Professor Rod Jackson

Epidemiology

University of Auckland

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

Sunday, 23 June 2013 Start 8:55am Duration: 25mins Baytrust

Goodbye Framingham, hello NZ: new risk scores for 1° care?

Rod Jackson

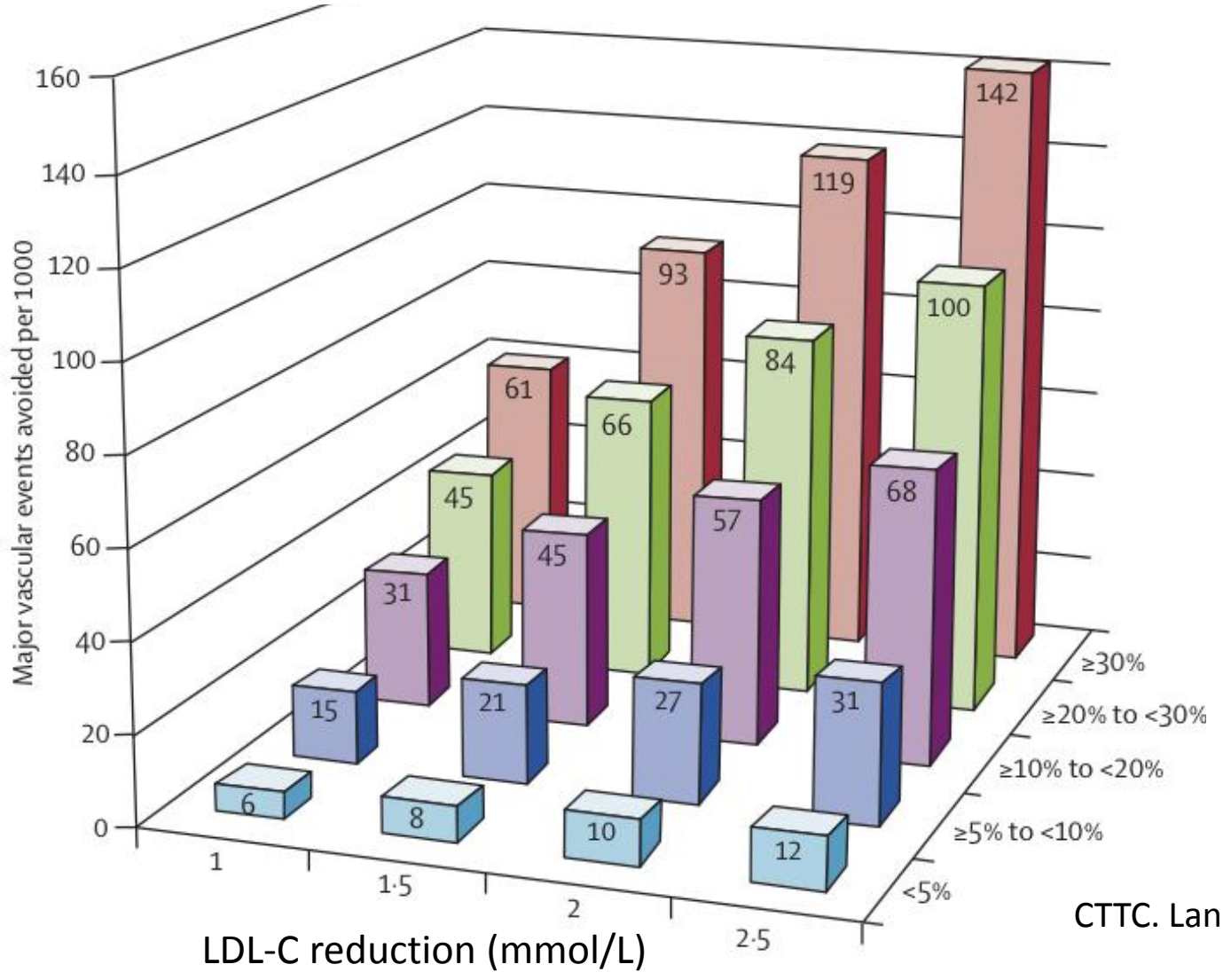
23 June 2013

Presentation outline

- **Rationale** for scoring CVD risk
- **PREDICT: methodology** - using electronic decision support to generate data to develop NZ CVD risk scores
- **PREDICT: baseline data**
- **PREDICT:** old & new risk predictors in the NZ dataset
- **PREDICT: follow-up data - observed** 5 year event versus **predicted** Framingham & NZ-adjusted Framingham 5 year event rates

Predicted benefits of increasing LDL-C reductions with statins by baseline absolute CVD risk:

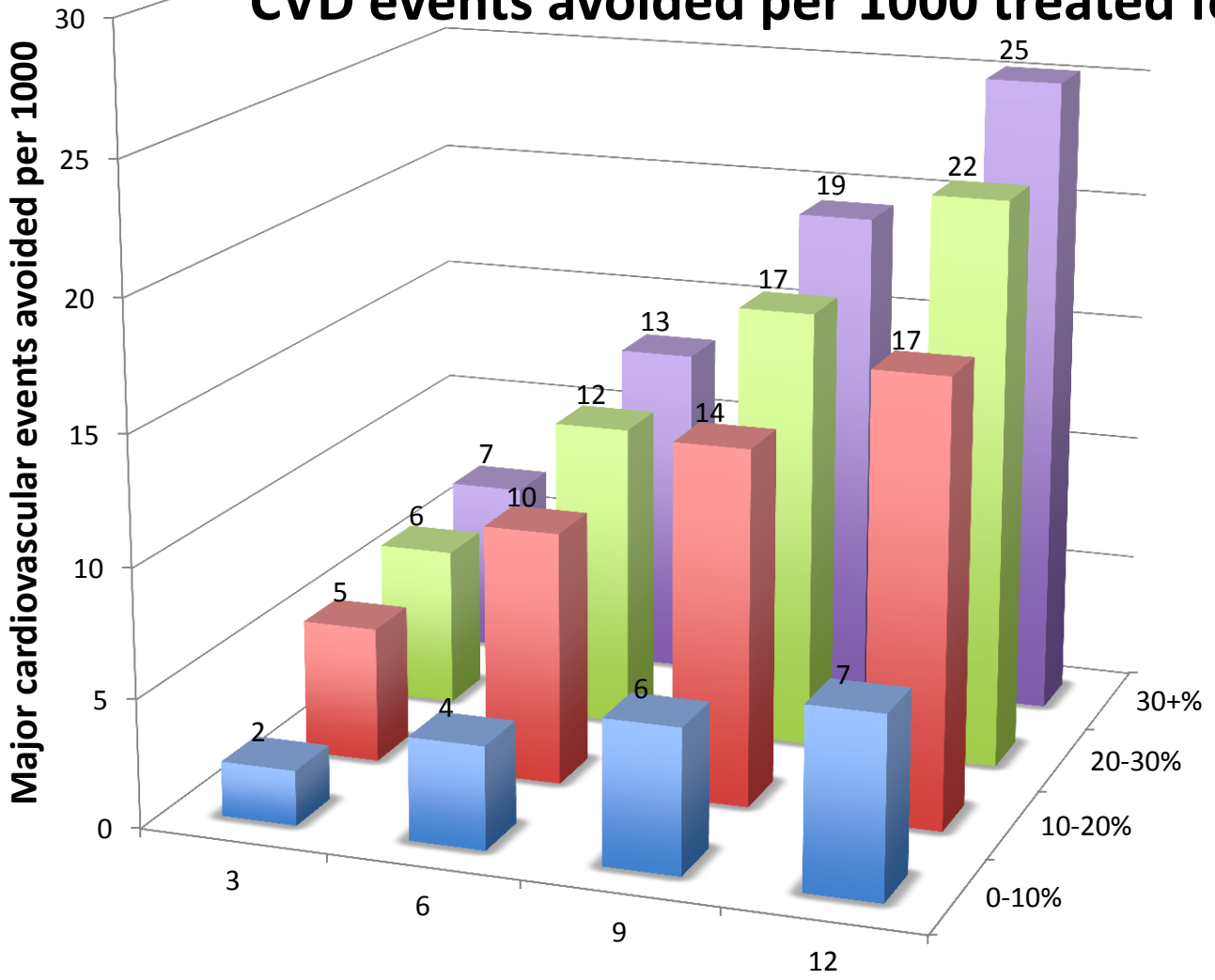
vascular events avoided per 1000 treated for 5 yrs



CTTC. Lancet 2012; 380:581-90

Predicted benefits of increasing SBP reduction with drugs by baseline absolute CVD risk:

