

# Management of Hypertension for Stroke Prevention in New Zealand: Can We Do Better?

Walter van der Merwe  
Nephrologist  
Waitemata DHB

# Increasing stroke numbers in New Zealand an 'epidemic' says leading AUT researcher

Tuesday 30 November 2010, 12:23PM

**By AUT University**

**182 views**

## NORTH SHORE CITY

Urgent measures are needed to reduce the growing number of stroke victims in New Zealand, says Professor Valery Feigin, Director of the new National Institute for Stroke and Applied Neuroscience, which is officially being launched today by Associate Minister of Health, the Hon Dr Jonathan Coleman at AUT's North Shore Campus.

Currently costing the country over \$450 million per year in hospital and rehabilitation-related costs alone, stroke incidence in New Zealand is the second highest amongst developed countries and numbers are only increasing, says Feigin.

# Increasing stroke numbers in New Zealand an 'epidemic' says leading AUT researcher

Tuesday 30 November 2010, 12:23PM

By AUT University

182 views

## NORTH SHORE CITY

Urgent measures are needed to reduce the growing number of stroke victims in New Zealand, says Professor Valery Feigin, Director of the new National Institute for Stroke and Applied Neuroscience, which is officially being launched today by Associate Minister of Health, the Hon Dr Jonathan Coleman at AUT's North Shore Campus.

Currently costing the country over \$450 million per year in hospital and rehabilitation-related costs alone, stroke incidence in New Zealand is the second highest amongst developed countries and numbers are only increasing, says Feigin.



# THE NEW ZEALAND MEDICAL JOURNAL

Journal of the New Zealand Medical Association, 15-February-2008 Vol 121  
No 1269

## **Differences in cardiovascular mortality between Australia and New Zealand according to socioeconomic status: findings from the Long- Term Intervention with Pravastatin in Ischaemic Disease (LIPID) Study**

Ralph A H Stewart, Fiona M North, Katrina J Sharples, R John Simes, Andrew M Tonkin,  
Harvey D White; for the Long-term Intervention with Pravastatin in Ischaemic Disease (LIPID)  
Study Investigators

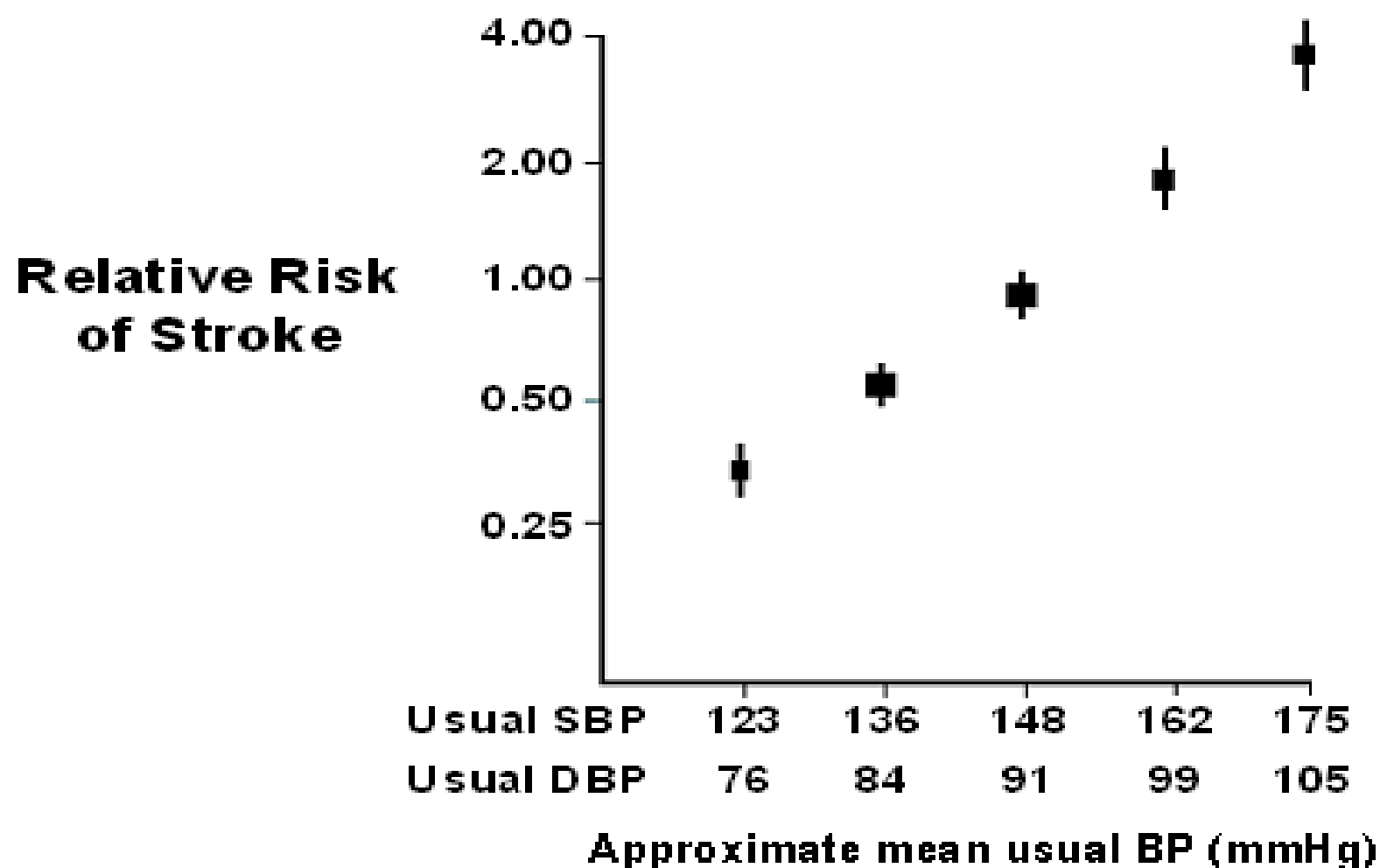
**Cardiovascular mortality 40%  
higher in NZ than Australia**

