

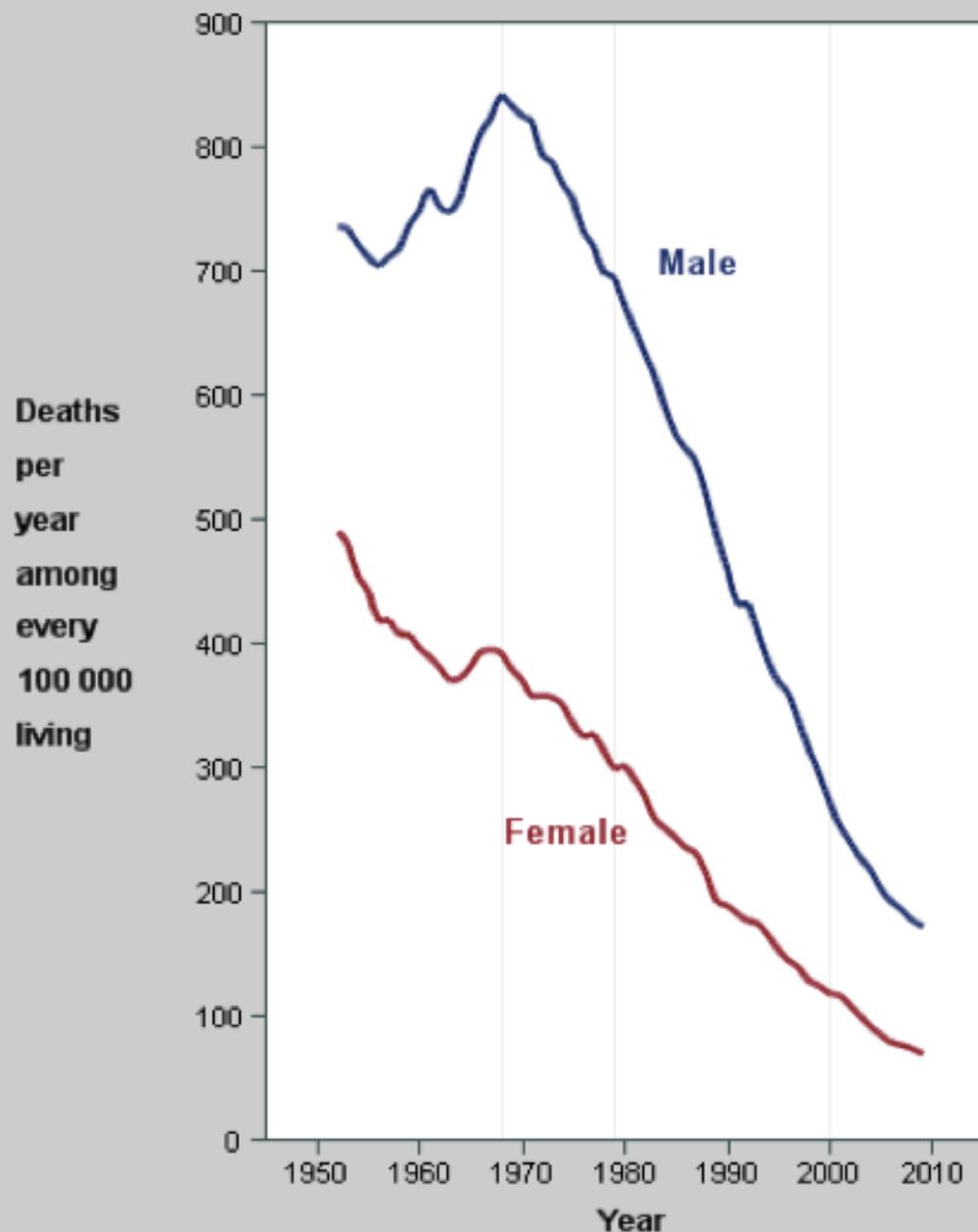
using big data to tackle inequalities in vascular diseases

Rod Jackson

Director VIEW research programme

University of Auckland

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



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

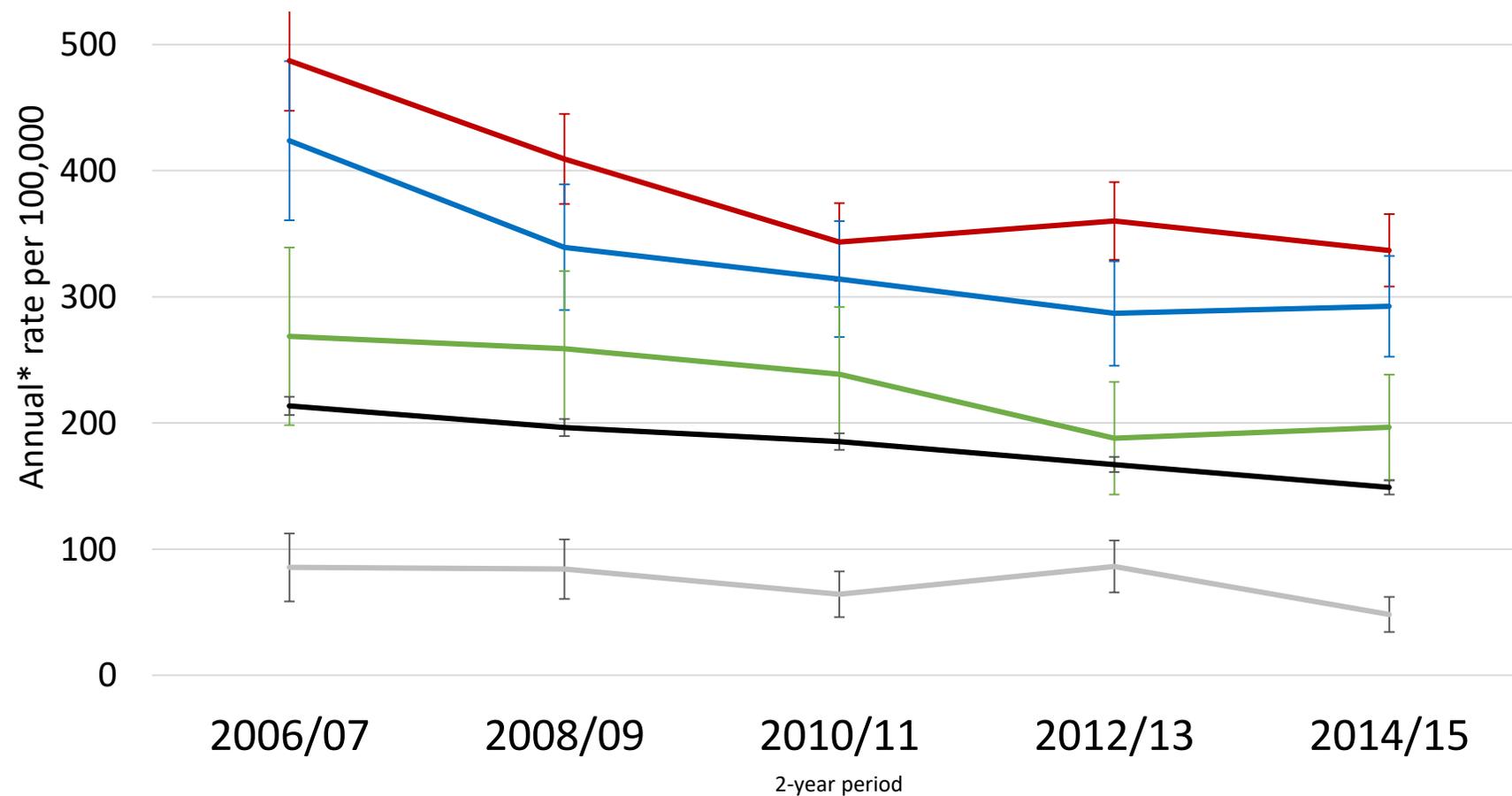
- 1274 (30% of deaths at this age)
- 173 out of every 100 000 males at this age, a rate which was:
 - 36% less than in 2000 (rate: 271)
 - 77% less than in 1975 (rate: 755)
 - 76% less than in 1955 (rate: 711)

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

- 513 (17% of deaths at this age)
- 70 out of every 100 000 females at this age, a rate which was:
 - 41% less than in 2000 (rate: 119)
 - 79% less than in 1975 (rate: 335)
 - 84% less than in 1955 (rate: 441)

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

Age-standardised* IHD Death Rates in men aged 35–84yrs, by ethnic group, 2006-2015



— Māori — Pacific — South Asian — European — Other Asian

VIEW2020

Vascular risk Informatics using Epidemiology & the Web

goal: to reduce inequities in vascular disease outcomes

- 1. improve accuracy of vascular risk prediction & target vascular risk management to highest risk people(s)*
- 2. monitor trends in inequities in vascular disease risk, risk management & outcomes & provide feedback to clinicians, providers & policymakers*

VIEW 2020 research team

Leadership team:

Rod Jackson (non-Māori director)

Maire Harwood (Māori co-director)

Sue Wells, (Primary care lead)

Andrew Kerr (Secondary care lead)

Dan Exeter (Social determinants lead)

Katrina Poppe (Data ecosystem lead)

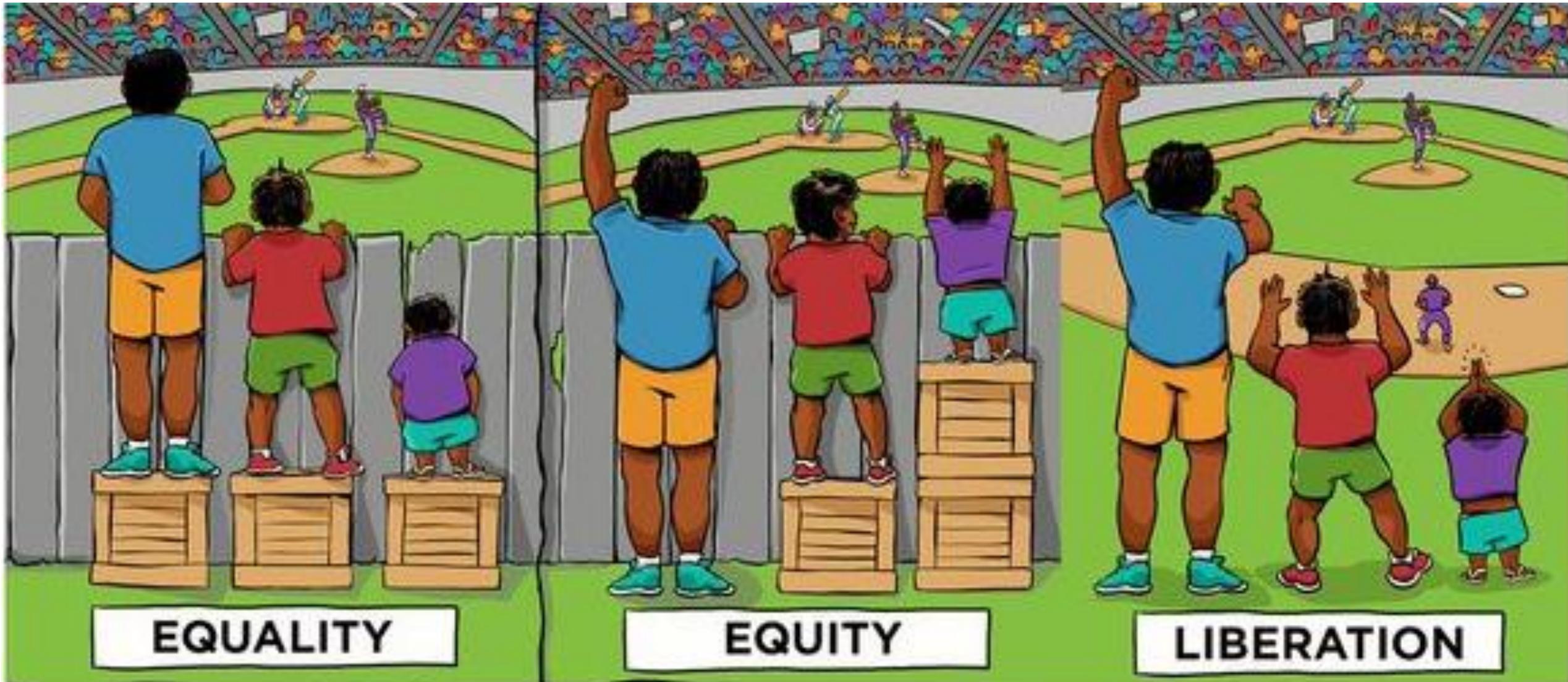
Research team:

Corina Grey (PhD student & Pacific lead),

Suneela Mehta (PhD student & South Asian lead),

Patricia Metcalf, Romana Pylypchuk, Jinfeng Zhao, Catherine Choi, Jeff Harrison, Jim Warren,
Vicky Cameron, Arier Lee, Rob Doughty, Mark Gahegan

reduce inequities in vascular disease by better targeted management of high-risk people(s) & monitoring outcomes



1. improve accuracy of vascular risk prediction & target vascular risk management to highest risk people(s)