CVD events avoided per 1000 treated for 5 yrs

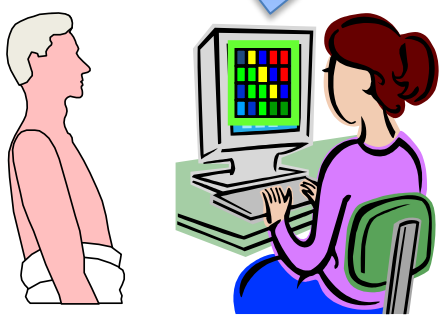


BLTTC unpublished 2013

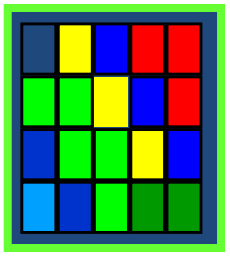
PREDICT: 2002- 2013

Patient population

Electronic medical record



PREDICT: electronic decision support software



NZ-adjusted Framingham HS risk algorithm

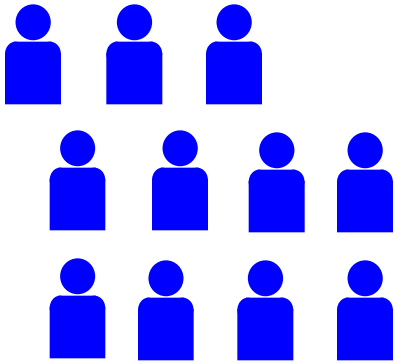
MoH

patient-specific outcomes: hospital admissions, deaths, drugs, labs

PREDICT

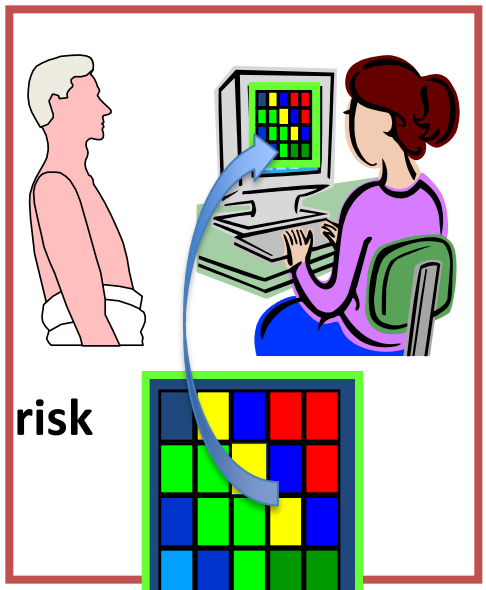
patient-specific CVD risk factor profiles

PREDICT: 2002- 2013



Patient population

Electronic medical record



NZ derived risk algorithm

NZ-adjusted Framingham HS risk algorithm

MoH

PREDICT

patient-specific outcomes: hospital admissions, deaths, drugs, labs

NHI encrypted linkage

patient-specific CVD risk factor profiles

Framingham & NZ-adjusted Framingham predictors for 1°prevention equations

- Age
- Gender
- Smoking
- Diabetes
- SBP
- TC/HDL

- Ethnicity (M, PI, Indo-Asian)*
- Family history premature CVD*
- TC ≥ 8mmol/L OR TC/HDL ≥8*
- BP≥ 170/100 mmHg*
- Type 2 diabetes ≥ 10yr OR with HbA1c ≥ 64mmol/mol OR with microalbuminuria*

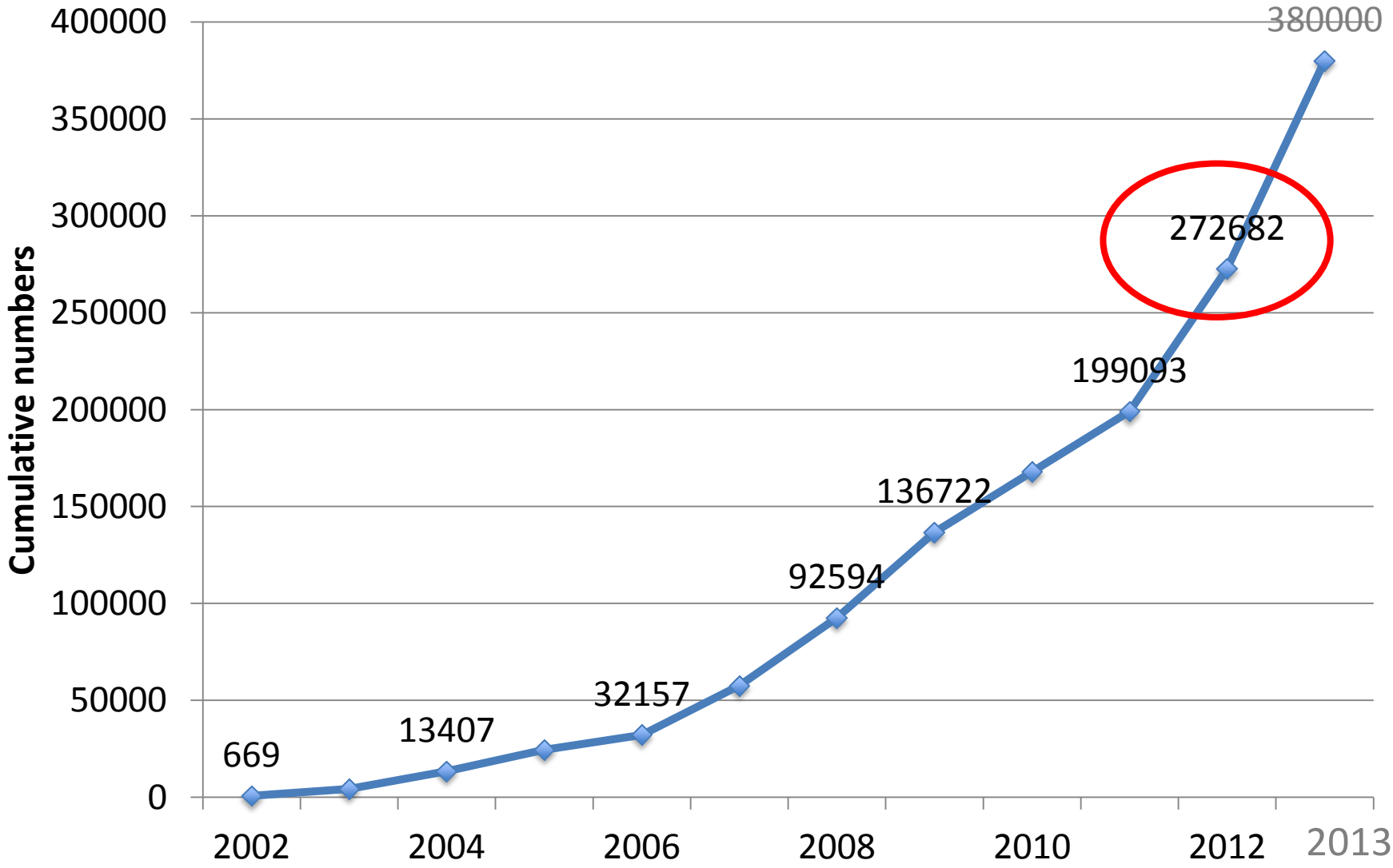
* *once-only 5% added to 5 year risk %*

Outcomes used in PREDICT: ‘all vascular/atherosclerotic CVD’

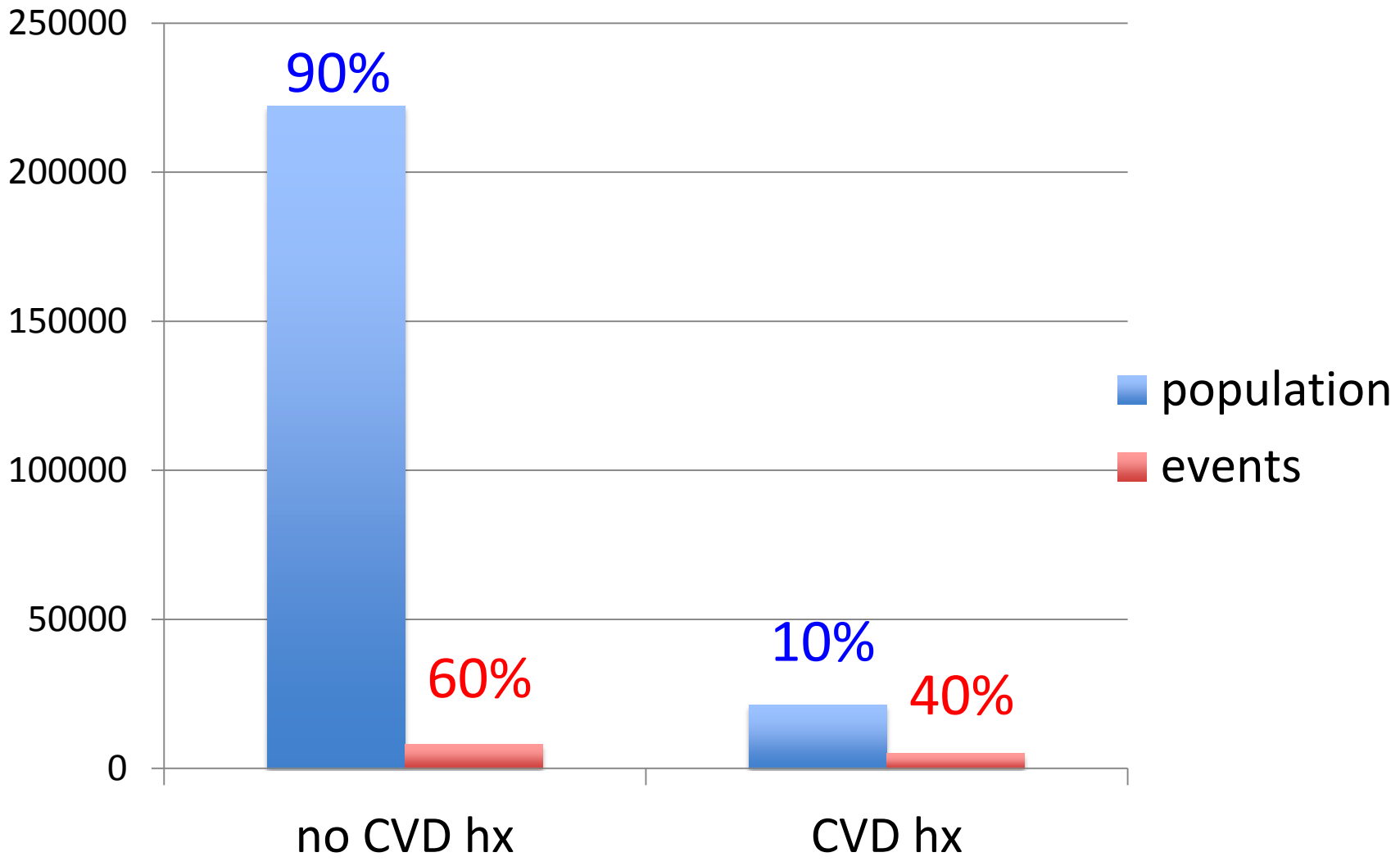
hospitalisations & deaths

- Ischaemic CHD events, including CABG and PCI
- Ischaemic & haemorrhagic cerebrovascular events, including TIAs, excluding trauma
- PVD, including arterial aneurysms & procedures unless specified non-atherosclerotic causes
- CHF and cardiomyopathies unless specified non ischaemic causes