### **Abstract**

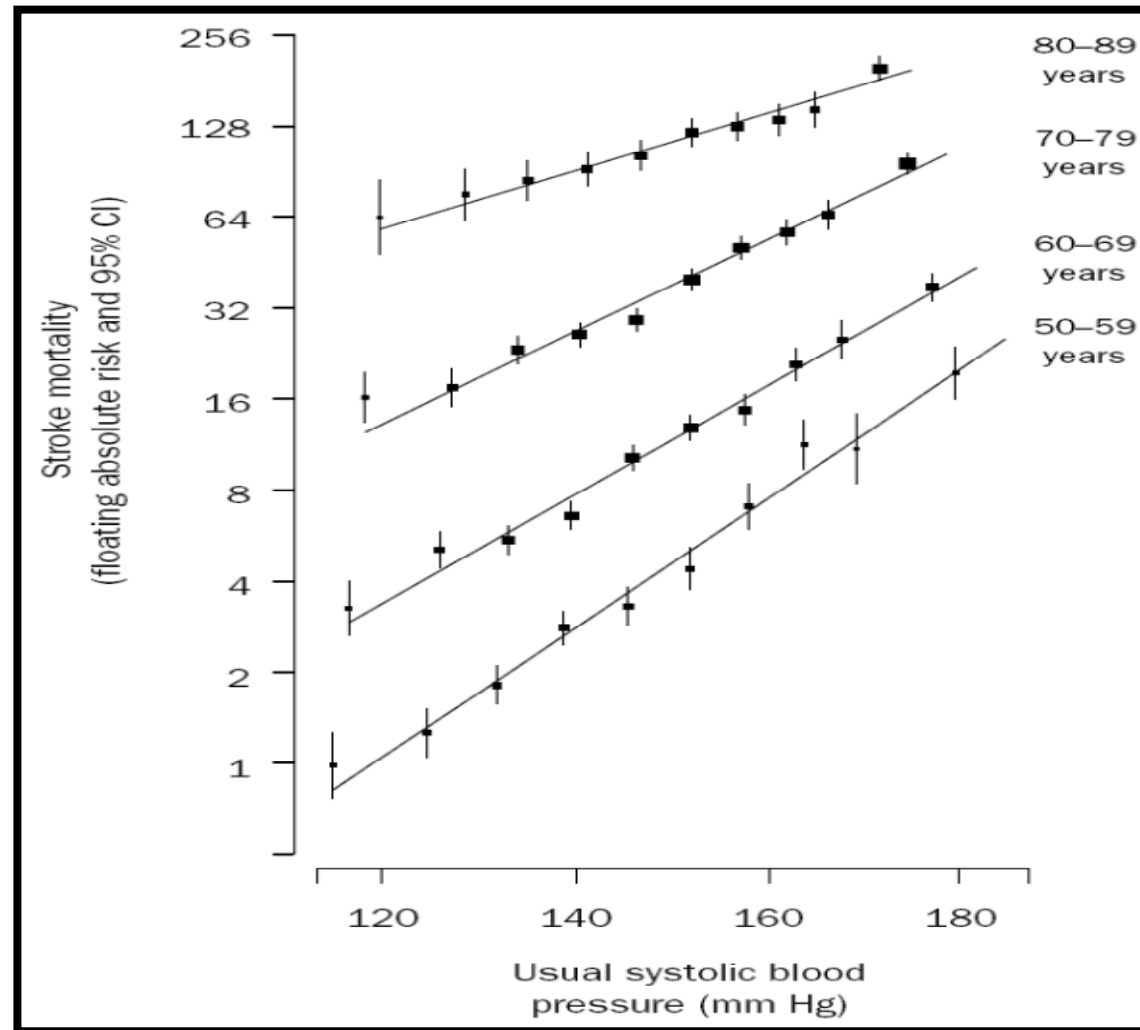
**Background** Cardiovascular mortality is higher in New Zealand compared to Australia, but reasons for this difference are uncertain. This study describes differences in cardiovascular risk factors and cardiovascular mortality in Australians and New Zealanders with stable coronary artery disease stratified by socioeconomic status.

Cerebrovascular circulation is the most blood pressure-sensitive “target organ” and up to 70% of all strokes are blood pressure-related

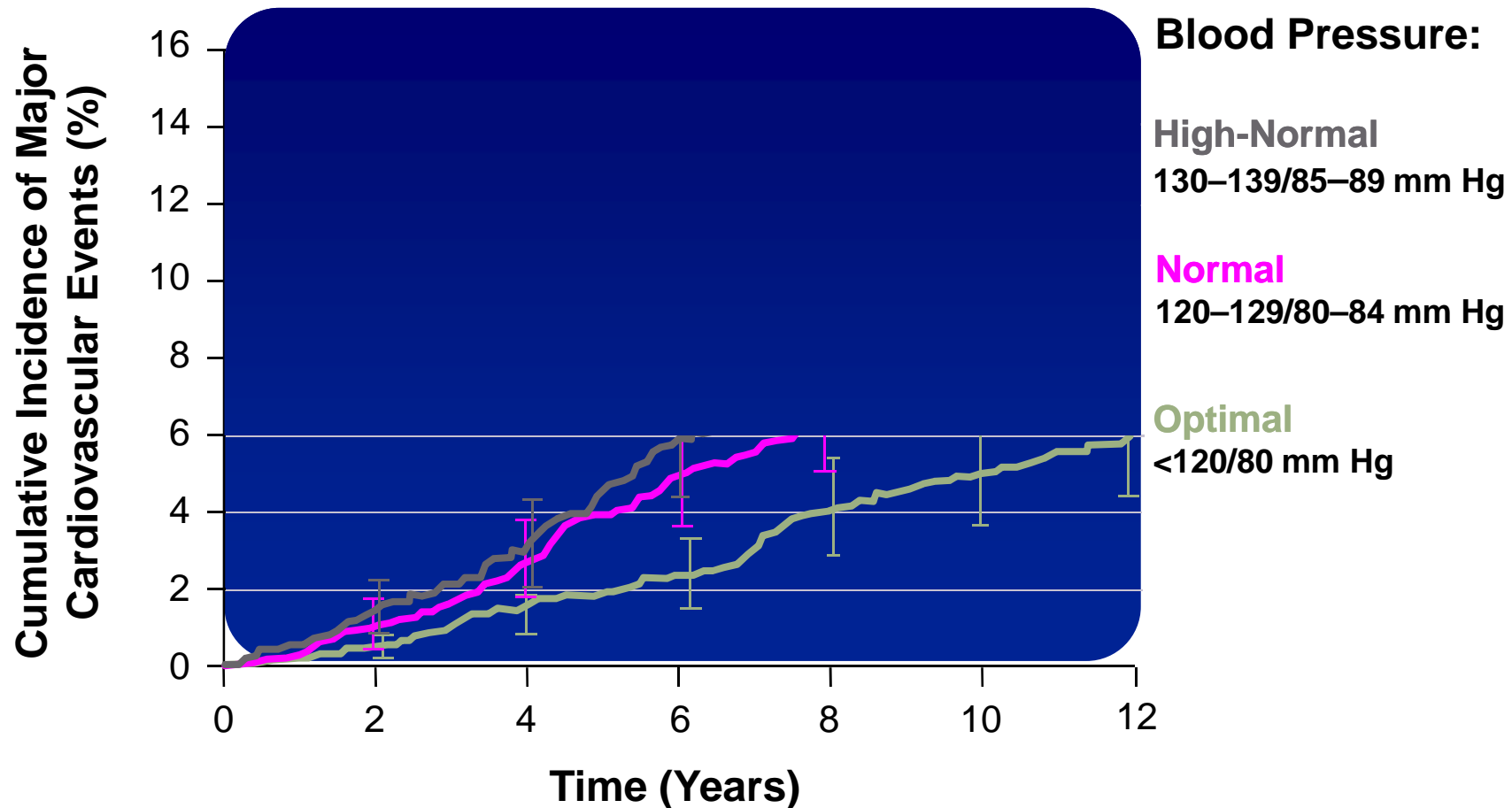
## Stroke and usual BP



# Blood Pressure and Risk of Stroke Mortality



## Impact of High-Normal Blood Pressure on Risk of Major Cardiovascular Events\* in Men



\*Defined as death due to cardiovascular disease or as having recognized myocardial infarction, stroke, or congestive heart failure.

Vasan RS. *N Engl J Med.* 2001;345:1291-1297.



JNC 7 Guidelines (*JAMA 2003;289:2560-2572*)

Classification of Blood Pressure

| Category               | SBP            |           | DBP          |
|------------------------|----------------|-----------|--------------|
| Normal                 | < 120          | or        | < 80         |
| <b>Prehypertension</b> | <b>120-139</b> | <b>or</b> | <b>80-89</b> |
| Stage 1                | 140-159        | or        | 90-99        |
| Stage 2                | > 160          | or        | > 100        |

# The VA Cooperative Study, 1967

|                      |                                      |
|----------------------|--------------------------------------|
| <b>Cohort</b>        | <b>143 men</b>                       |
| <b>Mean age</b>      | <b>51 years</b>                      |
| <b>Eligibility</b>   | <b>Diastolic BP 115-129 mmHg</b>     |
| <b>Design</b>        | <b>Double blind; placebo control</b> |
| <b>Therapy</b>       | <b>HCTZ, reserpine, hydralazine</b>  |
| <b>Duration</b>      | <b>1.5 years</b>                     |
| <b>BP<br/>change</b> | <b>-43/30 mmHg</b>                   |

HCTZ=hydrochlorothiazide

VA Cooperative Study Group. JAMA. 1967;202:1028-1034.