EVIDENCE-BASED
BEST PRACTICE
GUIDELINE

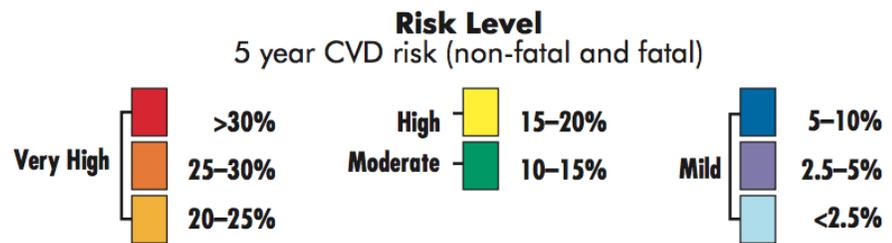
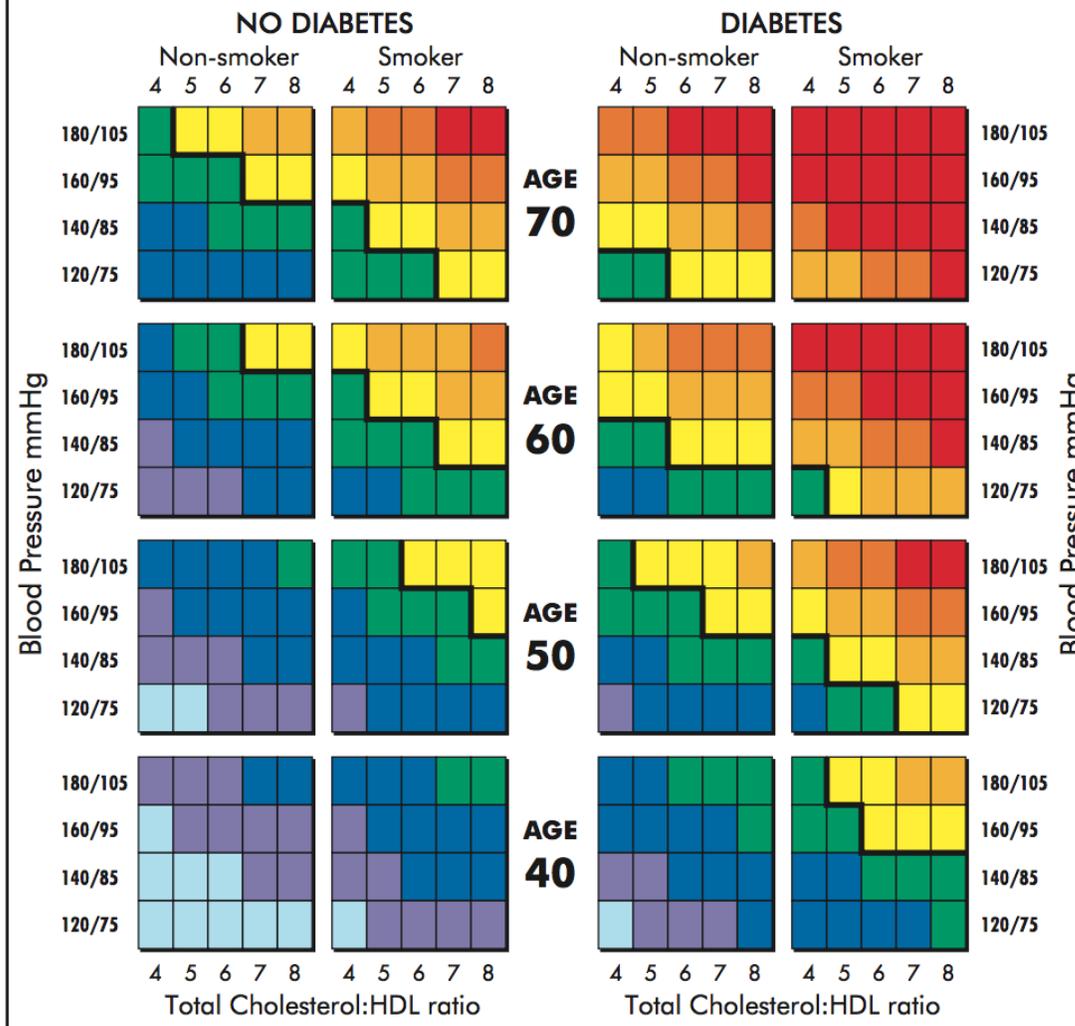
THE ASSESSMENT
AND MANAGEMENT OF
**CARDIOVASCULAR
RISK**

1992-2003- - -

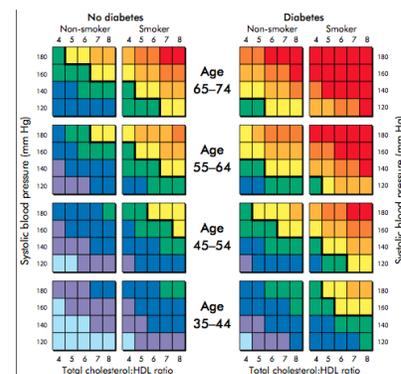
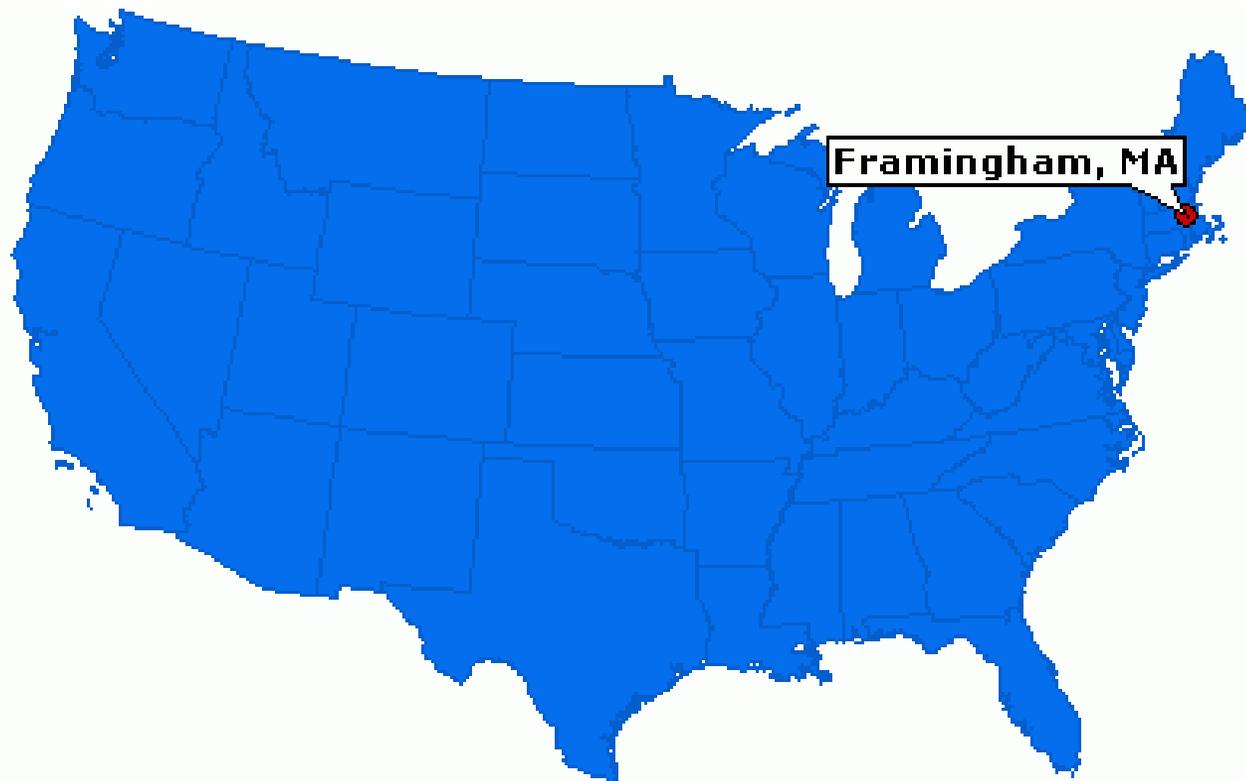


DECEMBER 2003

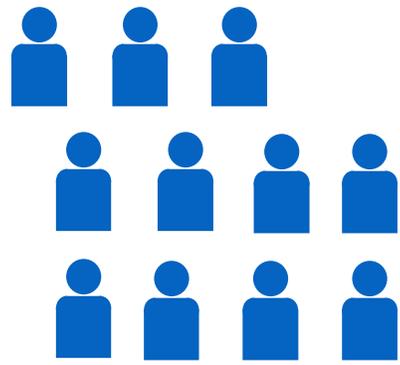
Risk level women



how accurate is a CVD risk prediction algorithm derived from a homogeneous cohort study of white Americans in the 1970s, when applied to a multi-ethnic & socio-economically diverse NZ population in the 21st century?

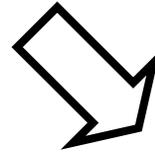


answering this question
requires a large-scale
cohort study: PREDICT

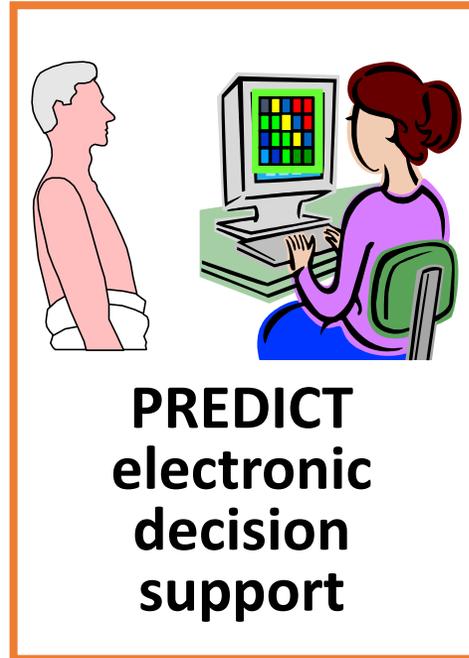


Patient population

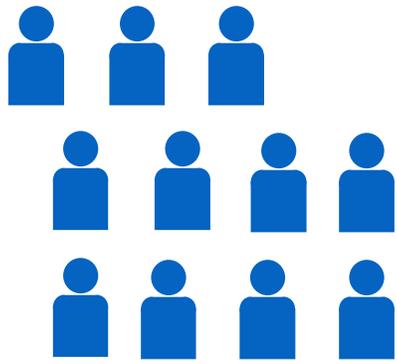
PREDICT was designed to:



Electronic medical
record

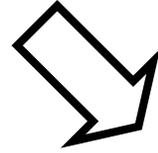


***facilitate CVD risk prediction to improve targeting of
CVD risk management***

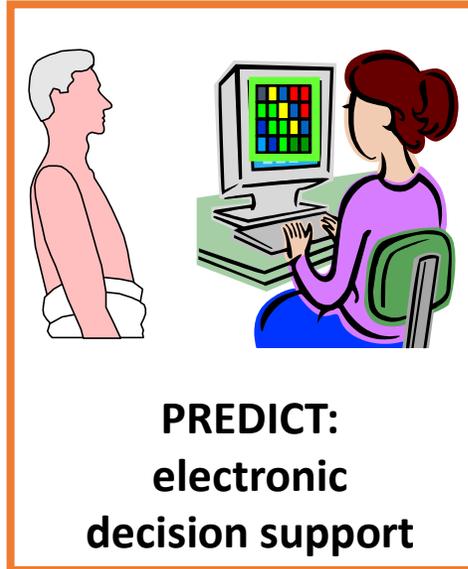


Patient population

& to simultaneously generate new evidence on CVD risk & management

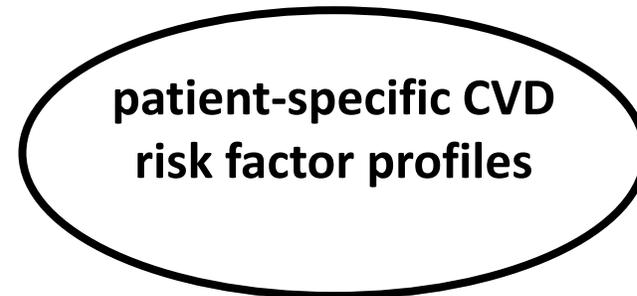


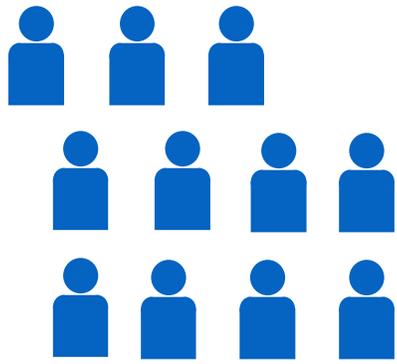
Electronic medical record



NHI (encrypted)

