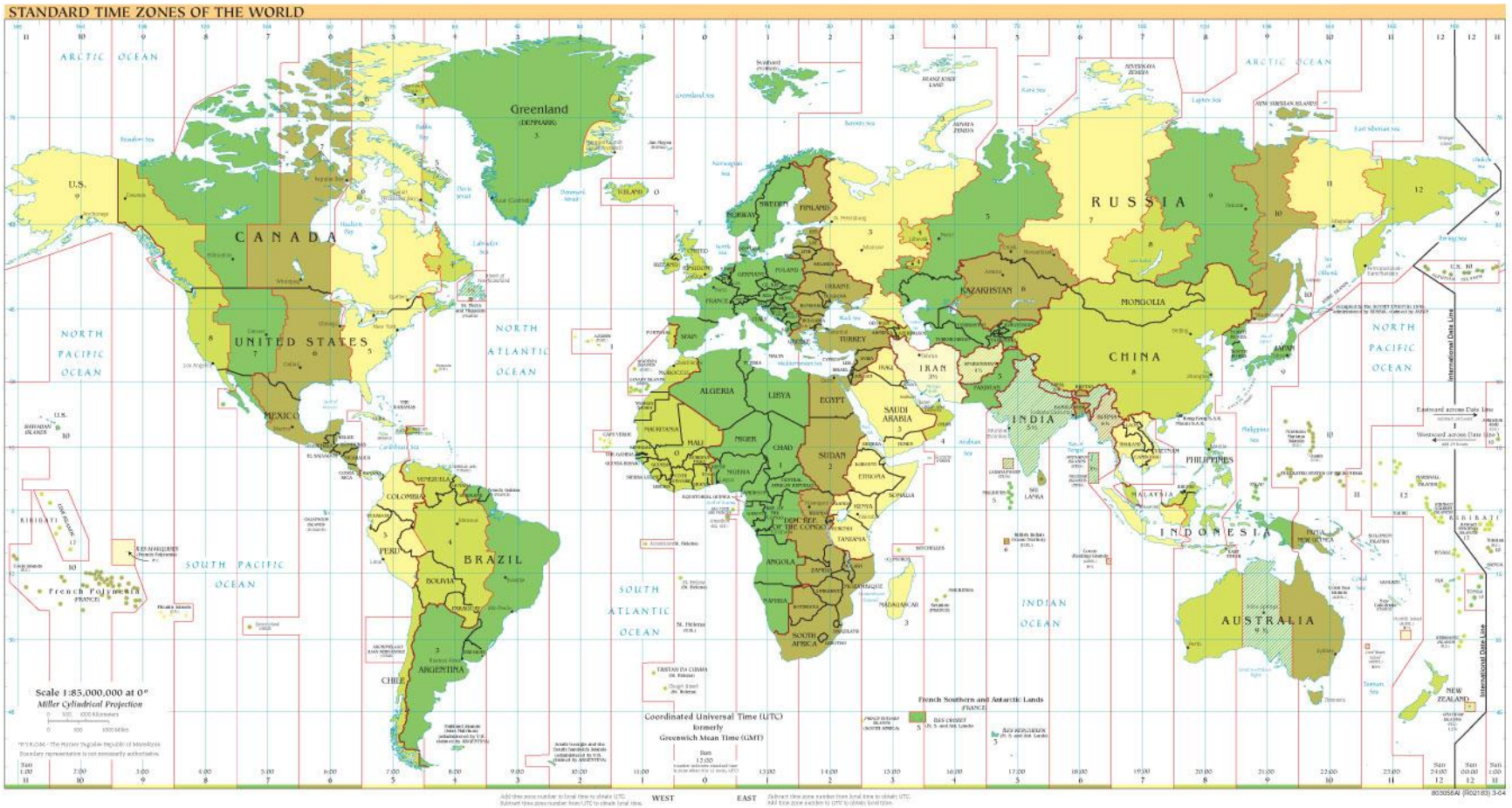
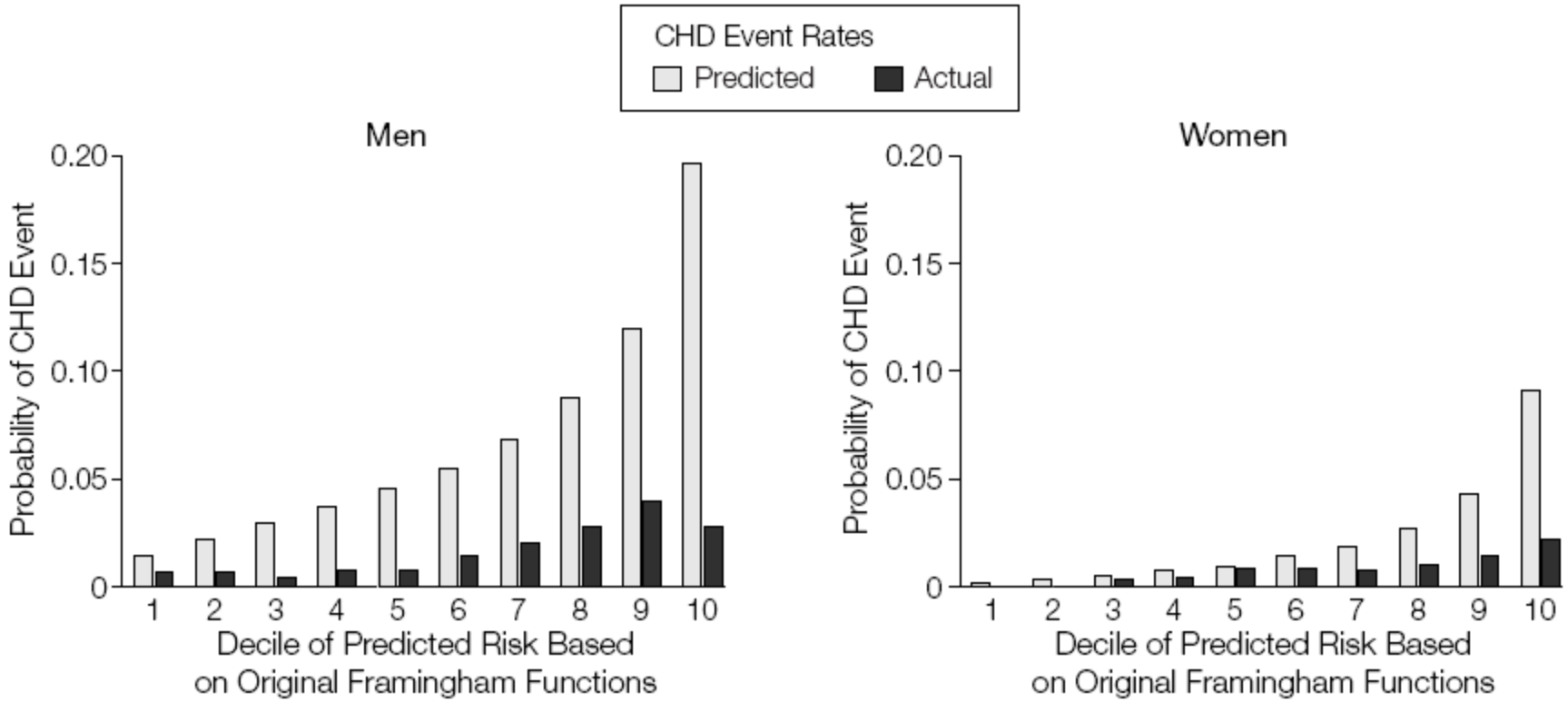
differences in cardiovascular risk in different ethic groups & different regions



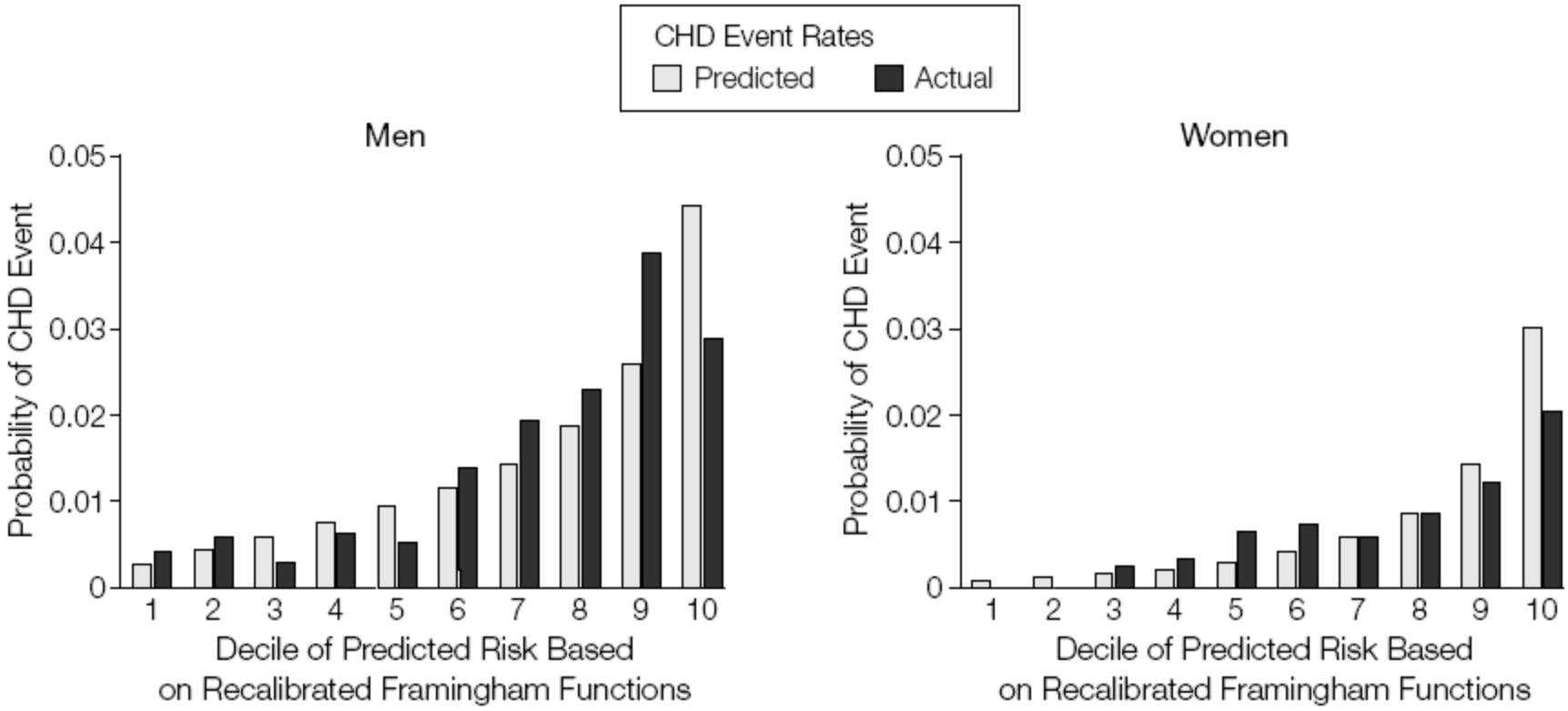
using the original Framingham functions in a Chinese population

Figure 2. Ten-Year Prediction of CHD Events in CMCS Men and Women Using the Original Framingham Functions



using recalibrated Framingham functions in a Chinese population

Figure 3. Ten-Year Prediction of CHD Events in CMCS Men and Women Using the Recalibrated Framingham Functions



Laboratory-based versus non-laboratory-based method for assessment of cardiovascular disease risk: the NHANES I Follow-up Study cohort

Thomas A Gaziano, Cynthia R Young, Garrett Fitzmaurice, Sidney Atwood, J Michael Gaziano

Summary

Background Around 80% of all cardiovascular deaths occur in developing countries. Assessment of those patients at high risk is an important strategy for prevention. Since developing countries have limited resources for prevention strategies that require laboratory testing, we assessed if a risk prediction method that did not require any laboratory tests could be as accurate as one requiring laboratory information.

Methods The National Health and Nutrition Examination Survey (NHANES) was a prospective cohort study of 14 407 US participants aged between 25–74 years at the time they were first examined (between 1971 and 1975). Our follow-up study population included participants with complete information on these surveys who did not report a history of cardiovascular disease (myocardial infarction, heart failure, stroke, angina) or cancer, yielding an analysis dataset N=6186. We compared how well either method could predict first-time fatal and non-fatal cardiovascular disease events in this cohort. For the laboratory-based model, which required blood testing, we used standard risk factors to assess risk of cardiovascular disease: age, systolic blood pressure, smoking status, total cholesterol, reported diabetes status, and current treatment for hypertension. For the non-laboratory-based model, we substituted body-mass index for cholesterol.

Findings In the cohort of 6186, there were 1529 first-time cardiovascular events and 578 (38%) deaths due to cardiovascular disease over 21 years. In women, the laboratory-based model was useful for predicting events, with a c statistic of 0·829. The c statistic of the non-laboratory-based model was 0·831. In men, the results were similar (0·784 for the laboratory-based model and 0·783 for the non-laboratory-based model). Results were similar between the laboratory-based and non-laboratory-based models in both men and women when restricted to fatal events only.

Interpretation A method that uses non-laboratory-based risk factors predicted cardiovascular events as accurately as one that relied on laboratory-based values. This approach could simplify risk assessment in situations where laboratory testing is inconvenient or unavailable.