## Mean follow-up 18 months

|                          | Placebo (70) | Active Treatment (73) |
|--------------------------|--------------|-----------------------|
| Deaths                   | 4            | 0                     |
| Class A events           | 10           | 0                     |
| Other treatment failures | 7            | 1                     |
| Class B events           | 6            | 1                     |
| Total events             | 27 (39%)     | 2 (3%)                |

Apart from the 1967 trial of treatment of individuals with severe hypertension, the majority of RCT's of drug treatment in hypertension have involved individuals broadly within the “mild to moderate” category

140-179/ 90-109

What do these RCT's (total ~ 190 000 pts) of hypertension drug treatment show?

Major cardiovascular events (MI, stroke, heart failure) reduced by ave. 25%

**Stroke 40%**, MI 15-20%, CHF 50%

Relative risk reduction similar in all age groups

*Arch Int Med 1993;153:578*  
*BMJ 2008;336:1121*

## **The Systolic Hypertension in the Elderly Program, 1991**

|                    |  |
|--------------------|--|
| <b>Cohort</b>      | <b>4,736; 43% men</b>  |
| <b>Age</b>         | <b>≥ 60 yrs old; mean 71.6 yrs old</b>                       |
| <b>Eligibility</b> | <b>Systolic BP 160–219 mmHg and Diastolic BP &lt;90 mmHg</b> |
| <b>Design</b>      | <b>Double blind; placebo control</b>                         |
| <b>Therapy</b>     | <b>Chlorthalidone (atenolol as step 2)</b>                   |
| <b>Duration</b>    | <b>4.5 years</b>   |
| <b>BP change</b>   | <b>Systolic BP –12 mmHg</b>                                  |

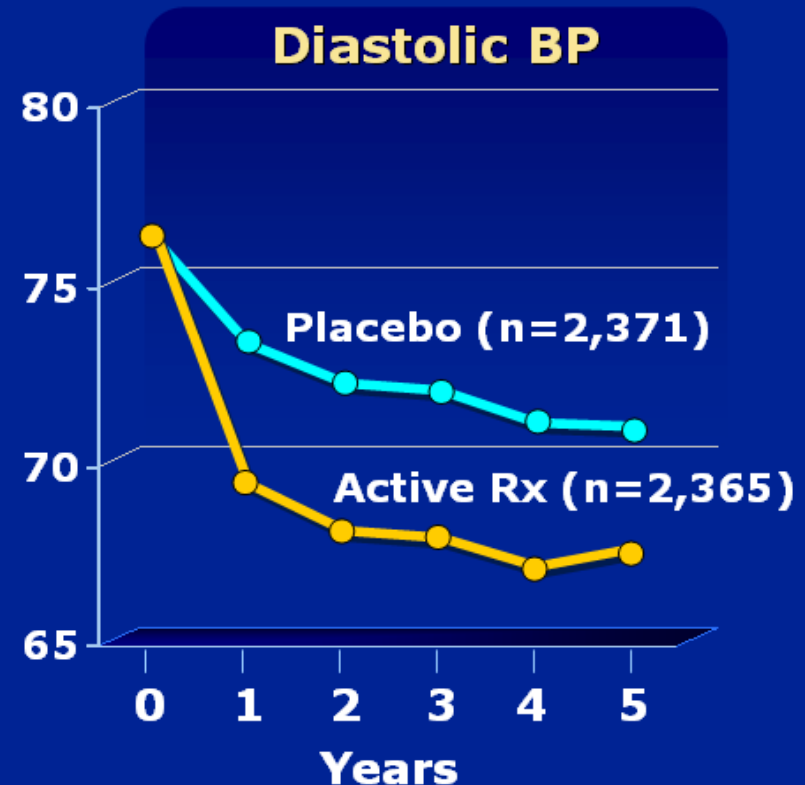
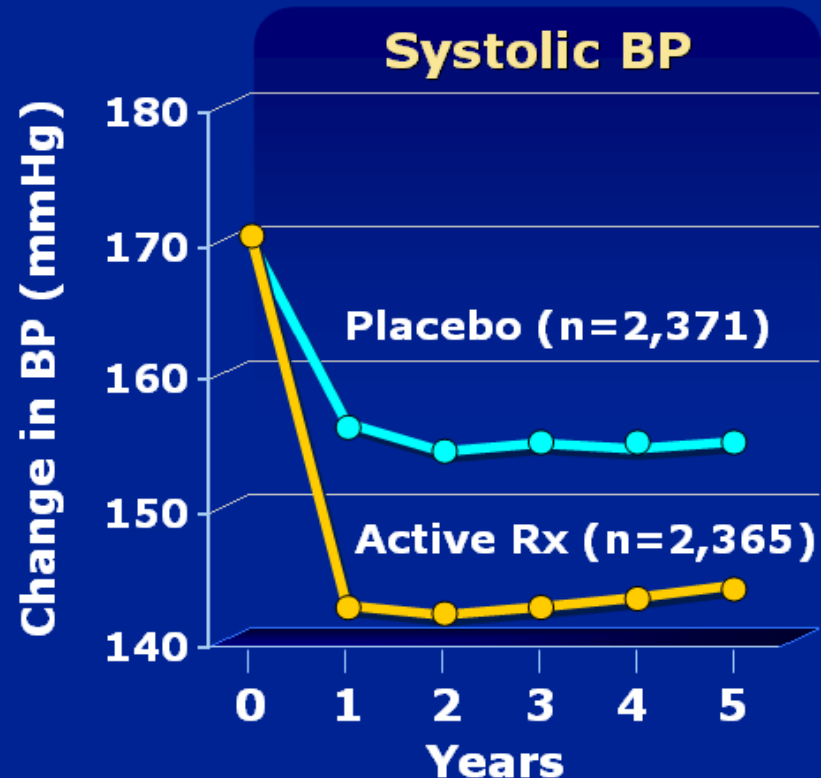
BP=blood pressure

SHEP Research Group. JAMA. 1991;265:3255-3264.

Slide Source  
Hypertension Online  
[www.hypertensiononline.org](http://www.hypertensiononline.org)