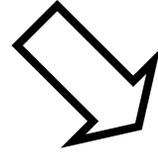
VIEW web server





Patient population

& to simultaneously generate new evidence on CVD risk & management

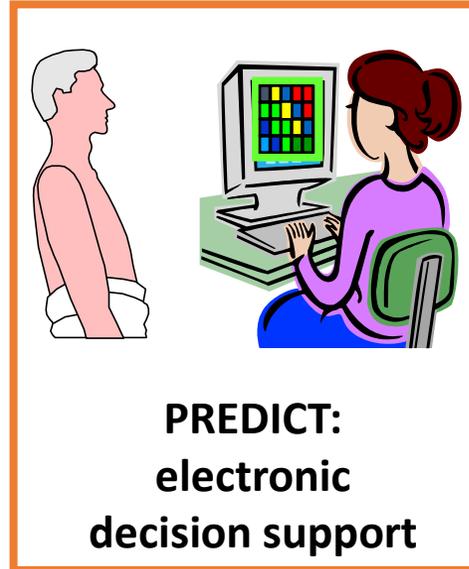


Electronic medical record

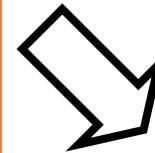
NHI



MoH server

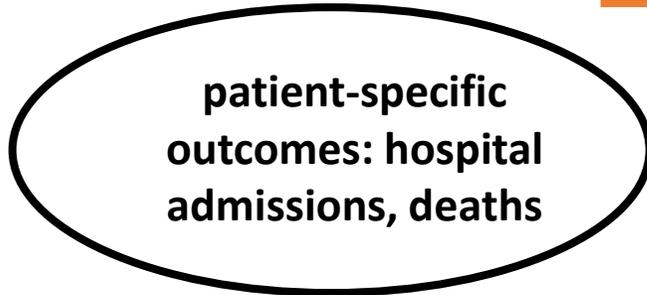


PREDICT:
electronic
decision support

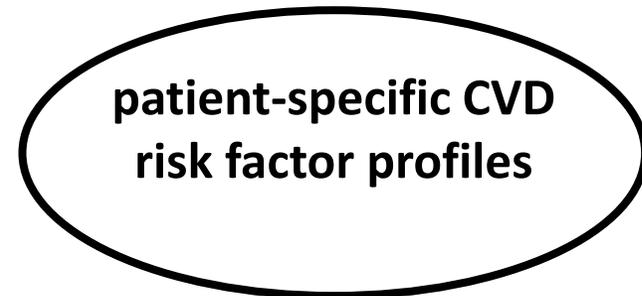


NHI (encrypted)

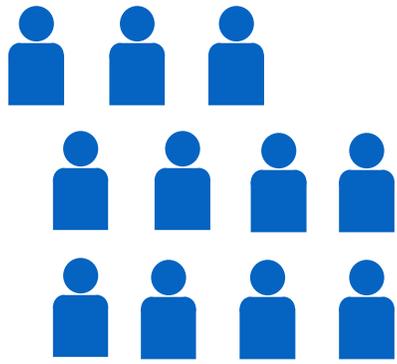
VIEW web server



patient-specific
outcomes: hospital
admissions, deaths

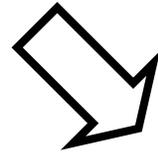


patient-specific CVD
risk factor profiles



Patient population

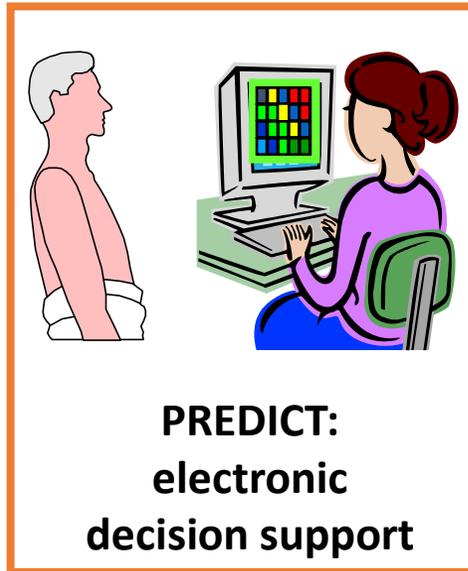
& to simultaneously generate new evidence on CVD risk & management



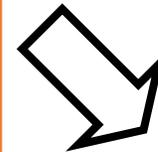
Electronic medical record

NHI

from MoH to VIEW server

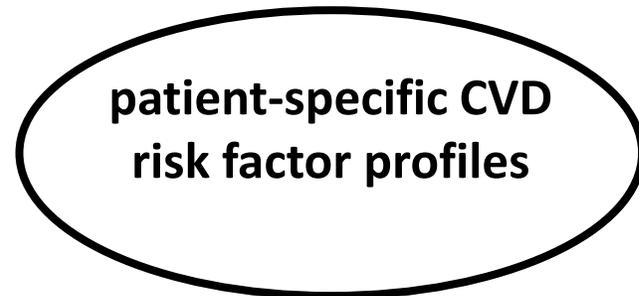
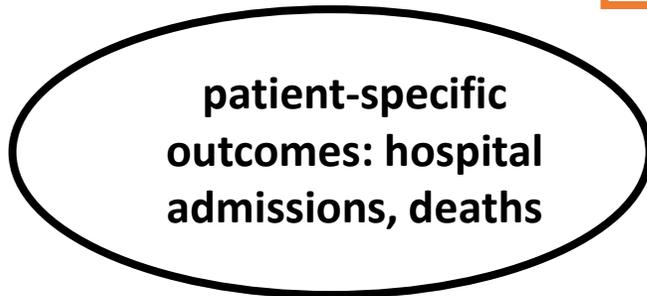


PREDICT:
electronic
decision support

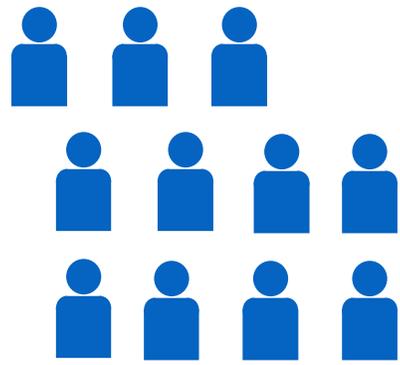


NHI (encrypted)

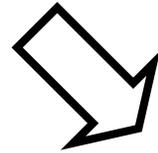
VIEW web server



& to simultaneously generate new evidence on CVD risk & management



Patient population

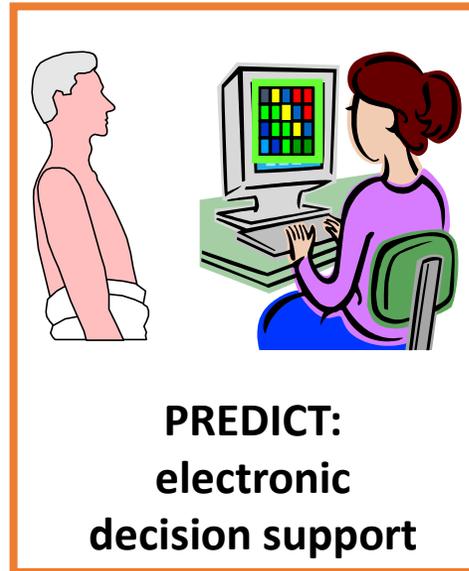


Electronic medical record

NHI



VIEW server

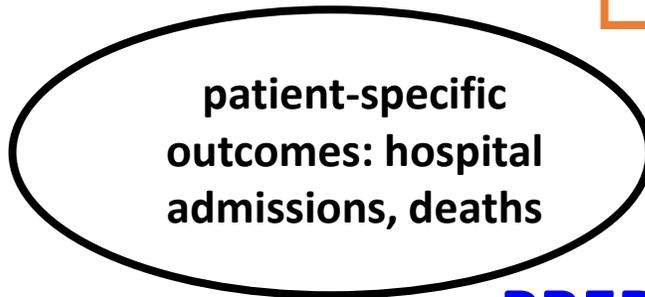


PREDICT:
electronic
decision support

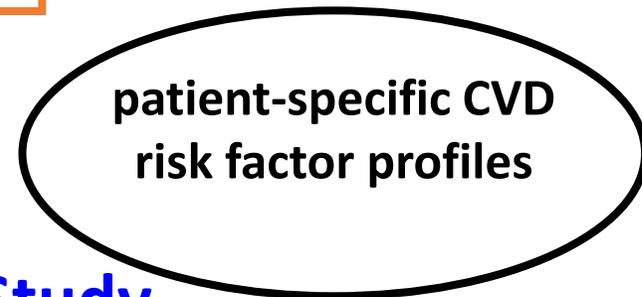


NHI (encrypted)

VIEW web server

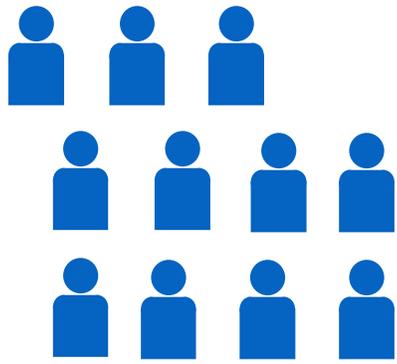


patient-specific
outcomes: hospital
admissions, deaths



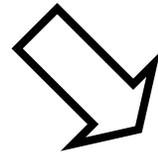
patient-specific CVD
risk factor profiles

PREDICT Cohort Study



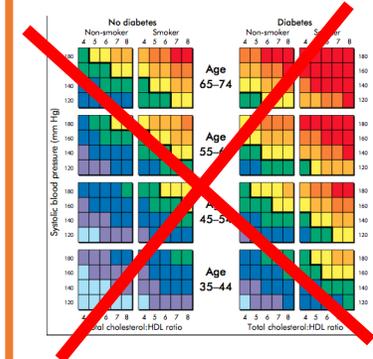
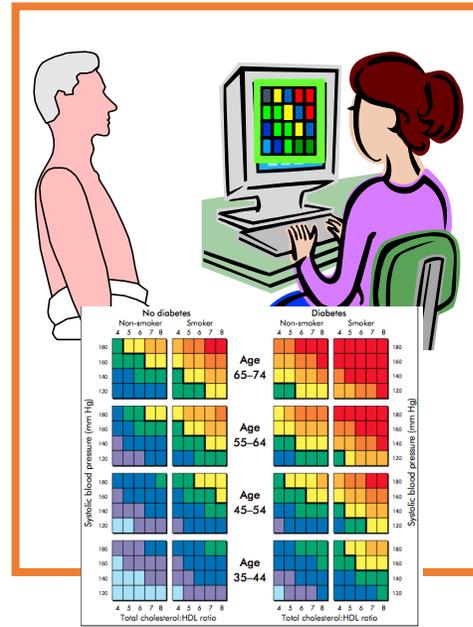
Patient population

& to simultaneously generate new evidence on CVD risk & management



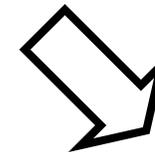
Electronic medical record

NHI

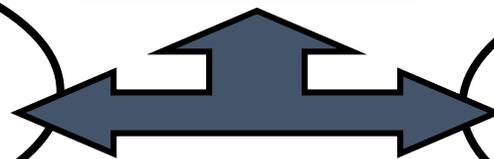


Framingham-based risk algorithm

NHI (encrypted)