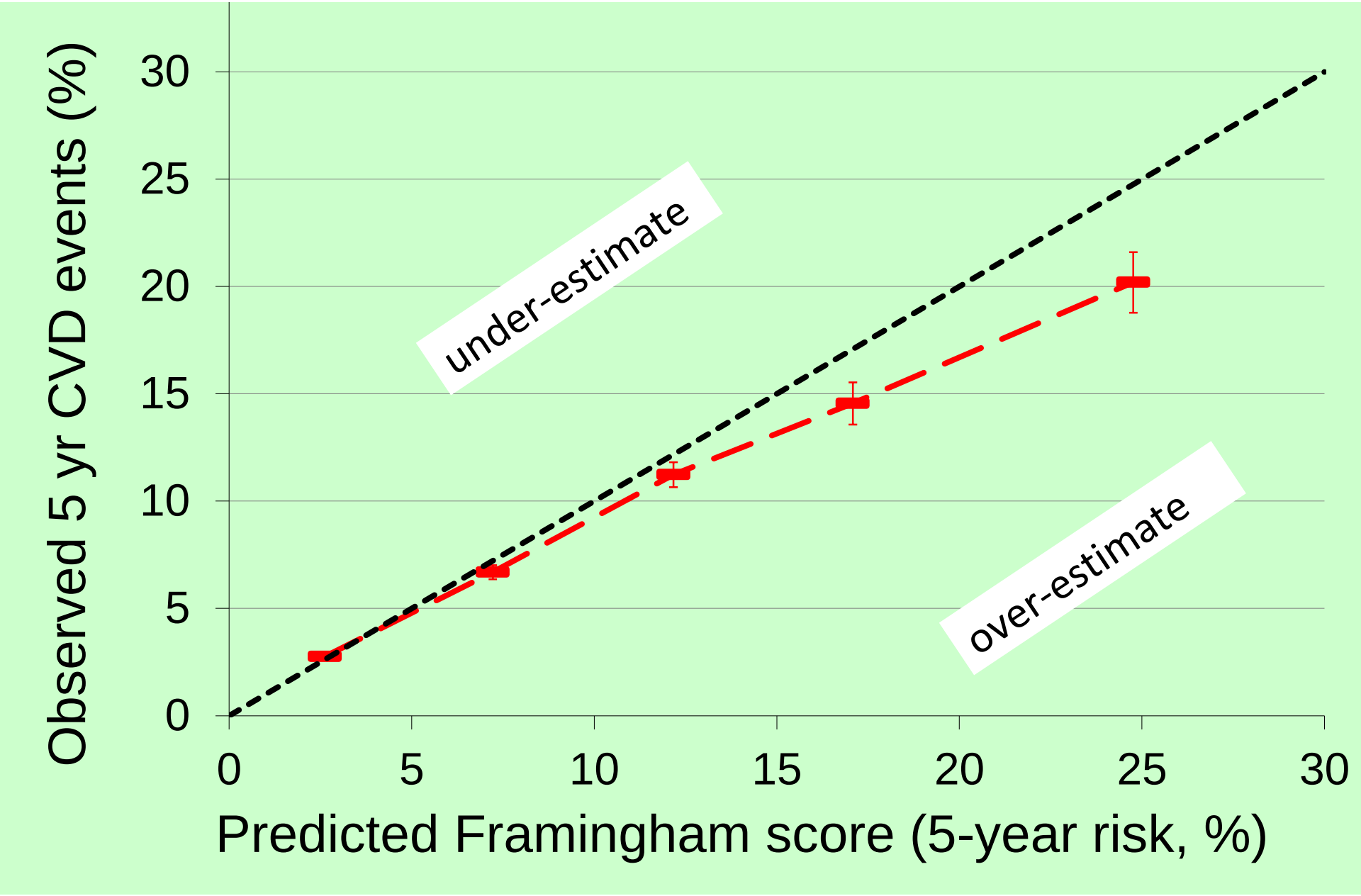
PREDICT recruitment 2002-13



CVD events by history of CVD in PREDICT



observed vs predicted CVD events rates



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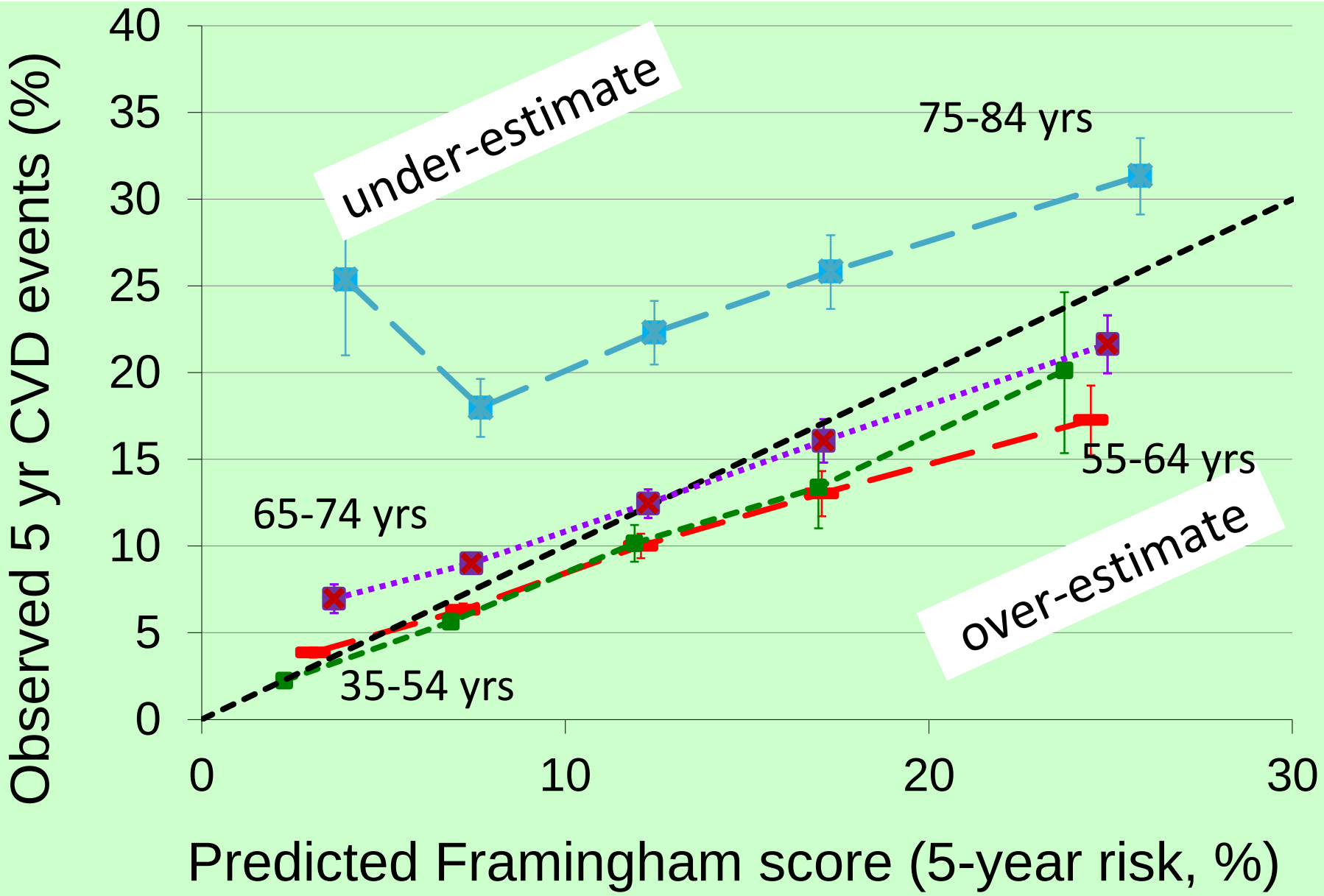
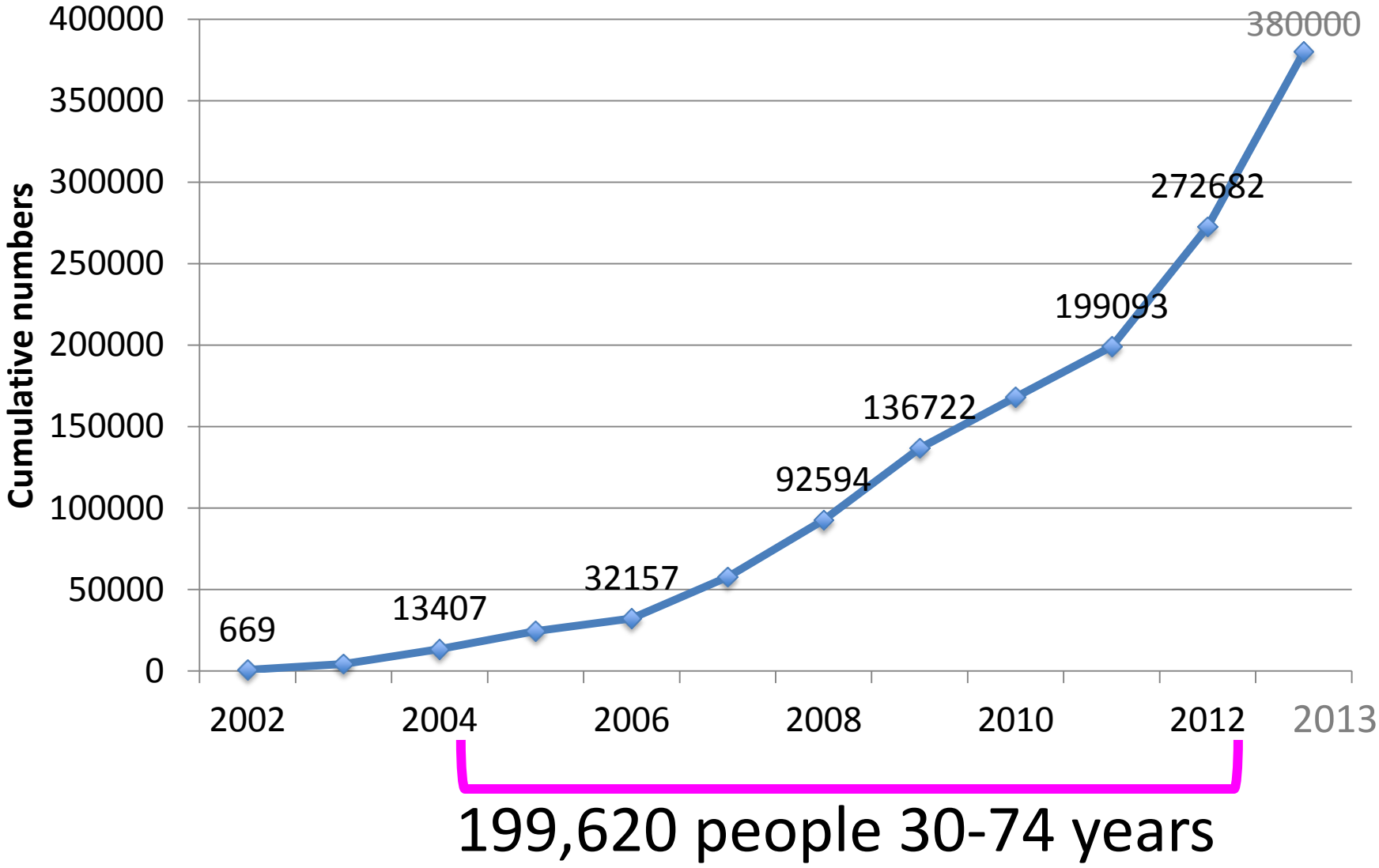


