



Dr Chris Ellis

Consultant Cardiologist
Auckland

CVD Risk Prediction in NZ 2013 and Beyond - the Clinician's View - Main Session (Workshop options scheduled)

Sunday, 23 June 2013

Start 9:20am

Duration: 25mins

Baytrust



 
Rotorua GP CME 2013

General Practice Conference & Medical Exhibition

20-23 June 2013 | Energy Events Centre | Rotorua

CVD Risk Prevention in NZ 2013 & Beyond: The Clinicians View

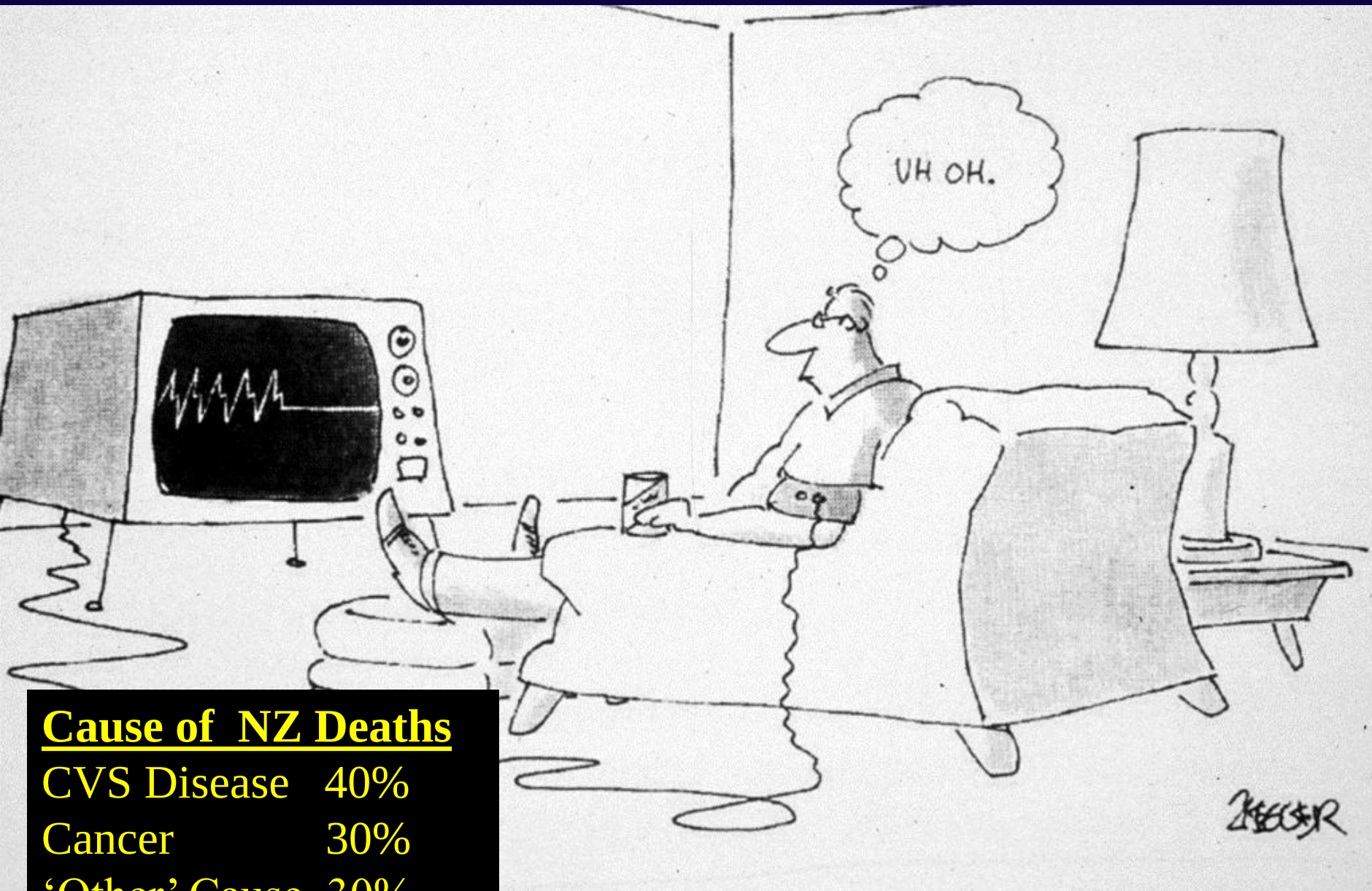
Dr Chris Ellis
Cardiologist

Green Lane CVS Service,
Cardiology Department,
Auckland City Hospital

& Auckland Heart Group, Mercy Hospital, Auckland



CVS Disease: Is it a Major Problem in New Zealand?



Cause of NZ Deaths

CVS Disease 40%

Cancer 30%

'Other' Cause 30%

Rod's Talk (Summarised)



The facts are coming! The facts are coming!

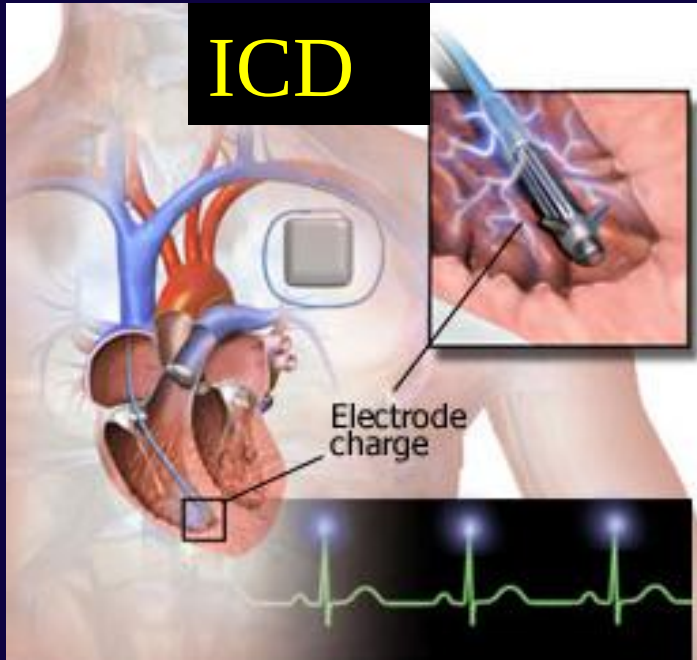
Chris's Talk (Summarised)



"Your pulse is very, very weak!"

Expensive Treatments

ICD



STENTS

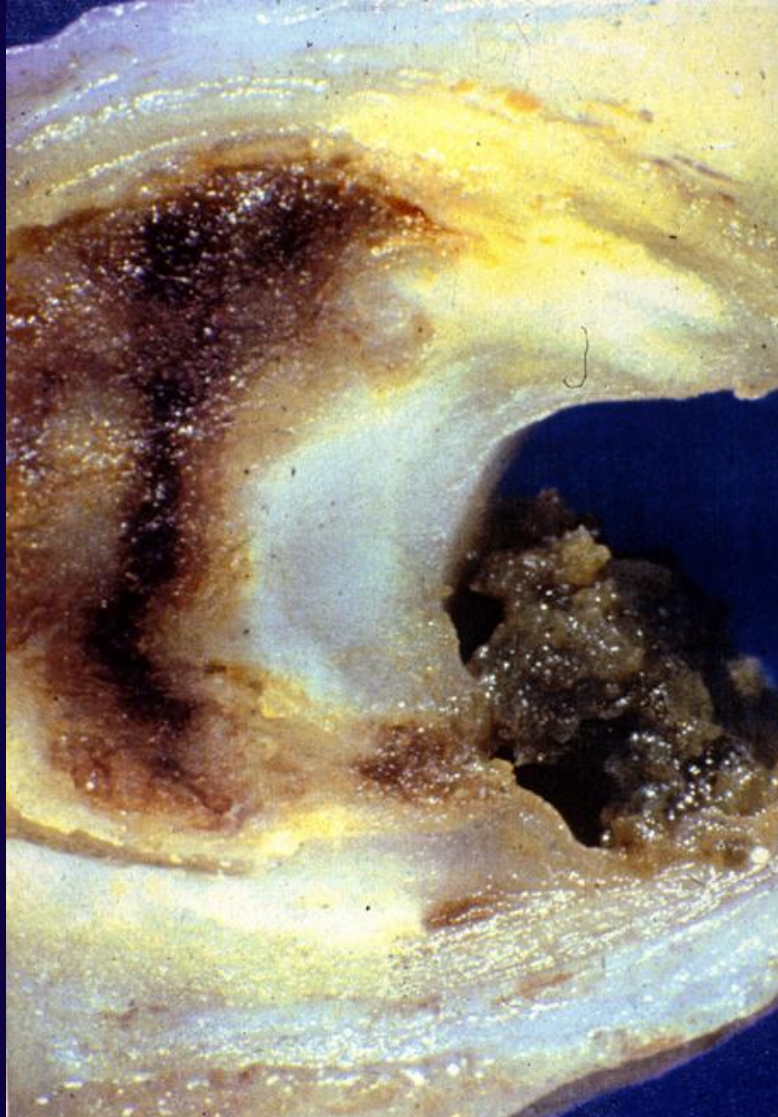


CABG



CVS Disease is an Expensive & Major Problem in
New Zealand: Prevention is Better than Cure

Do We Really Understand Atherosclerosis?

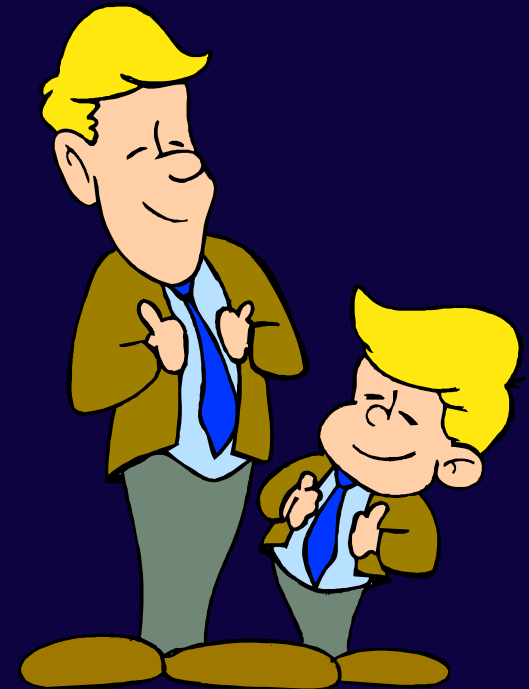


Atherosclerosis is a Highly Complex Ageing of the Arteries

Lifestyle



Genetic



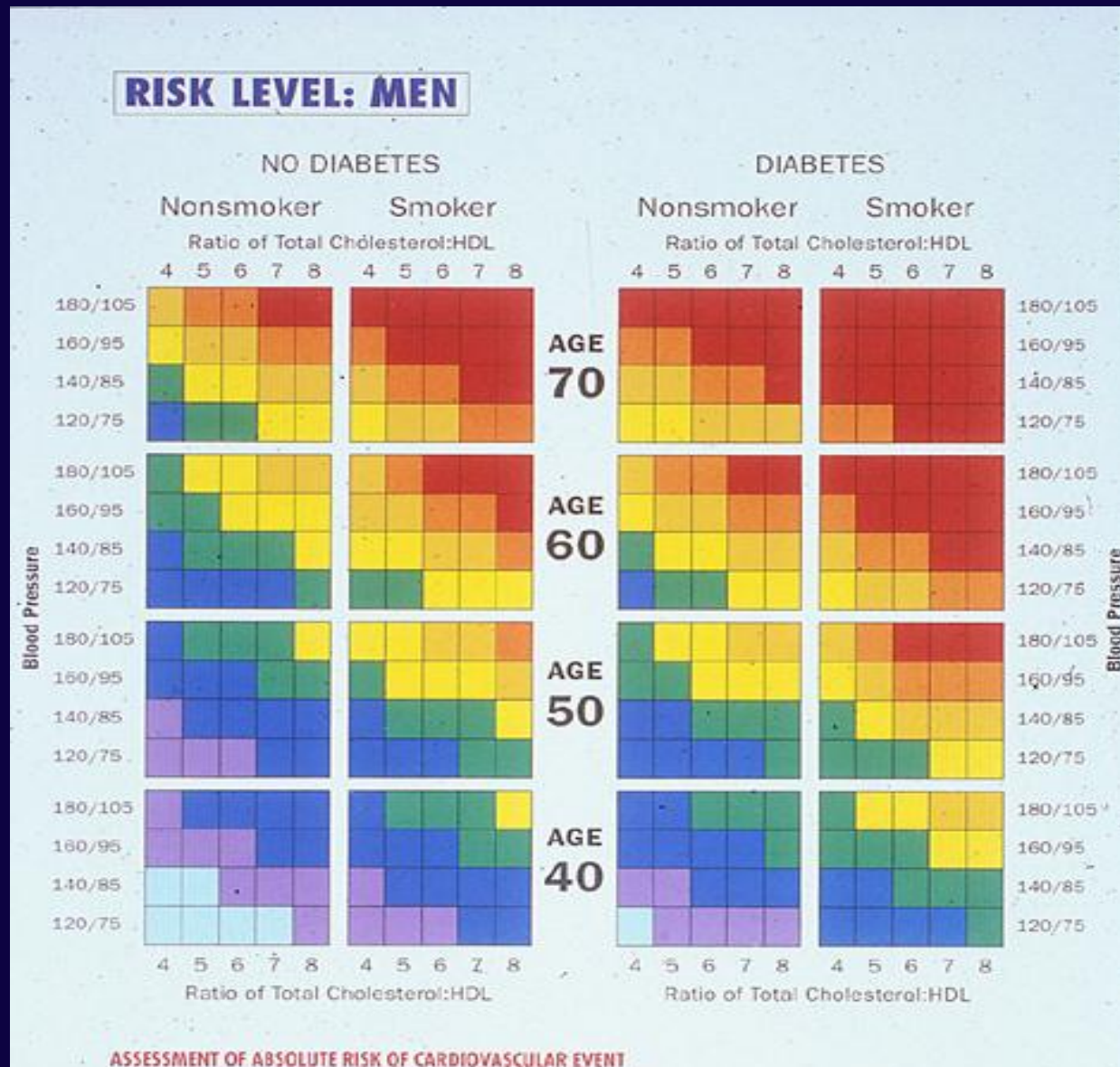
Atherosclerosis is Poorly understood: but is driven by *lifestyle* and *genetic* factors

Atherosclerosis: A Complex Ageing/Disease Process

How Do We Assess CVS Risk in New Zealand?