# SHEP

## Change in Blood Pressure

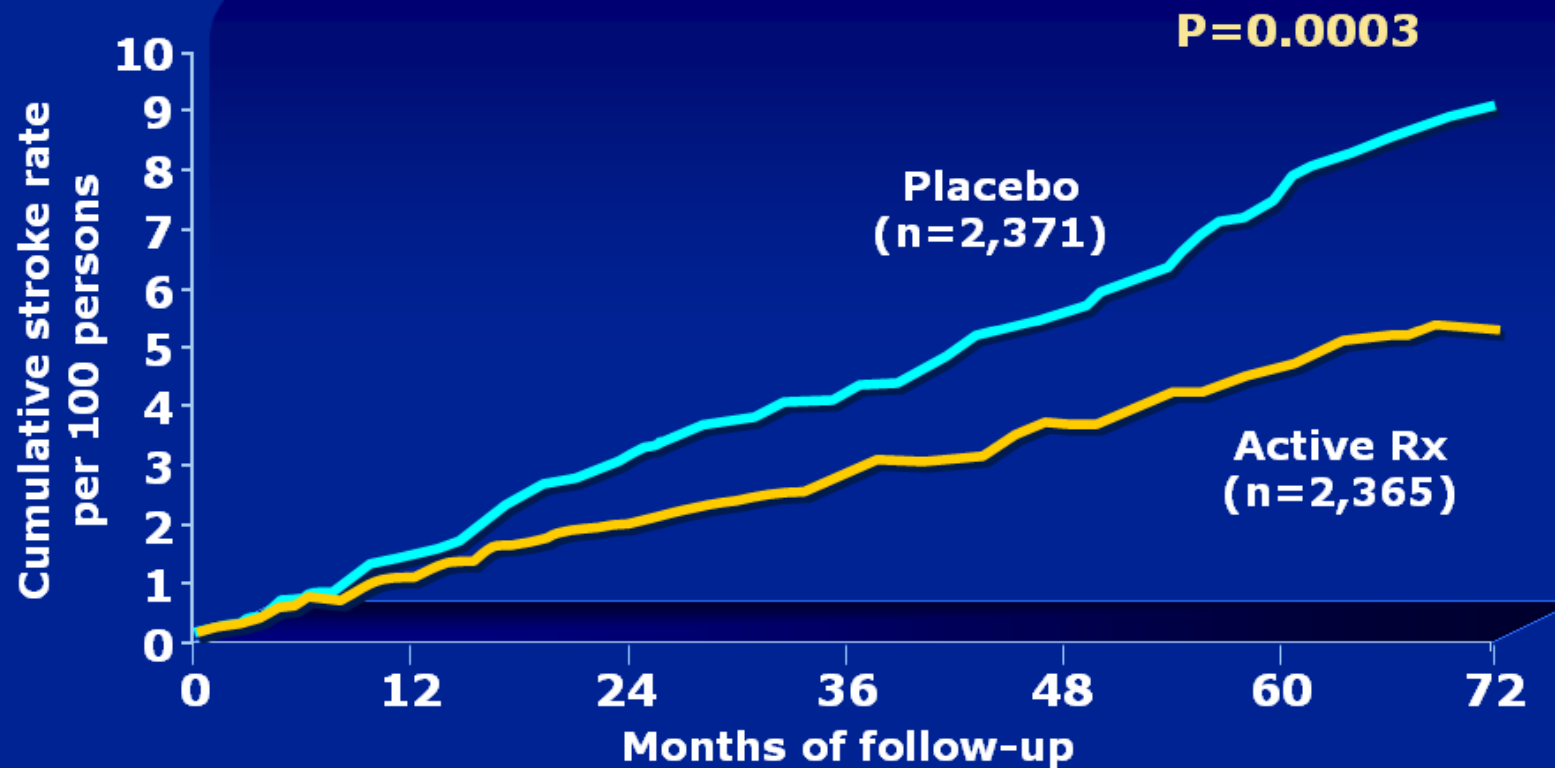


SHEP=Systolic Hypertension in the Elderly Program  
SHEP Research Group. JAMA. 1991;265:3255-3264.  
Copyright ©1991, American Medical Association.

BP=blood pressure

Slide Source  
Hypertension Online  
[www.hypertensiononline.org](http://www.hypertensiononline.org)

## **SHEP** **Cumulative Stroke Rate**

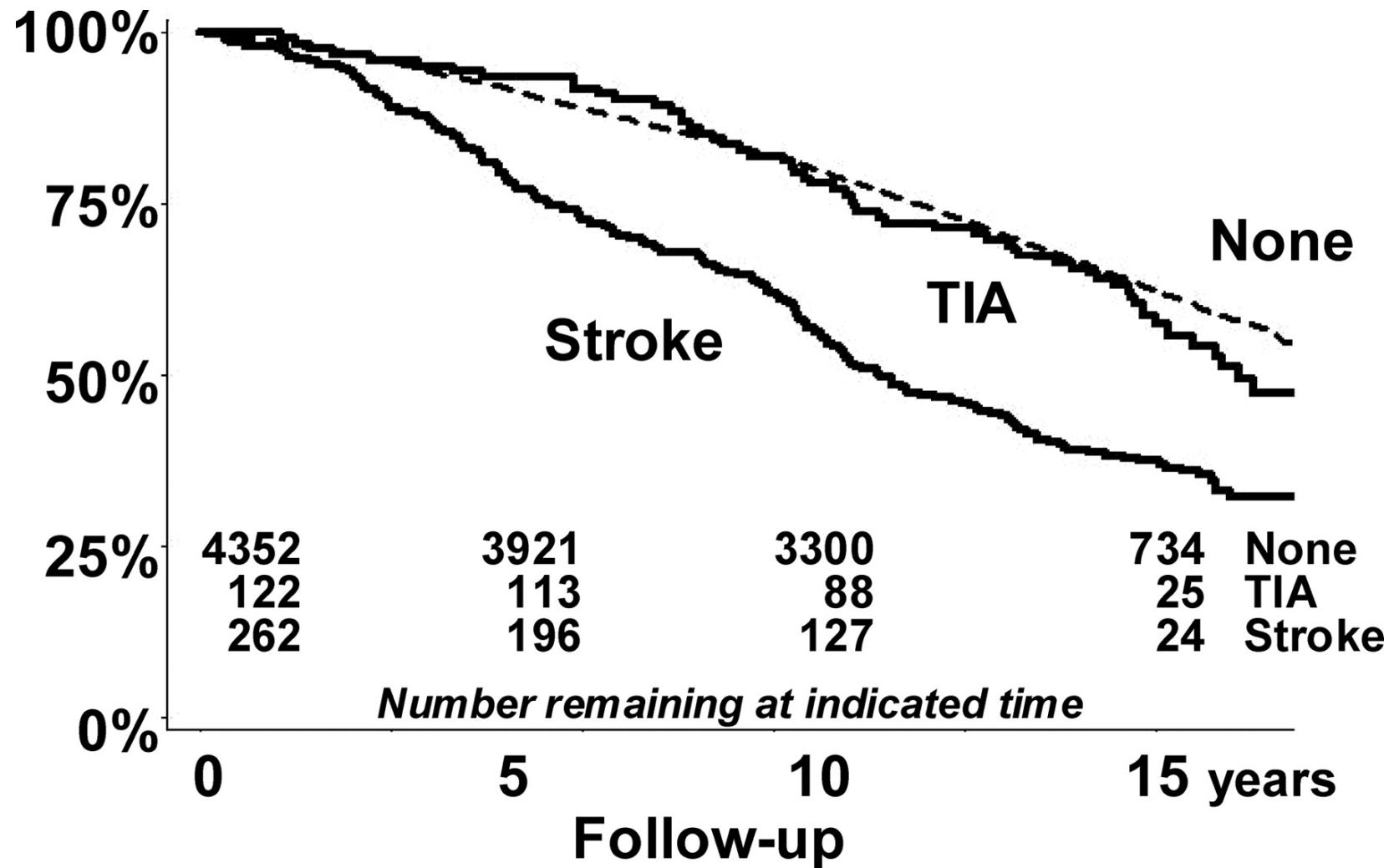


**SHEP=Systolic Hypertension in the Elderly Program**  
**SHEP Research Group. JAMA. 1991;265:3255-3264.**  
**Copyright ©1991, American Medical Association.**

Slide Source  
Hypertension Online  
[www.hypertensiononline.org](http://www.hypertensiononline.org)



Figure 2. Kaplan–Meier all-cause mortality survival curves for SHEP participants with incident stroke (n=262), TIA (n=122), or neither during the extended follow-up period.