Lancet 2008; 371: 923–31

See Comment page 878

Division of Cardiovascular Medicine (T A Gaziano MD), **Division of Social Medicine and Health Inequalities** (S Atwood BA), **Brigham & Women's Hospital, Boston, MA, USA; Harvard Medical School, Boston, MA, USA** (C R Young MSc); **Laboratory for Psychiatric Biostatistics, McLean Hospital, Belmont, MA, USA** (G Fitzmaurice DSc); **and Brigham & Women's Hospital, VA Boston Healthcare System, Boston, MA, USA** (J M Gaziano MD)

Correspondence to:
Dr Thomas A Gaziano, Division of Cardiovascular Medicine, Brigham & Women's Hospital, Boston, MA 02115, USA
tgaziano@partners.org

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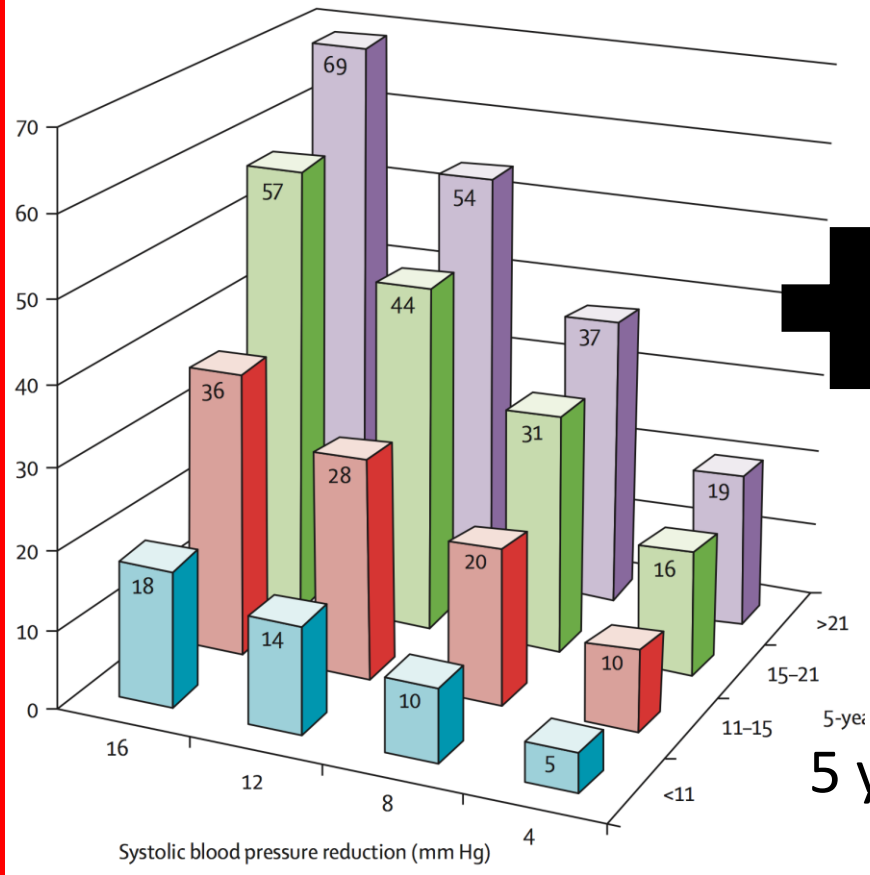
  - heart age & heart forecast

how should we choose treatment thresholds?

CVD events avoided per 1000 treated



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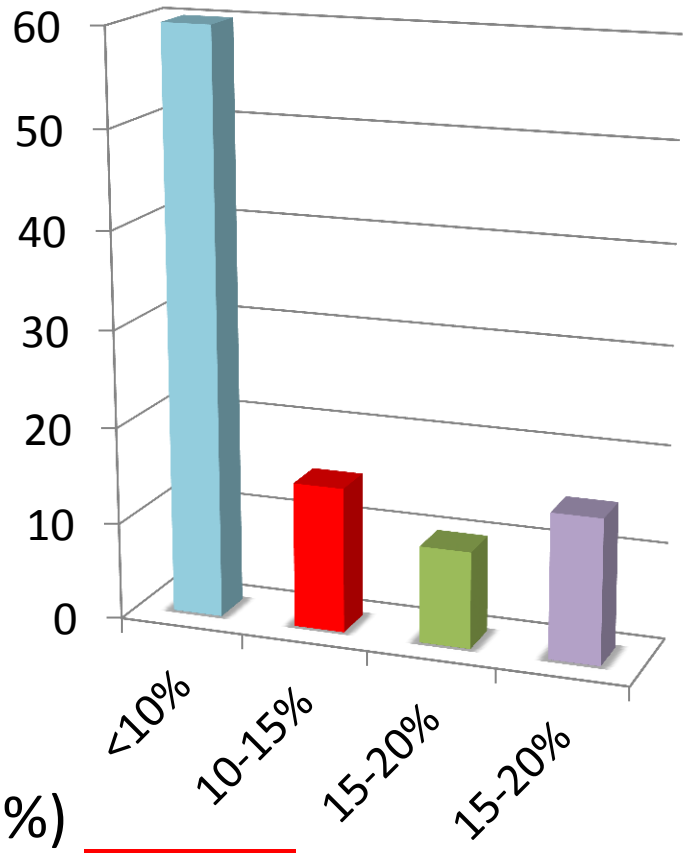
% of population & numbers



5 yr risk (%)

+

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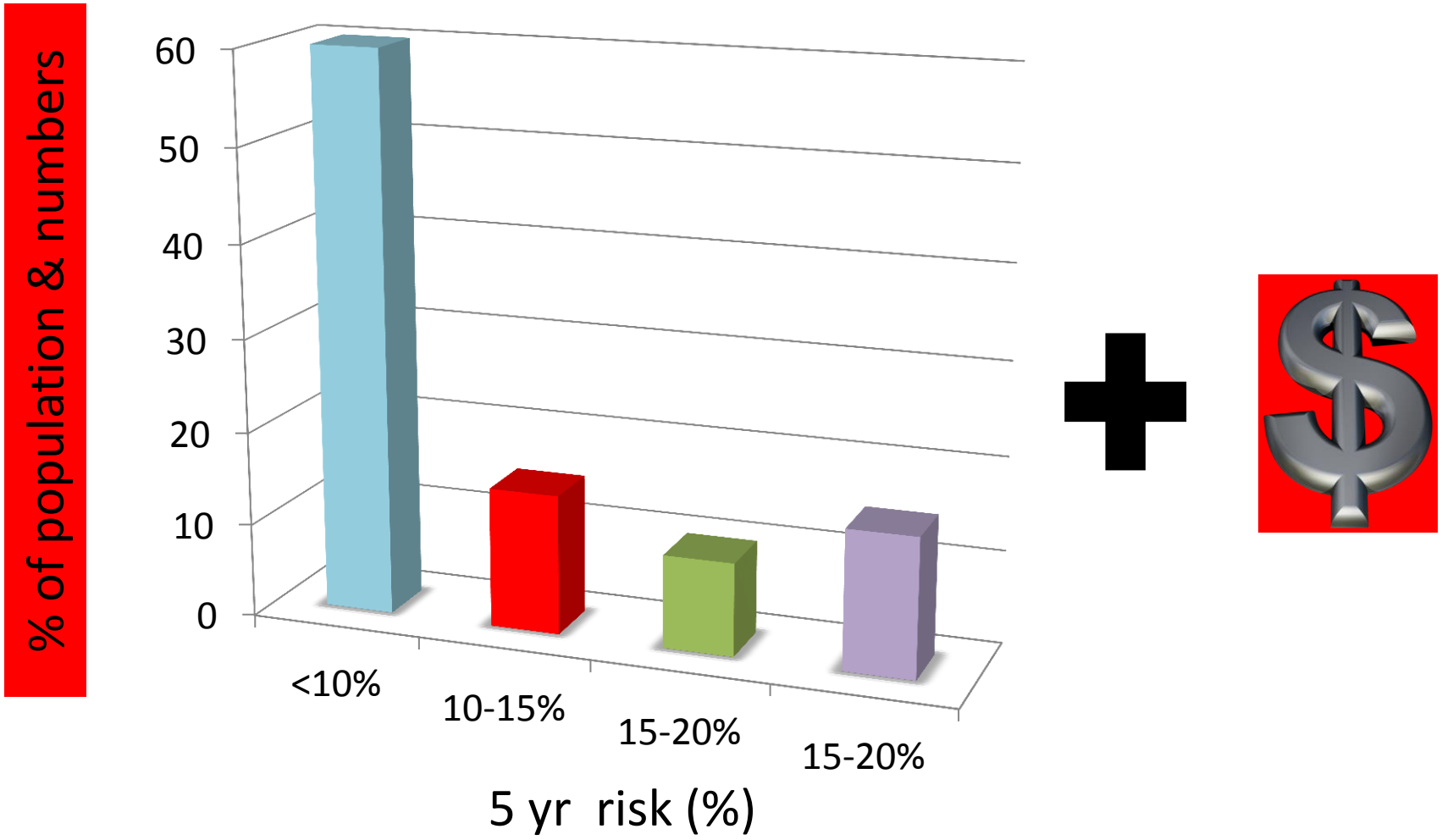
who should have their risk predicted?



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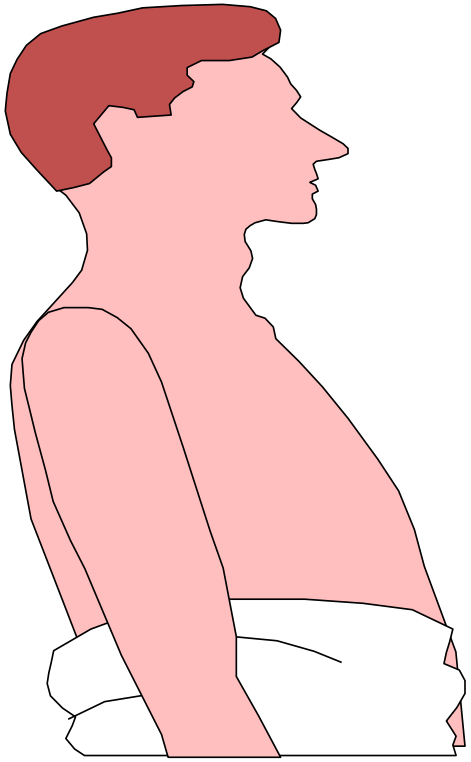