PREDICT recruitment 2004-12/13



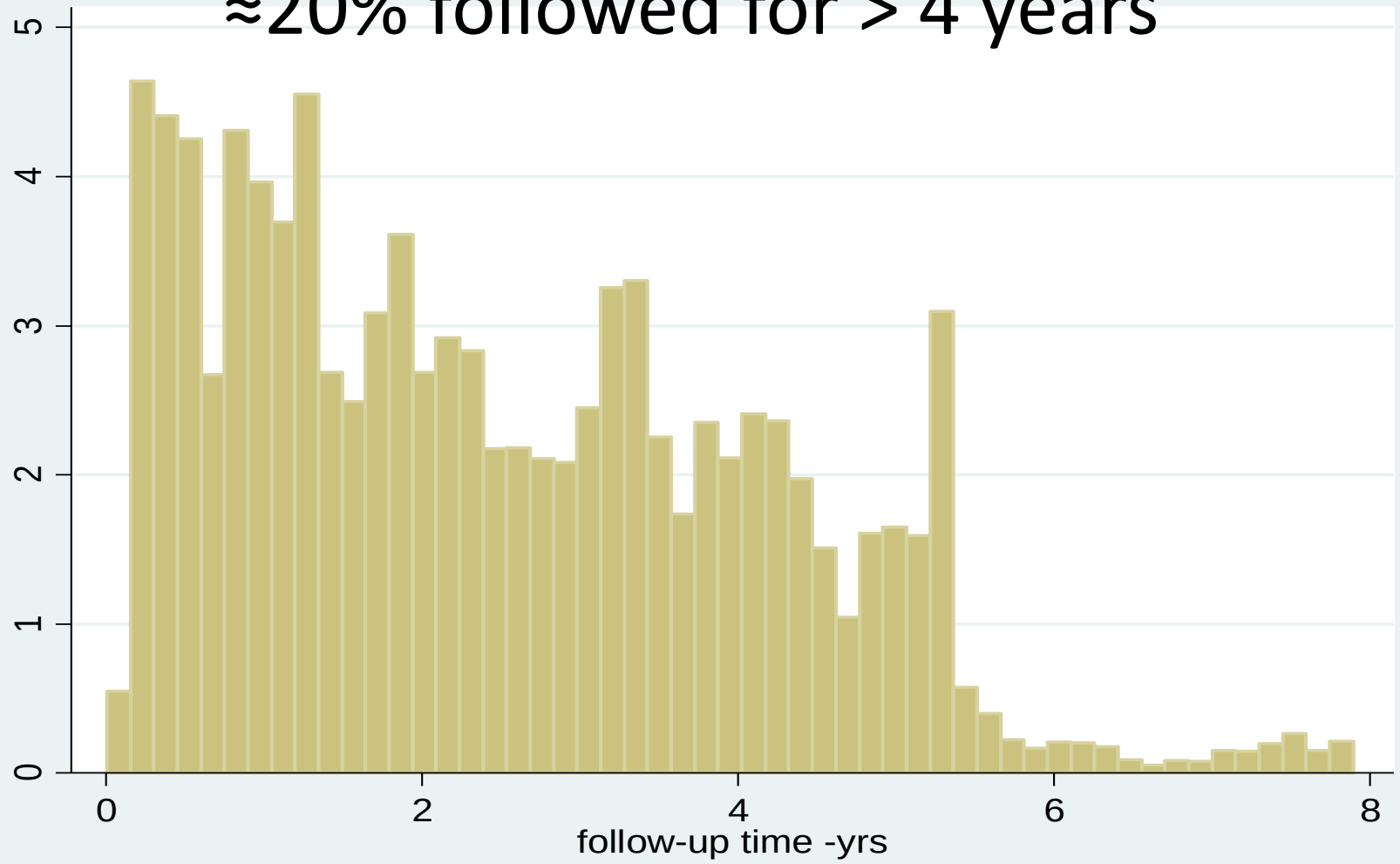
Baseline numbers 2004-2012 (by age, gender, ethnicity, diabetes) ages 30-74 yrs, excluded if previous CVD history, GLD, renal disease

	Men	Women
Total	**110,623**	**88,997**
European	58,290	45,941
Maori	14,784	13,350
Pacific	16,528	13,525
Indian	9,989	7,184
Other Asian	8,690	7,471

Follow-up time (Nov 2004-July 2012)

Mean =2.5 years

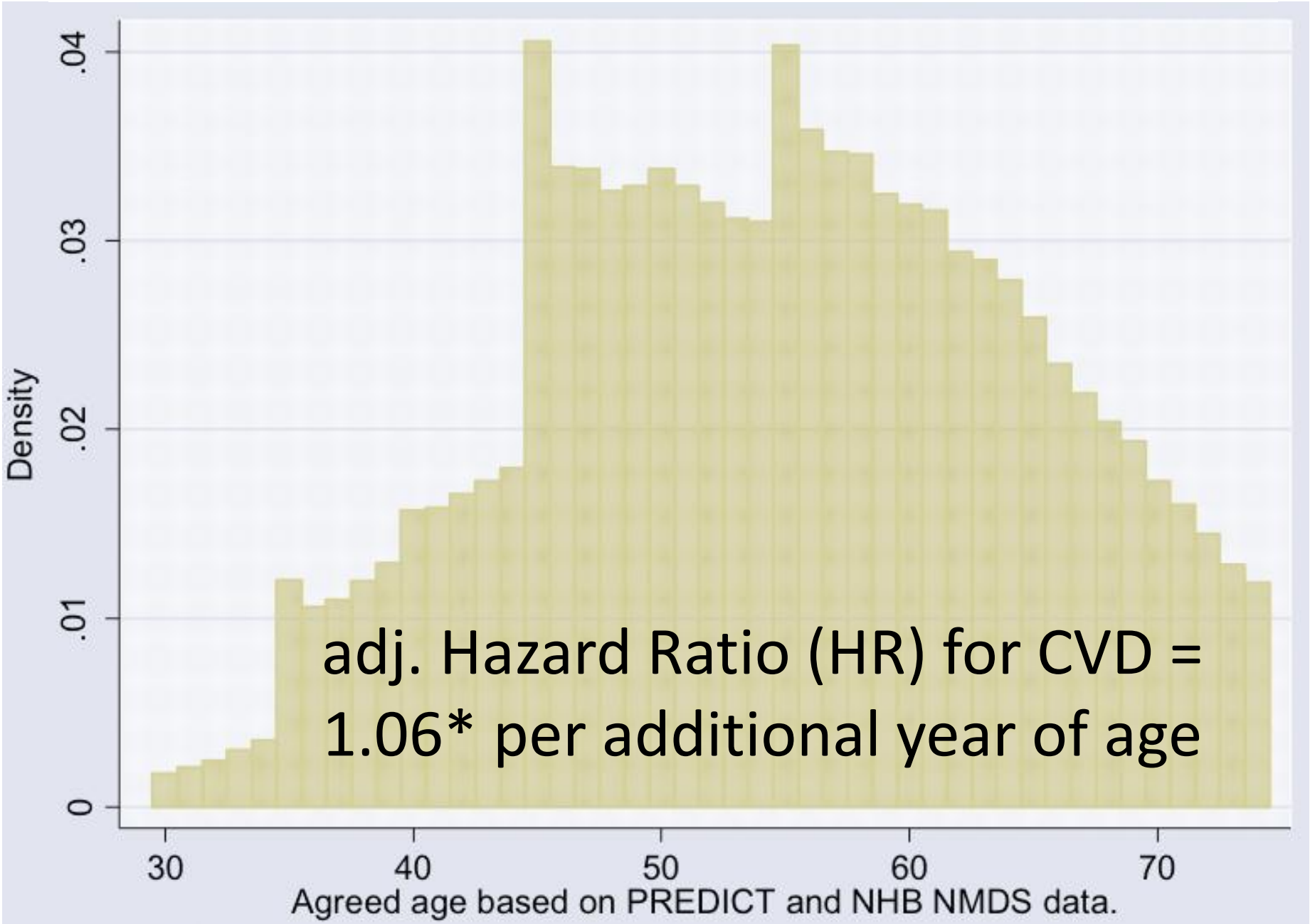
≈20% followed for > 4 years



1st CVD events if no hx CVD 2004-12(population = 199,620, events =6,194)