Patel A B et al. Stroke 2008;39:1084-1089

(1) 65% of participants who suffered a stroke during original SHEP Trial (4.5 years) died during 14.3 year follow-up vs 40.6% of those who did not suffer stroke

(2) 55% cardiovascular deaths

- 32% non-stroke (principally CAD)
- 23% stroke

Initial stroke even if minor is a marker of a serious systemic disease which carries a poor prognosis

Patients with initial stroke more likely to die of non-stroke cardiovascular causes

Prevention of initial stroke is important

Treating global cardiovascular risk is important

# Treatment of Hypertension in Patients 80 years of Age or Older (HYVET Study)

N.Engl.J.Med.2008;358:1887-98

- In this study, patients 80 years of age or older with sustained systolic hypertension were randomly assigned to receive either the diuretic indapamide, with or without the angiotensin-converting-enzyme inhibitor perindopril, or matching placebos, for a target blood pressure of 150/80 mm Hg

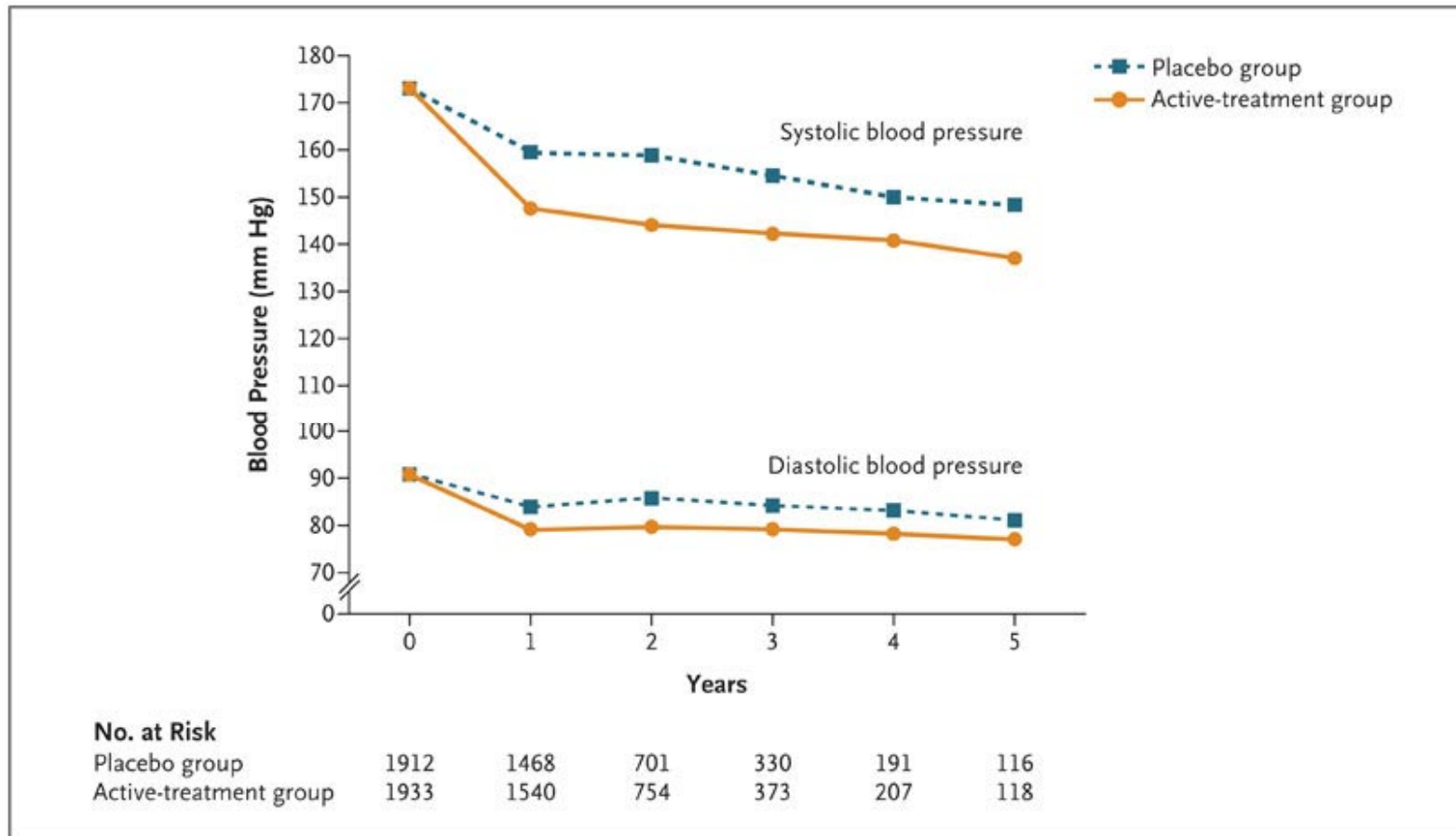
1933 patients on active treatment and 1912 placebo

Mean age 83.6 years (both groups)

Mean seated BP 173/90 (both groups)

Mean BP reduction in treatment group 15/6.1

Followed for mean 4 years



Treatment Group had:

- 30% reduction in in rate of fatal or non-fatal stroke
- 39% reduction in rate of death from stroke
- 21% reduction in rate of death from any cause
- 23% reduction in rate of death from cardiovascular causes
- 64% reduction in rate of heart failure



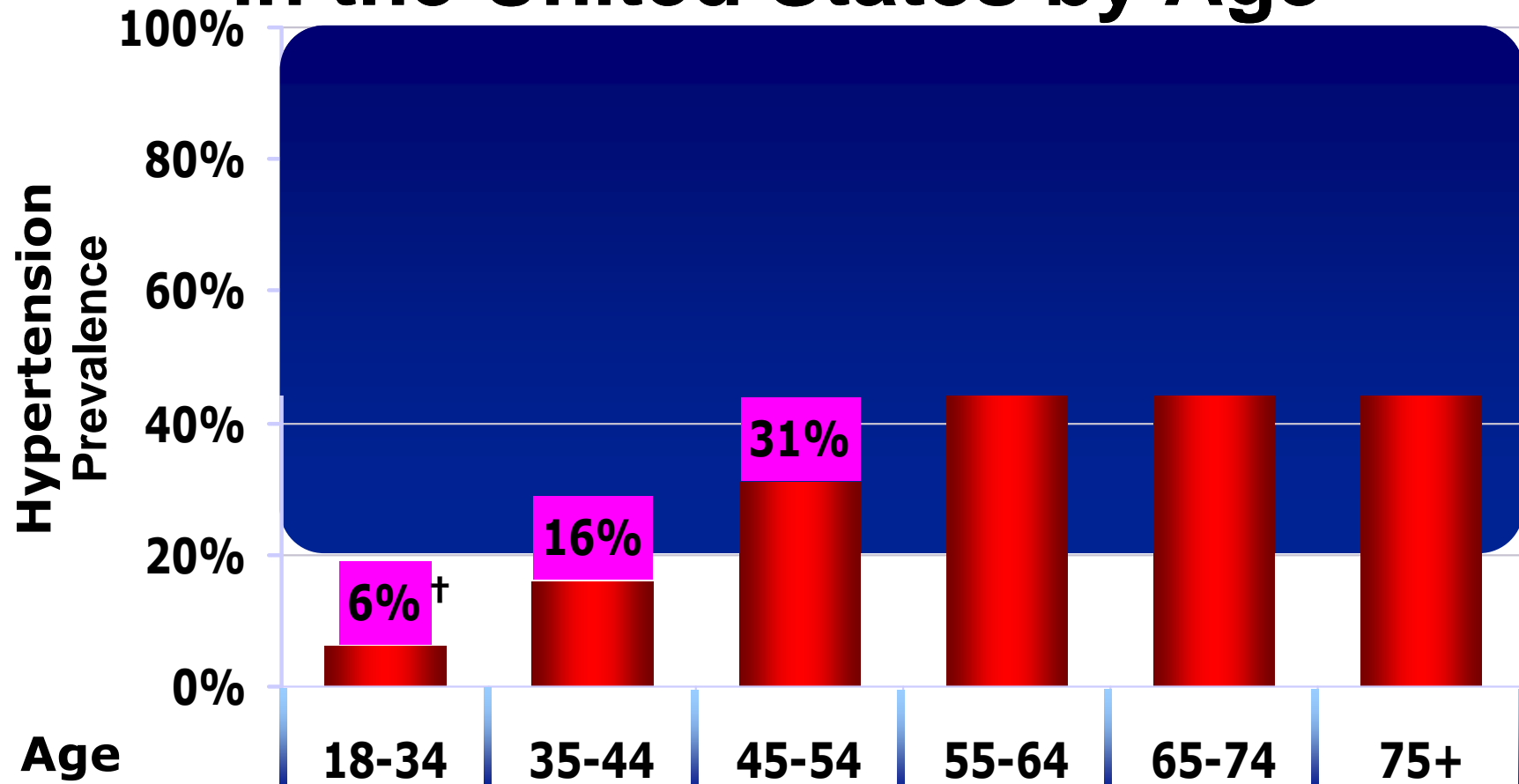
Before 2001 it was unclear whether BP treatment was effective for secondary prevention of stroke , but following publication of *Progress* (*Lancet* 2001;358:1033) and subsequent studies clear that it is