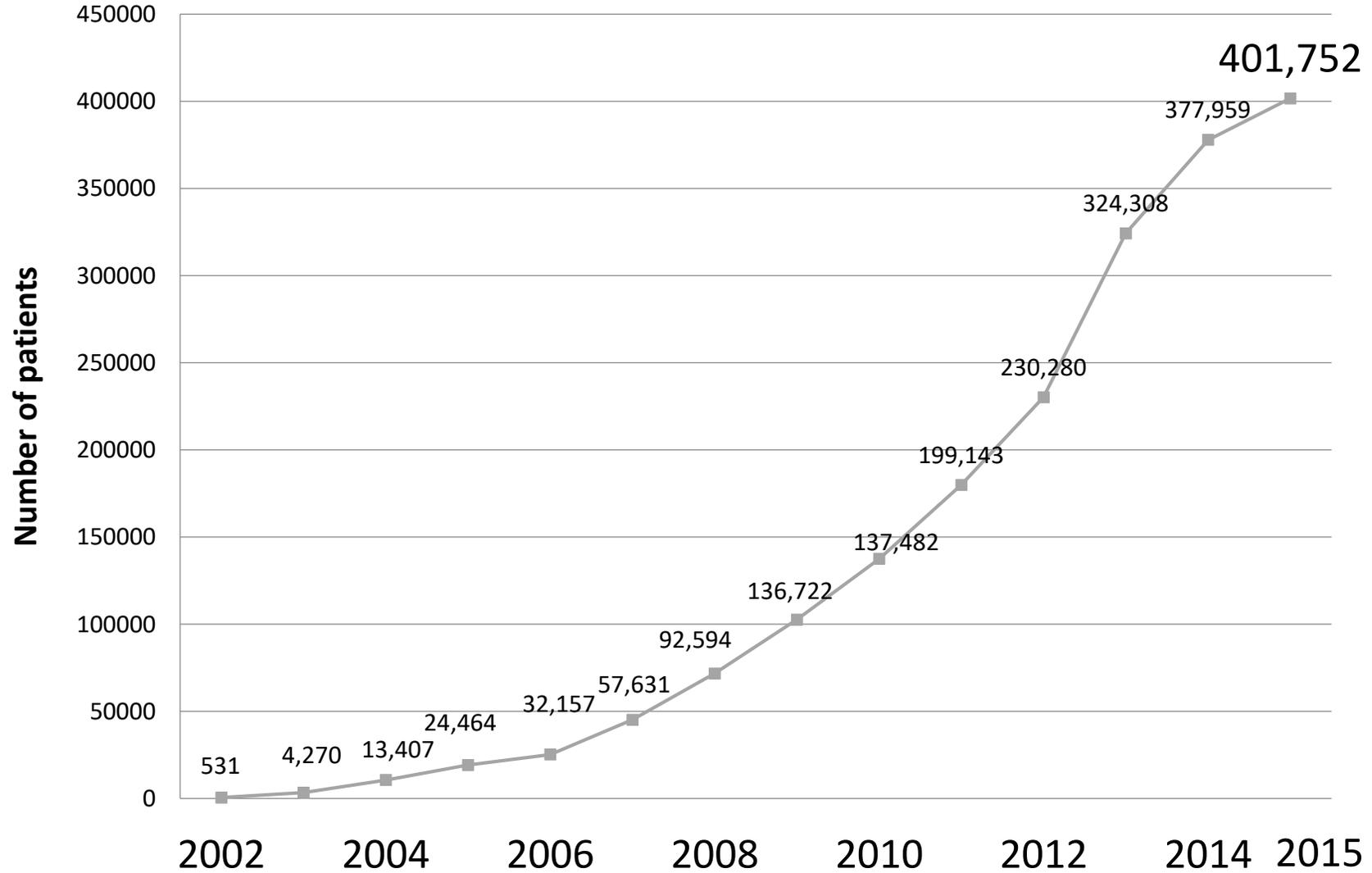


patient-specific outcomes: hospital admissions, deaths



patient-specific CVD risk factor profiles

PREDICT-CVD1° Cohort Recruitment, by Year



PREDICT cohort baseline characteristics

	Women	Men
Participants; n (% of total cohort)	175,699 (44%)	226,053 (56%)
Incident CVD events; n (% of sex-specific cohort)^a	5,650 (3.2%)	9,736 (4.3%)
Total person-years observed	743,640	941,881
Crude incidence of CVD (per 1000 per year)	7.6 (7.4, 7.8)	10.3 (10.1, 10.5)
Follow-up time in years; mean (SD)	4.2 (2.7) ^b	4.2 (2.7) ^b
People with follow up ≥5 years	58,493 (33%)	72,417 (32%)
Age in years; mean (SD)	56 (8.9)	51.8 (9.9)
Self-identified ethnicity:		
European	96,032 (55%)	128,503 (57%)
Māori	23,853 (14%)	27,573 (12%)
Pacific	22,537 (13%)	28,073 (12%)
South Asian	14,188 (8%)	20,232 (9%)
Chinese/other Asian	19,089 (11%)	21,672 (10%)

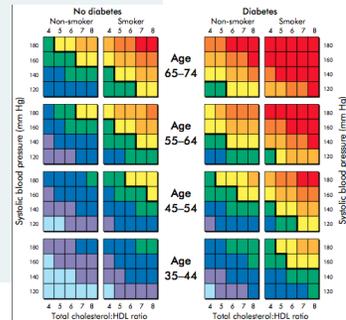
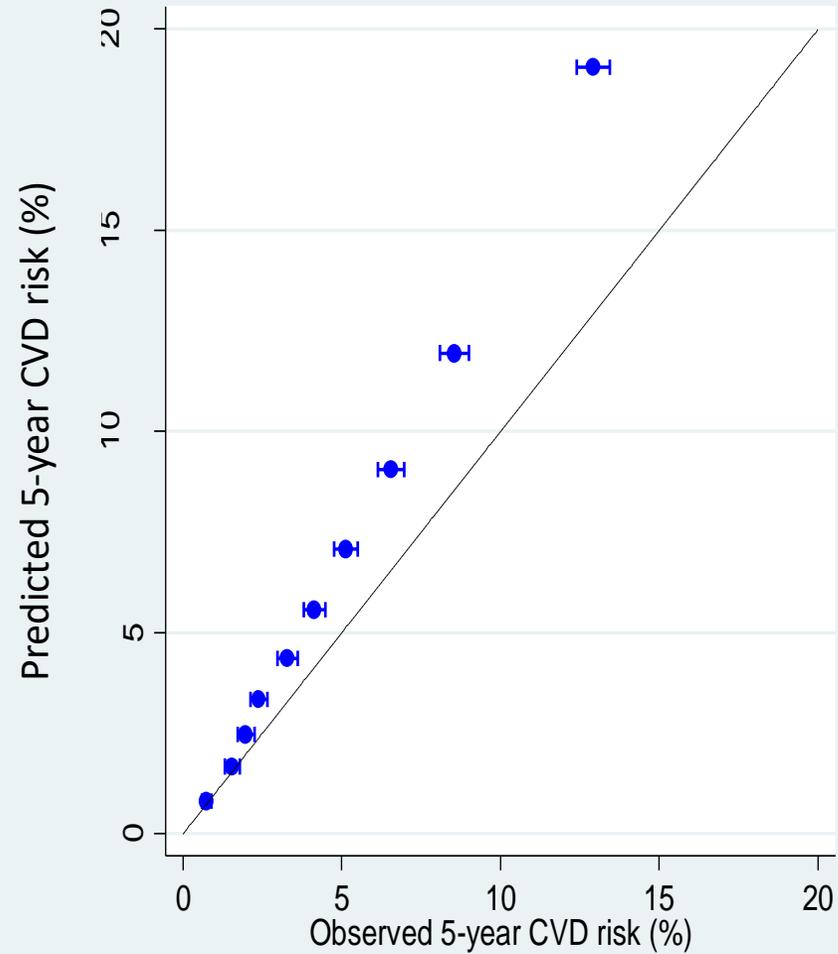
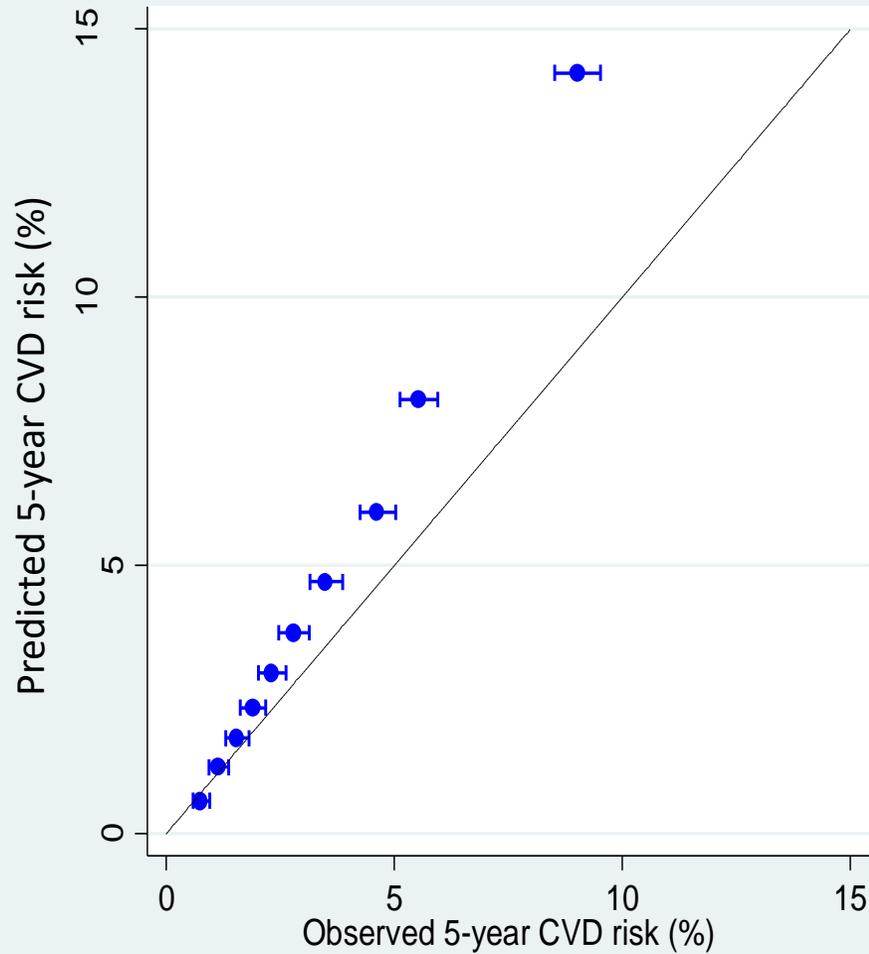
PREDICT cohort baseline characteristics

	Women	Men
NZ Deprivation quintile:		
1 (least deprived)	38,523 (22%)	50,379 (22%)
2	34,230 (20%)	44,609 (20%)
3	31,808 (18%)	40,684 (18%)
4	32,626 (19%)	41,553 (18%)
5 (most deprived)	38,512 (22%)	48,828 (22%)
Smoking:		
Never smoker	129,158 (74%)	149,139 (66%)
Ex-smoker	24,838 (14%)	39,856 (18%)
Current smoker	21,703 (12%)	37,058 (16%)
Family history of premature CVD	22,996 (13%)	24,495 (11%)
Atrial fibrillation	1,777 (1%)	3,680 (1.6%)

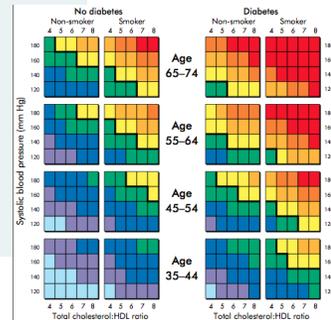
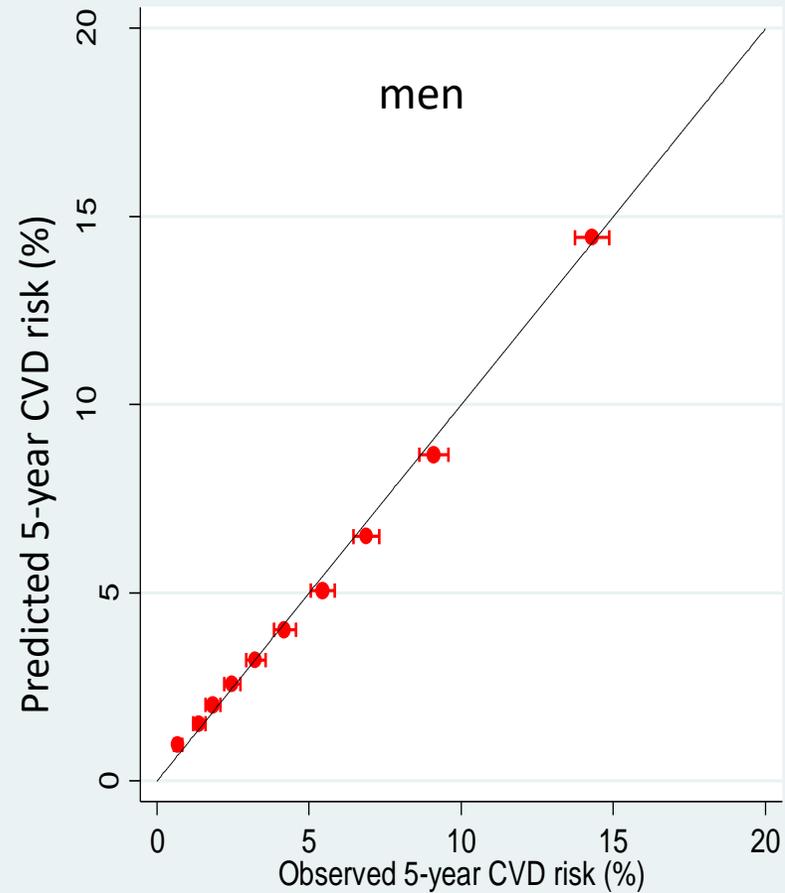
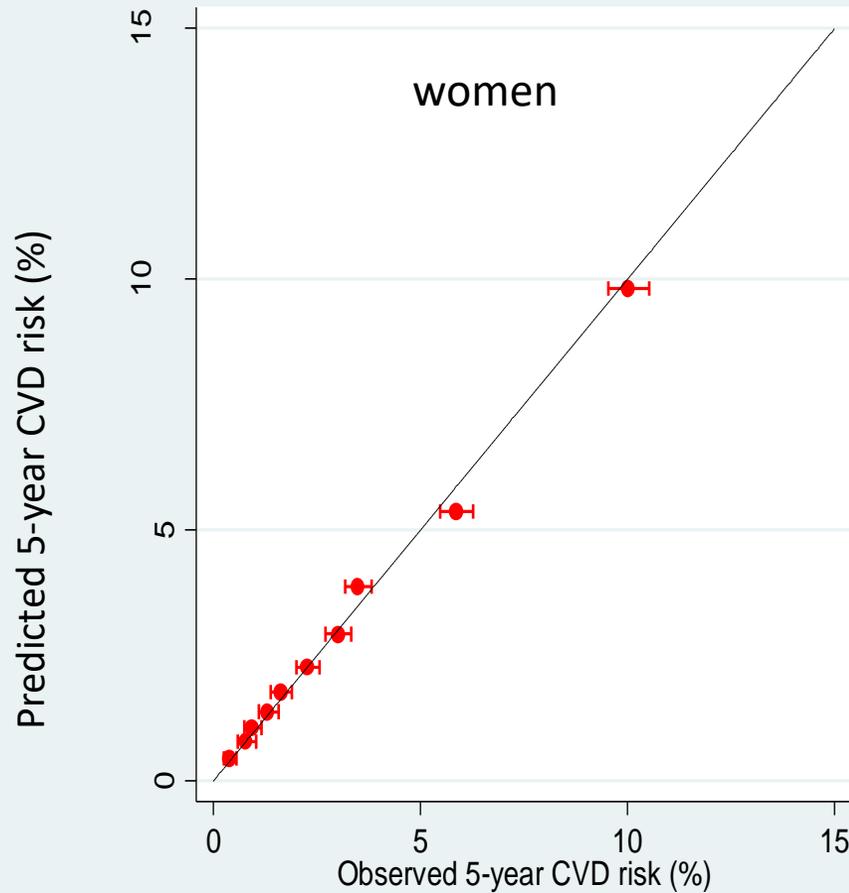
Adjusted HRs: PREDICT models