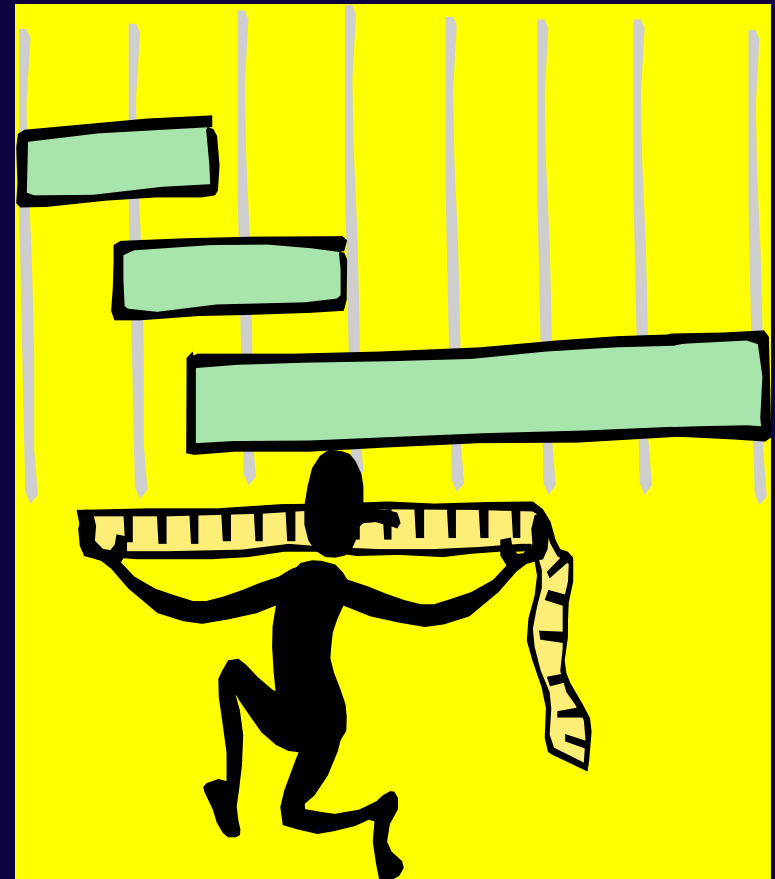


Framingham-Based Risk Tables



Framingham-Based CVS Risk Tables: Risk Factors Used in NZ

- Age (decades)
- Gender
- Diabetes Status (Y/N)
- Hypertension
- Smoker (Y/N)
- Total Cholesterol/HDL Ratio



Additional 5% CVS Risk Factors (2003/2009 NZ Guidelines)

Family history of premature CHD or ischaemic stroke:

- In a first-degree male relative before the age of 55 years or
- In a first-degree female relative before the age of 65 years

Maori

Pacific peoples or people from the Indian subcontinent

People with both diabetes and microalbuminuria

People who have had type 2 diabetes mellitus:

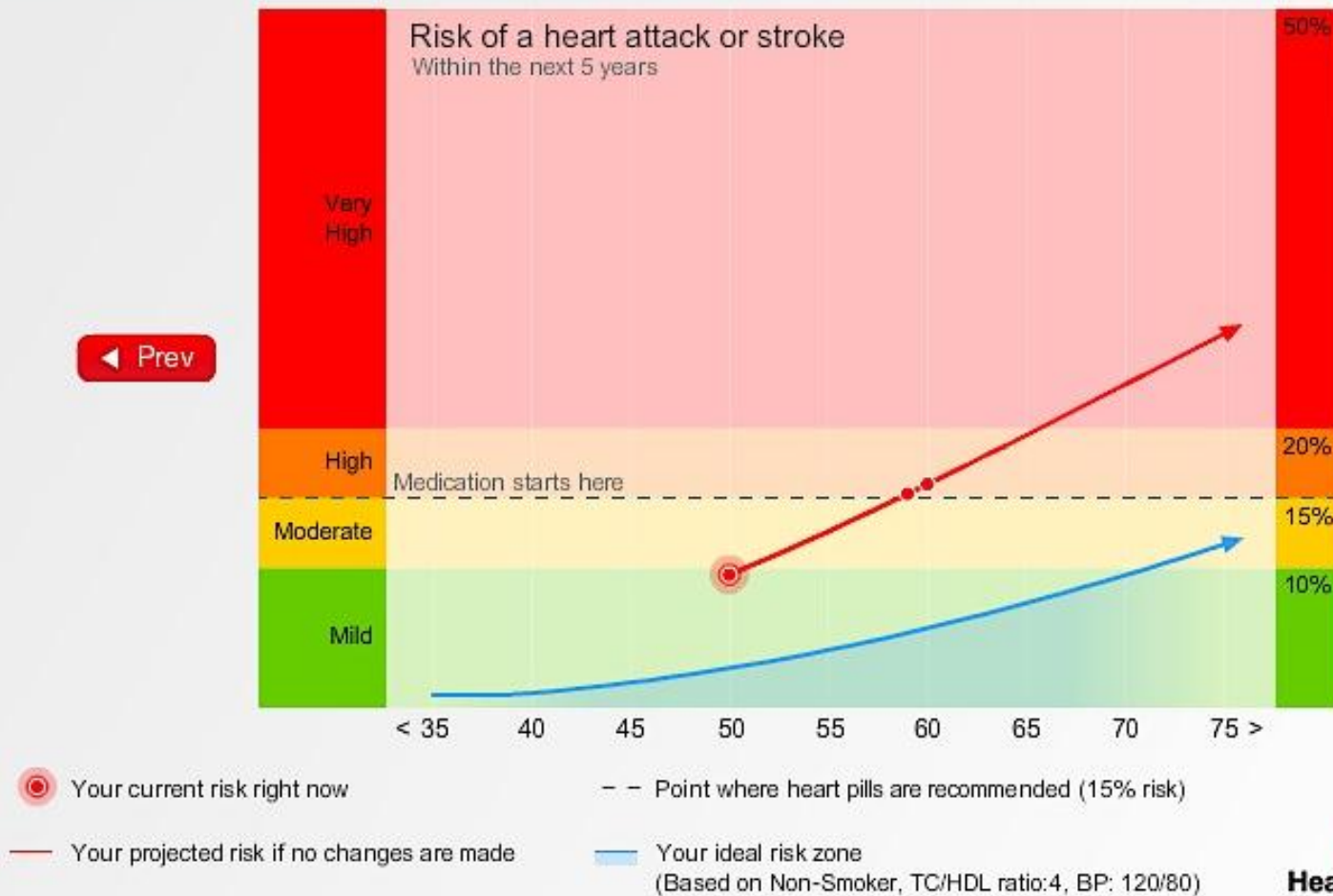
- For more than 10 years or
- Who have an HbA1c consistently greater than 8%

(People with the metabolic syndrome) GONE 2009

IF Total Cholesterol ≥ 8 then risk $\geq 15\%$

if Total Cholesterol/ HDL ≥ 8 then risk $\geq 15\%$

if BP consistently $\geq 170/100$ then risk $\geq 15\%$



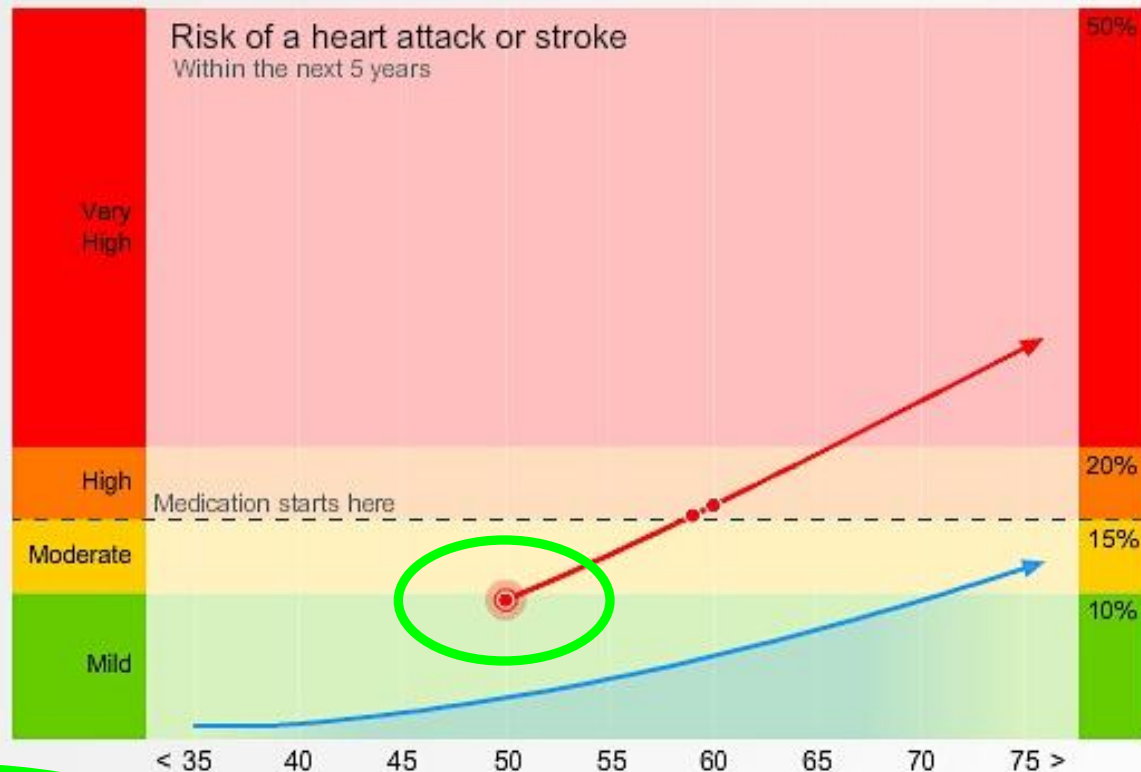
You can reduce your risk of a heart attack or stroke by...

- not smoking
- eating a healthy heart diet
- 'Push-Play' by being active for at least 30 minutes on most days of the week

This will help you to feel good and lower your blood pressure and cholesterol.

You can adjust these factors on the next page to see what they can do for your risk of a heart attack or stroke.

In NZ We Assess this Complex Ageing/Disease Process with only 6 Major and a few additional Minor Risk Factors from a 50 year-old Study of 5,600 people in the USA.....



You can reduce your risk of a heart attack or stroke by...

- not smoking
- eating a healthy heart diet
- 'Push-Play' by being active for at least 30 minutes on most days of the week

This will help you to feel good and lower your blood pressure and cholesterol.

You can adjust these factors on the next page to see what they can do for your risk of a heart attack or stroke.

Next

● Your current risk right now

-- Point where heart pills are recommended (15% risk)

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



© 2008

“Your current risk right now”.....[Really?!]