Following a stroke or TIA there is a 33% reduction in recurrent stroke risk for each 10mmHg reduction in SBP (*J Clin Hypertens* 2011;13:693)

Stroke not just a problem of old people

Young men with unrecognised  
hypertension and metabolic syndrome  
particularly at risk

# Prevalence of Hypertension in the United States by Age



\*Based on data from the 1999–2000 National Health and Nutrition Examination Survey. Hypertension is defined as blood pressure  $\geq 140/90$  mm Hg or as receiving antihypertensive treatment.

†Low reliability due to large relative error.

**Fields LE, et al. *Hypertension*. 2004;44:398-404.**

So why is stroke  
incidence in New  
Zealand unacceptably  
high?

High blood pressure is not  
effectively managed in New  
Zealand  
(personal view)

Hypertension specialists retired or died from the 1980's – 1990's.  
Cardiologists deemed hypertension not to be an important specialty,  
shut down the hypertension clinics, and devolved hypertension  
management entirely to primary care



Cardiologists and other medical specialists lost hypertension  
management skills



No-one left to educate medical students, trainee physicians and GP's



GP's don't know how to treat simple or complex hypertension and have  
nowhere to refer their difficult patients

We are not interested in prevention

**Public awareness BP health risk - All time Low**

**99% of resource - High tech treatments and complications**

- Coronary angiography and intervention
- Cardiac surgery
- Stroke units and rehab (\$450 million per year inpatient costs)
- Heart failure clinics

No financial incentives for  
GP's to manage blood  
pressure effectively



Because no-one in the Pharmac corridors of power is interested in hypertension our patients are missing out on badly needed modern (and some old) antihypertensive drug therapies

*Reserpine*

*Aldactazide*

*Amiloride*

*Minoxidil*

*Moxonidine*

*Eplerenone*

*Aliskerin*

*Combinations containing chlorthalidone rather than HCTZ*

*Modern fixed-dose combinations*

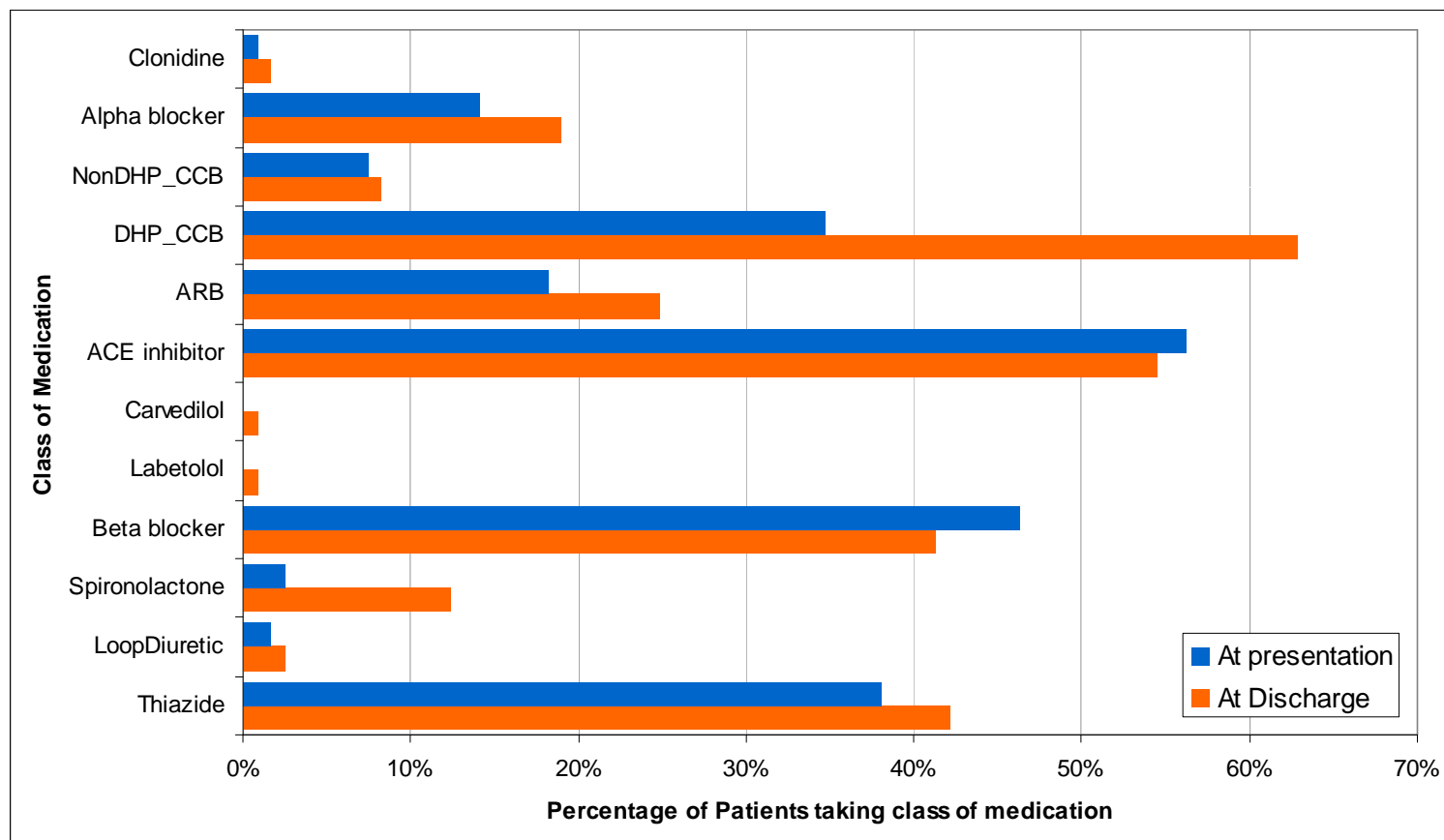
- *ACE-inhibitor – CCB*
- *ARB-CCB*
- *ACE-inhibitor – CCB – thiazide*
- *ARB – CCB – thiazide*

# Hypertension Clinic Patients

Mean age 57 (range: 19 – 89)