	Adjusted hazards ratios (95% CI)	
	Women	Men
Age (per year)	1.08 (1.07, 1.08)	1.07 (1.07, 1.07)
Ethnicity:		
European	1	1
Māori	1.48 (1.37, 1.60)	1.34 (1.26, 1.42)
Pacific	1.22 (1.12, 1.33)	1.19 (1.12, 1.27)
South Asian	1.13 (1.00, 1.27)	1.34 (1.24, 1.45)
Chinese/other Asian	0.75 (0.66, 0.85)	0.67 (0.61, 0.74)
NZ Deprivation quintile (per 1 quintile)	1.11 (1.09, 1.14)	1.08 (1.07, 1.10)
Smoking:		
Non-smoker	1	1
Ex-smoker	1.09 (1.01, 1.18)	1.08 (1.02, 1.14)
Smoker	1.86 (1.73, 2.00)	1.66 (1.57, 1.75)

Framingham predicted 5-year risk versus in observed 5-year risk in PREDICT cohort

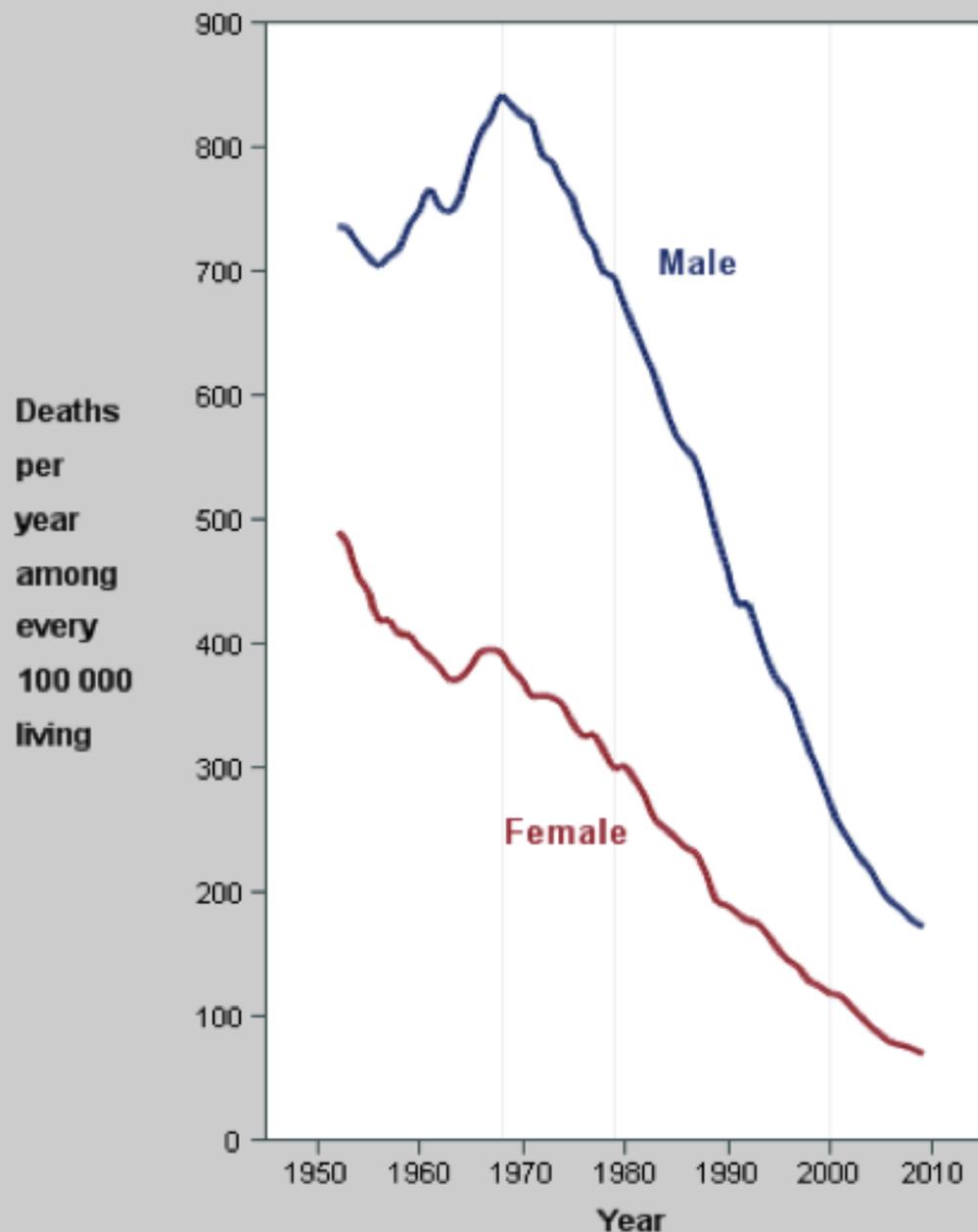


PREDICT predicted 5-year risk versus in observed 5-year risk in PREDICT cohort



2. monitor trends in inequities in vascular disease risk, risk management & outcomes & provide feedback to clinicians, providers & policymakers

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



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

- 1274 (30% of deaths at this age)
- 173 out of every 100 000 males at this age, a rate which was:
 - 36% less than in 2000 (rate: 271)
 - 77% less than in 1975 (rate: 755)
 - 76% less than in 1955 (rate: 711)

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

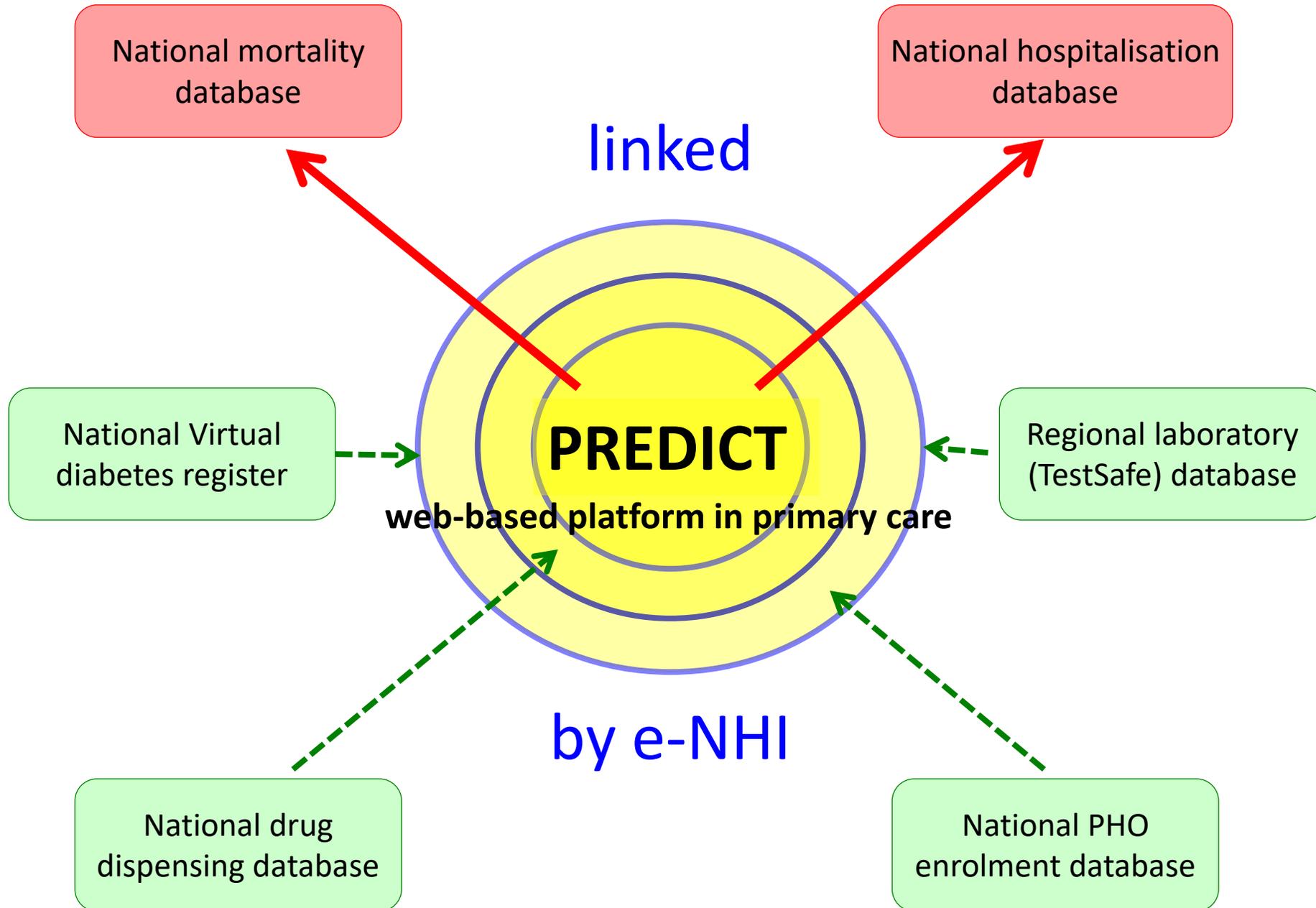
- 513 (17% of deaths at this age)
- 70 out of every 100 000 females at this age, a rate which was:
 - 41% less than in 2000 (rate: 119)
 - 79% less than in 1975 (rate: 335)
 - 84% less than in 1955 (rate: 441)

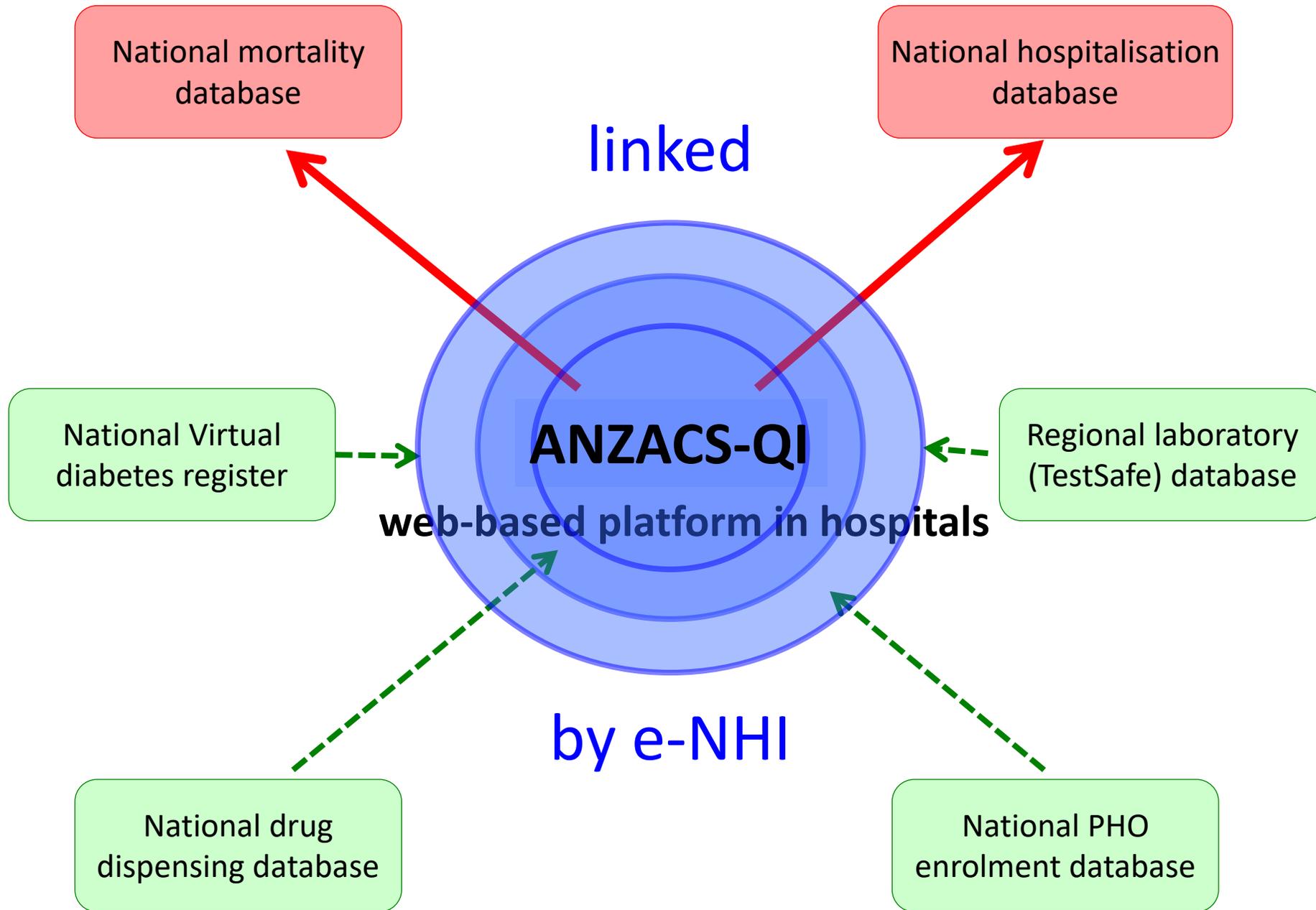
Created: 17 May 2013, 4:34 pm
Males & females, ages 35-69 years
Vascular diseases
New Zealand