35 yr old male

Overweight smoker

Non diabetic

BP 140/ 80 mmHg

TC 6.0 mmol/L

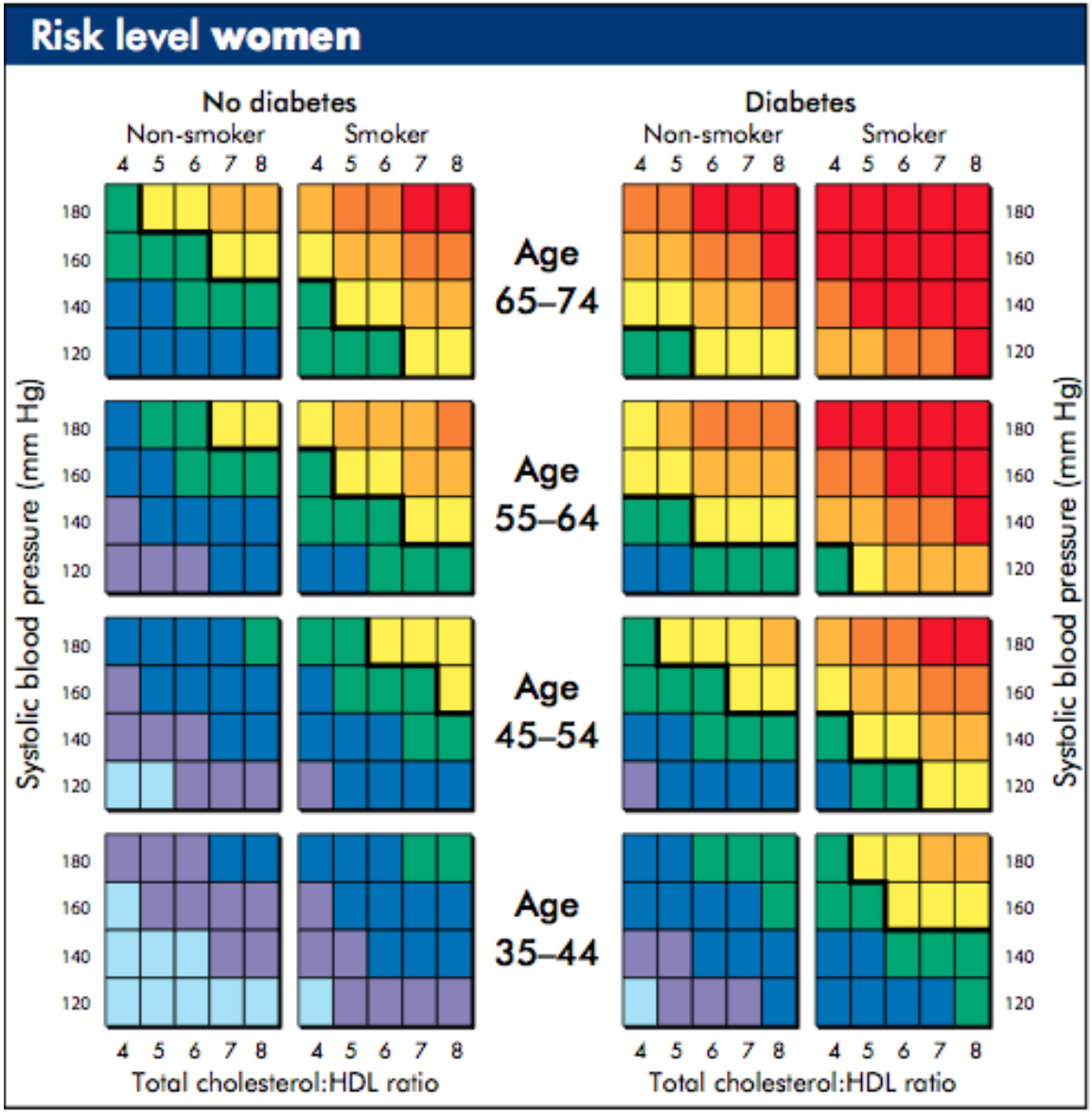
HDLC 1.0 mmol/L

TC/HDL = 6.0

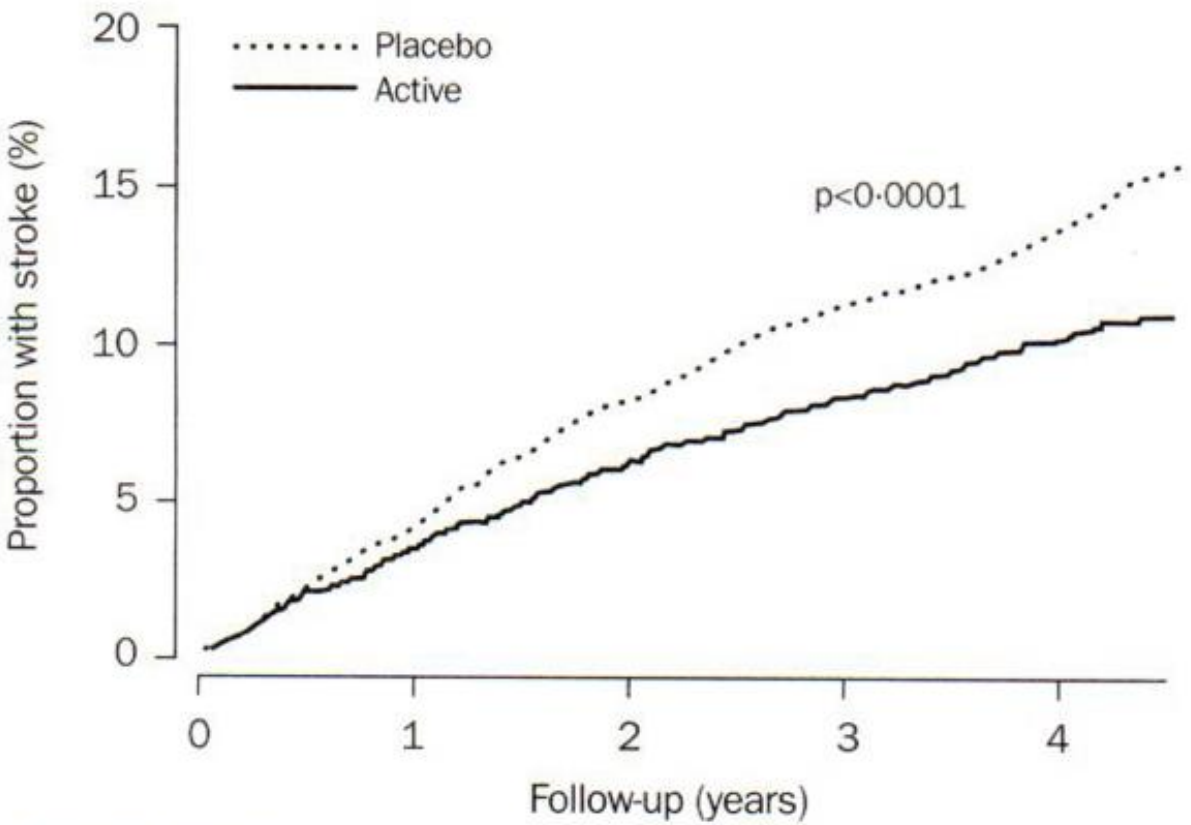
5-yr CVD risk = 4%

but long-term risk ↑↑

Why predict short-term CVD risk?



Blood pressure lowering & stroke



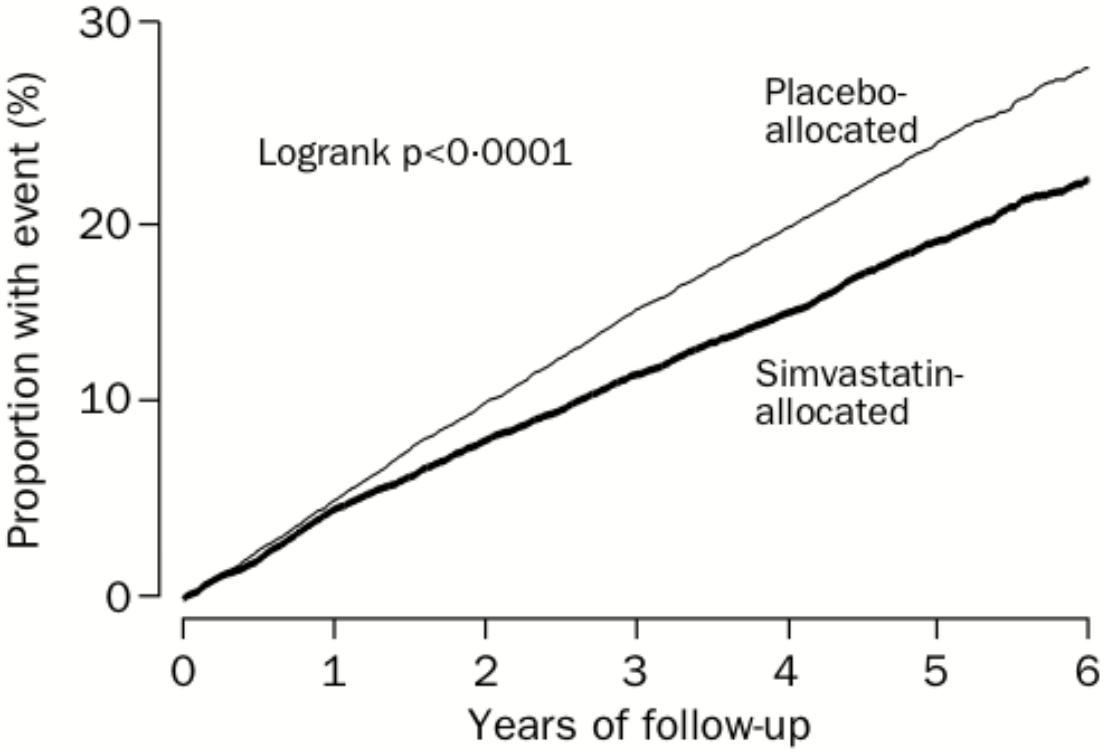
Numbers at risk

Active	3051	2902	2765	2634	1595
Placebo	3054	2880	2707	2551	1533

Figure 3: **Cumulative incidence of stroke among participants assigned active treatment and those assigned placebo**

Progress Lancet 2001; 358: 1033-41

Lipid lowering & CVD



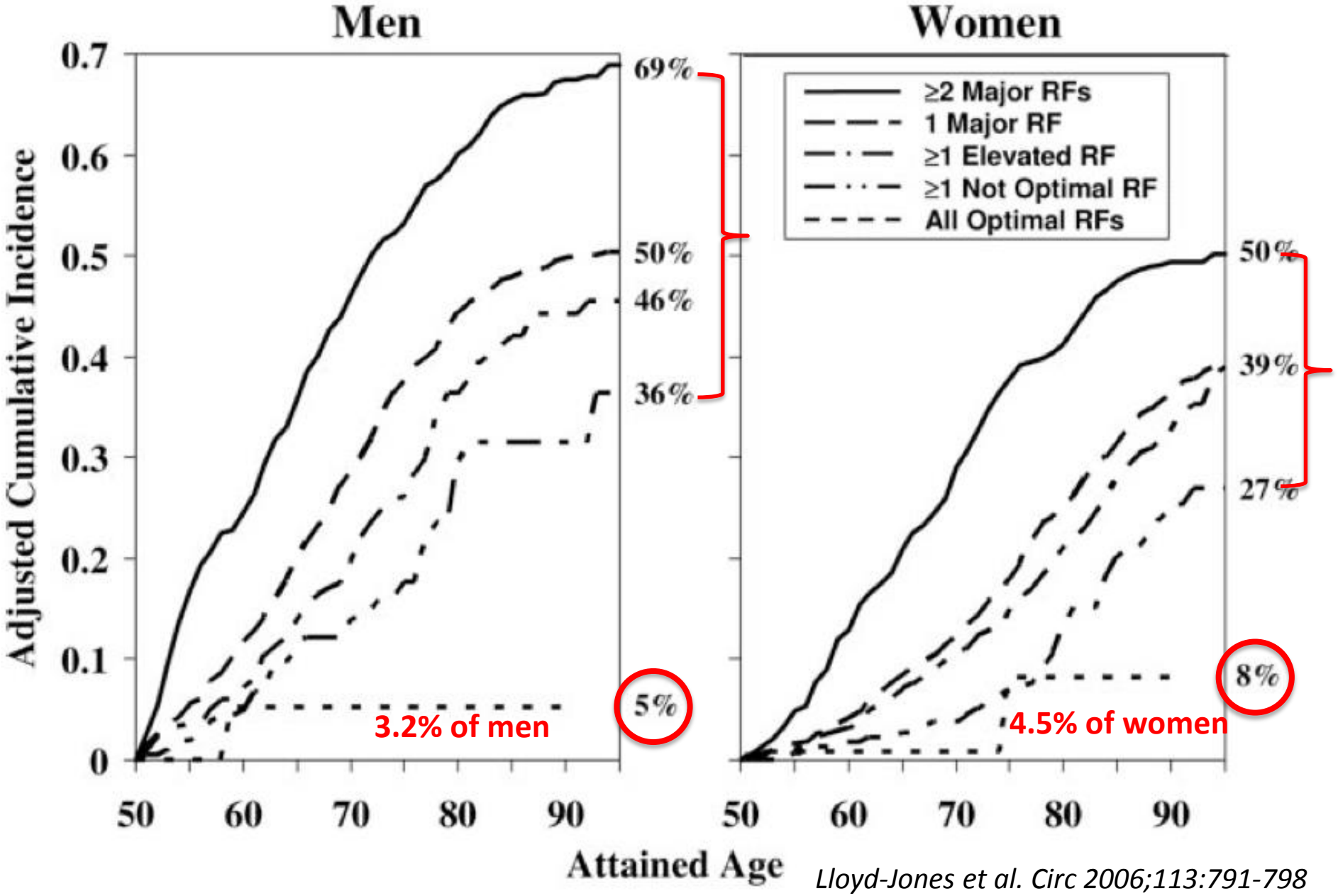
Benefit (SE)/1000 allocated simvastatin	5 (3)	20 (4)	35 (5)	46 (5)	54 (7)	60 (18)

Figure 6: **Life-table plot of effects of simvastatin allocation on percentages having major vascular events**

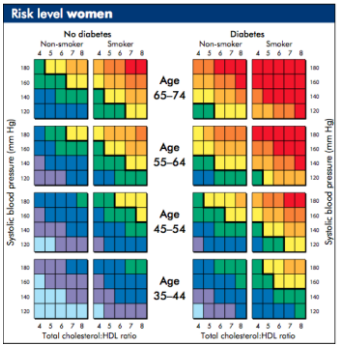
See figure 5 for numbers of participants having a first event during each year of follow-up.

HPS Lancet 2002; 360: 7–22

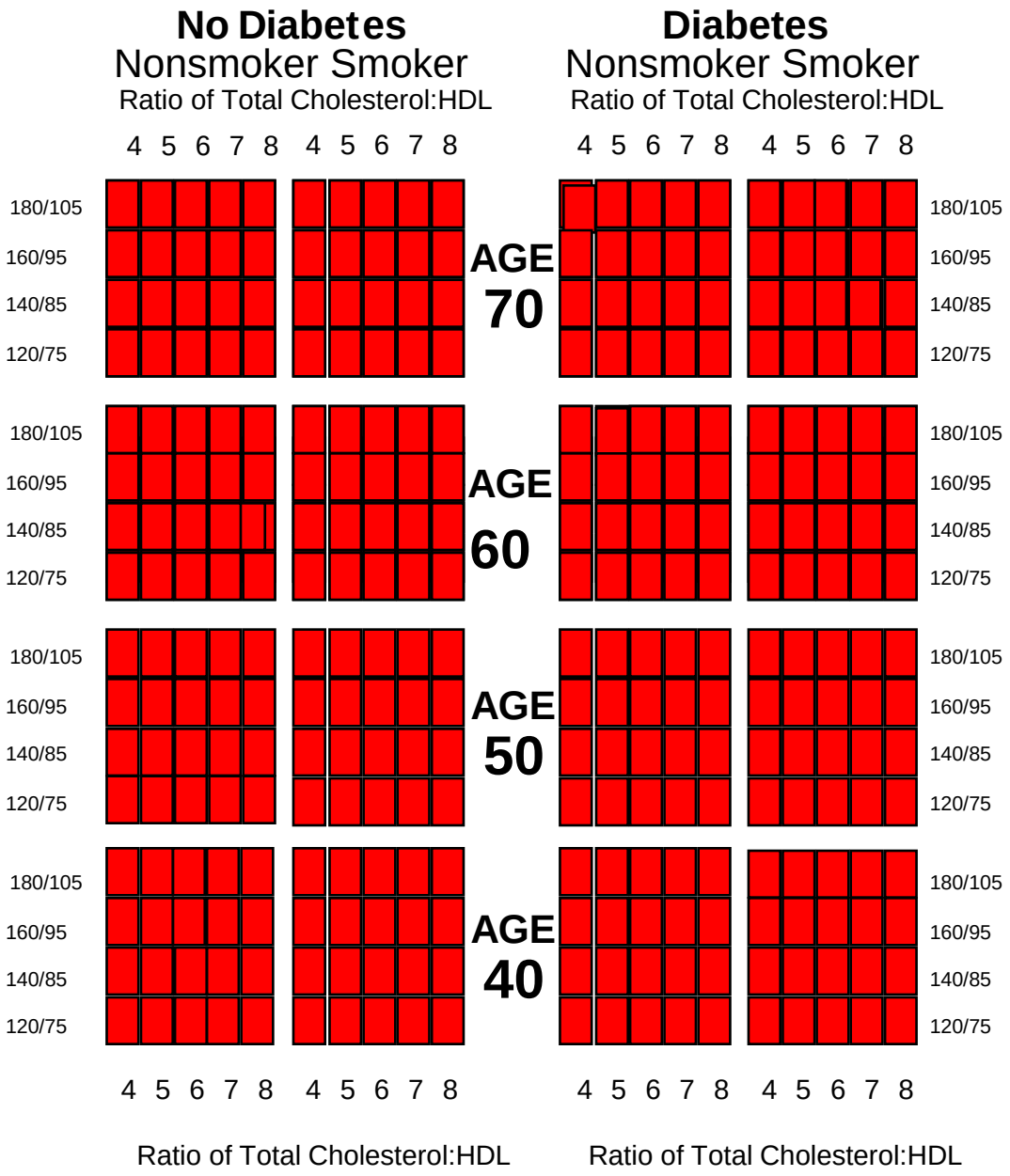
Lifetime risk of CVD to age 95 yrs: Framingham