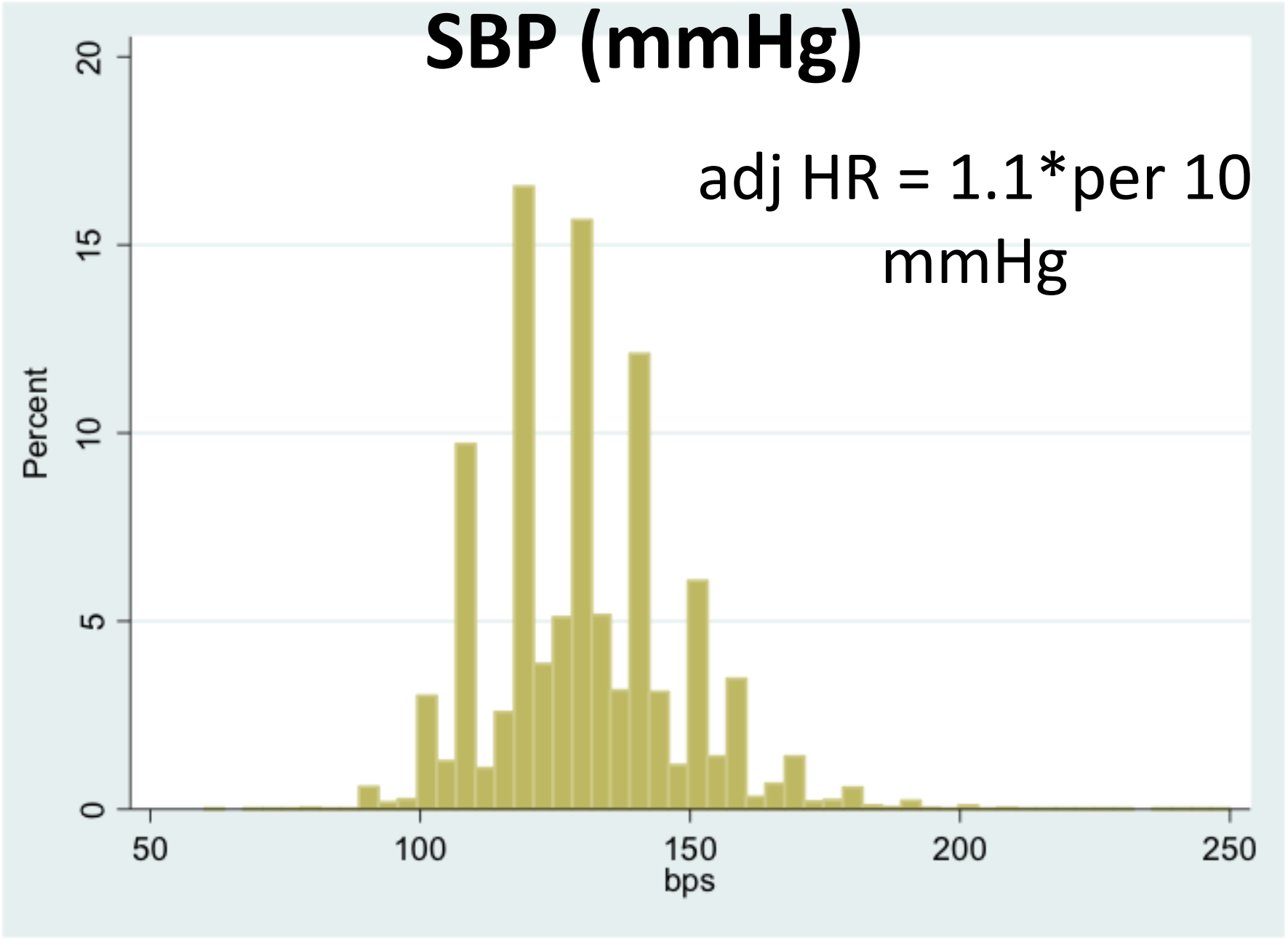
	non fatal	fatal
Total	**5,727 (92%)**	**467 (8%)**
CHD	48%	62%
Stroke / TIA	19%	24%
PVD	6%	4%
CHF	21%	10%
Other CVD	6%	0%

Age distribution 30-74 years

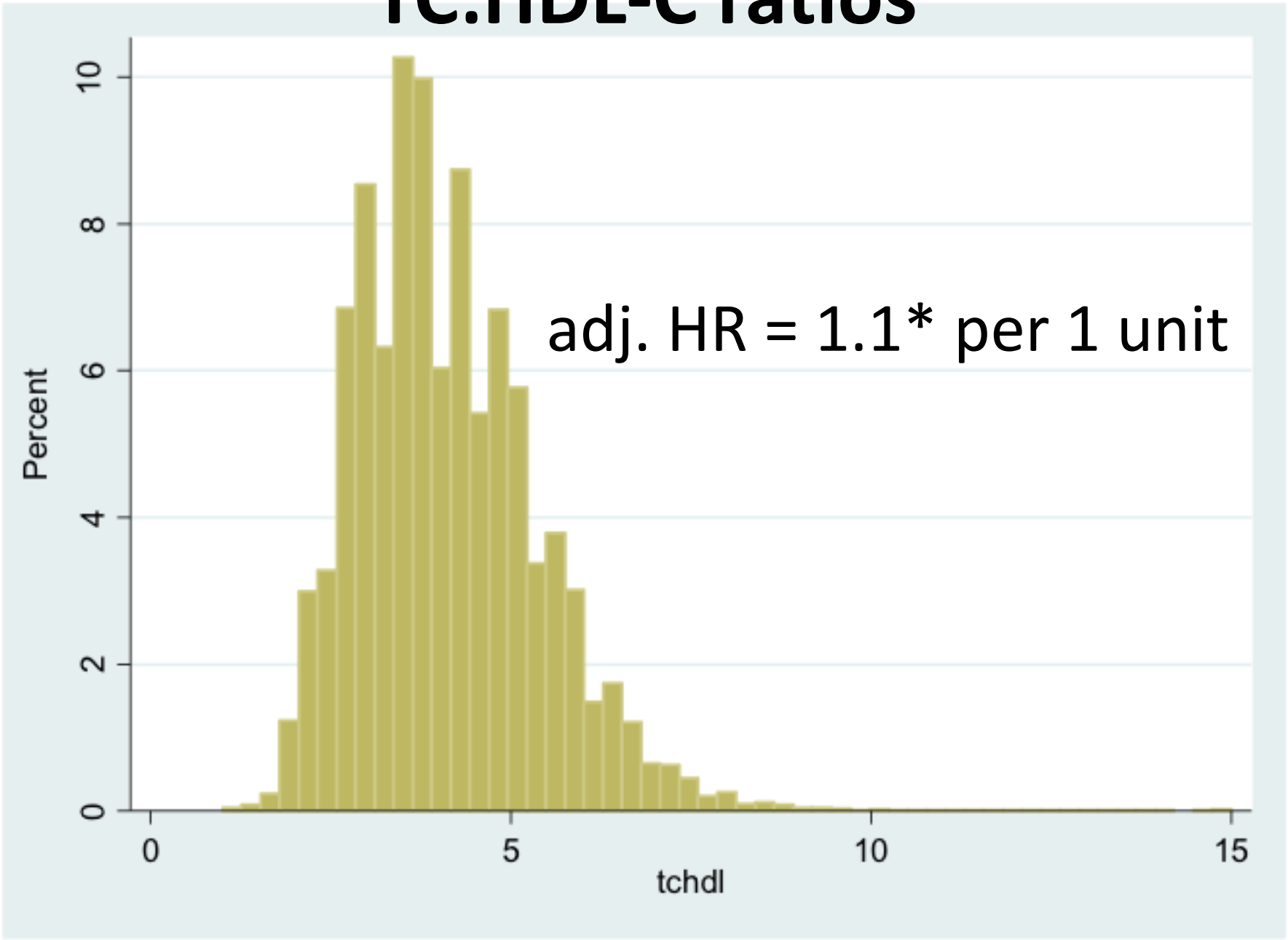


Socio-demographic risk factors	% of cohort	Adjusted HR * p<0.05
Male gender	56%	1.5*
Ethnicity: European	54%	1.0
Maori	13%	1.8*
Pacific	15%	1.6*
Indian	8%	1.5*
other Asian	8%	0.7*
Deprivation: 1	18%	1.0
2	16%	1.2*
3	17%	1.3*
4	20%	1.4*
5	28%	1.6*

SBP (mmHg)