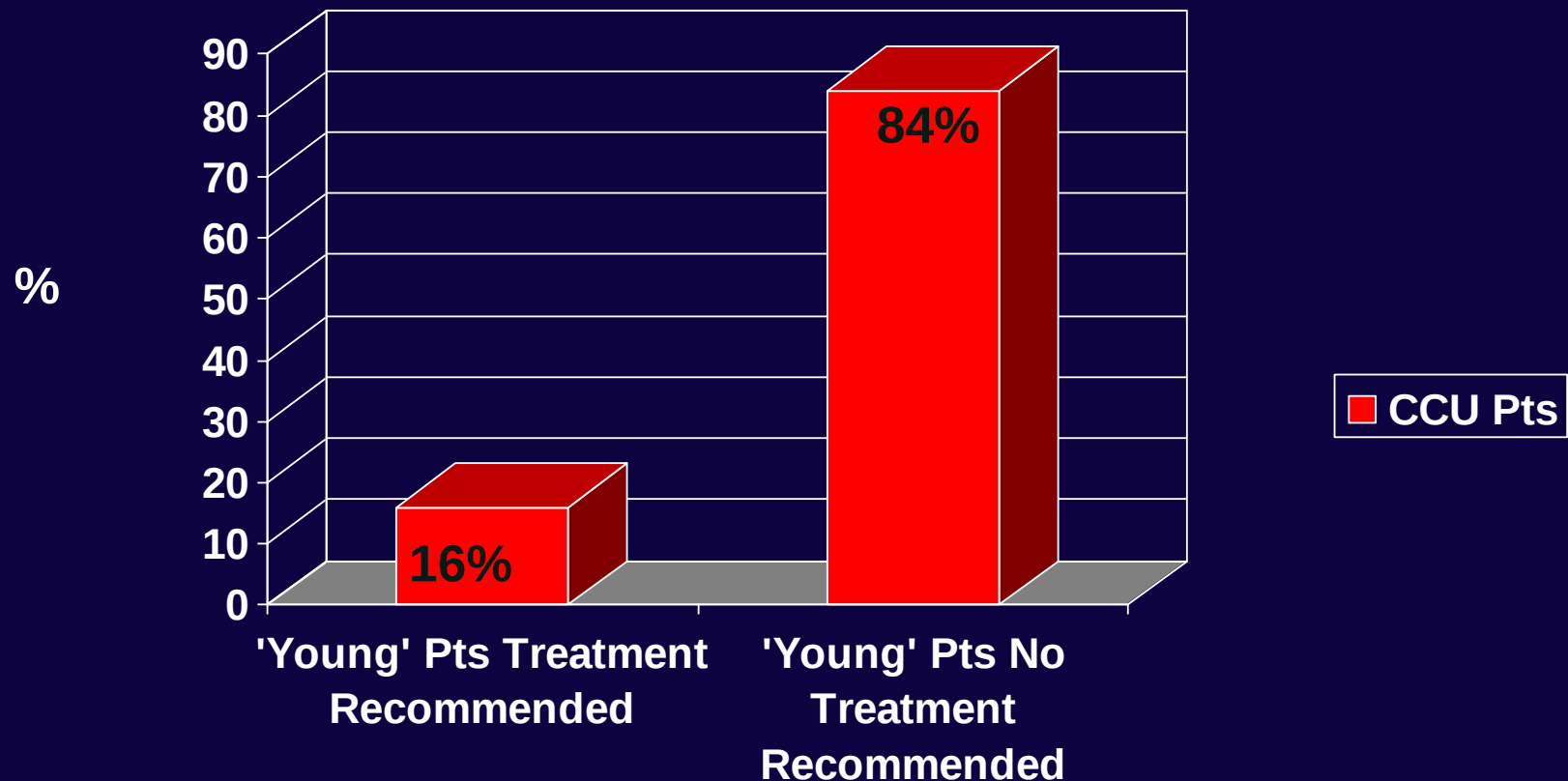
Can the USA Framingham Tables Really Predict CVS Risk: in Acute Coronary Syndrome Patients in NZ?



Auckland City Hosp CCU Pts 1 June 06 to 30 June 07

J Looi, CJ Ellis et al CSANZ 2008

Pts with NZ Framingham CVS Risk > 15% over 5 Years

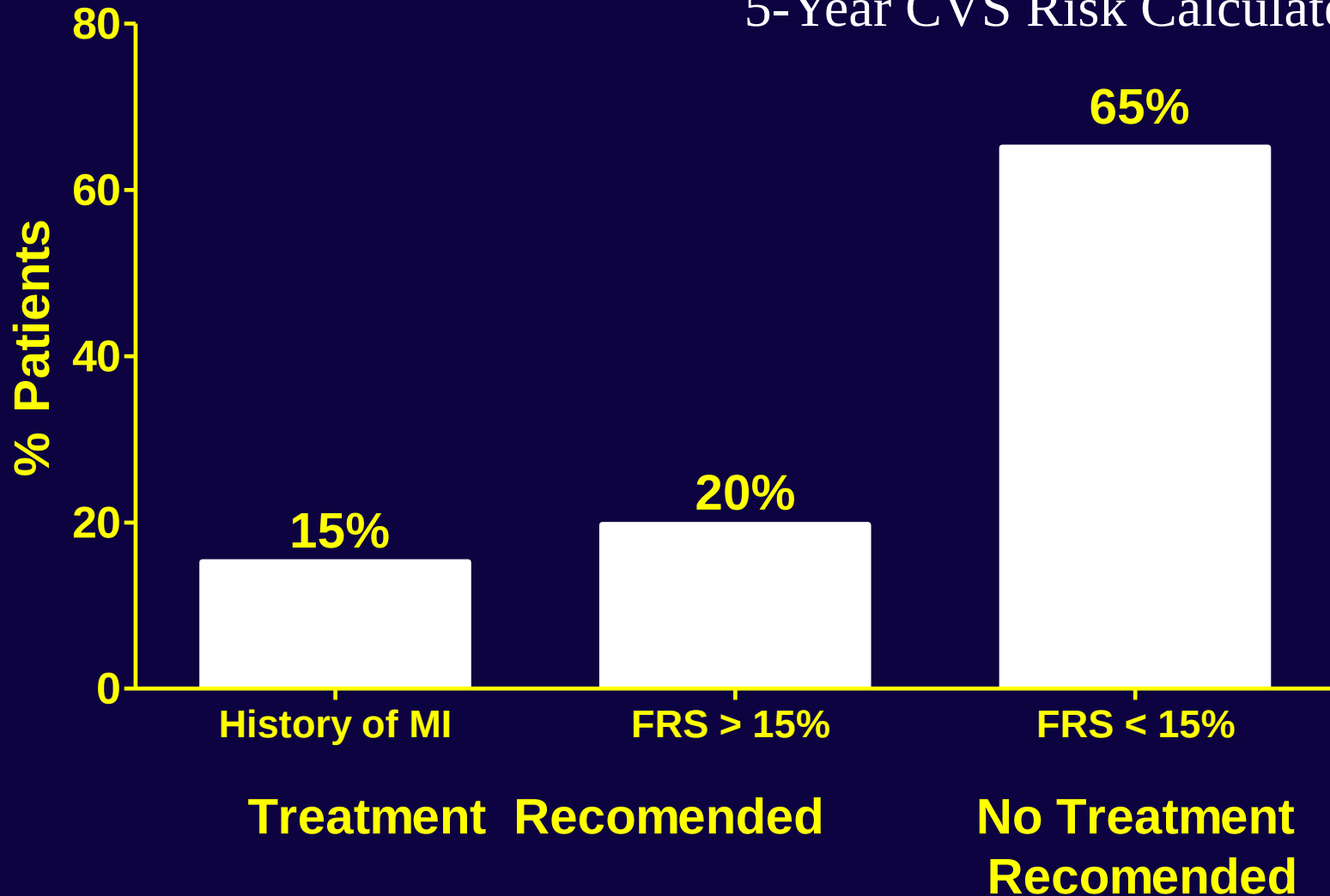


229 pts: 'Young' (male<55, female<65 years), no prior CVS disease

The 2012 Auckland/Northland Primary PCI STEMI Cohort

N=400 pts (2 from Hawkes Bay!)

5-Year CVS Risk Calculated



The NZ Framingham Guideline Tables
Cannot Predict CVS Risk in Acute
Coronary Syndrome Patients in NZ



We will soon have the ‘PREDICT’
New Zealand Data, so we won’t need
to use Framingham Tables

[Unfortunately Wrong]

THE NEW ZEALAND MEDICAL JOURNAL

Journal of the New Zealand Medical Association



Performance of Framingham cardiovascular risk scores by ethnic groups in New Zealand: PREDICT CVD-10

Tania Riddell, Sue Wells, Rod Jackson, Ai-Wei Lee, Sue Crengle, Dale Bramley,
Shanthi Ameratunga, Romana Pylypchuk, Joanna Broad, Roger Marshall,
Andrew Kerr

NZMJ 19 February 2010, Vol 123 No 1309; ISSN 1175 8716

URL: <http://www.nzma.org.nz/journal/123-1309/3980/>

PREDICT ICD 10 AM Codes: Endpoints (1)

Outcomes	ICD-10-AM codes	Number of first events (N) ^a
Coronary heart disease	I20–I25 (except I252) Acute coronary syndromes, chronic ischemic heart diseases	770
Cardiac arrest or sudden cardiac death	E1053, E1153, E1453 Coronary heart disease	
	I461 Sudden cardiac death, so described	
	R96 Other sudden death, cause unknown	
	R98 Unattended death	
	3530400–3530501 Coronary angioplasty or stent ★	
	3531000–531005 Percutaneous coronary intervention	
Coronary procedures	3849700–3850304, 9020100–9020103 Coronary artery bypass ★	301
	3863700 Re-operation for reconstruction of occluded coronary artery	
	3845619 Other intrathoracic procedures on arteries of heart without cardiopulmonary bypass	
	3865308 Other intrathoracic procedures on arteries of heart with cardiopulmonary bypass	
	3850500 Open coronary endarterectomy	
	I63 Cerebral infarction	
	I64 Stroke, not specified as haemorrhage or infarction	
	I66 Occlusion and stenosis of cerebral arteries, not resulting in cerebral infarction	
	I678 Other specified cerebrovascular diseases ★	
	I693 Sequelae of cerebral infarction	
	I694 Sequelae of stroke, not specified as haemorrhage or infarction	
	I698 Sequelae of other and unspecified cerebrovascular diseases	

PREDICT ICD 10 AM Codes: Endpoints (2)

Ischaemic cerebrovascular disease	G45 (except G453), G46 Transient ischaemic attack I670 Dissection of cerebral arteries, nonruptured I671 Cerebral aneurysm, nonruptured	1098
Peripheral arterial disease	I65 Occlusion and stenosis of precerebral arteries I71 Aortic aneurysm and dissection (other arterial dissection) I72 Other aneurysm I74 Arterial embolism and thrombosis	120
Peripheral procedures	I739 Peripheral vascular disease, unspecified I7021, I7022, I7023, I7024 Intermittent claudication, gangrene, or diabetic peripheral angiopathy with or without gangrene 330–331 Repair aneurysm 3270000–3276318 Artrial bypass graft 3250000–3255400 Endarterectomy and patch angioplasty 9023000 Embolectomy or thrombectomy of other artery 9022900 Other endarterectomy	38
Total		2327

40% of Endpoints are 'TIAs'.....Is this accurate?

2013: Now 6% are 'TIAs'....Is this now accurate?

*One person may have multiple ICD codes for a first cardiovascular event.