**BP:** avg 155/86 at presentation; 131/75 avg at discharge 74%  
achieved target blood pressure

Average number of visits: 3.5



2009 Edition



# New Zealand Cardiovascular Guidelines Handbook

A summary resource for primary care practitioners

Cardiovascular risk assessment  
and diabetes screening

- Cardiovascular risk factor management

Smoking cessation

Atrial fibrillation

Coronary heart disease

Stroke and transient ischaemic attack

Rheumatic fever

Prevention of infective endocarditis

Heart failure

l3i0ney Health  
NEW ZEALAND



STROKE  
FOUNDATION  
OF NEW ZEALAND LTD

diabetes  
new zealand

Heart  
Foundation

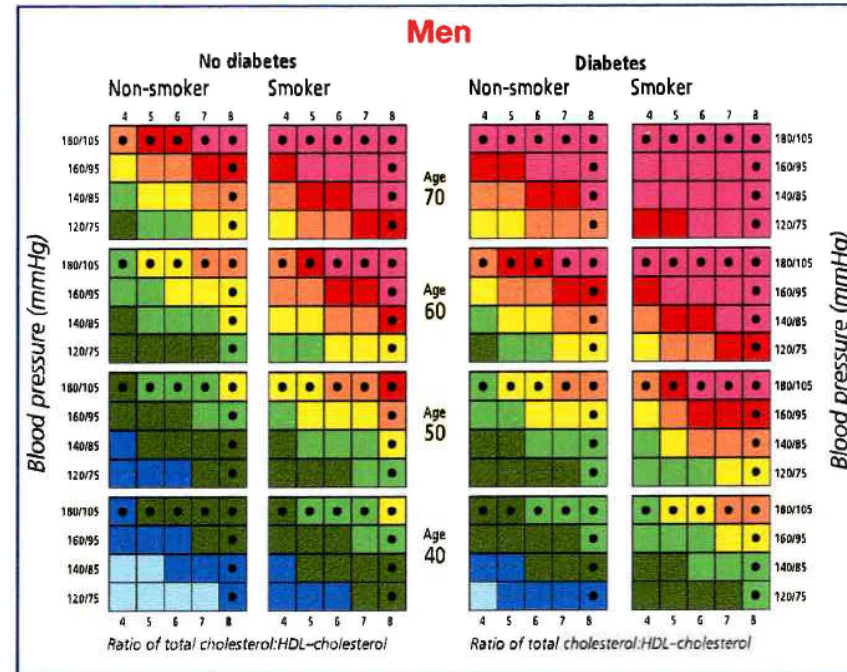
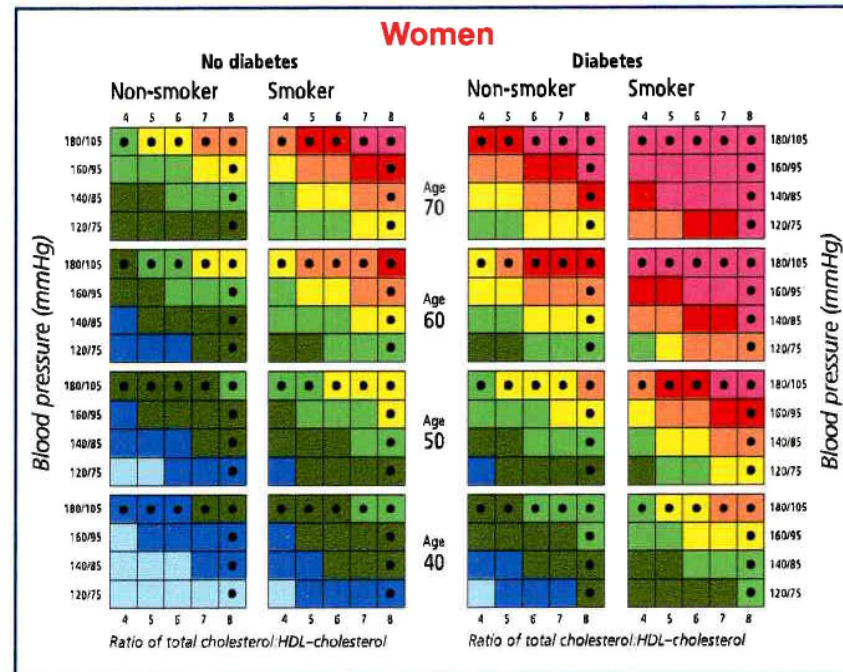
New Zealand  
GUIDELINES GROUP  
Te Rōpū Rarangi Tohutohu  
Promoting Effective Health and Disability Services

# New Zealand Cardiovascular Risk Calculator

## Assessing cardiovascular risk and treatment benefit



National Prescribing Service Limited



Cells with this marker (•) indicate patients with either a very high total cholesterol or very high blood pressure. In these patients the tables may underestimate true risk.

| Absolute 5-year CV risk<br>(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<br>5-year CV risk<br>(fatal and non-fatal) | Benefits: NNT <sup>a</sup> for 5 years to prevent one event <sup>b</sup><br>(CVD events prevented per 100 people treated for 5 years) |   |   |
|---|---|---|---|
|   | 1 intervention<br>(25% risk reduction)  | 2 interventions<br>(45% risk reduction) | 3 interventions<br>(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)                          |

<sup>a</sup> Number needed to treat

<sup>b</sup> Based on the conservative estimate that each intervention: aspirin, blood pressure treatment (↓ SBP by 10 mmHg) or lipid modification (↓ LDL-cholesterol by 20%) reduces CV risk by approximately 25% over 5 years.

Basis for this is that active (pharmacological) treatment is suggested if 5 year risk of cardiovascular event is  $> 15\%$

*But*

“Isolated single risk factors” do not mandate therapy unless extremely abnormal (BP  $> 170/100$ , total cholesterol  $> 8\text{mmol/l}$  etc)

50 year old European female

- BP averages 160/95 on multiple readings
- BMI 25
- TC 6.1mmol/l, HDL 1.2mmol/l
- Non-smoker, non-diabetic

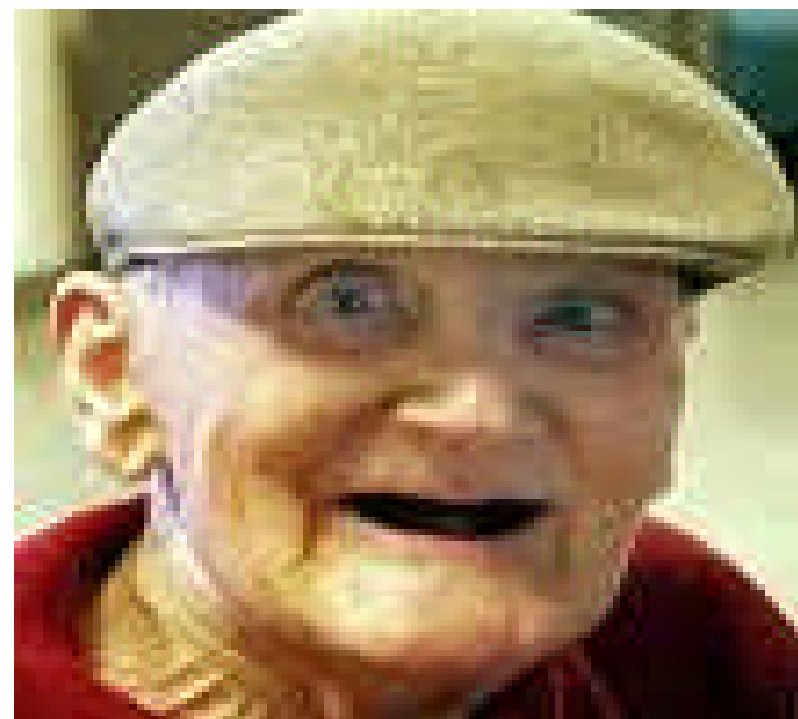
50 year old European female

- BP averages 160/95 on multiple readings
- BMI 25
- TC 6.1, HDL 1.2
- Non-smoker, non-diabetic