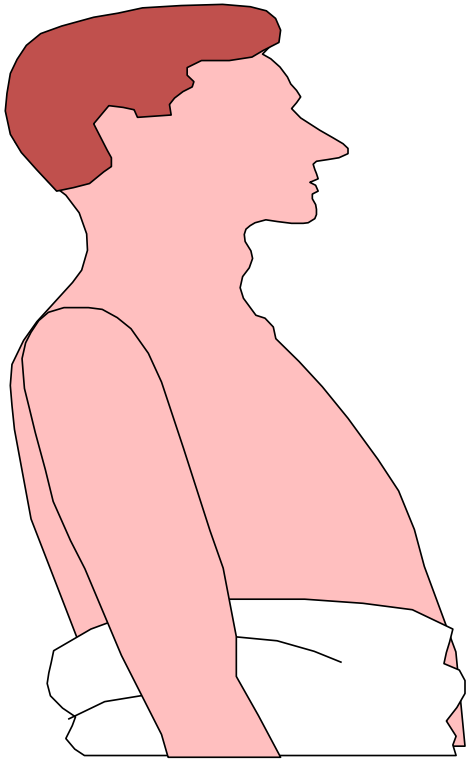
Lloyd-Jones et al. Circ 2006;113:791-798



Predicting life-time CVD risk



….is clinically irrelevant



35 yr old male

Overweight smoker

Non diabetic

BP 140/ 80 mmHg

TC 6.0 mmol/L

HDLC 1.0 mmol/L

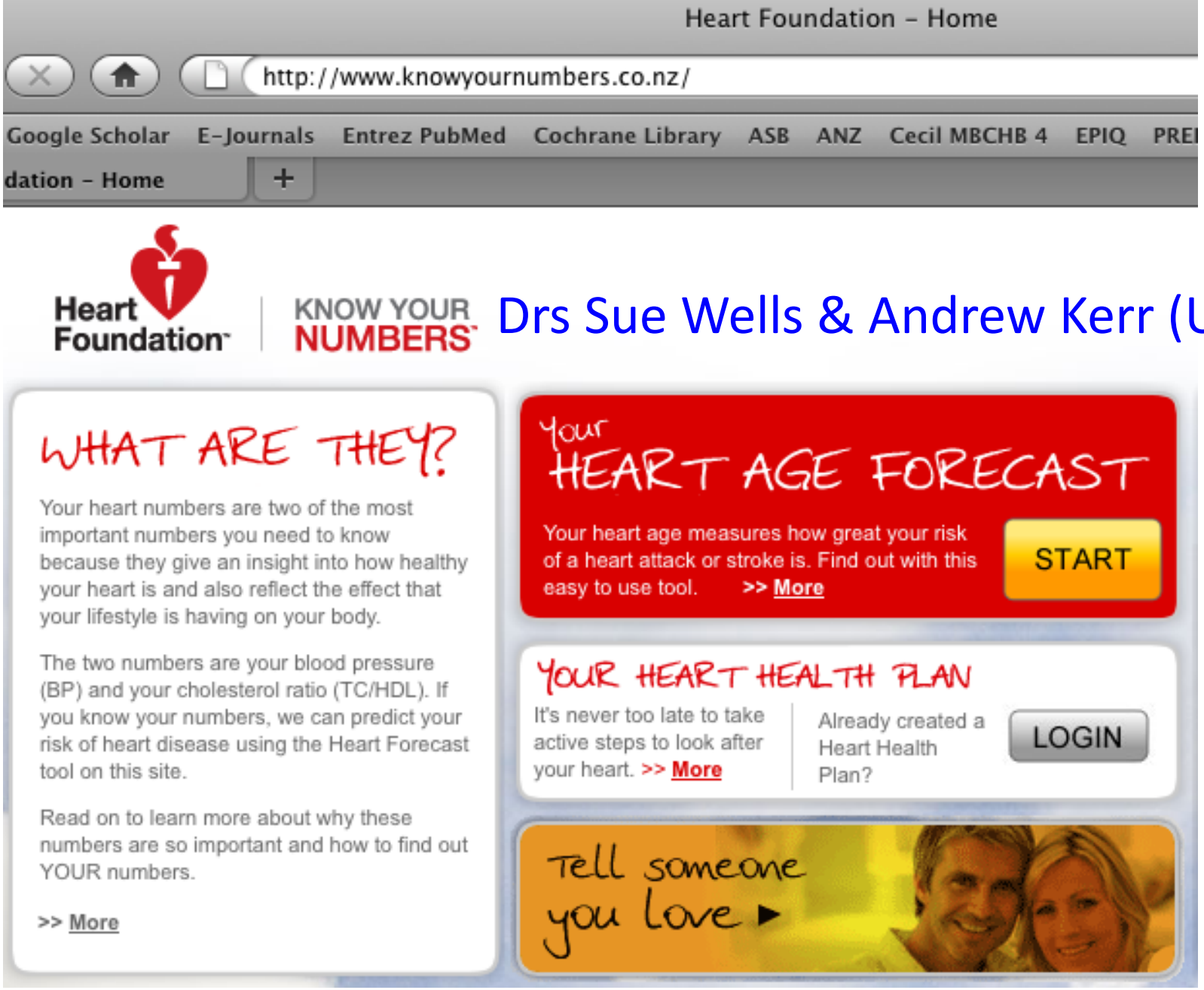
TC/HDL = 6.0

5-yr CVD risk = 4%

but long-term risk ↑↑

key questions on CVD risk prediction

- why treat predicted (combined) risk rather than individual risk factors?
- which prediction tool for which population?
- how should we choose treatment thresholds?
- who should have their risk predicted?
- should predicted risk be modified for patients already on treatment?
- should we treat short-term or long-term risk?
- how should we communicating risk?
  - heart age & heart forecast



Drs Sue Wells & Andrew Kerr (UoA)

www.knowyournumbers.co.nz

Your HEART FORECAST

Heart Foundation | THE UNIVERSITY OF AUCKLAND FACULTY OF MEDICAL AND HEALTH SCIENCES | ENIGMA

Introduction Step 1

Your Risk Factors Step 2

Gender: (•) male ( ) female

Age: 35 years

Do you belong to any high risk ethnic group? ( ) yes (•) no

The following ethnic groups may be at higher risk: New Zealand Maori, Samoan, Cook Island Maori, Tongan, Niuean, Tokelauan, Fijian, Other Pacific Islands, Indian, Sri Lankan, Pakistani, Bangladeshi, Afghani, Nepalese & Tibetan.

Average BP: 140 / 80 mmHg

TC/HDL Ratio: 6

Are you a current smoker or have you recently quit? (•) yes ( ) no

Recently quit is any time within the last 12 months.

Do you have diabetes?: ( ) yes (•) no

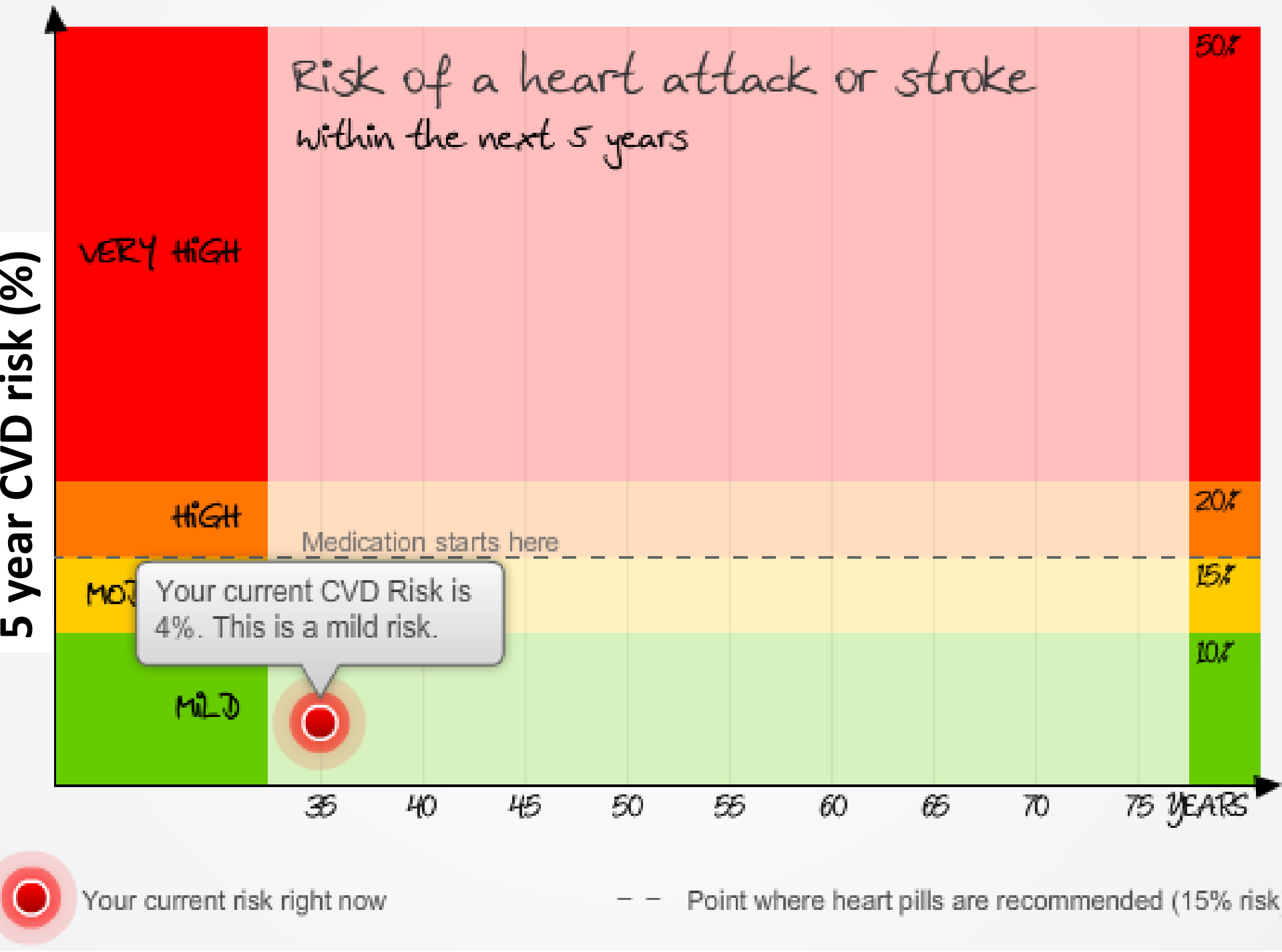
Either Type 1, Type 2 or Type unknown diabetes. Not Gestational diabetes.

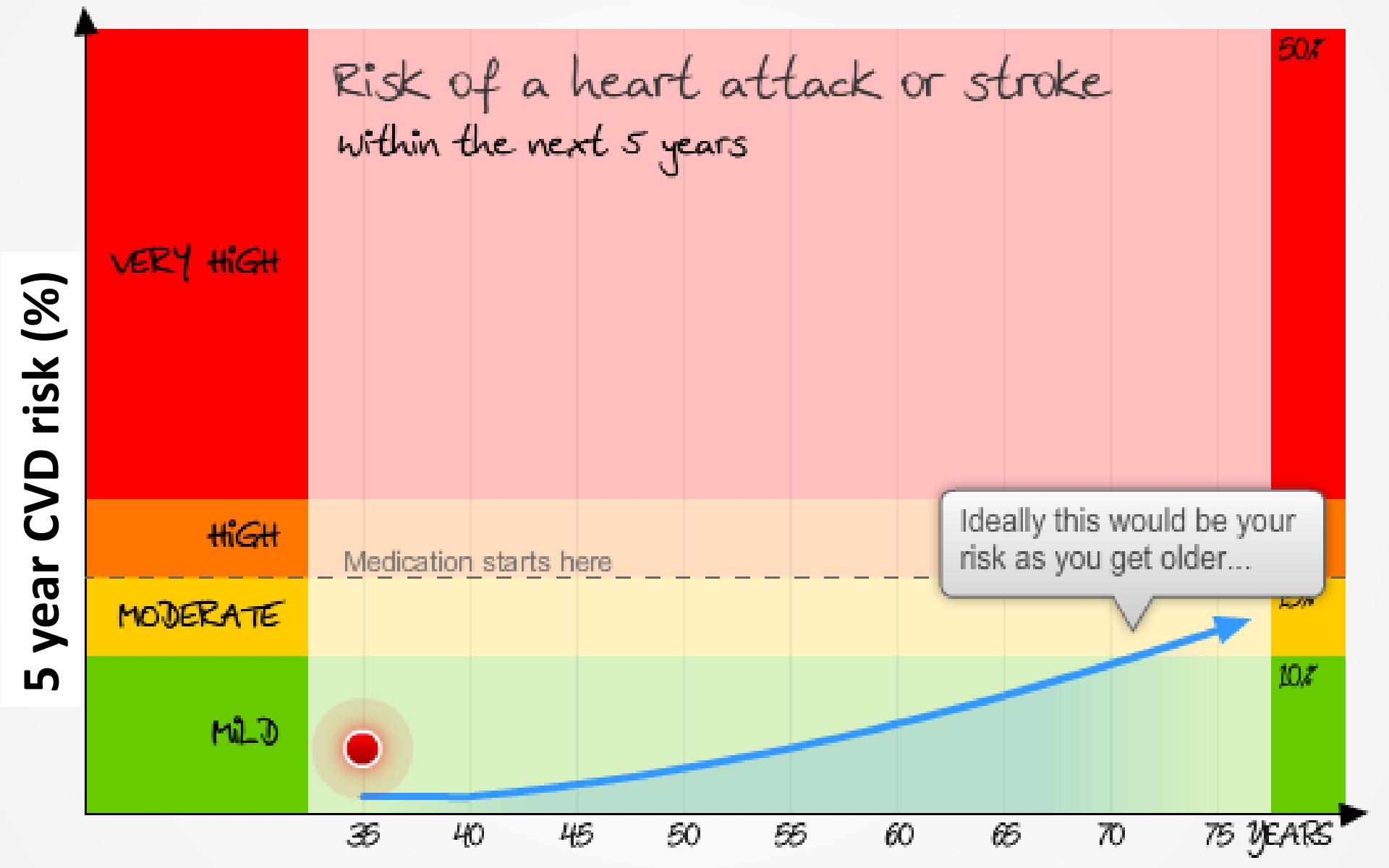
Family history of early heart attack or stroke?: ( ) yes (•) no

A brother or father below 55 years old or a sister or mother below 65 years old.