Some Problems with PREDICT 10 Comparison Study: “Framingham vs. New Zealand Data” (1)

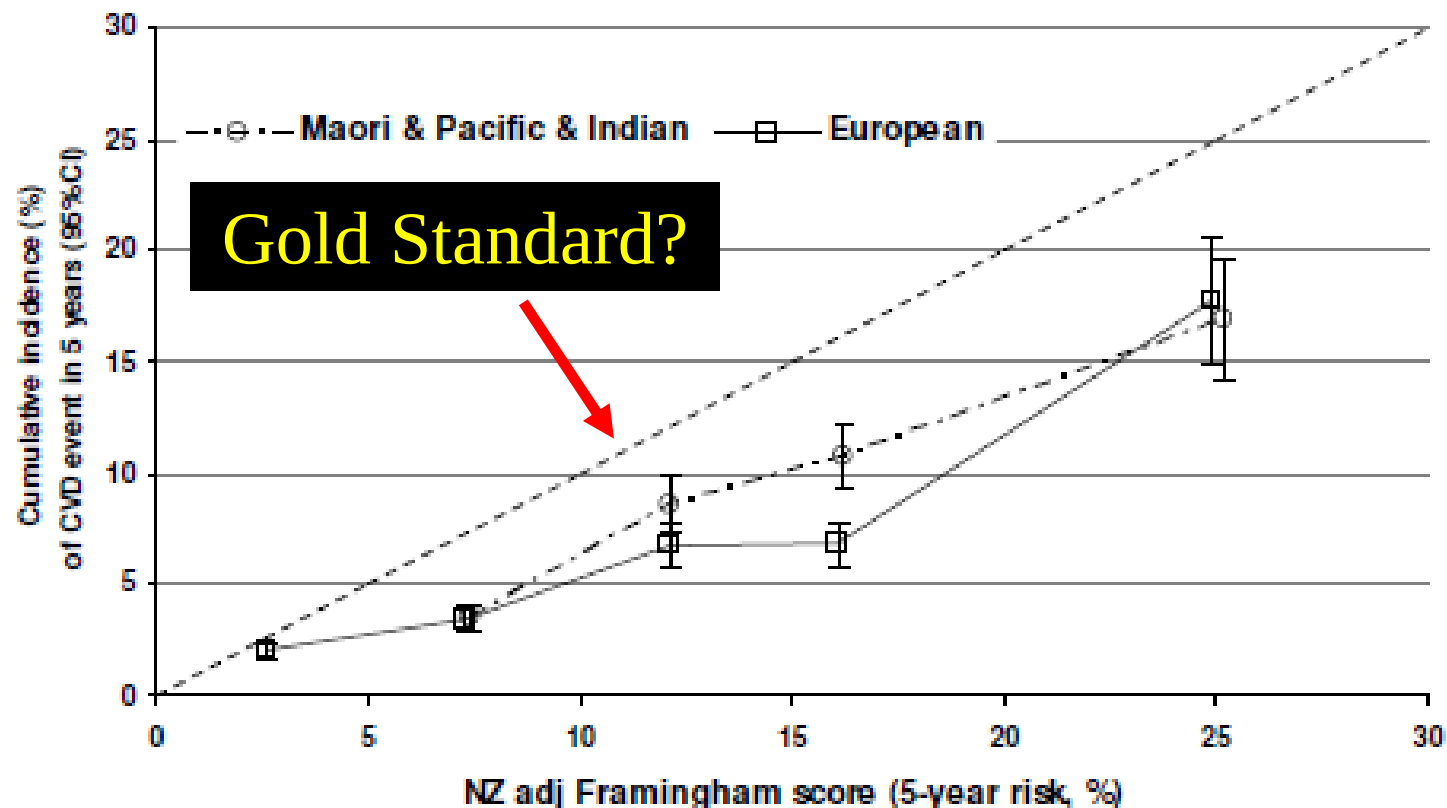
- Framingham data collected by careful FU with Research Nurse [expensive study]
 - Probably fairly accurate endpoints
 - (although never fully published)
- PREDICT cohort is based on public hospital admissions linked to deaths & readmissions [cheap study]
 - House surgeon & coder dependent
 - Endpoint accuracy uncertain

Some Problems with PREDICT 10 Comparison Study: “Framingham vs. New Zealand Data” (2)

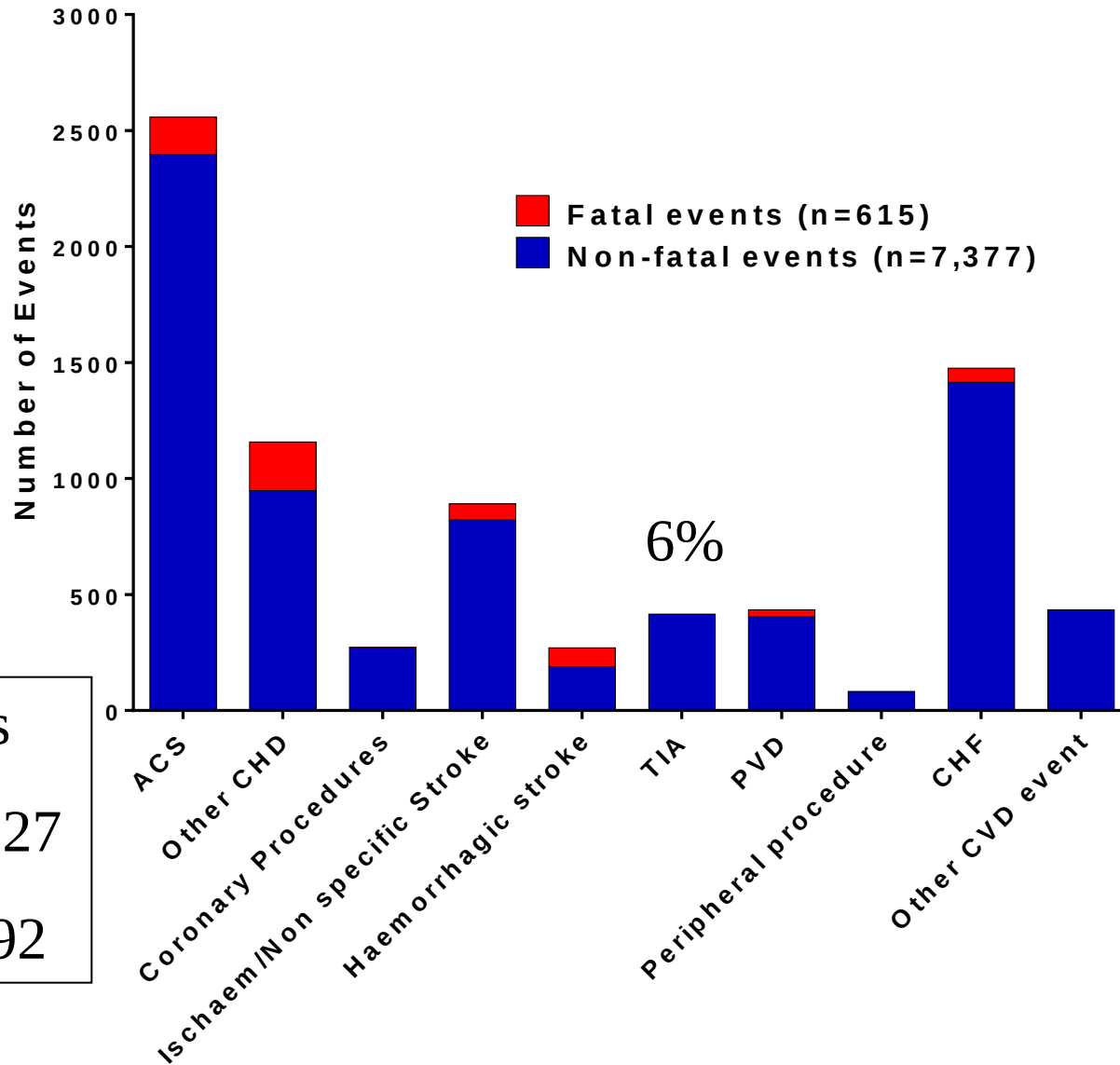
- Other Inaccuracies:
 - Which of the ‘eligible’ patients were enrolled
 - How many? Which type: low risk/ high risk?
 - Silent MI, UAP, TIAs (in community): not recorded
 - Private hospital admissions: not recorded
 - PCIs/CABGs: not recorded
 - MIs/ UAP/PVD: not recorded
 - Heart failure admissions etc.: not recorded
- Effect of Pt Treatment on baseline & endpoints
- Social Deprivation not collected

PREDICT ICD 10 AM Codes: Endpoints (3)

Figure 2. Calibration (relationship between observed and predicted events) of the New Zealand adjusted Framingham scores for European and Māori, Pacific and Indian ethnic groups



PREDICT Endpoints Revisited (Last 2 Weeks)



TIA: Endpoints
Was 40% of 2327
Now 6% of 7992

QRISK 2 Study (UKs PREDICT)

Collins & Altman BMJ 2009

- 365 GP practices linked to a database
 - 1.6 million people registered (of 3.6 million)
 - Aged 35 to 74 years
- QRISK 2 = 32 variables at baseline
 - Included Social Deprivation score at baseline
- 1st CVS event recorded by GP
 - MI, Angina, CHD, Stroke & TIA
- Run: 1 Jan 1993 to 20 June 2008

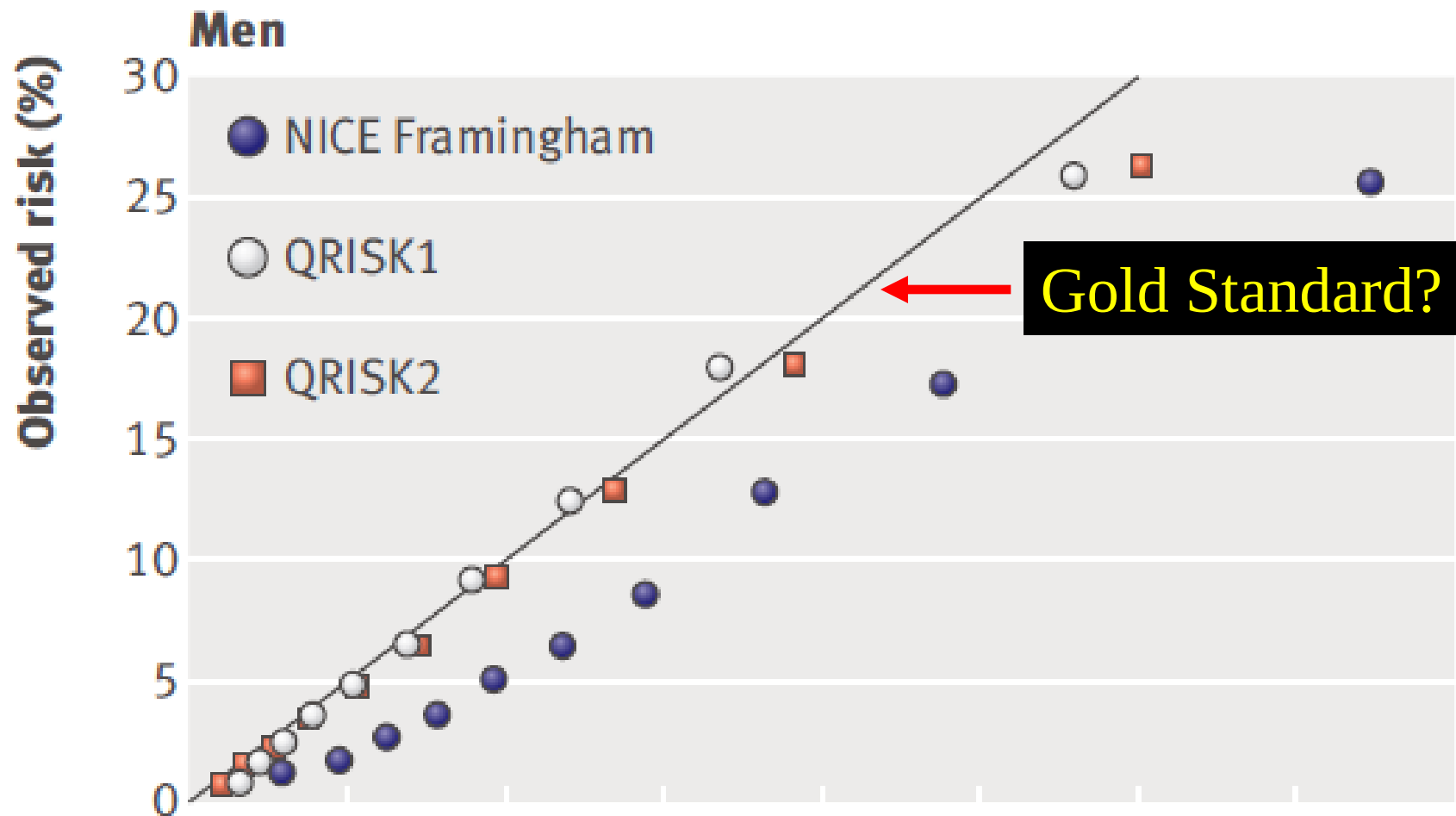
QRISK 2 Study (UKs PREDICT)

Collins & Altman BMJ 2009

- Median FU 6.2 years, 9.4 million person years
 - 80% records not complete
- 71,465 CVS endpoints
- 10 Year observed CVS events:
 - 9% in men
 - 6% in women
- QRISK 2 more accurate than:
 - Framingham, NICE, QRISK 1

QRISK 2 UK CVS Prediction

BMJ 2009



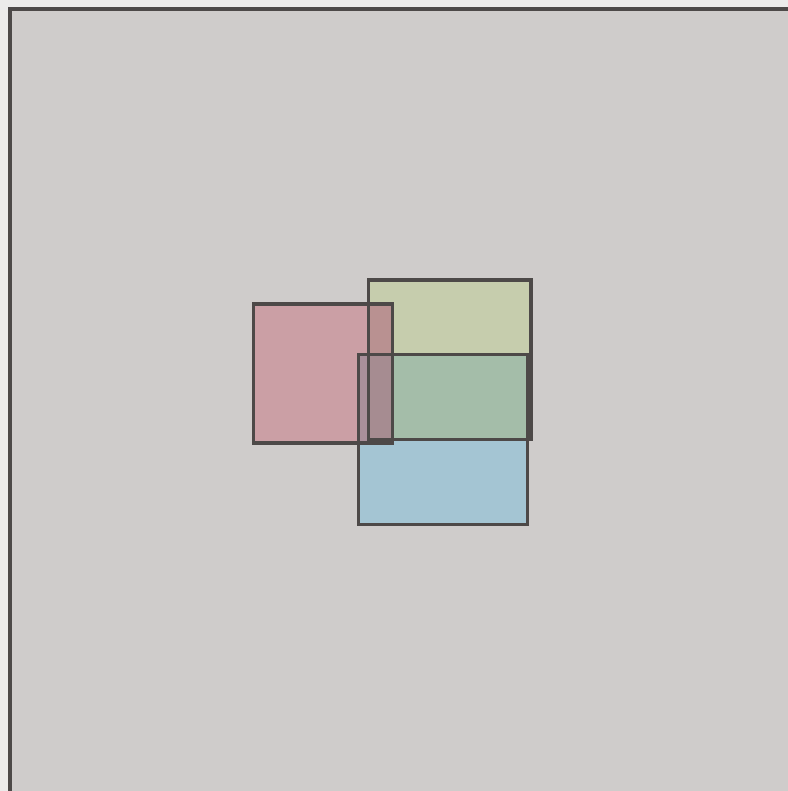
QRISK or Framingham for predicting cardiovascular risk?