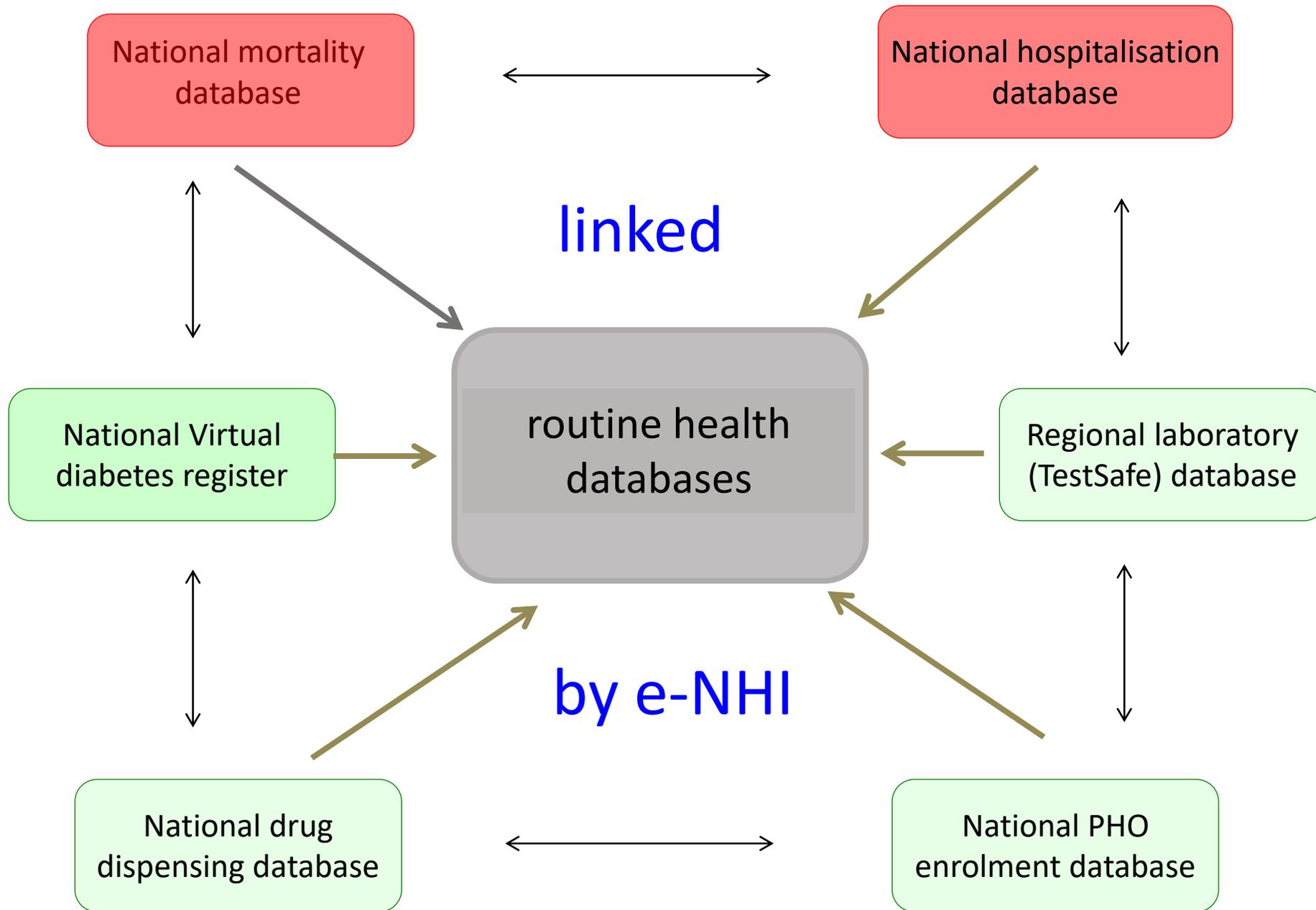
creating national cohorts:

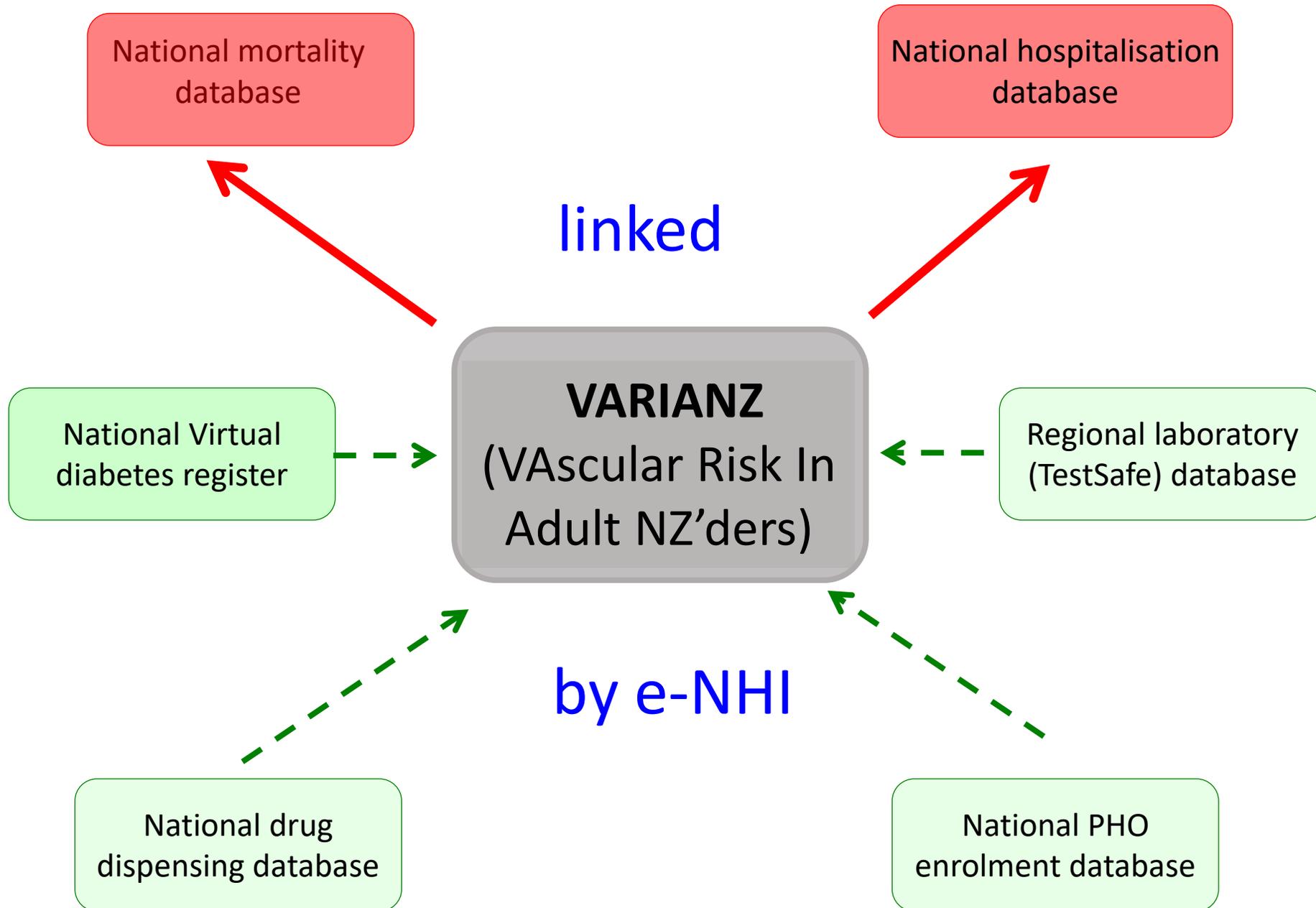
VARIANZ

(Health Service Utilisation cohorts)