Next ▶

Your Heart Forecast Step 3


Risk of a heart attack or stroke
within the next 5 years
5 year CVD risk (%)
VERY HIGH
HIGH
MOD
MILD
50%
20%
15%
10%
Medication starts here
Your current CVD Risk is 4%. This is a mild risk.
35
40
45
50
55
60
65
70
75
YEARS
Your current risk right now
Point where heart pills are recommended (15% risk

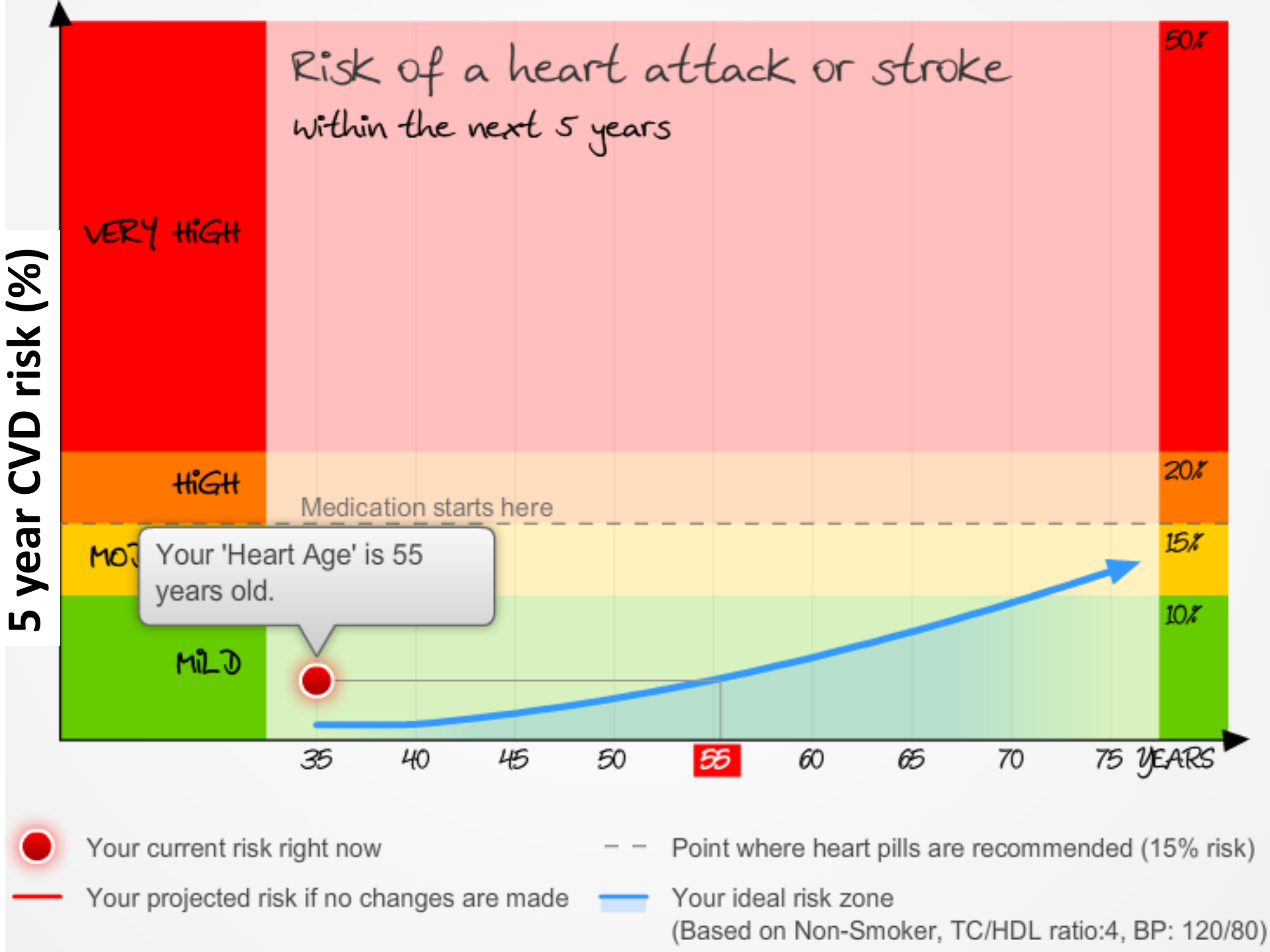


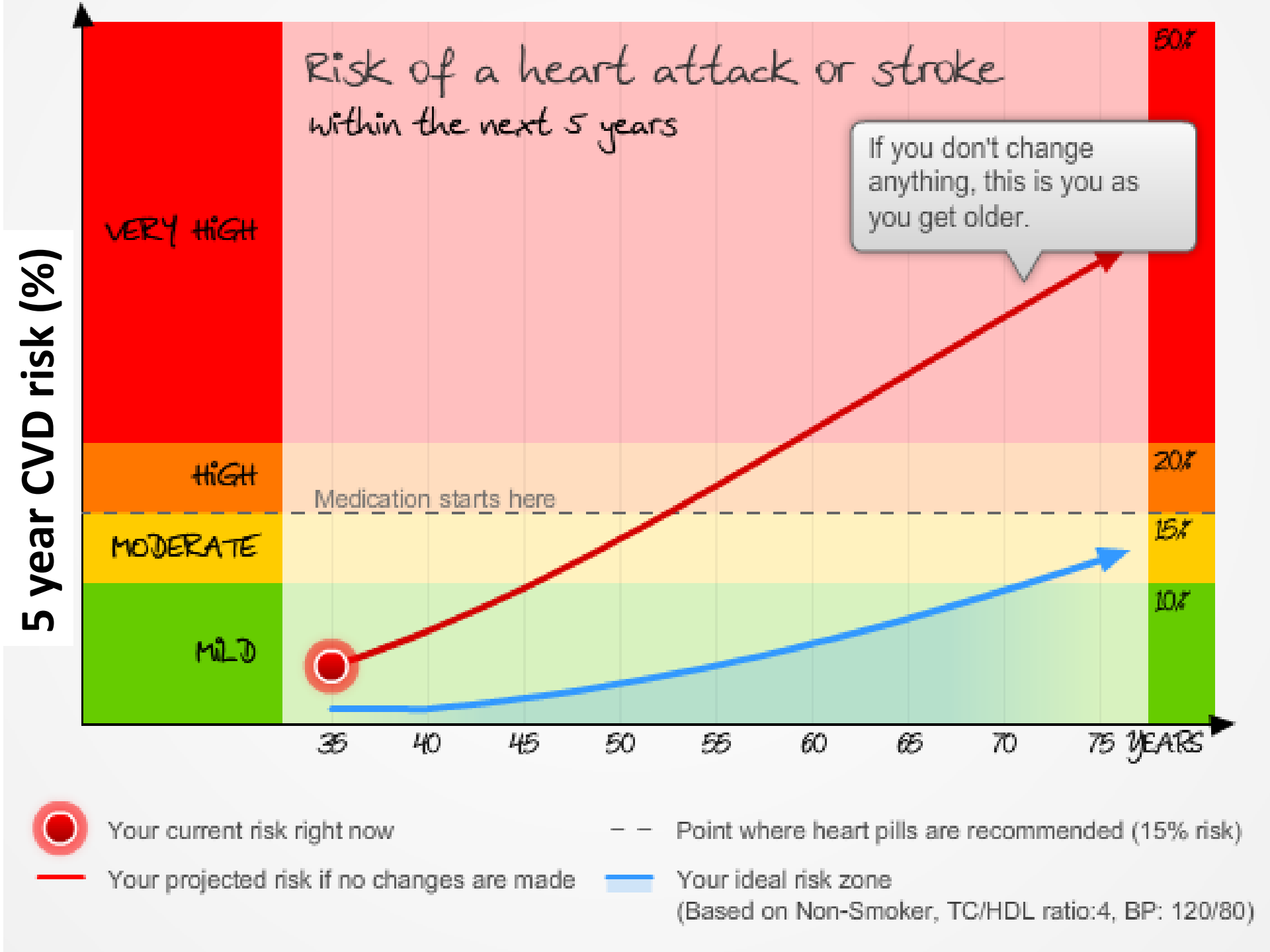
Your current risk right now

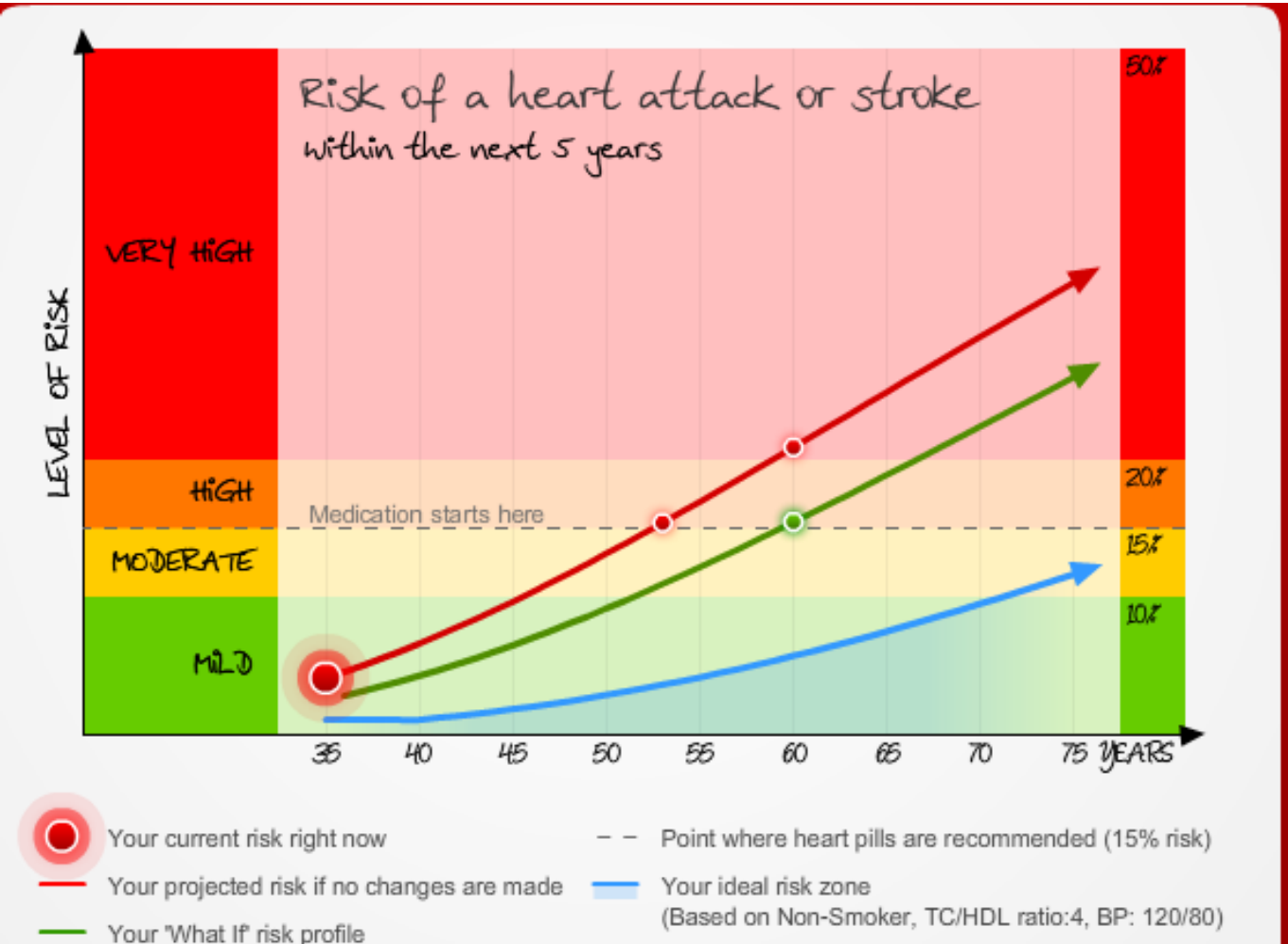
Your projected risk if no changes are made

Point where heart pills are recommended (15% risk)

Your ideal risk zone
(Based on Non-Smoker, TC/HDL ratio:4, BP: 120/80)


Risk of a heart attack or stroke
within the next 5 years
5 year CVD risk (%)
VERY HIGH
HIGH
MOD
MILD
50%
20%
15%
10%
Medication starts here
Your 'Heart Age' is 55 years old.
35
40
45
50
55
60
65
70
75
YEARS
Your current risk right now
Your projected risk if no changes are made
Point where heart pills are recommended (15% risk)
Your ideal risk zone
(Based on Non-Smoker, TC/HDL ratio:4, BP: 120/80)


Risk of a heart attack or stroke
within the next 5 years
If you don't change anything, this is you as you get older.
VERY HIGH
HIGH
MODERATE
MILD
Medication starts here
50%
20%
15%
10%
5 year CVD risk (%)
35
40
45
50
55
60
65
70
75
YEARS
Your current risk right now
Your projected risk if no changes are made
Point where heart pills are recommended (15% risk)
Your ideal risk zone
(Based on Non-Smoker, TC/HDL ratio:4, BP: 120/80)



What if..