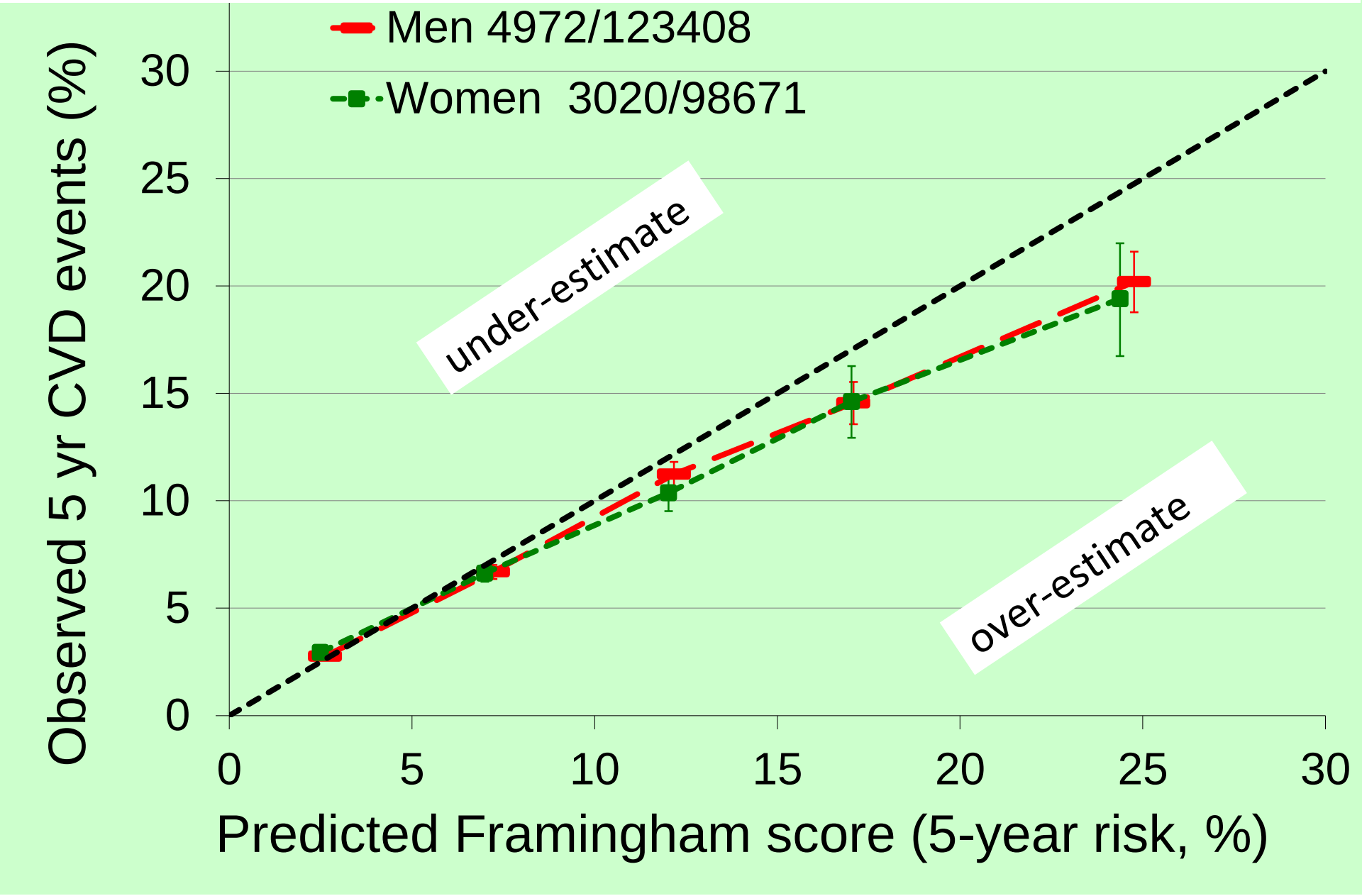


TC:HDL-C ratios



categorical risk factors	Percent of cohort	Adjusted HR
atrial fibrillation	1.5 %	3.5*
family hx	11.5%	1.1
diabetes	16%	1.8*
smoking	16%	1.6*
on BP or lipid lowering Rx at assessment	40%	