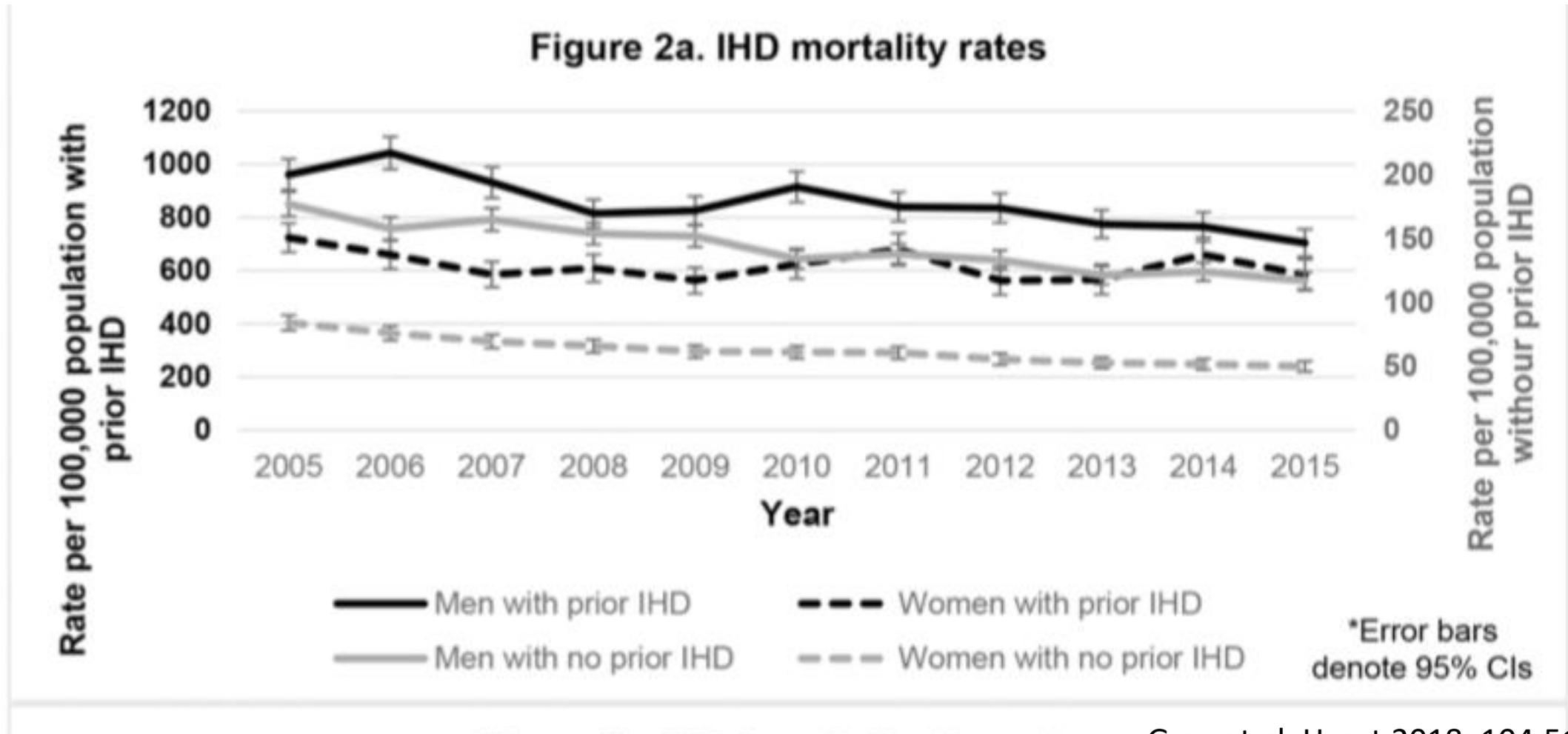




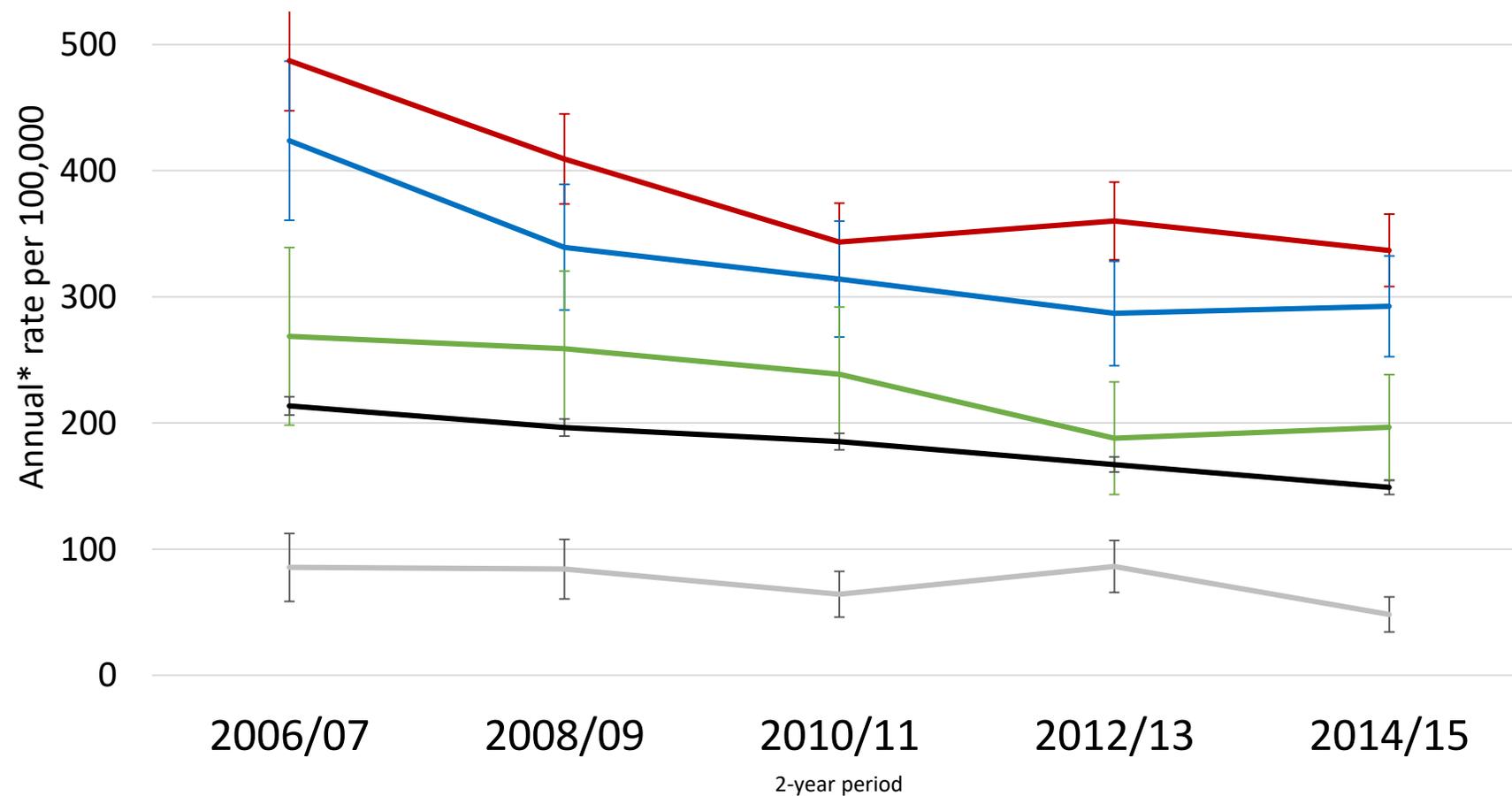




Age-standardised IHD Death Rates in women & men aged 35–84y, by prior IHD status, 2005–2015

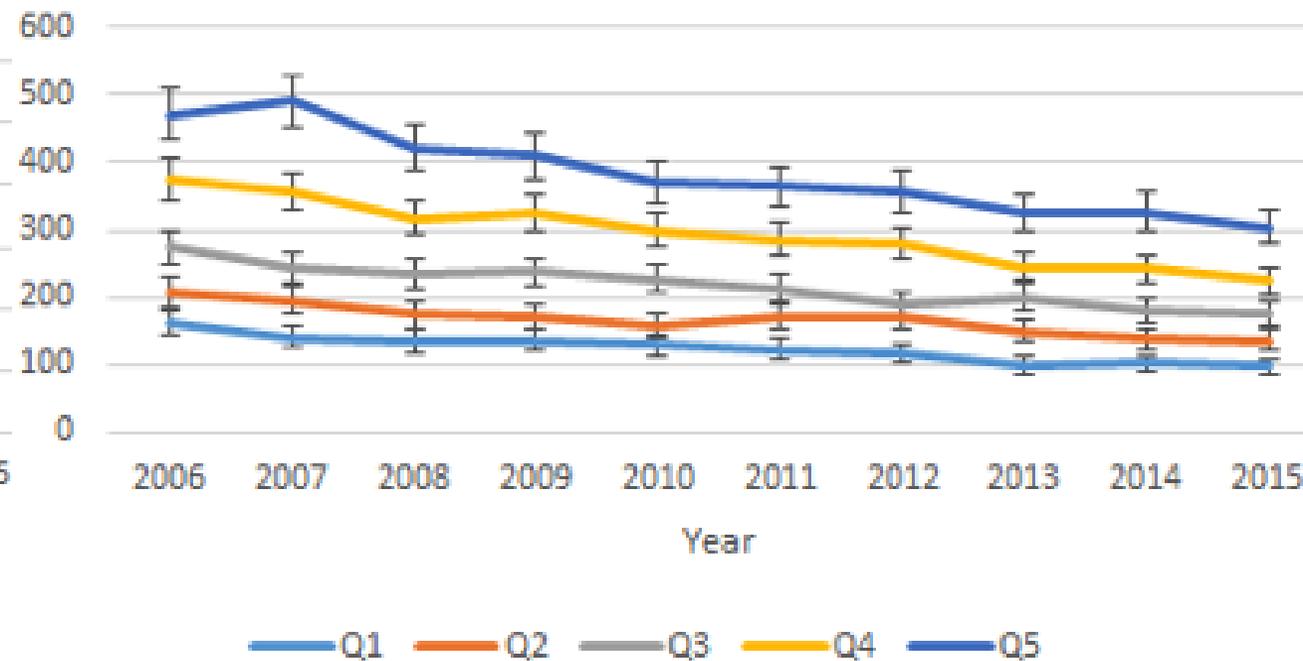
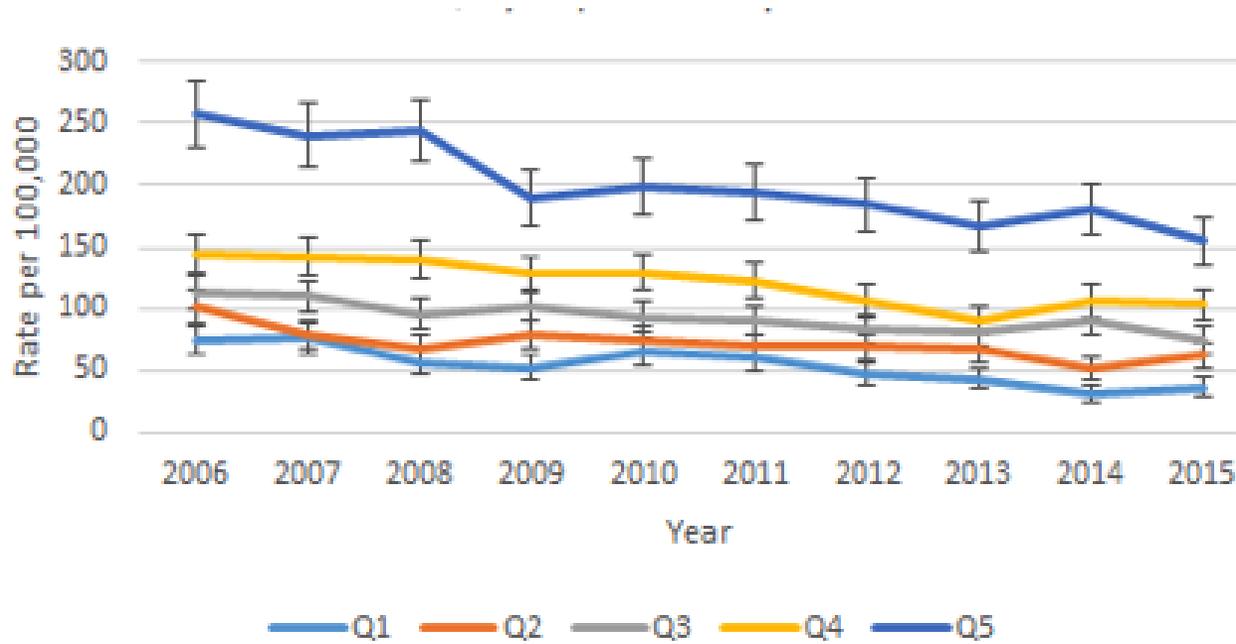


Age-standardised* IHD Death Rates in men aged 35–84yrs, by ethnic group, 2006–2015



— Māori — Pacific — South Asian — European — Other Asian

Age-standardised* IHD Death Rates in women (L) & men (R) aged 35–84y, by NZ Dep, 2006–2015



THE NEW ZEALAND MEDICAL JOURNAL

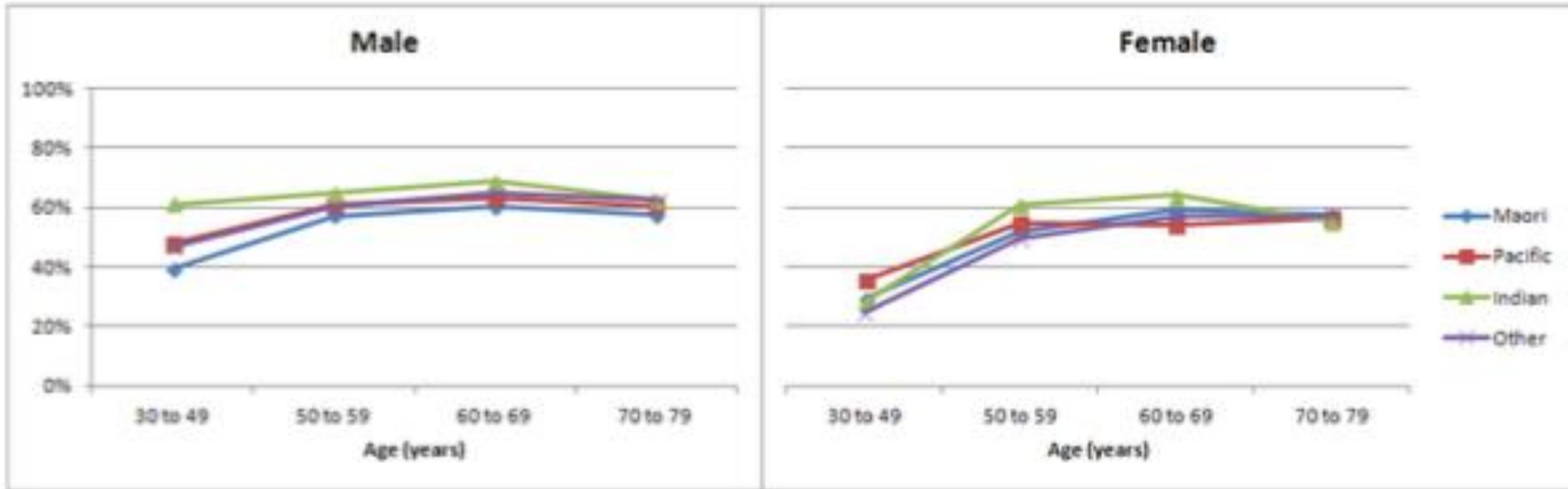
Journal of the New Zealand Medical Association



Effect of age, gender, ethnicity, socioeconomic status and region on dispensing of CVD secondary prevention medication in New Zealand: The Atlas of Health Care Variation CVD cohort (VIEW-1)

Andrew Kerr, Dan Exeter, Grant Hanham, Corina Grey, Jinfeng Zhao, Tania Riddell, Mildred Lee, Rod Jackson, Sue Wells