See how changes in your lifestyle can influence your risk

- [ ] If you quit smoking (long term):
- [ ] If you develop diabetes

If your blood pressure changes

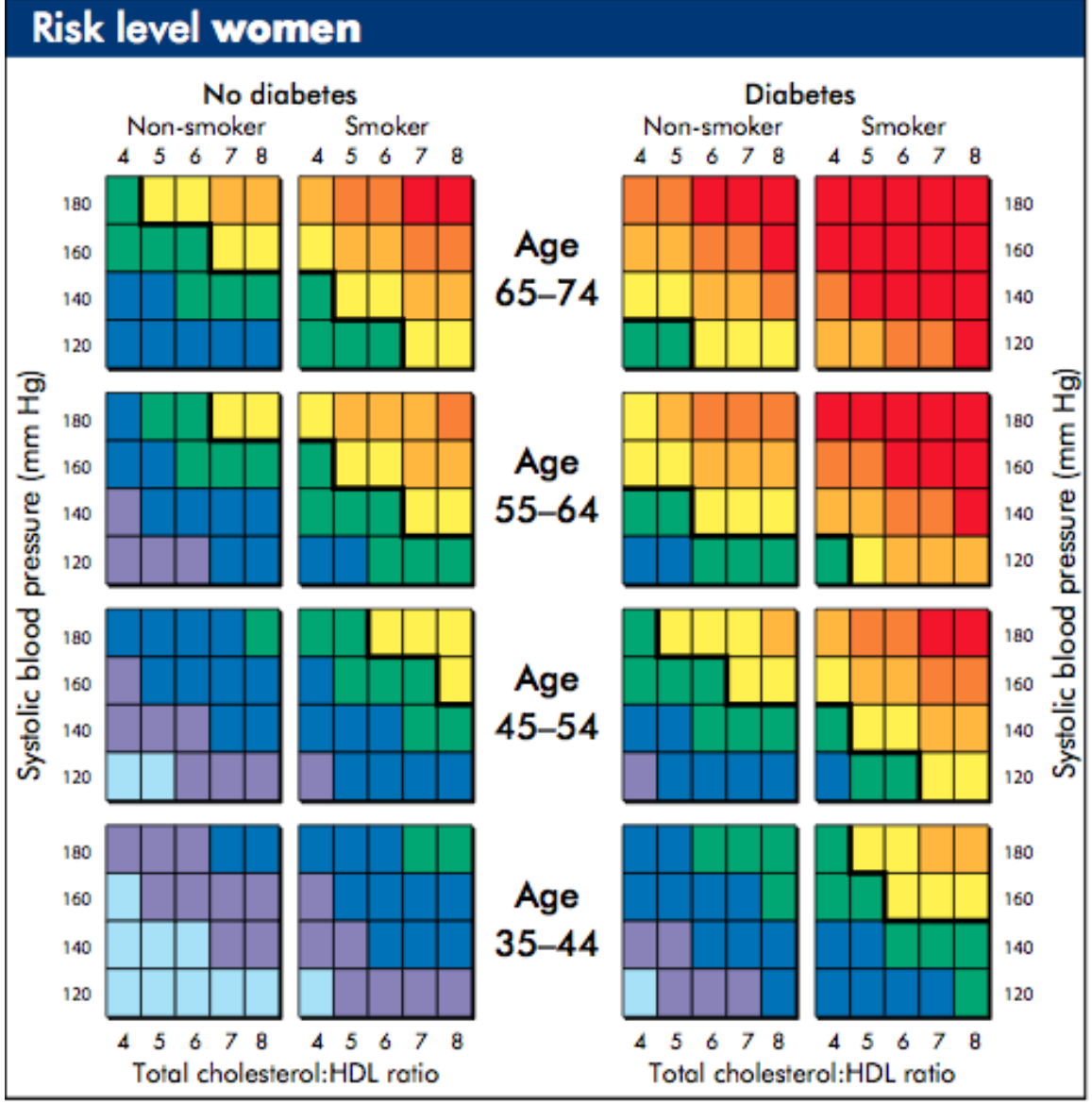
120 130 140 150 160 170

If your cholestrol ratio changes

4.0 5.0 6.0 7.0 8.0

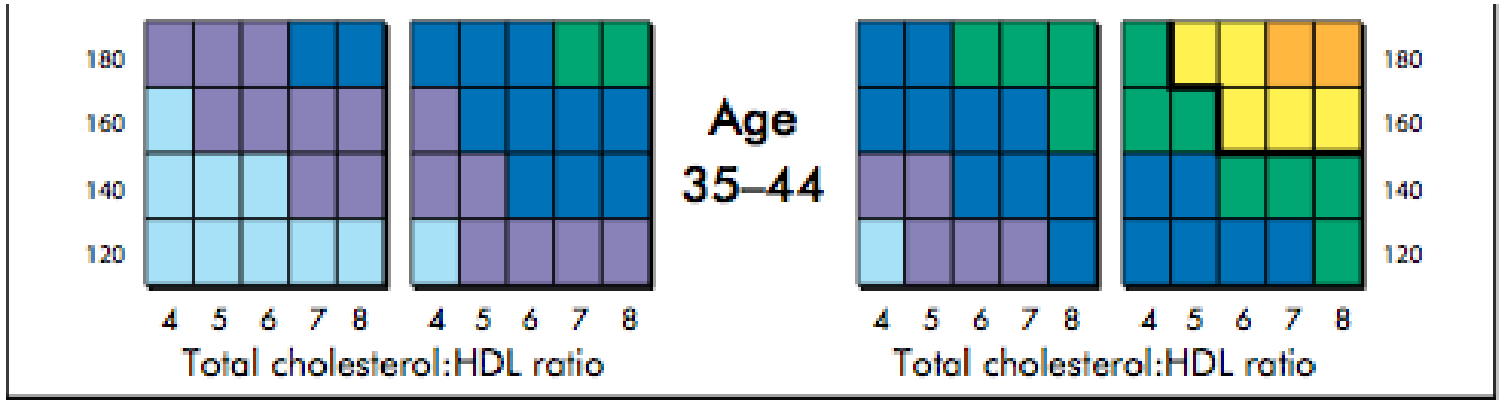
Reset

◄ Back Next ►

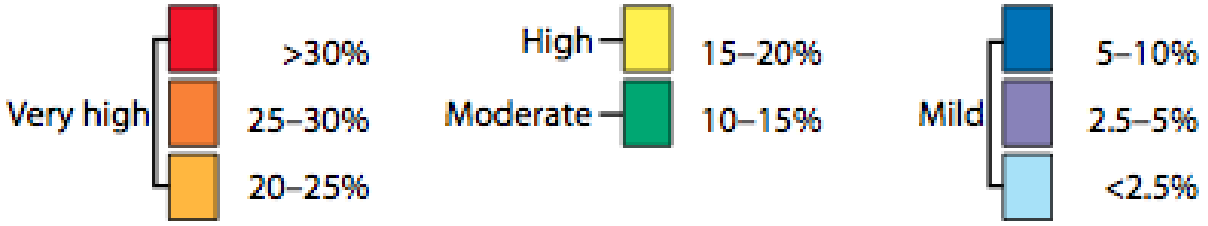


Risk level (for women and men)
5-year cardiovascular disease (CVD) risk (fatal and non-fatal)

- Very high: >30%; 25–30%; 20–25%
- High: 15–20%
- Moderate: 10–15%
- Mild: 5–10%; 2.5–5%; <2.5%

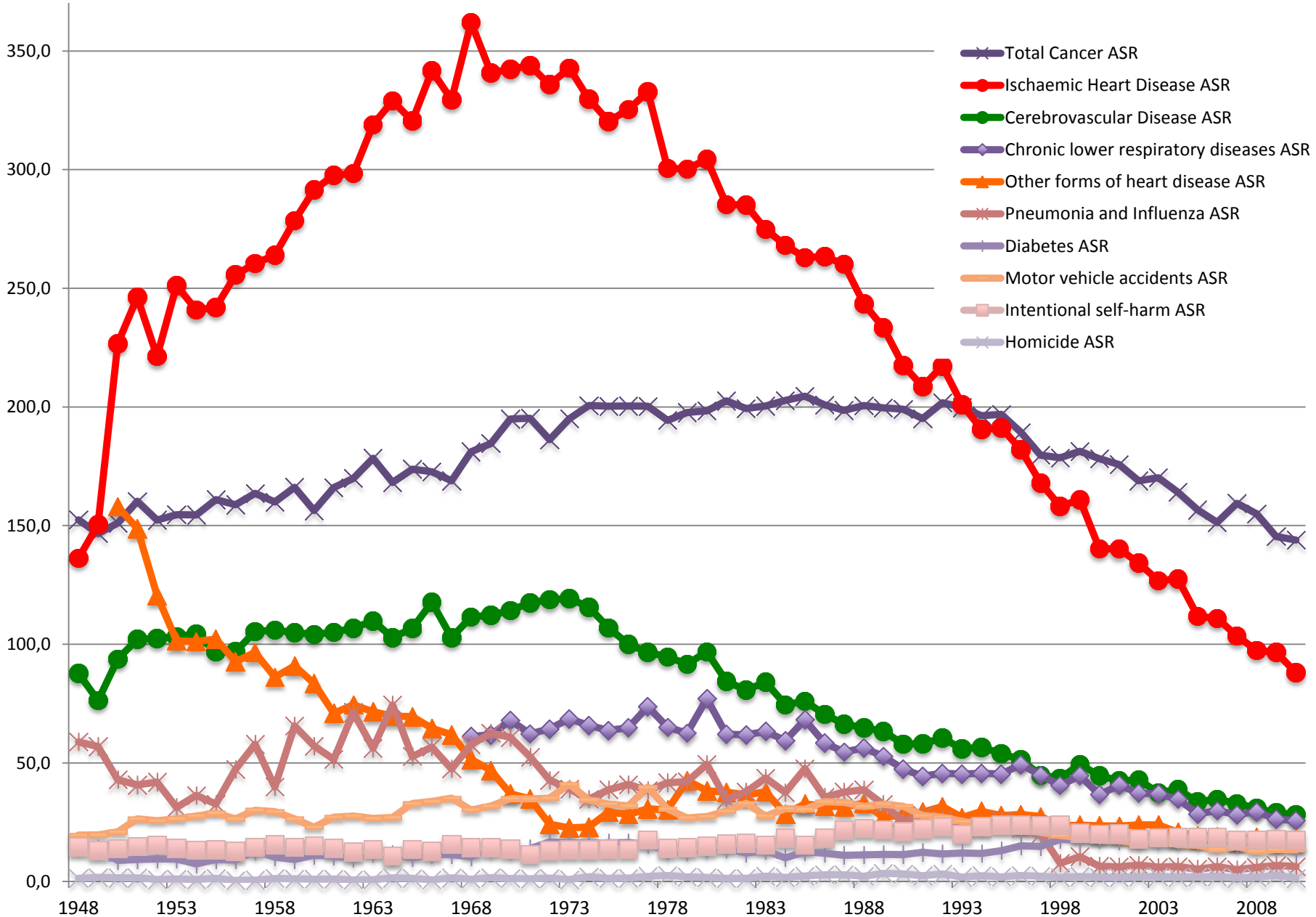


Risk level (for women and men)
5-year cardiovascular disease (CVD) risk (fatal and non-fatal)

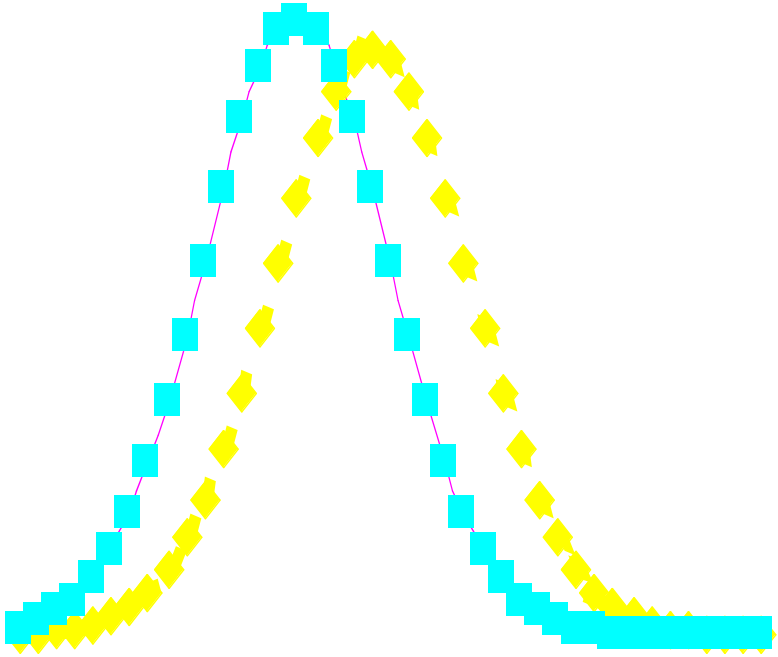


Risk level: 5-year CVD risk (fatal and non-fatal)	**Benefits: NNT for 5 years to prevent one event** (CVD events prevented per 100 people treated for 5 years)		
	1 intervention (25% risk reduction)	**2 interventions (45% risk reduction)**	**3 interventions (55% risk reduction)**
30%	13 (7.5 per 100)	7 (14 per 100)	6 (16 per 100)
20%	20 (5 per 100)	11 (9 per 100)	9 (11 per 100)
15%	27 (4 per 100)	15 (7 per 100)	12 (8 per 100)
10%	40 (2.5 per 100)	22 (4.5 per 100)	18 (5.5 per 100)
5%	80 (1.25 per 100)	44 (2.25 per 100)	36 (3 per 100)