observed vs predicted CVD events rates



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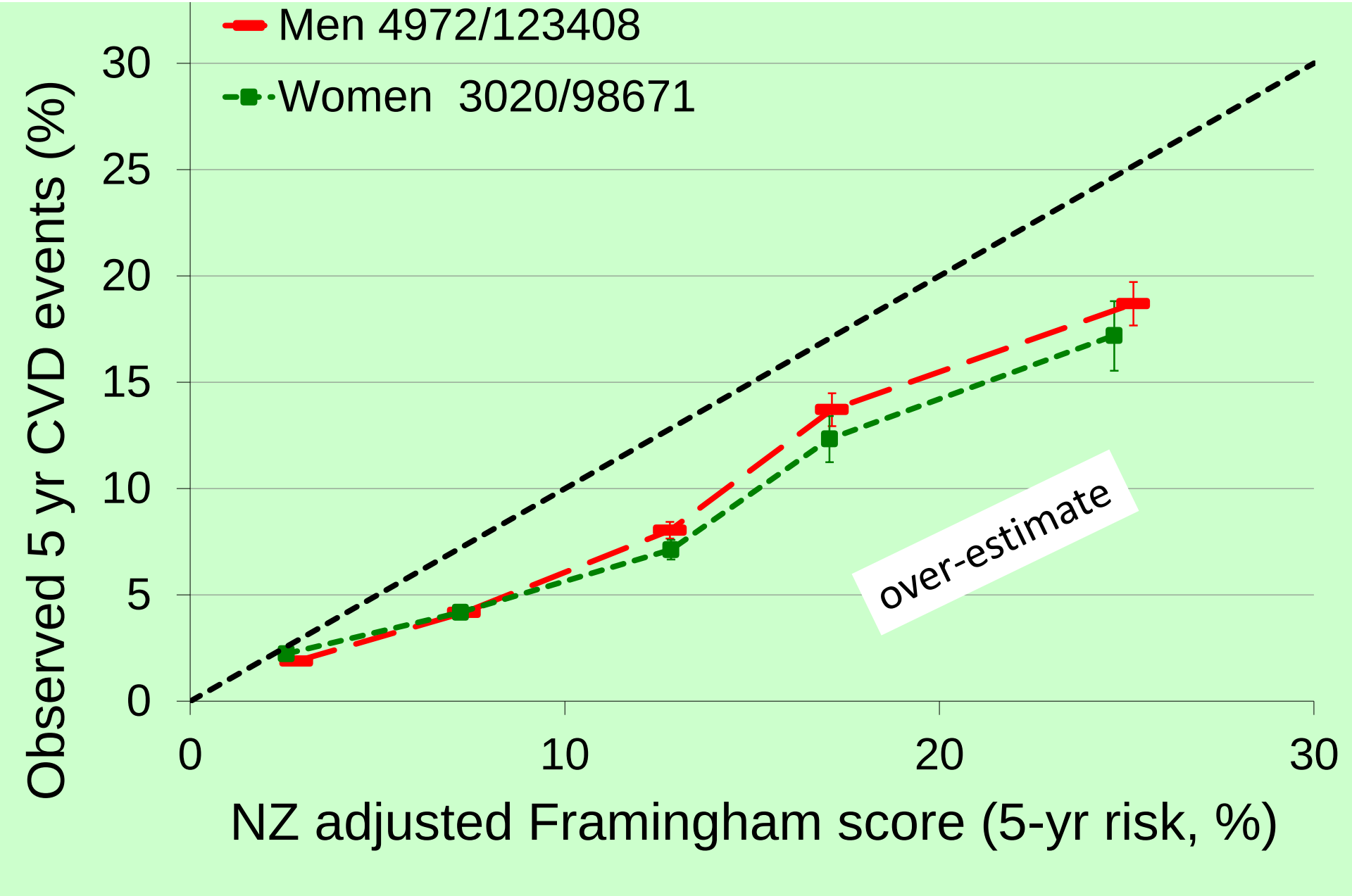
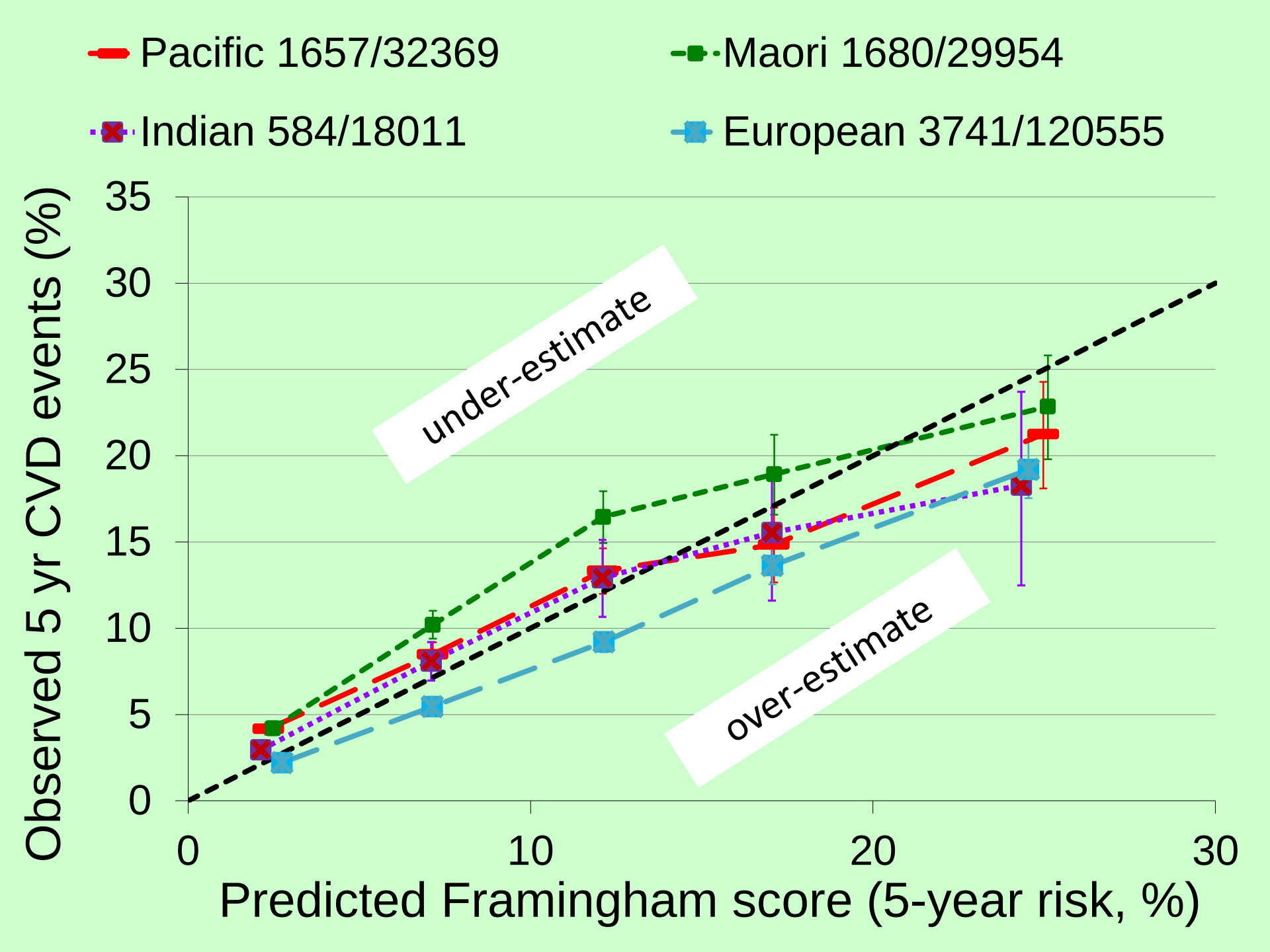
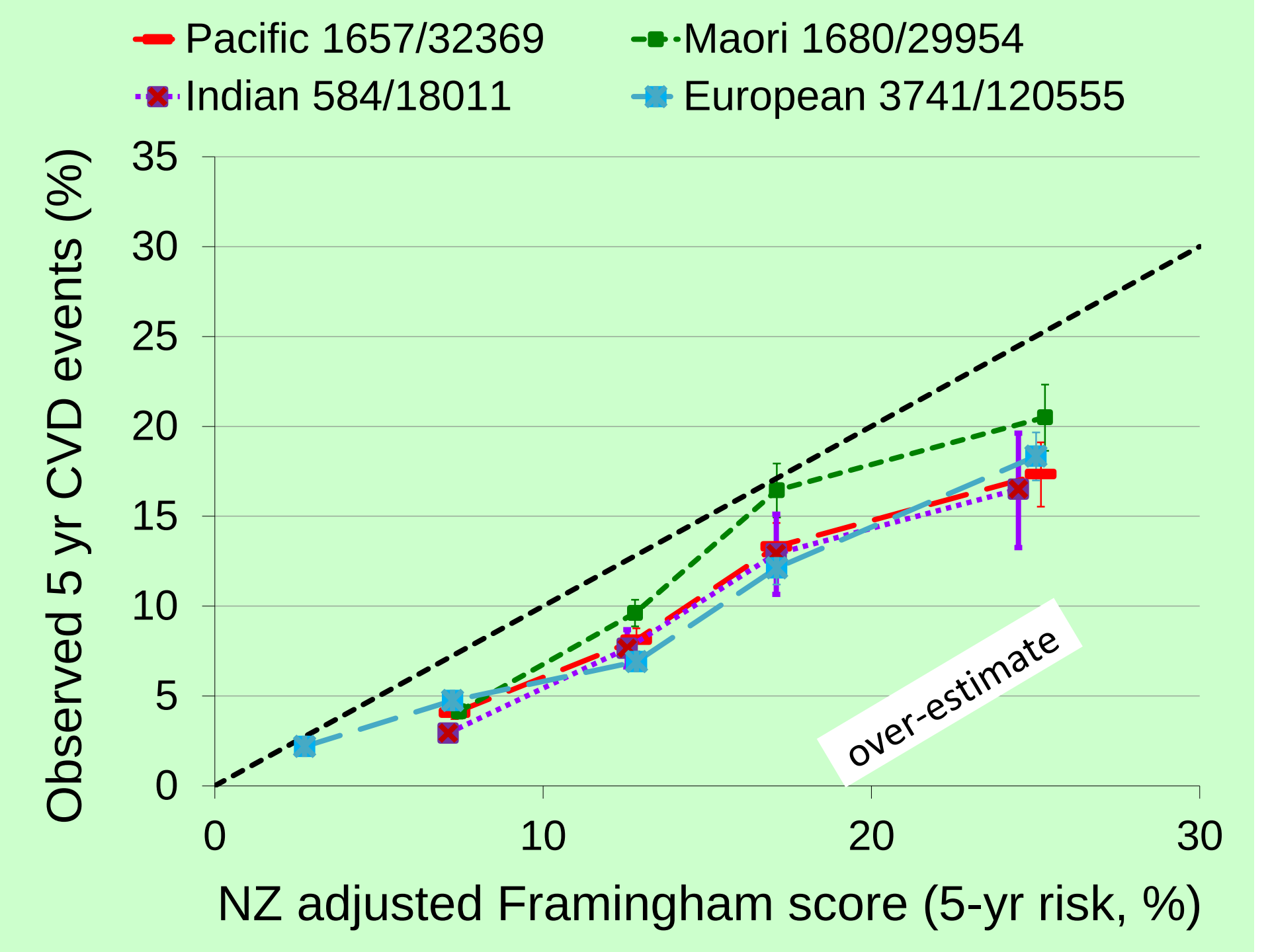



Pacific 1657/32369
Maori 1680/29954
Indian 584/18011
European 3741/120555
under-estimate
over-estimate
Observed 5 yr CVD events (%)
Predicted Framingham score (5-year risk, %)
0
5
10
15
20
25
30
35
0
10
20
30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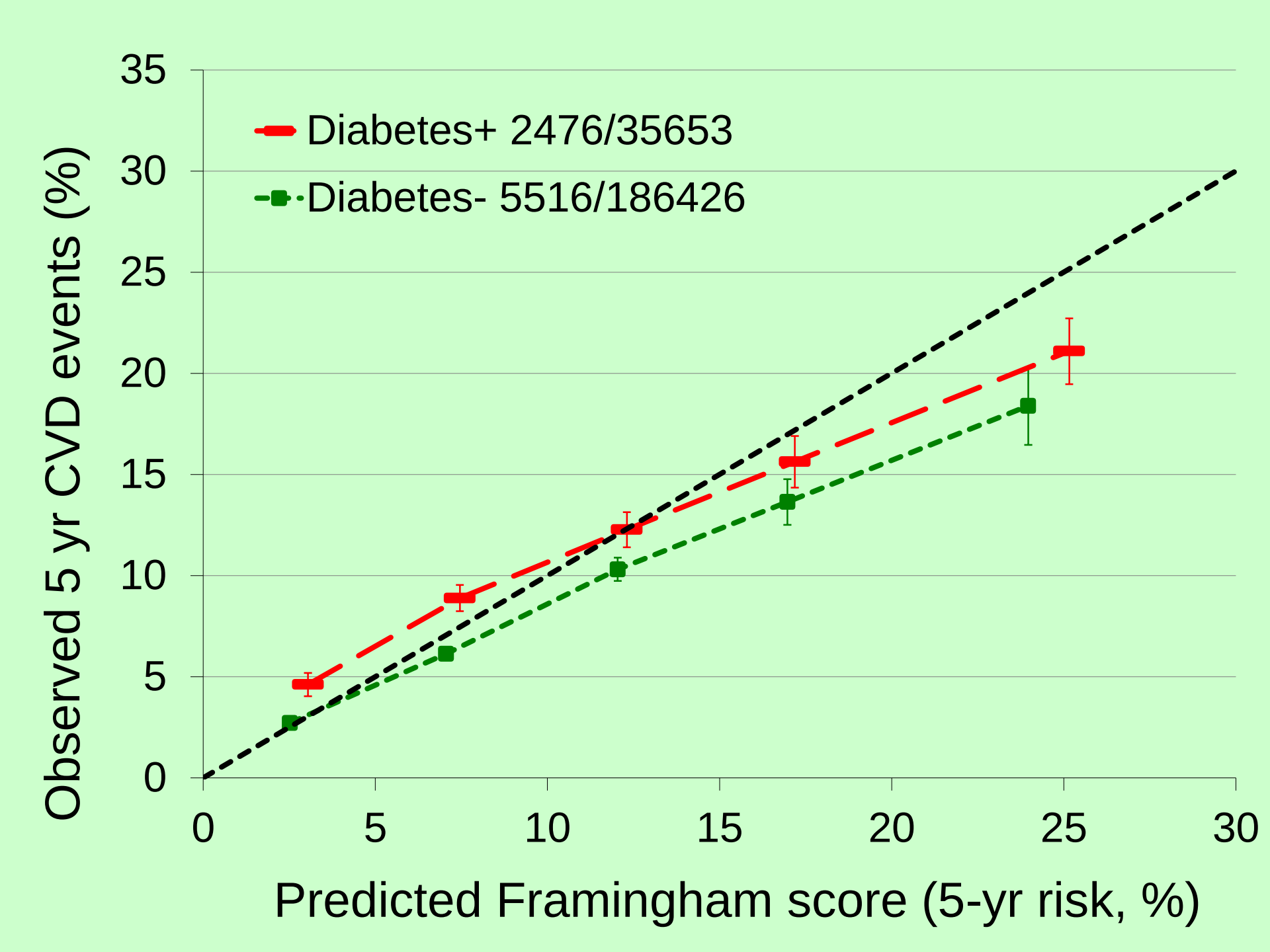
Observed 5 yr CVD events (%)
35
30
25
20
15
10
5
0
0
10
20
30
NZ adjusted Framingham score (5-yr risk, %)
over-estimate