QRISK is better on every performance measure, and should be recommended in the UK

Jackson R et al. BMJ 2009 (Editorial on QRISK)

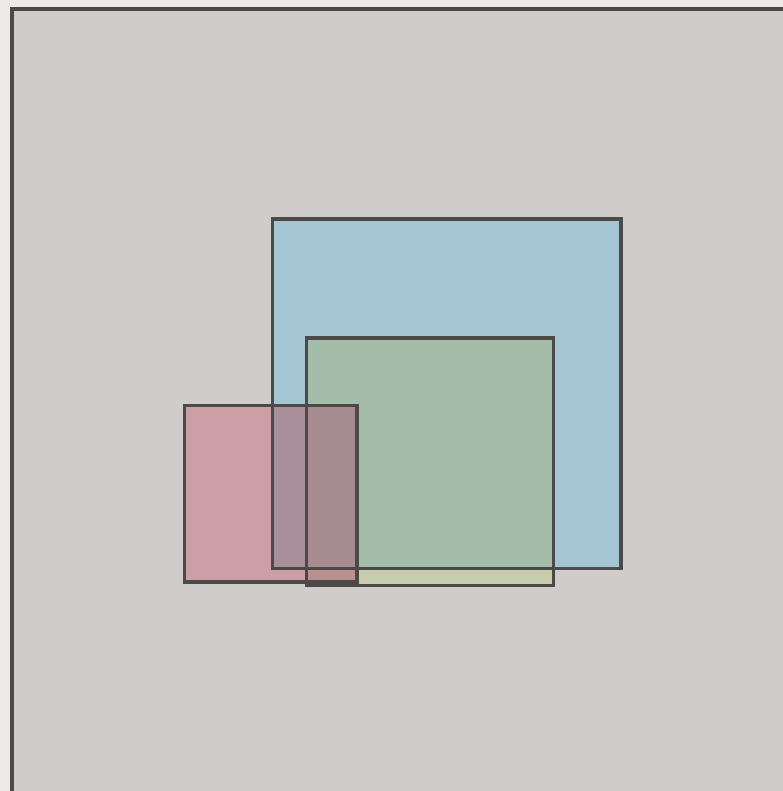
- QRISK calculated 10% of men at baseline as ‘high risk’
 - Qualified for statin treatment (NICE UK Guidelines)
 - But only 30% of subsequent CVS events were predicted
 - 70% of CVS events were missed
- Framingham calculated 20% of men at baseline as ‘high risk’
 - 50% of CVS events were missed
- “But a closer look at the Collins & Altman evaluation provides a sobering message about the current state of CVS risk prediction”

Women



All women
Develop cardiovascular disease

Men

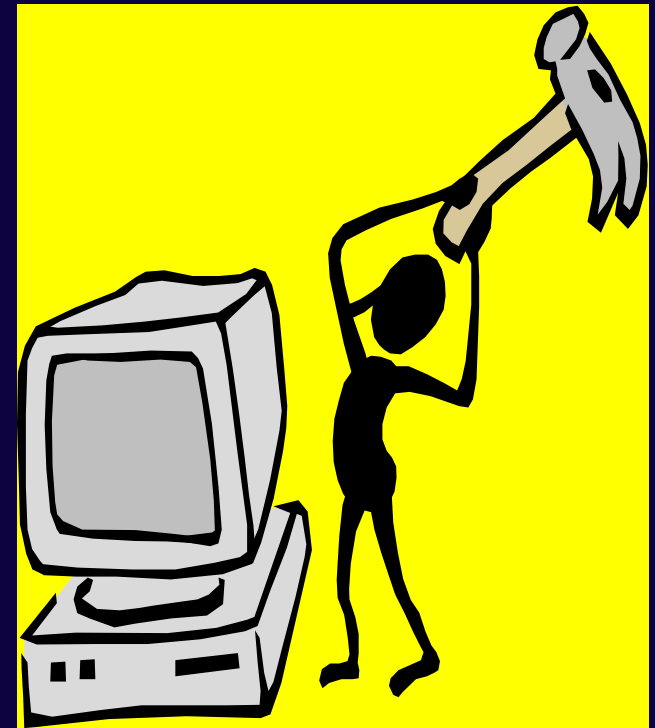


QRISK high risk
Framingham high risk

Jackson R et al. BMJ 2009 (Editorial on QRISK)

Unfortunately the PREDICT CVS Risk Assessment Programme is Flawed in Design

- Even the best Epidemiological models of CVS risk assessment are very inaccurate
- NZ PREDICT may be useful
 - Fundamentally flawed in design
 - Especially relying on weak endpoints to drive the study
- It may (or may not) be an improvement.....we hope it is



Background: Are We Surprised that
Epidemiological Studies Struggle to Accurately
Detect CVS Risk for Individuals in New Zealand?



Illogical Process?

In Other Areas of Medicine, we '*Look for Disease*'

- Breast Cancer: Mammogram
- Colon Cancer: Colonoscopy

BUT

- Coronary Artery Disease: 'Coloured Charts' or Equations of Risk Factors?

What happens if we '*Look for Disease*' in Coronary Artery Disease?

- Calcium Scoring

Calcified Coronary Arteries

- Intuitive for CVS Risk
 - *Look for disease*
 - Concept used elsewhere
- Calcified Atherosclerosis
 - The ‘End Product’ of all CVS risk factors [known or unknown]
- *The extent of coronary atherosclerosis:*
 - The strongest predictor of CVS events

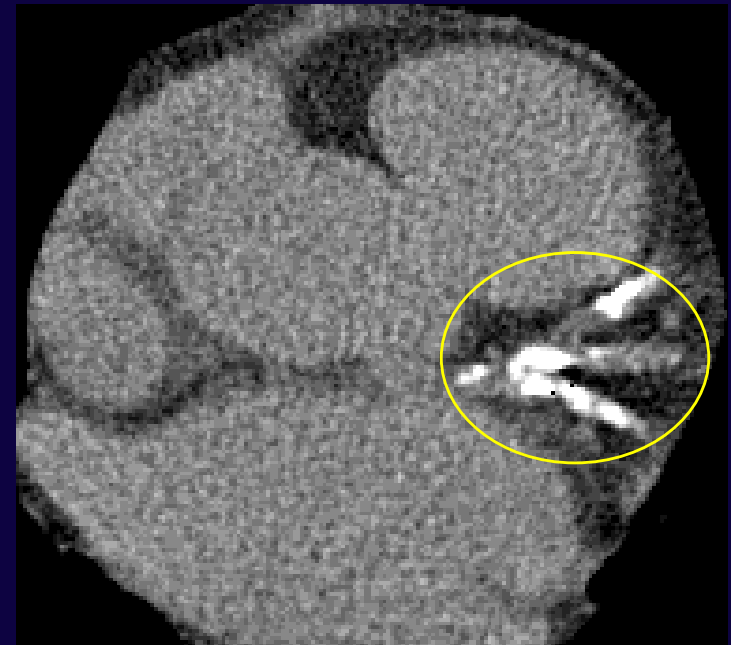


“Could Coronary Calcium Scoring: be
the Logical Way to Assess CVS Risk?”

Beware!: CT Coronary Calcium Scoring is
challenging the established
[and entrenched?]
Epidemiological concepts of CVS risk
assessment

What is a CT Calcium Score Test?

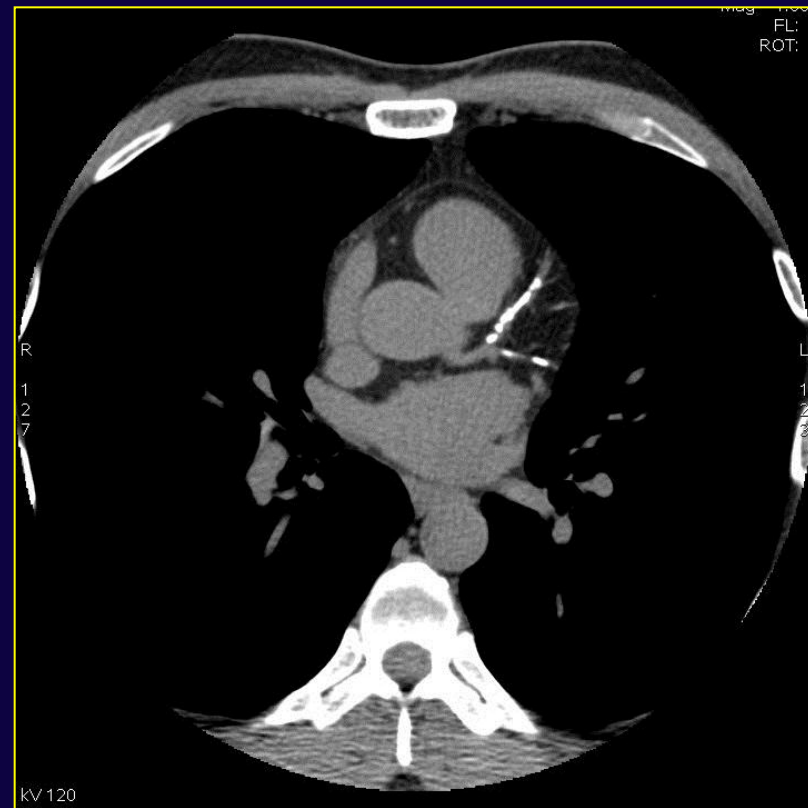
- X-Ray ‘slices’ of the heart
- 3mm Intervals
- About 50 cardiac slices per scan
- Computer-assisted algorithm
- Score relates to volume and density of calcium in the coronary arteries
- “Agatston” Units



Images from a CT Calcium Score Test



No calcium



Heavy calcium

GE MEDICAL SYSTEMS
LightSpeed VCT
Ex:
Se: 2
Im: 1
SN 1100.00 Ax
DFOV 25.0cm
STND

A 133

TS1
M46Y
AW148002216.937.1305529664
Mar 08 2010
02:40:45 PM
SEGM512 X512

Mag = 1.00
FL:
ROT:

R
1
0
8

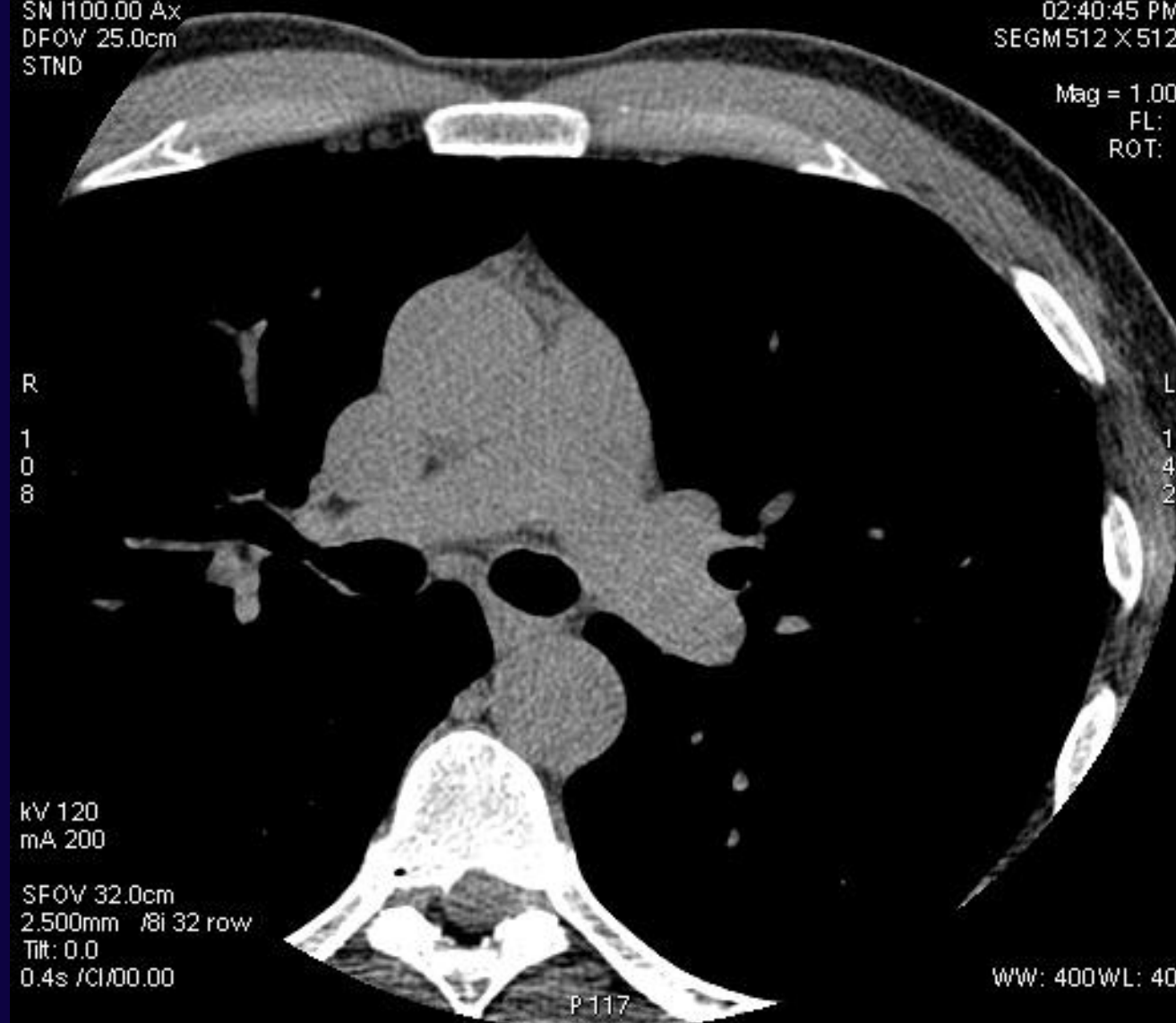
L
1
4
2

kV 120
mA 200

SFOV 32.0cm
2.500mm /8i 32 row
Tilt: 0.0
0.4s /CI/00.00

WW: 400WL: 40

P 117



GE MEDICAL SYSTEMS
LightSpeed VCT
Ex:
Se: 2
Im: 1
SN I54.75 Ax
DFOV 25.0cm
STND

A 125

VS
M48Y
AW1700651958.994.1305536230
Mar 07 2011
02:56:32 PM
SEGM512 X 512

Mag = 1.00
FL:
ROT:

R
1
2
7

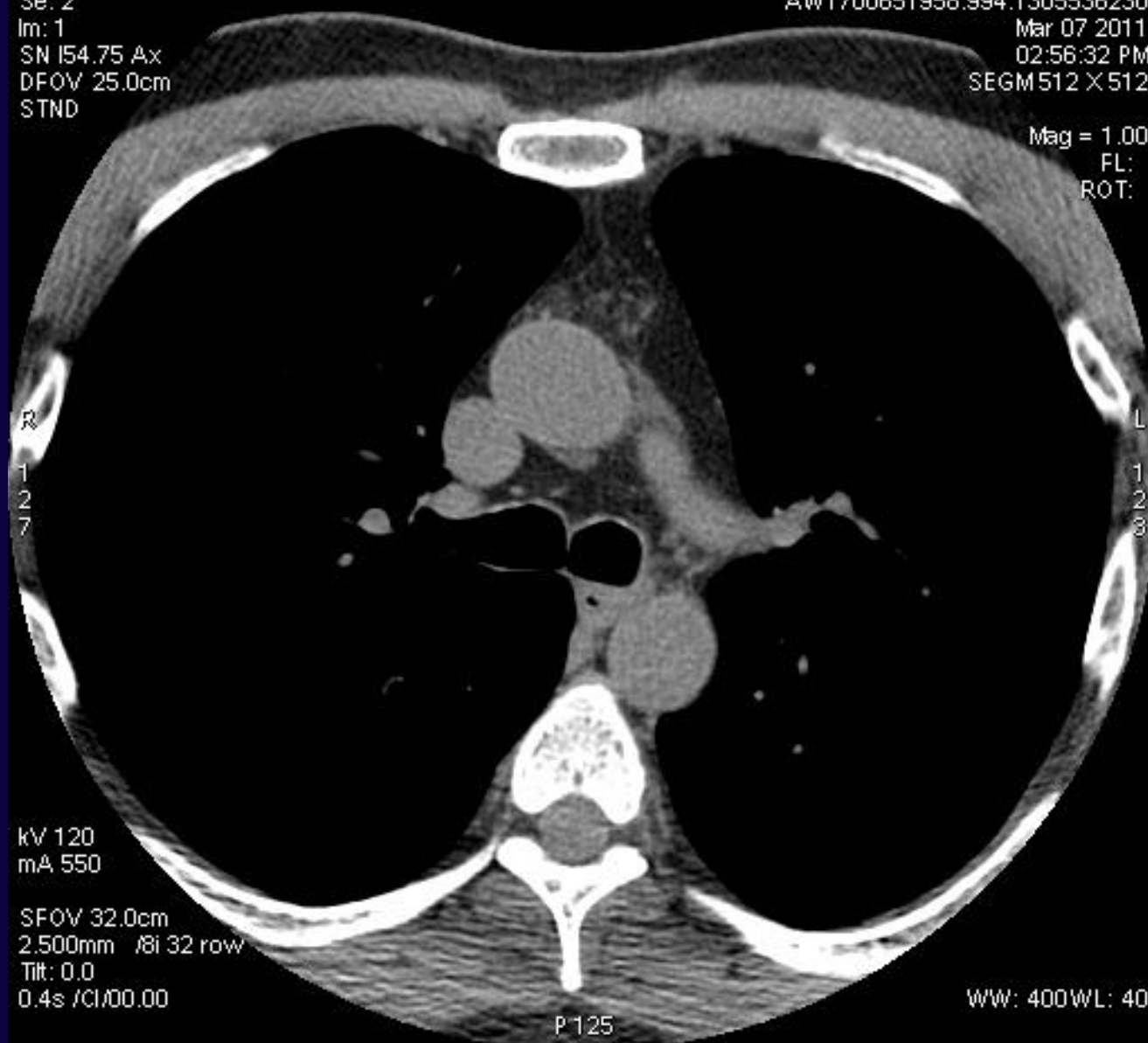
L
1
2
3

kV 120
mA 550

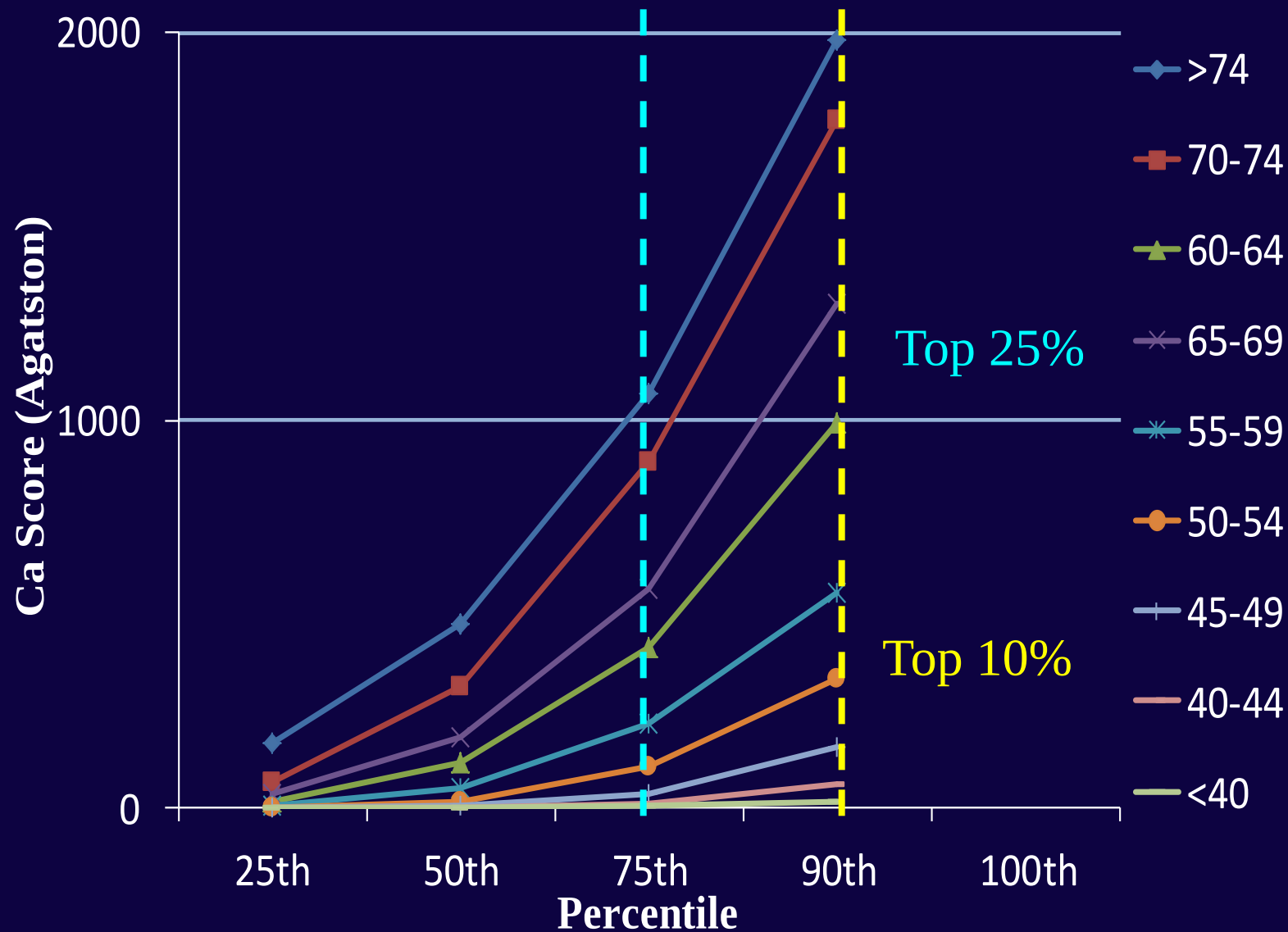
SFOV 32.0cm
2.500mm /8i 32 row/
Tilt: 0.0
0.4s /CI/00.00