deaths from heart disease & other causes: NZ

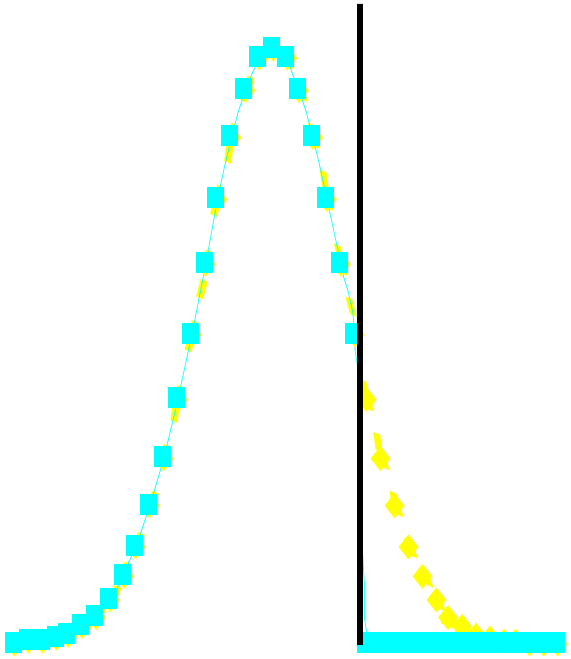


population-based approach



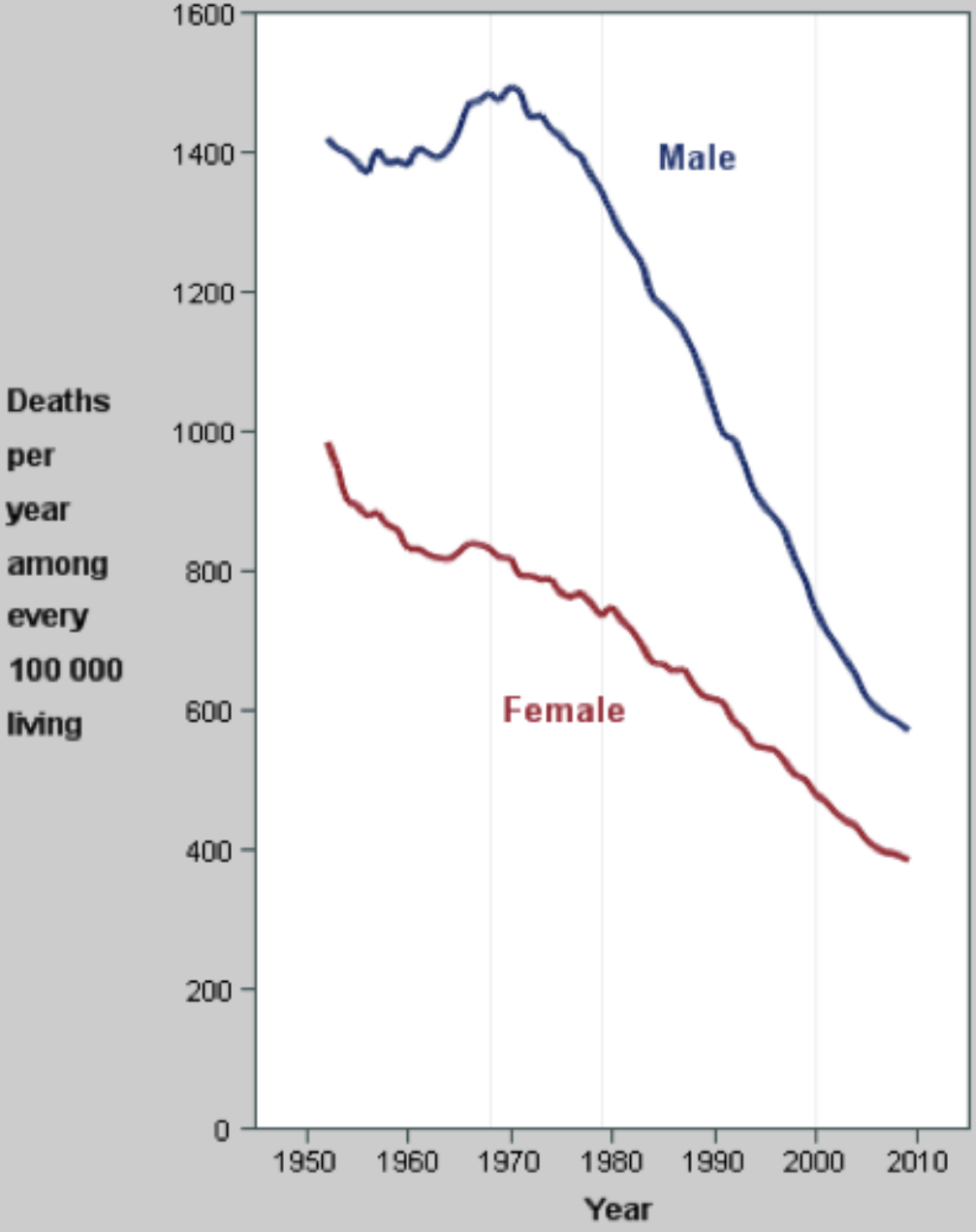
distribution shifting:
⇩BP or TC
population- wide

high-risk approach



treatment of high BP or TC:
⇩ only if high

Mortality trends for all causes of death: age 35-69 years, New Zealand (Aotearoa)



Male deaths from any cause at age 35-69 years in 2009:

- 4281 (29% of all male deaths)
- 572 out of every 100 000 males at this age, a rate which was:
  - → 23% less than in 2000 (rate: 743)
  - → 60% less than in 1975 (rate: 1421)
  - → 59% less than in 1955 (rate: 1384)

Female deaths from any cause at ages 35-69 years in 2009:

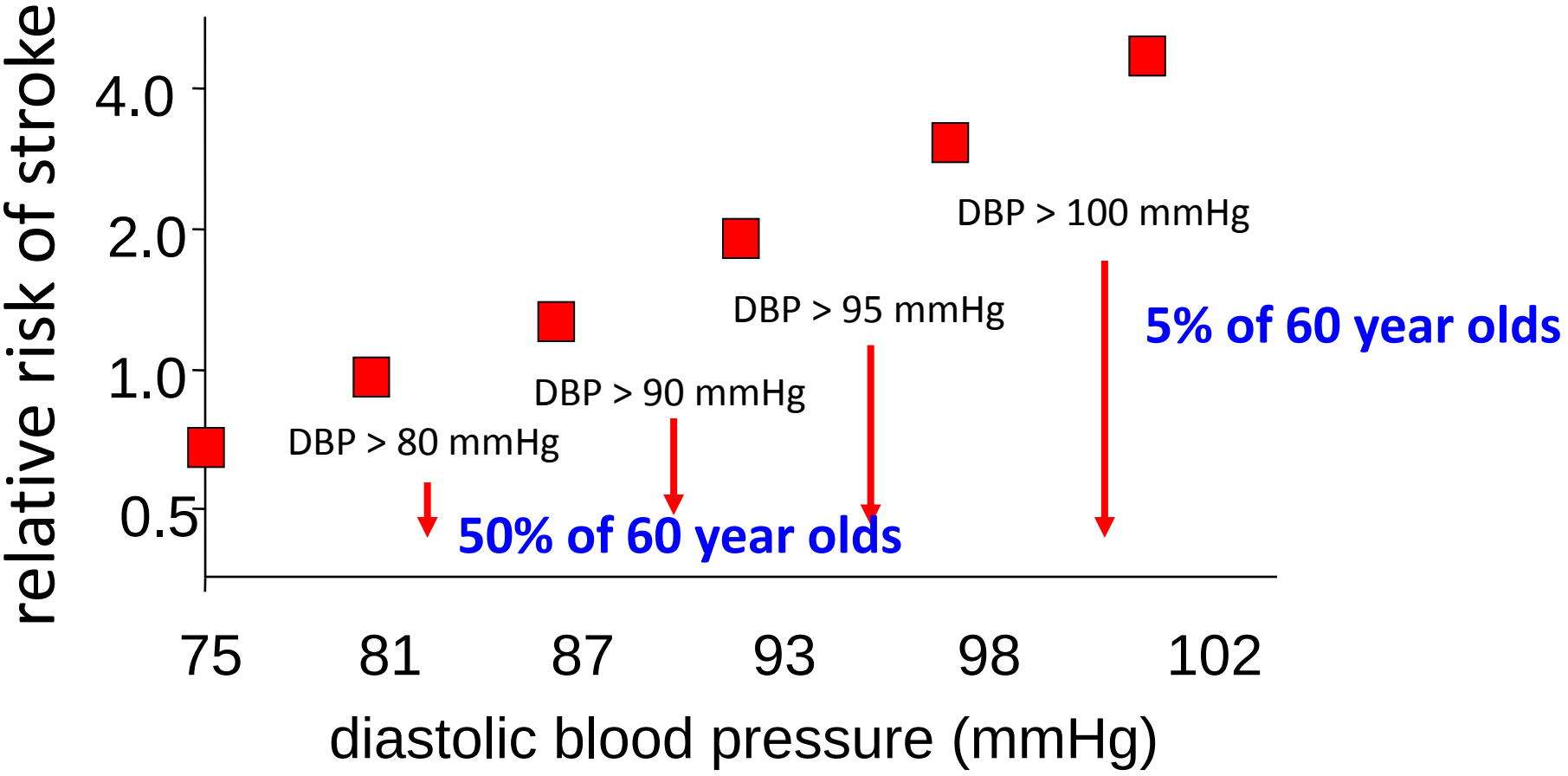
- 3046 (21% of all female deaths)
- 387 out of every 100 000 females at this age, a rate which was:
  - → 19% less than in 2000 (rate: 480)
  - → 50% less than in 1975 (rate: 768)
  - → 57% less than in 1955 (rate: 893)

Created: 17 May 2013, 4:34 pm
Males & females, ages 35-69 years
All causes
New Zealand

www.mortality-trends.org

relative stroke risk and usual Blood Pressure

(45 prospective studies: 450,000 people 13,000 events)



PSC Lancet 1995;346:1647-53

PREDICT™
CLINICAL EXPERT SYSTEMS

NZ CVD / DIABETES PROGRAMME

DEMOGRAPHICS | CVD RISK ASSESSMENT | CVD RISK MANAGEMENT | DIABETES MANAGEMENT

Practitioners details

NZMC / NZNC number

Demographics (All to be prepopulated from PMS)

First name

Last name

NHI

DHB Catchment: Please Select

Quintile of deprivation

Meshblock geocode

Date of birth: dd/mm/yyyy

Age: Years

Gender: Please Select

Ethnic Group (1 or more self-identified ethnic group may be chosen): Not Stated

Ethnic Group 2: Not Stated

Ethnic Group 3: Not Stated

NEXT ...

DEMOGRAPHICS | **CVD RISK ASSESSMENT** | CVD RISK MANAGEMENT | DIABETES MANAGEMENT

This page should be completed for all patients. All underlined items are required.

After submitting this form, additional follow up management forms become available to you. The secondary Diabetes management form will become available dependant upon the status of the Diabetes field on this form.

NOTE: It is inappropriate to do CVD risk assessment in pregnancy.

ASSUME NEGATIVE DEFAULTS

Clinical History

Family History of Premature CVD: Yes - No

Angina/MI: Yes - No

PTCA/CABG: Yes - No

Ischaemic Stroke or TIA: Yes - No

PVD: Yes - No

Diabetes: Please select

ECG confirmed Atrial Fibrillation: Yes - No

Diagnosed Genetic Lipid Disorder: Please select

Diagnosed metabolic syndrome: Yes - No

Smoking History: Please select

Pregnant? Yes - No

Examination

Most recent BP (Sitting): / mmHg

Previous BP (Sitting): / mmHg

TC/HDL ratio: - Date: dd/mm/yyyy

Total Cholesterol: mmol/L - Date: dd/mm/yyyy

This data is the patient's real clinical information Yes - No

Risk Assessment:

This page was made specifically for **Joe Bloggs *(ABC1235)***: 09-Aug-2006 10:37 hrs

Estimated risk of having a CVD event in the next 5 years: 18%

Estimated risk level: 5-year CV risk (fatal and non-fatal)	**Estimated Benefits: NNT for 5 years to prevent one event** (CVD events prevented per 100 people treated for 5 years)		
	1 intervention (25% risk reduction)	**2 interventions (45% risk reduction)**	**3 interventions (55% risk reduction)**
18%	22 (4.5 per 100)	12 (8.1 per 100)	10 (9.9 per 100)

Based on the conservative estimate that each intervention: aspirin, blood pressure treatment (lowering systolic blood pressure by 10 mm Hg) or lipid modification (lowering LDL-C by 20%) reduces CV risk by about 25% over 5 years.

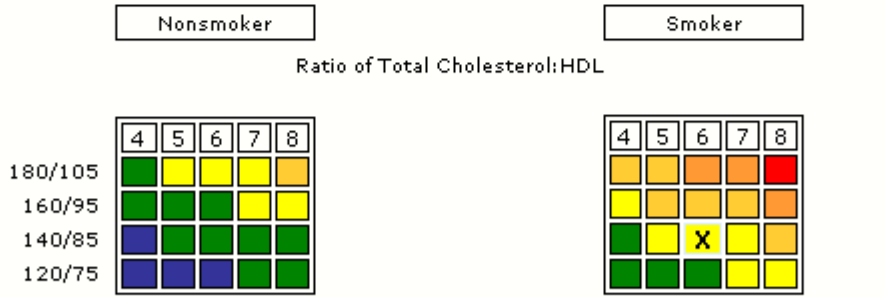
CVD risk has been moved up one risk category (5%), as cardiovascular risk may be underestimated in the Framingham risk equation; based on:

- family history of premature coronary heart disease or ischaemic stroke in a first-degree male relative before the age of 55 years or a first-degree female relative before the age of 65 years
- Maori or Pacific ethnicity or people from the Indian subcontinent
- metabolic syndrome

Cardiovascular Disease: Baseline Risk and Treatment Benefit

NO DIABETES

(With a 5% upward risk adjustment applied)



RISK ASSESSMENT INFO | DEBUG INFO

Note the BMI calculator on this page calculates the BMI value automatically from height and weight. All underlined items are required.

Examination

Height	170	cm
Weight	80	kg - Date: dd/mm/yyyy
BMI (Auto-calculated)	27.7	kg/m²
Waist circumference	100	cm

CVD medications

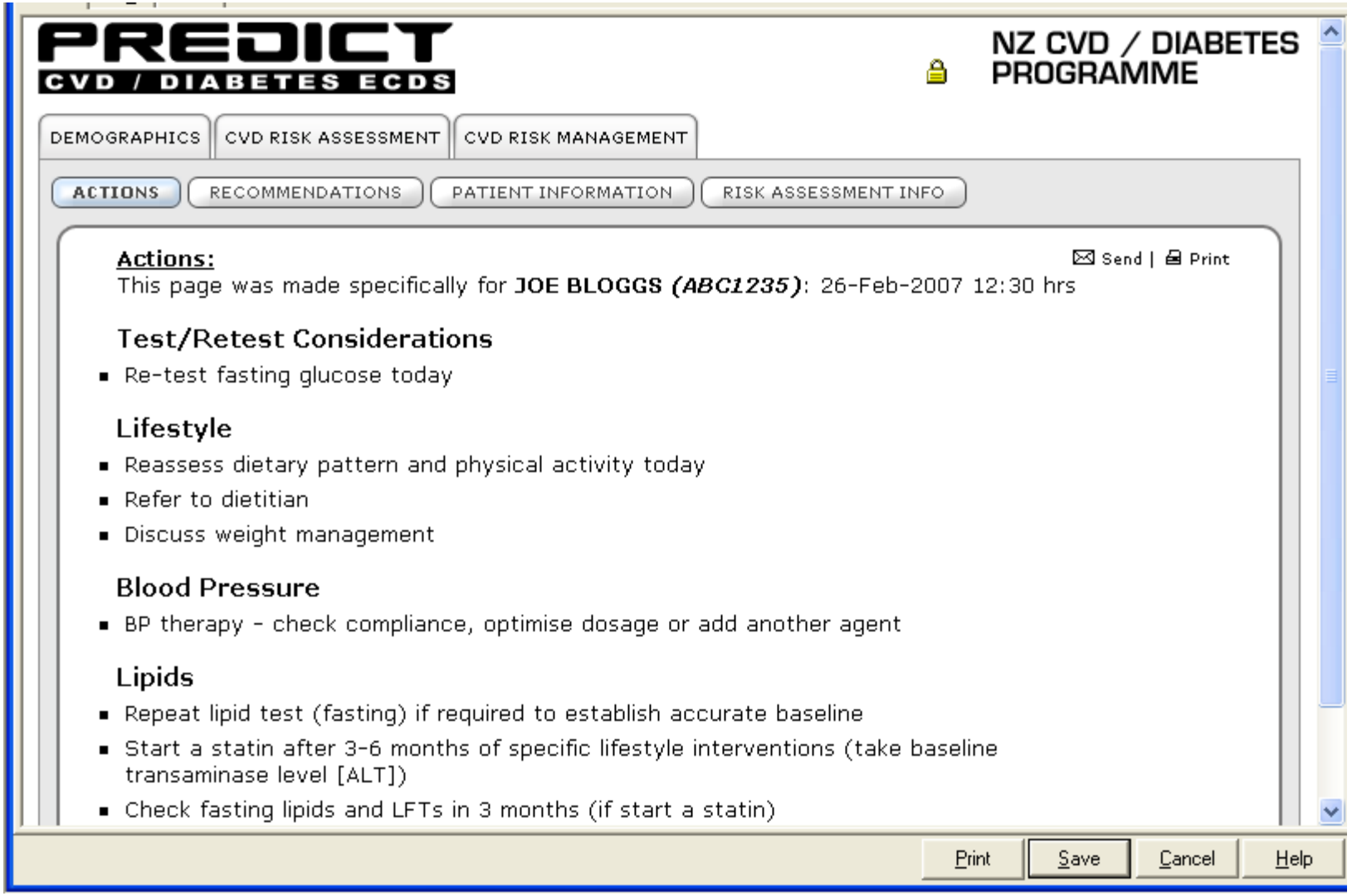
CAUTION: Please note that all medications default to "No". Please review carefully before proceeding.