Diabetes+ 2476/35653
Diabetes- 5516/186426
Observed 5 yr CVD events (%)
Predicted Framingham score (5-yr risk, %)
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5
10
15
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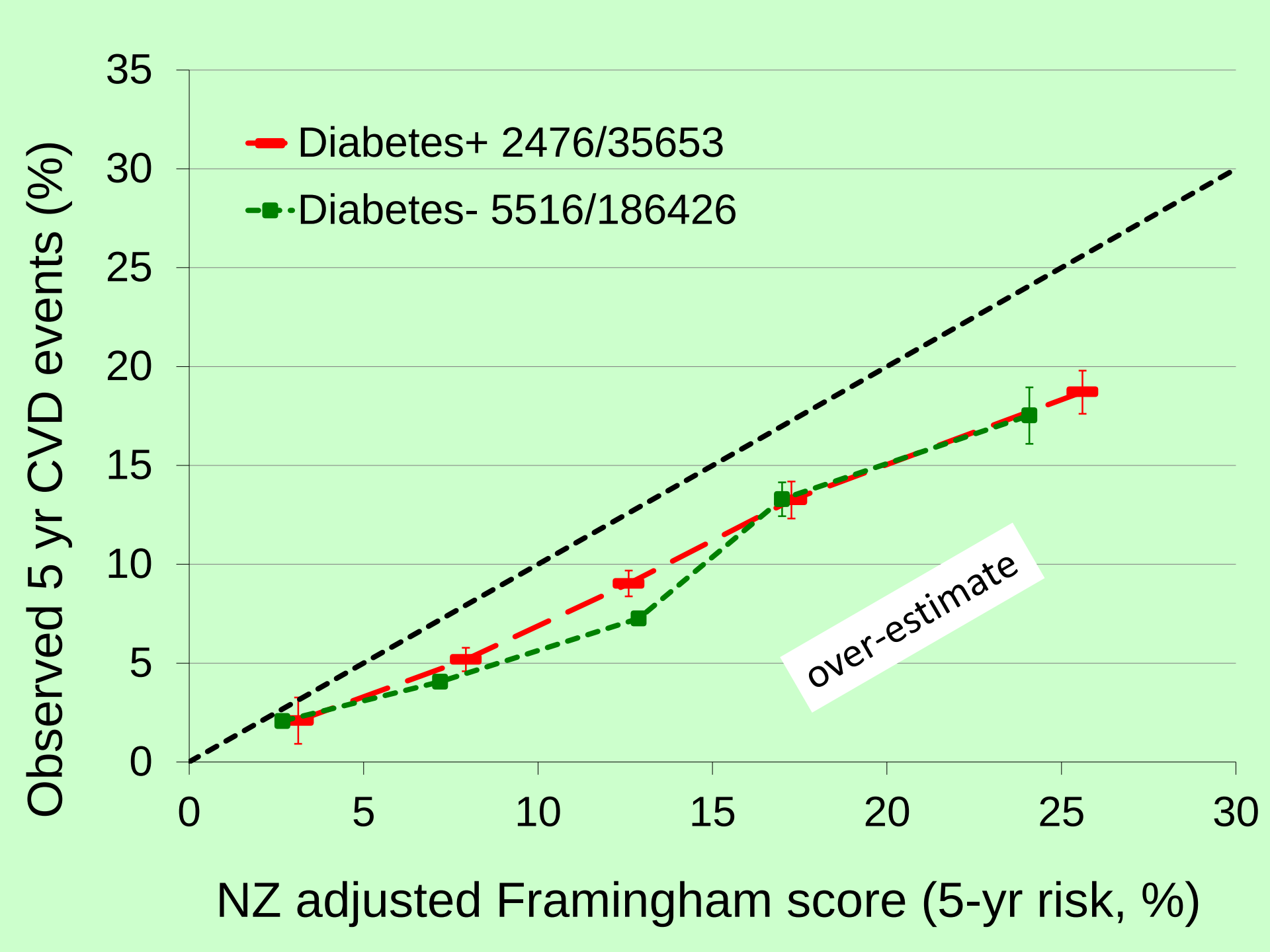
25
30
35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over-estimate
Observed 5 yr CVD events (%)
NZ adjusted Framingham score (5-yr risk, %)
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5
10
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20
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30
35

Summary (1)

- original Framingham score under-estimates risk in 75-84 year-olds, Maori & diabetics
- NZ-adjusted Framingham score over-adjusts risk for high-risk ethnic groups and diabetics

Summary (2)

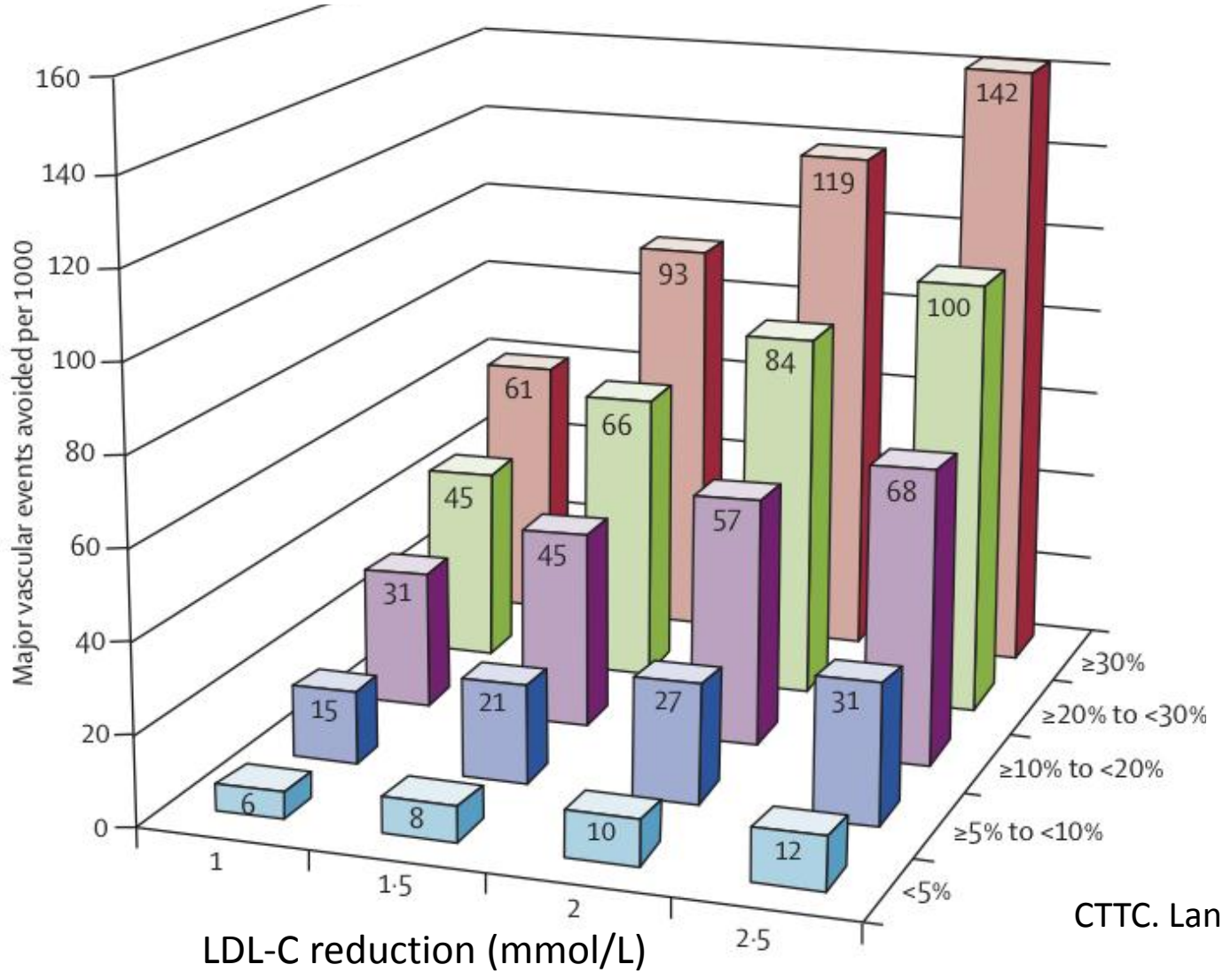
- new scores will include ethnicity, SES, ? AF as well as standard risk factors
- current family history measure does not predict future events – needs redeveloping
- other predictors under investigation include: Rx at assessment, BMI, serum urate & creatinine

the future

- we will develop ‘a family’ of new risk scores for different populations: by gender, ethnicity, drug treatment at assessment
- potential ‘add-on’ markers: low cost (e.g. augmentation index; more invasive/expensive tests (e.g. coronary calcium) to improve risk assessment in sub-groups (still to be defined)

Predicted benefits of increasing LDL-C reductions with statins by baseline absolute CVD risk:

vascular events avoided per 1000 treated for 5 yrs



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