P 125

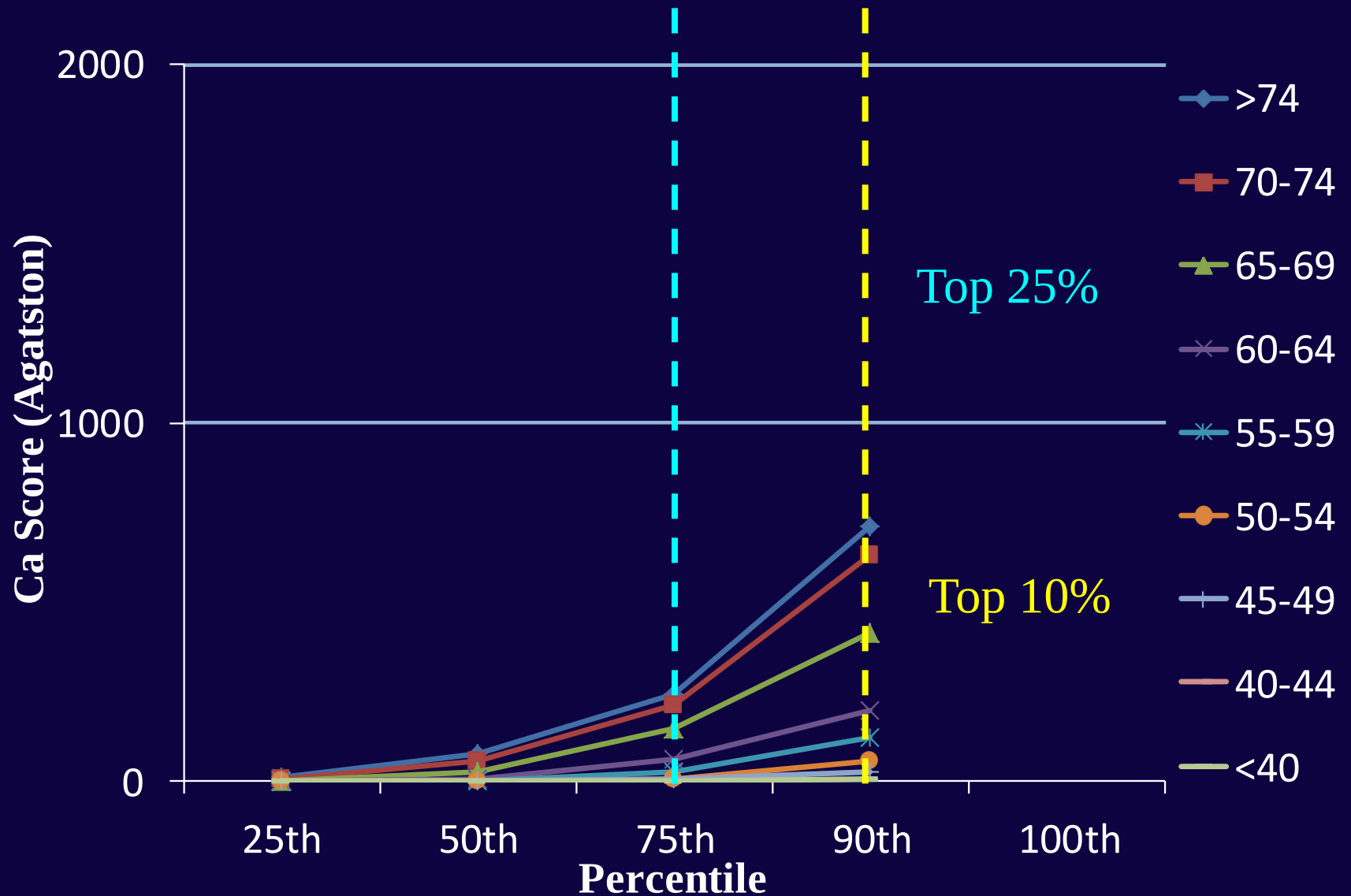
WW: 400WL: 40



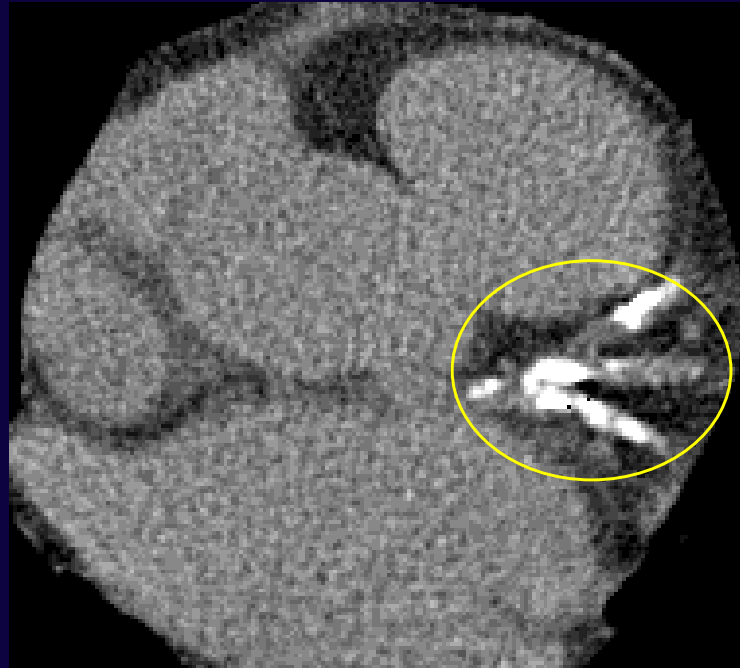
Coronary Ca Score: Males



Coronary Ca Score: Females



What is the Science to show that Calcium Scores Predict CVS Risk?



St Francis Heart Study [of 4,613 Asymptomatic People]

Arad et al. JACC 2005;46: 158-65, 166-72.

A Coronary Calcium Score of ≥ 100 Agatston units

- x 10 times increase risk of a CVS events

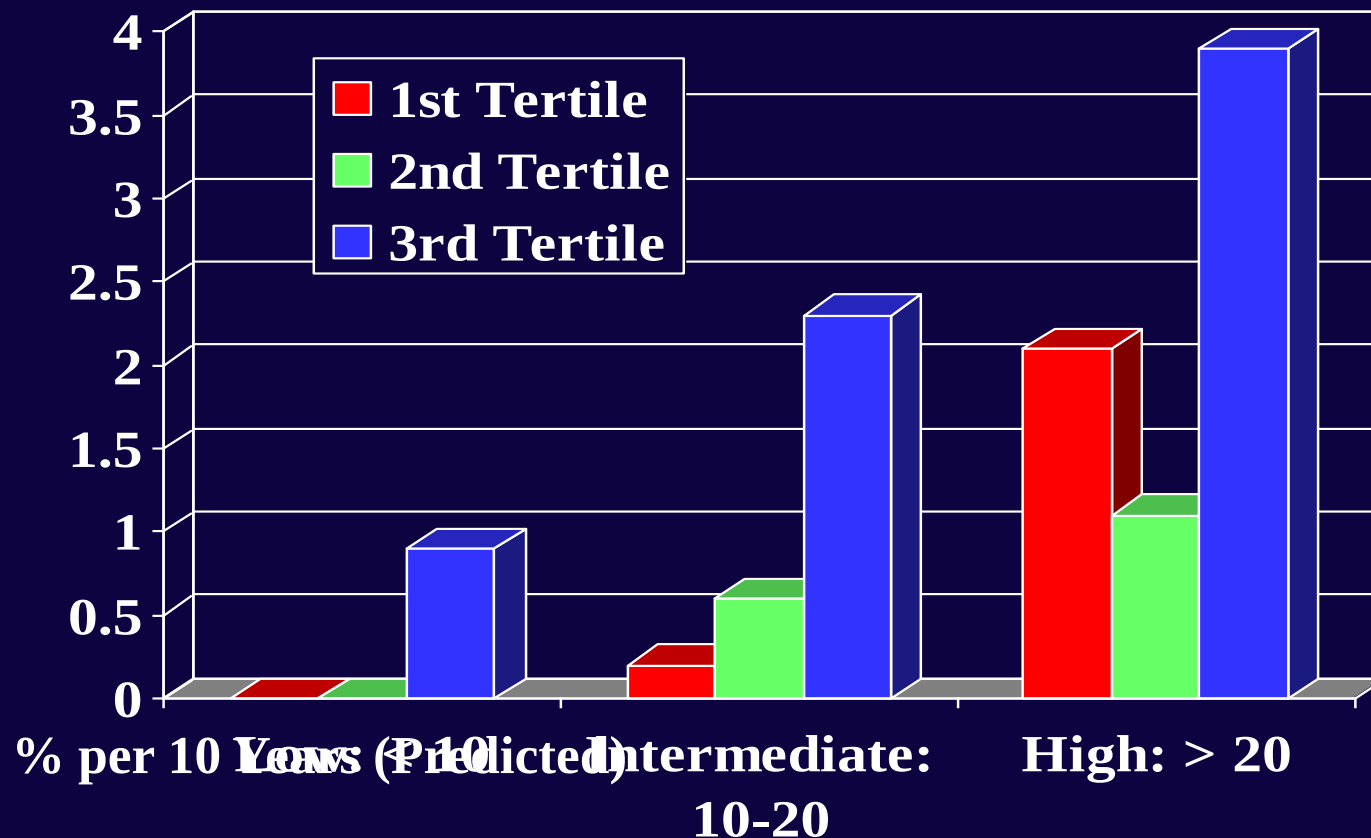
The Coronary Calcium Score

- Was superior to the Framingham Risk Equation
(Receiver-operator curve 0.79 ± 0.03 vs 0.69 ± 0.03 ,
 $p=0.0006$)
- Enhanced stratification of Framingham Risk
categories, low, intermediate, high risk ($p<0.0001$)

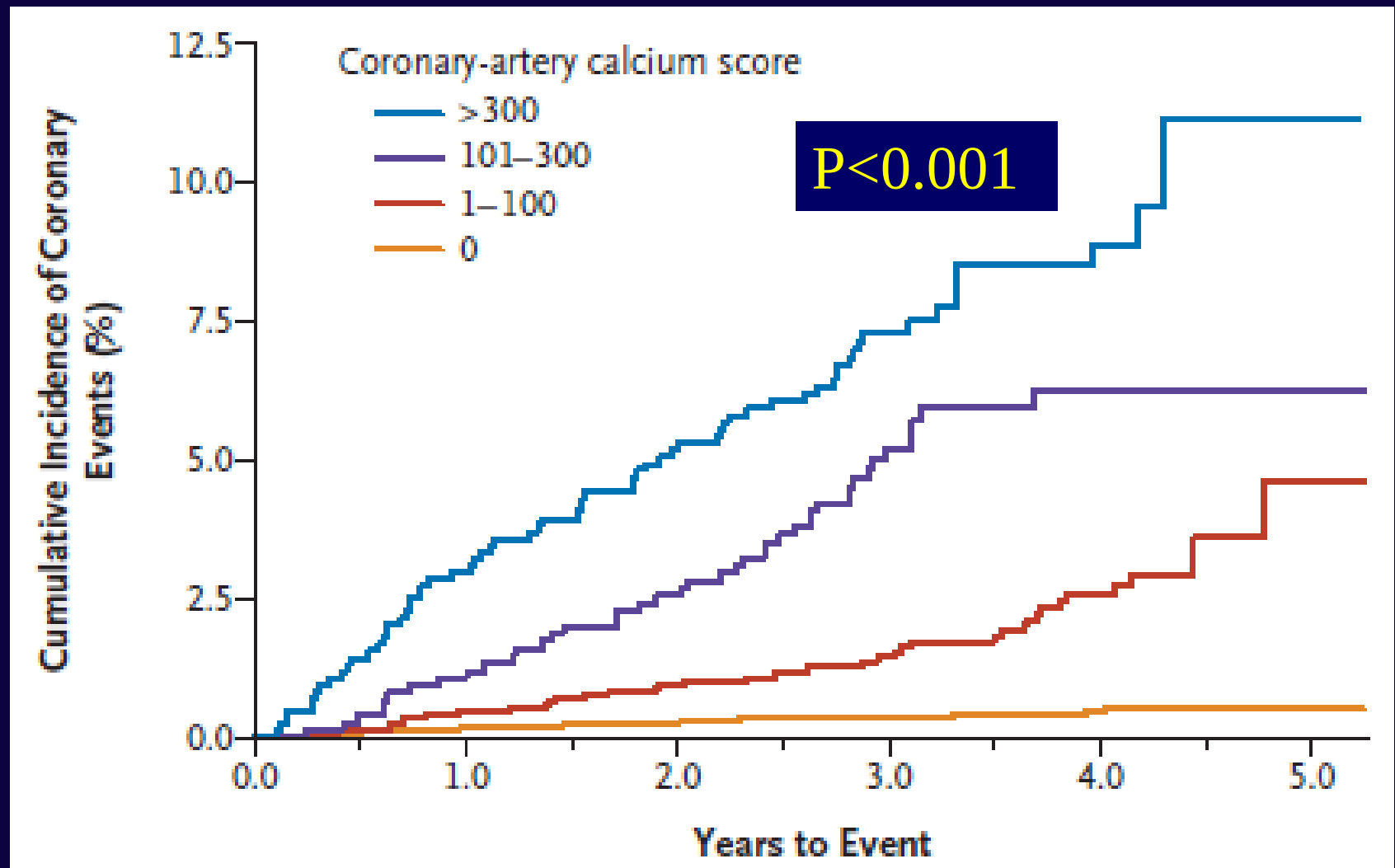
St Francis Heart Study: Coronary Event Rates as a function of Calcium Score within Framingham Risk Groups

Arad JACC 2005;46:158-65

% per year (CVS Events)