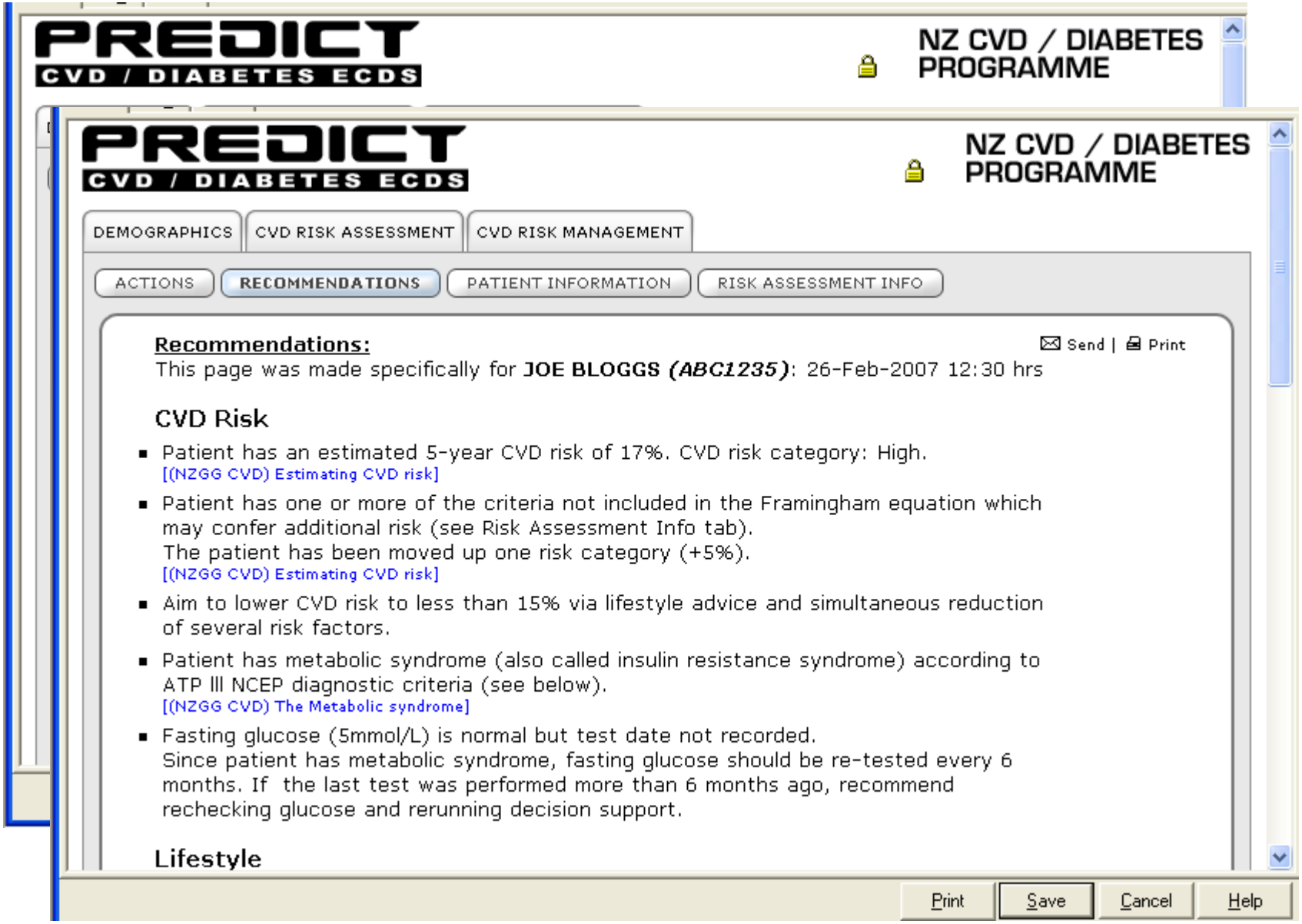
Aspirin	No
Clopidogrel	No
Warfarin	No
ACE Inhibitor	No
Angiotensin II Receptor Blocker	No
Beta Blocker	No
Thiazide	No
Calcium Antagonist	No
Other drug therapy for Hypertension	No
Statin	No
Fibrate	No
Other Lipid lowering drugs	No

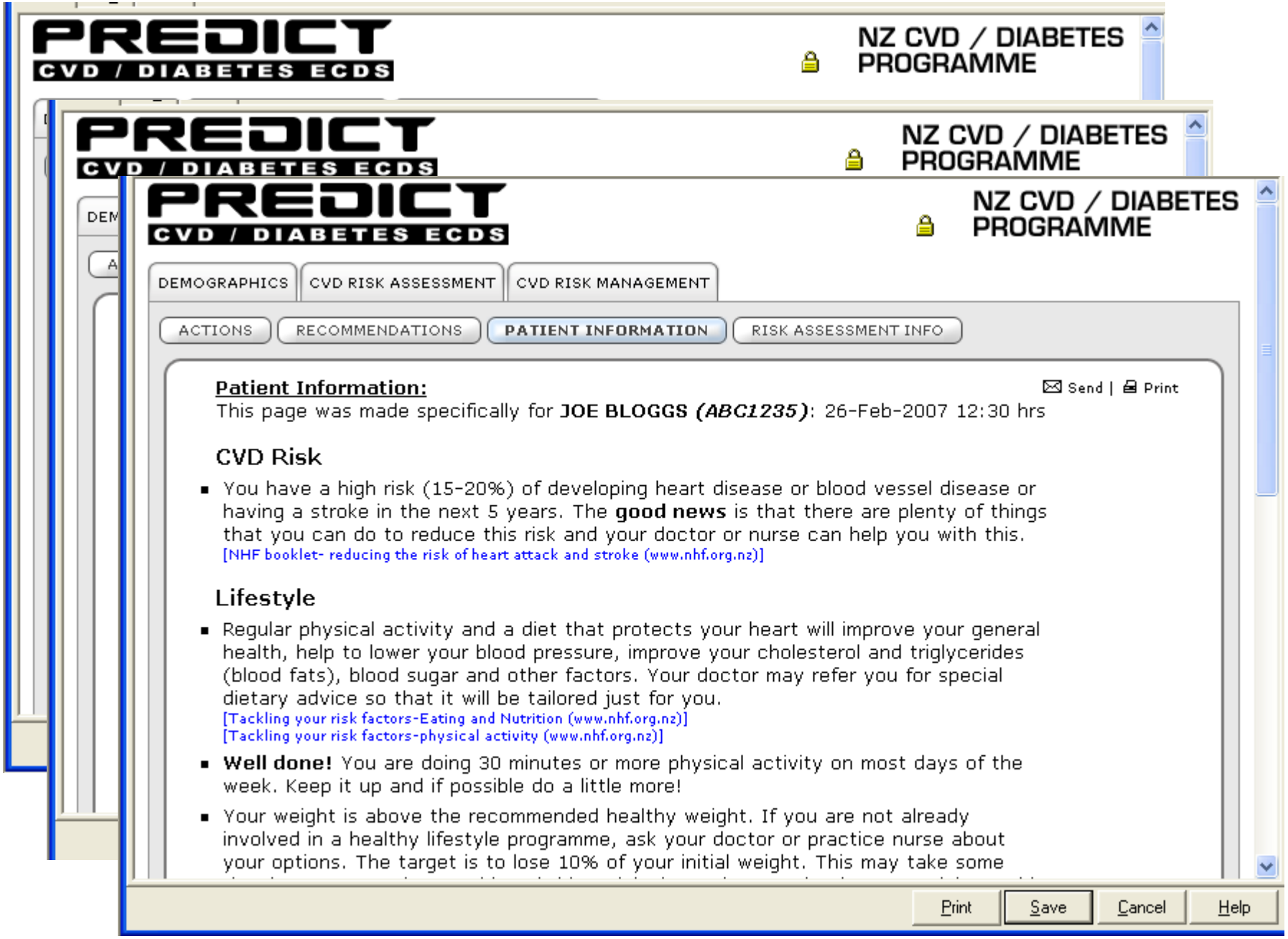
Investigation

Fasting glucose	6.1	mmol/L - Date:	26/10/2004 dd/mm/yyyy
LDL Cholesterol (fasting)	3.3	mmol/L - Date:	26/10/2004 dd/mm/yyyy
Triglyceride (fasting)	2.2	mmol/L - Date:	26/10/2004 dd/mm/yyyy
HDL Cholesterol	1	mmol/L - Date:	26/10/2004 dd/mm/yyyy

Lifestyle management


PREDICT
CVD / DIABETES ECDS
NZ CVD / DIABETES PROGRAMME
DEMOGRAPHICS
CVD RISK ASSESSMENT
CVD RISK MANAGEMENT
ACTIONS
RECOMMENDATIONS
PATIENT INFORMATION
RISK ASSESSMENT INFO
Actions:
Send | Print
This page was made specifically for JOE BLOGGS (ABC1235): 26-Feb-2007 12:30 hrs
Test/Retest Considerations
Re-test fasting glucose today
Lifestyle
Reassess dietary pattern and physical activity today
Refer to dietitian
Discuss weight management
Blood Pressure
BP therapy - check compliance, optimise dosage or add another agent
Lipids
Repeat lipid test (fasting) if required to establish accurate baseline
Start a statin after 3-6 months of specific lifestyle interventions (take baseline transaminase level [ALT])
Check fasting lipids and LFTs in 3 months (if start a statin)
Print
Save
Cancel
Help


PREDICT
CVD / DIABETES ECDS
NZ CVD / DIABETES PROGRAMME
PREDICT
CVD / DIABETES ECDS
NZ CVD / DIABETES PROGRAMME
DEMOGRAPHICS
CVD RISK ASSESSMENT
CVD RISK MANAGEMENT
ACTIONS
RECOMMENDATIONS
PATIENT INFORMATION
RISK ASSESSMENT INFO
Recommendations:
Send | Print
This page was made specifically for JOE BLOGGS (ABC1235): 26-Feb-2007 12:30 hrs
CVD Risk
Patient has an estimated 5-year CVD risk of 17%. CVD risk category: High.
[(NZGG CVD) Estimating CVD risk]
Patient has one or more of the criteria not included in the Framingham equation which may confer additional risk (see Risk Assessment Info tab).
The patient has been moved up one risk category (+5%).
[(NZGG CVD) Estimating CVD risk]
Aim to lower CVD risk to less than 15% via lifestyle advice and simultaneous reduction of several risk factors.
Patient has metabolic syndrome (also called insulin resistance syndrome) according to ATP III NCEP diagnostic criteria (see below).
[(NZGG CVD) The Metabolic syndrome]
Fasting glucose (5mmol/L) is normal but test date not recorded.
Since patient has metabolic syndrome, fasting glucose should be re-tested every 6 months. If the last test was performed more than 6 months ago, recommend rechecking glucose and rerunning decision support.
Lifestyle
Print
Save
Cancel
Help


PREDICT
CVD / DIABETES ECDS
NZ CVD / DIABETES PROGRAMME
DEMOGRAPHICS
CVD RISK ASSESSMENT
CVD RISK MANAGEMENT
ACTIONS
RECOMMENDATIONS
PATIENT INFORMATION
RISK ASSESSMENT INFO
Patient Information:
Send | Print
This page was made specifically for JOE BLOGGS (ABC1235): 26-Feb-2007 12:30 hrs
CVD Risk
You have a high risk (15-20%) of developing heart disease or blood vessel disease or having a stroke in the next 5 years. The good news is that there are plenty of things that you can do to reduce this risk and your doctor or nurse can help you with this.
[NHF booklet- reducing the risk of heart attack and stroke (www.nhf.org.nz)]
Lifestyle
Regular physical activity and a diet that protects your heart will improve your general health, help to lower your blood pressure, improve your cholesterol and triglycerides (blood fats), blood sugar and other factors. Your doctor may refer you for special dietary advice so that it will be tailored just for you.
[Tackling your risk factors-Eating and Nutrition (www.nhf.org.nz)]
[Tackling your risk factors-physical activity (www.nhf.org.nz)]
Well done! You are doing 30 minutes or more physical activity on most days of the week. Keep it up and if possible do a little more!
Your weight is above the recommended healthy weight. If you are not already involved in a healthy lifestyle programme, ask your doctor or practice nurse about your options. The target is to lose 10% of your initial weight. This may take some
Print
Save
Cancel
Help