Adequate maintenance of triple therapy

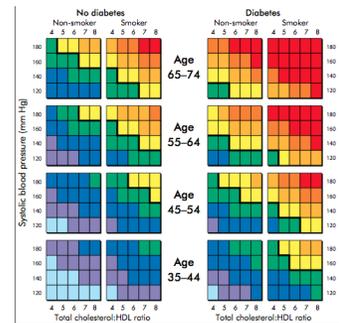




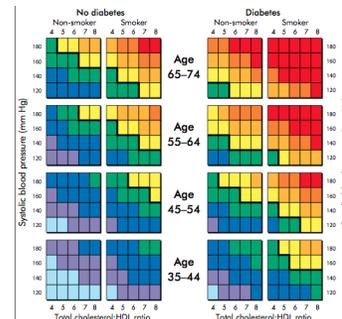
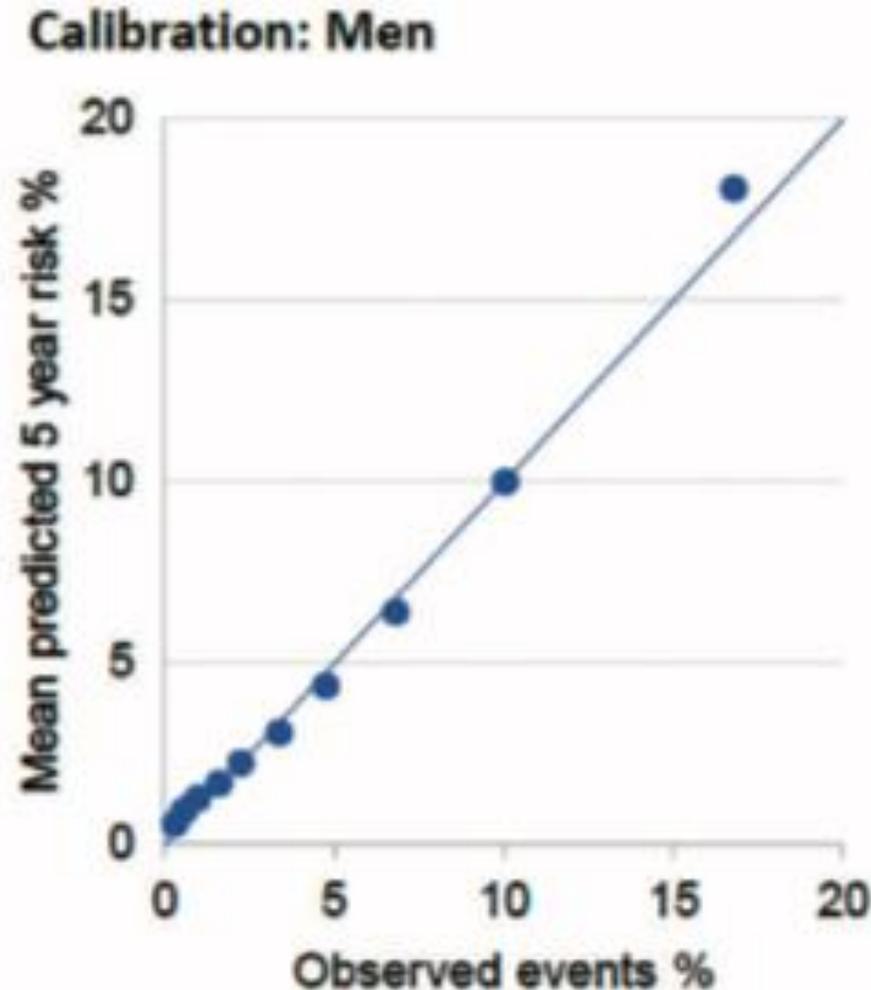
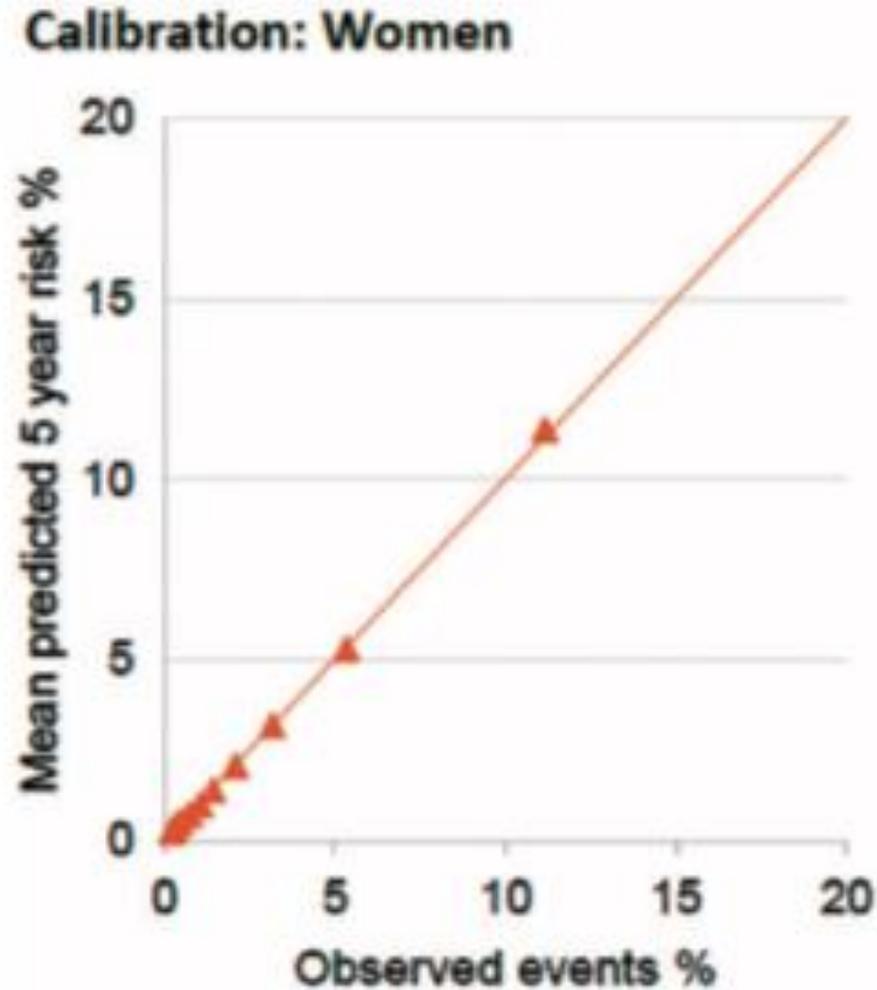
Original article

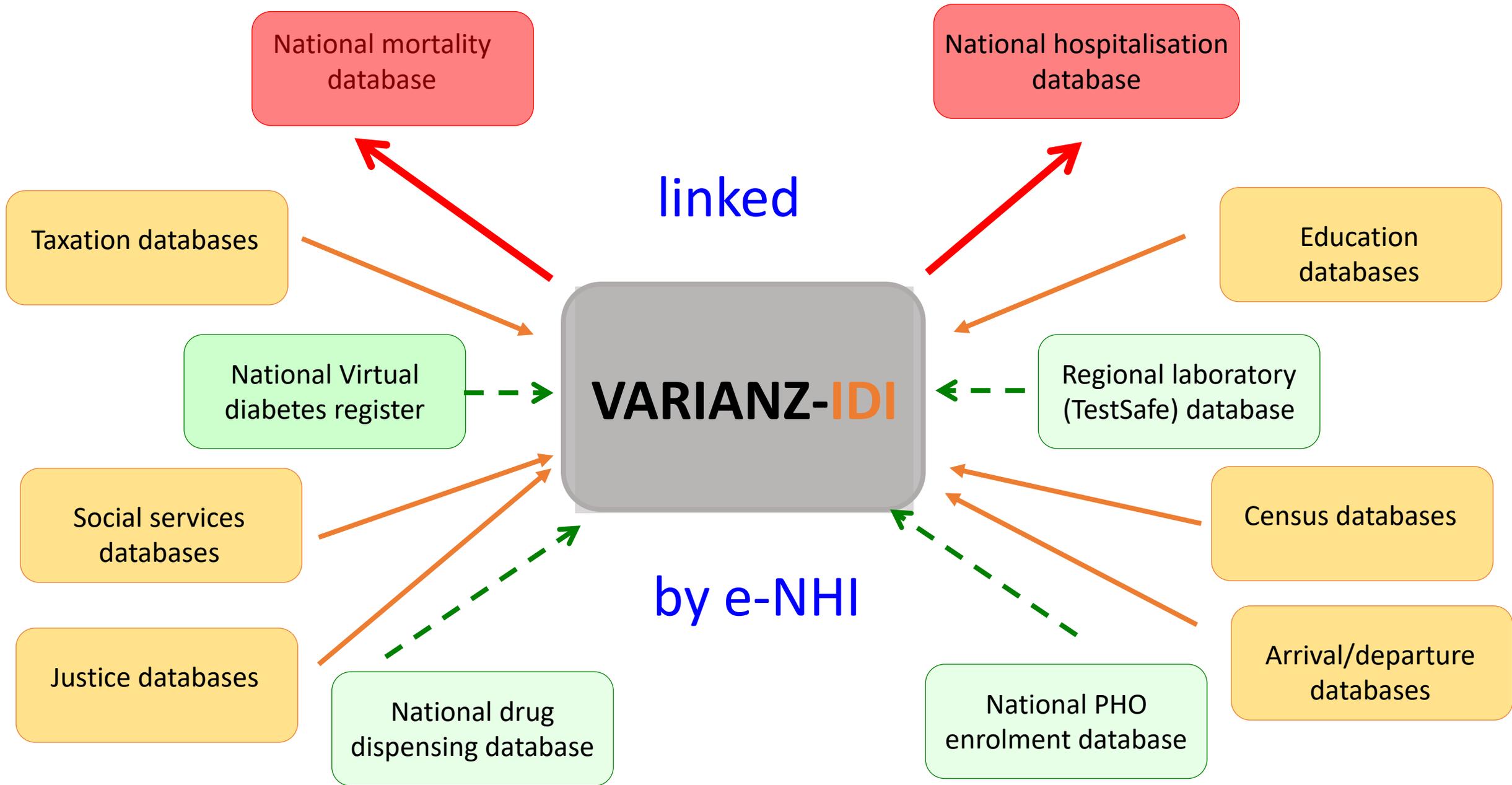
Development and validation of alternative cardiovascular risk-prediction equations for population health planning: a routine health data linkage study of 1.7 million New Zealanders

Suneela Mehta, Rod Jackson, Romana Pylypchuk, Sue Wells & Andrew Kerr



VARIANZ predicted 5-year risk versus in observed 5-year risk in VARIANZ cohort





Constructing whole of population cohorts for health and social research using the New Zealand Integrated Data Infrastructure

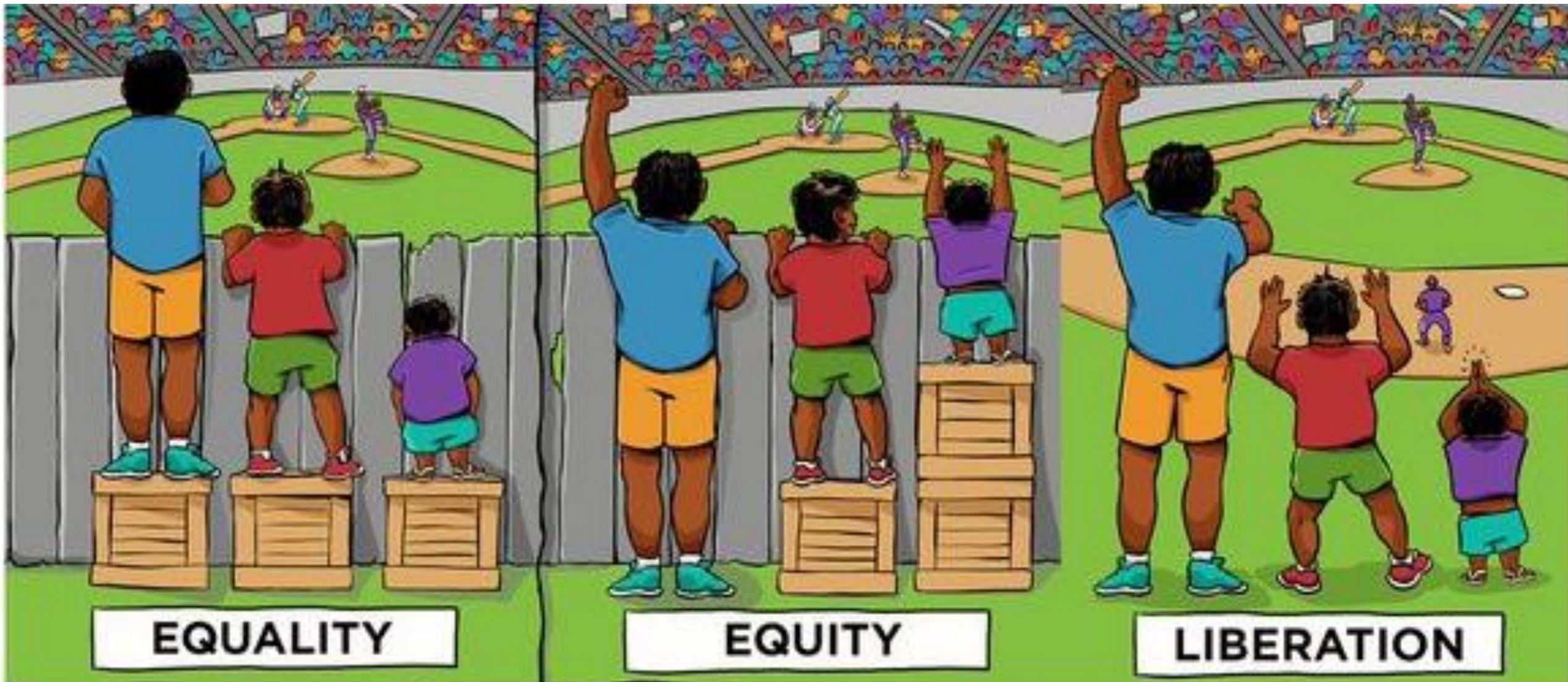
Jinfeng Zhao,¹ Sheree Gibb,² Rod Jackson,¹ Suneela Mehta¹ and Daniel J. Exeter¹

Aust NZ J Public Health. 2018; Online; doi: 10.1111/1753-6405.12781

Table 1: The IDI population compared to the HSU and 2013 Census populations by demographics, deprivation and DHB.

Distribution	Populations						Percentage Difference	
	IDI (N)	IDI (%)	HSU (N)	HSU (%)	Census (N)	Census (%)	IDI-HSU (%)	IDI-Census (%)
Total	4,414,287	100	4,266,789	100	4,242,051	100	3	4
Sex								
Male	2,172,804	49	2,063,709	48	2,064,018	49	5	5
Female	2,241,483	51	2,202,120	52	2,178,030	51	2	3
Prioritised ethnicity								
Māori	700,941	16	551,895	13	598,602	14	21	15
Pacific	288,249	7	274,005	6	244,158	6	5	15
Asian	482,670	11	354,516	8	457,167	11	27	5
Indian	163,287	4	113,412	3	151,809	4	31	7
Chinese	157,872	4	120,465	3	161,769	4	24	-2
Other Asian	161,508	4	120,642	3	143,589	3	25	11
All Other	2,942,430	67	3,086,376	72	2,711,472	64	-5	8

reduce inequities in vascular disease by better targeted management of high-risk people(s) & monitoring outcomes



thank you