Calcium Score & Any Coronary Events: MESA Study NEJM 2008;358:1336-45



THE NEW ZEALAND MEDICAL JOURNAL

Journal of the New Zealand Medical Association



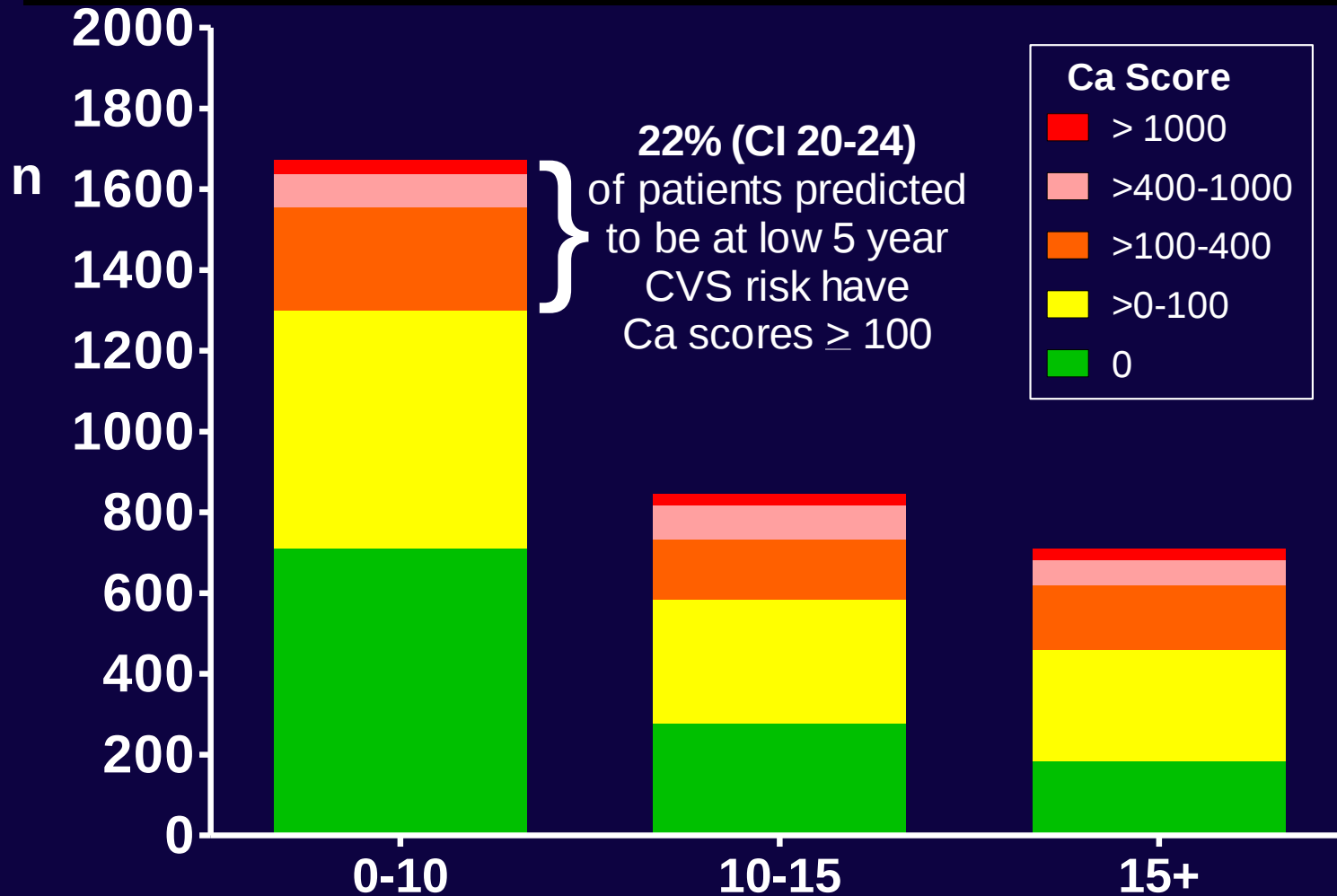
High calcium scores in patients with a low Framingham risk of cardiovascular (CVS) disease: implications for more accurate CVS risk assessment in New Zealand

Chris J Ellis, Malcolm E Legget, Colin Edwards, Niels Van Pelt, John A Ormiston,
Jonathan Christiansen, Helen Winch, Mark Osborne, Greg Gamble

NZMJ 27 May 2011, Vol 124 No 1335; ISSN 1175 8716

URL: <http://www.nzma.org.nz/journal/124-1335/4676/>

Results: Agatston Calcium Score by Band of 5-Year CVS Risk Estimated by the NZ Guidelines Group 2009 'Adjusted' (Anderson) Framingham Equation



N=3477 pts

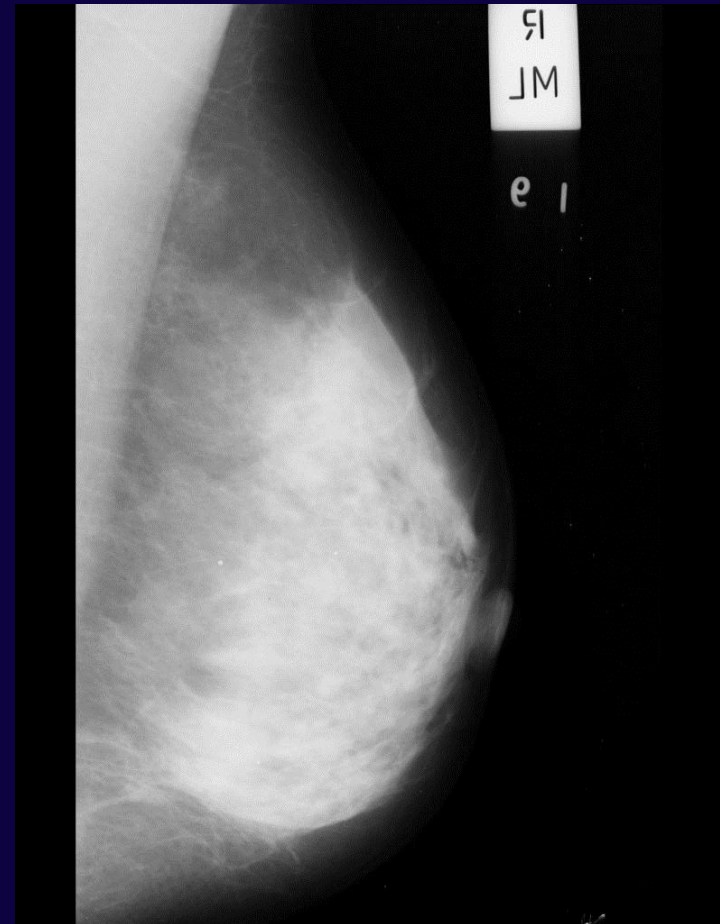
Framingham CVS 5 Year Risk Estimate %
(Incorporating 2009 NZGG Adjustments)

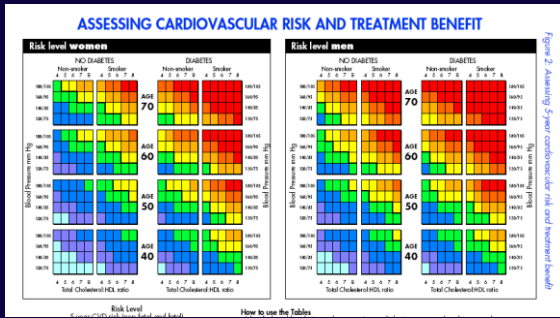
The Radiation Dose of a CT Calcium Score is Reasonable as a Screening Test

Calcium Score (Alone)

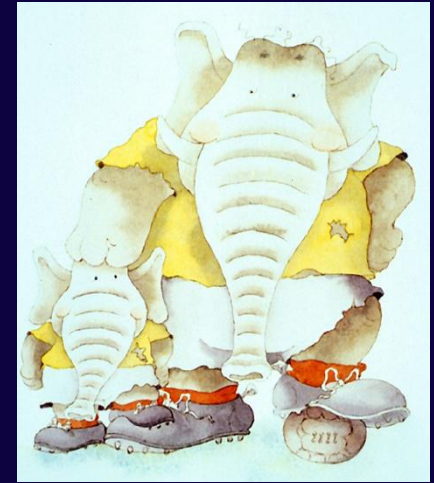
~ 1 mSv: Same
as a Mammogram

Background Radiation
dose in NZ is 3 mSv/year





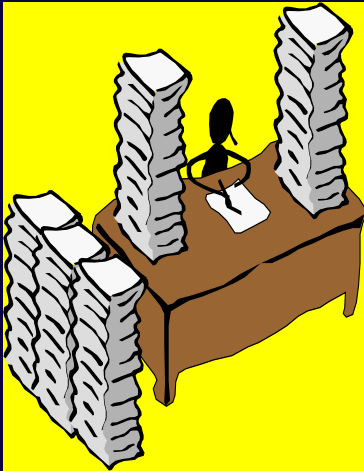
NB: A Calcium Score is MORE Predictive of CVS Risk than the Framingham Equation



Framingham-Based:
5 or 10-Year Risk &
“Lifetime-Risk”

CVS Risk Assessment

Family History

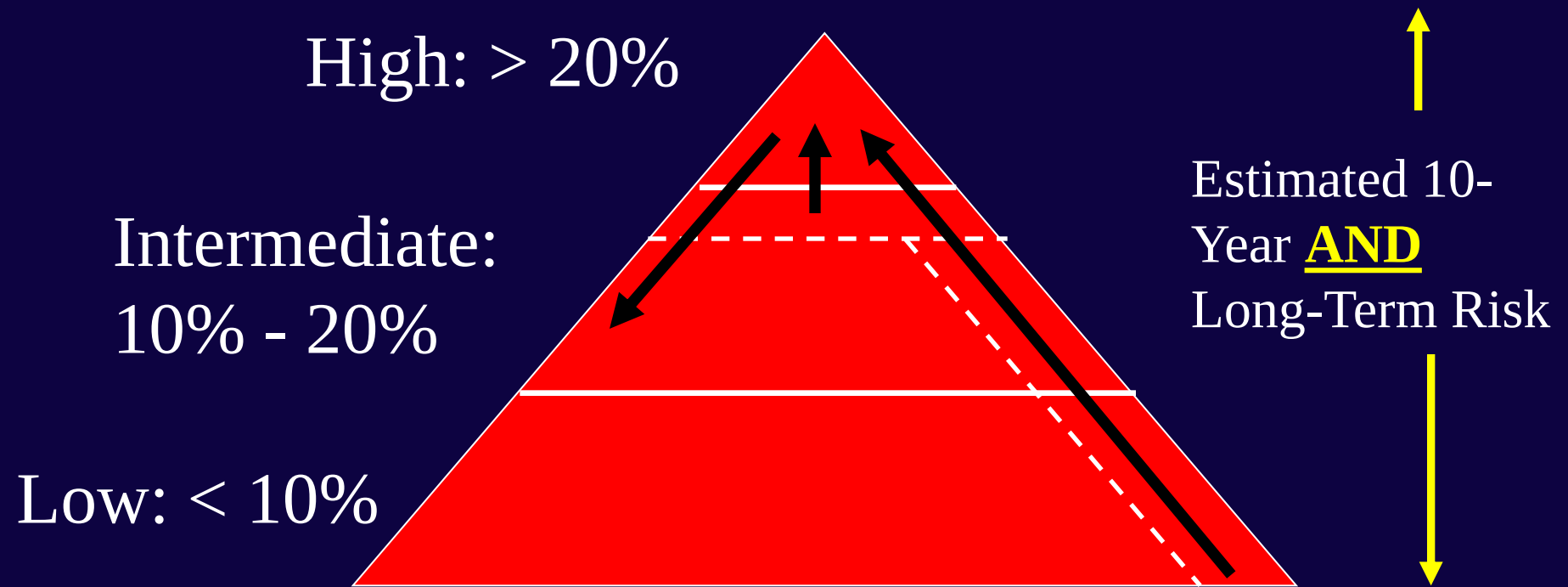


“Modern Risk Factors”



Calcium Scoring (& CT Angiography)

Potential Identification of more High & Low-Risk Individuals using Calcium Scoring



A Revolutionary Idea!



Professor Les Toop (GP): Presented at the NZ Cardiac Society Annual Meeting

- Focussed on the ‘folly’ of epidemiological absolute risk
 - Highlighted the need to treat more younger pts who were “train-wrecks waiting to happen”
 - Highlighted the need to keep the pt at the centre of the discussion of treatment & risk
- Revolutionary thinking!
- (Too conservative in treatment views for me!)

CVD Risk Prevention in NZ 2013 & Beyond: The Clinicians View – Conclusions (1)

- CVS risk assessment is difficult & inaccurate
 - Clinicians should use all ‘clues’ available
 - Don’t just rely on Epidemiology studies
- The 5-Year risk idea is just ludicrous
 - Suggest you consider a pts ‘lifetime’ risk

CVD Risk Prevention in NZ 2013 & Beyond: The Clinicians View – Conclusions (2)

- Many middle-aged pts would benefit from treatment
 - Generic ACE-Inhibitors & Diuretics are cheap & effective
 - Generic Statins & Aspirin are cheap & effective
 - Strokes & MIs are expensive & disabling for a patient
- Remain a Clinician to your patient
 - Maintain your independent thoughts!
 - Your patient relies on you to look after them

The End
→