**5 year risk 5-10%: therefore**

**No antihypertensives**

**No statin**



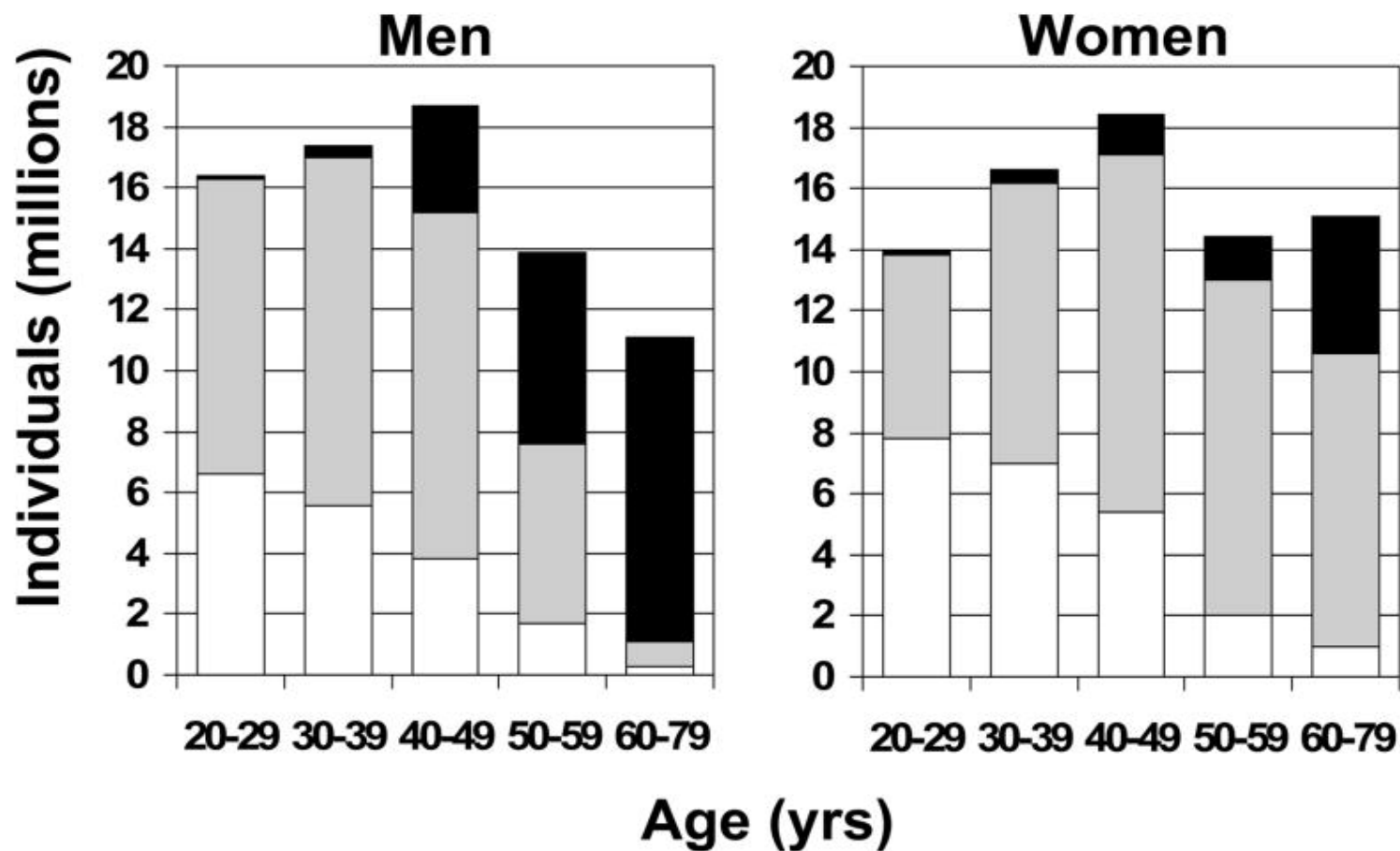




**“Old Men  
Making Rules  
to Treat  
Themselves”**

### CV Risk Factor Estimation Systems

| System                      | Geographic Area    | Age (yrs)    | Time Horizon (yrs) |
|-----------------------------|--------------------|--------------|--------------------|
| Framingham                  | US                 | 35-75        | 10                 |
| Score                       | Europe             | 40-65        | 10                 |
| Assign                      | Scotland           | 30-74        | 10                 |
| Q Risk                      | General Practice   | 35-74        | 10                 |
| Procam                      | Europe             | 20-75        | 10                 |
| WHO/ISH                     |                    | 40-79        | 10                 |
| Reynolds                    | WHS-PHS2           | 45-80        | 10                 |
| <b>NZ CV Risk Guideline</b> | <b>New Zealand</b> | <b>35-75</b> | <b>5</b>           |



*Marma et al. Circ Cardiovasc Qual Outcomes 2010;3(1):8-14 (NHANES survey 2003-2006 – US adults aged 20-79)*

*Short term cardiovascular risk*

- low < 10% 10 year
- high  $\geq$  10% 10 years or diagnosed diabetes

*Long term cardiovascular risk*

- low < 39% lifetime
- high  $\geq$  39% lifetime

*Population divided in to 3 groups*

- low short term/ low long term (26%)
- low short term/ **high long term** (56%)
- **high short term/ high long term** (18%)

## For example

50 year old female

- BP 160/95
- TC 6.1, HDL 1.2
- Non-smoker, non-diabetic

NZ Risk Score 5-10% 5years – no treatment

**Lifetime cardiovascular risk – 50%**

50 year old female

- BP 115/75
- TC 4, HDL 1.5
- Non-smoker, non- diabetic

NZ Risk Score <2.5% - no treatment

**Lifetime cardiovascular risk – 8%**

If we had the means to reduce the risk of breast cancer in women at high lifetime risk by 42% - would we employ it?

Causes of death in NZ women

- **cardiovascular disease 40%**
- breast cancer 5%

## Waitemata Hypertension Clinic Risk Factor Management Guideline

- No smoking at any time
- Fasting blood glucose < 5.5mmol/l
- Antihypertensive drug treatment of all (irrespective of age, gender, smoking or lipid status) with sustained BP  $\geq 140/90$ , and  $\geq 130/80$  for diabetes, CKD, or history of MI, stroke or PVD
- Statins for all (irrespective of age, gender, BP or smoking status) with LDL-C > 2.5mmol/l +/- TC/HDL-C ratio > 4, and irrespective of lipid profile in diabetics, CKD or history of MI, stroke or PVD
- Low dose aspirin in all over 50 on treatment for hypertension or dyslipidaemia, and irrespective of age in all individuals with a history of MI, stroke, or PVD



# Hypertension as a Public Health Risk

2011 **C**anadian **H**ypertension  
**E**ducation **P**rogram  
Recommendations



## Summary

Blood pressure elevation is associated with up to 70% of stroke

Most of the excess risk associated with hypertension can be prevented by treating blood pressure to target

Stroke rates are unacceptably high in New Zealand (in my view) because of widespread poor management of hypertension

Hypertension is poorly managed in NZ because of

- Poor public health awareness (government)

- Lack of specialist referral services (government and DHB's)

- Underskilled and unincentivised GP's

- Lack of clinical leadership (primary and secondary care)

- Outdated and ambiguous advice in the NZ Cardiovascular Guideline

