



Assessing Māori/non-Māori differences in cardiovascular disease risk and risk management in routine primary care practice using web-based clinical decision support: (PREDICT CVD-2)

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Abstract

Aim To describe the cardiovascular disease risk factor status and risk management of Māori compared with non-Māori patients opportunistically assessed in routine practice using PREDICT-CVD, an electronic clinical decision support programme.

Methods In August 2002, a primary healthcare organisation, ProCare, implemented PREDICT-CVD as an opportunistic cardiovascular risk assessment and management programme. Between 2002 and February 2006, over 20,000 cardiovascular risk assessments were undertaken on Māori and non-Māori patients. Odds ratios and mean differences in cardiovascular risk factors and risk management for Māori compared to non-Māori (European and other, Pacific, Indian, and other Asian) patients were calculated.

Results Baseline risk assessments were completed for 1450 (7%) Māori patients and 19, 164 (93%) non-Māori patients. On average, Māori were risk assessed 3 years younger than non-Māori. Māori patients were three times more likely to be smokers, had higher blood pressure and TC/HDL levels, and twice the prevalence of diabetes and history of cardiovascular disease as non-Māori. Among patients with a personal history of cardiovascular disease, Māori were more likely than non-Māori to receive anticoagulants, blood pressure-lowering and lipid-lowering medications. However, of those patients with a history of ischaemic heart disease, Māori were only half as likely as non-Māori to have had a revascularisation procedure.

Conclusion An electronic decision support programme can be used to systematically generate cardiovascular disease risk burden and risk management data for Māori and non-Māori populations in routine clinical practice in real-time. Moreover, the PREDICT-CVD programme has established one of the largest cohorts of Māori and non-Māori ever assembled in New Zealand. Initial findings suggest that Māori are more likely than non-Māori to receive drug-based cardiovascular risk management if they have a personal history of cardiovascular disease. In contrast, among the subgroup of patients with a history of ischaemic heart disease, Māori appear to receive significantly fewer revascularisations than non-Māori.

The gap in life expectancy between Māori and non-Māori in New Zealand increased over the period 1980–1999. Most notably, the slow decline in Māori cardiovascular disease (CVD) mortality rates over this period contrasted with the rapid decline in non-Māori rates.¹ As a consequence, CVD remains the major contributing cause to the widening life expectancy disparity between Māori and non-Māori people in New Zealand.

The most recent New Zealand guideline on CVD risk management² recommends a systematic evidence-based approach to assessment and management based on a patient's absolute 5-year risk.

The target population for CVD risk assessment is all men over the age of 45 years, and all women over the age of 55 years. However, at any given age, Māori have an increased prevalence of CVD compared to non-Māori. Therefore, risk assessment is recommended a decade earlier for Māori patients—i.e. at ages 35 years for Māori men, and 45 years for Māori women.

PREDICT-CVD is a web-based clinical decision support programme for CVD risk assessment and management. Its development has been described elsewhere.³ PREDICT-CVD has been shown to be an effective tool for increasing CVD risk assessment in routine primary care practice. Indeed, in a before-after evaluation, investigators found its use produced a four-fold increase in risk assessment and risk factor documentation for both Māori and non-Māori.^{4,5}

This paper reports on differences at baseline between Māori and non-Māori CVD risk assessments and management in the first 3½ operational years of PREDICT-CVD in ProCare a large primary health organisation in Auckland, New Zealand.

Methods

This report describes a pre-planned analysis of Māori/non-Māori differences in a study examining CVD risk and risk management in primary care in Auckland, New Zealand. A full description of the study methods and data definitions can be found in the paper by Bannink et al.³

A web-based clinical decision support programme, PREDICT-CVD, was integrated with the patient management system MedTech for primary care practitioners in ProCare, a large primary health organisation (patient population approximately 650,000) in Auckland, New Zealand.

Whenever a ProCare health practitioner used PREDICT-CVD, an anonymous electronic patient profile was generated and stored on the PREDICT server. PREDICT-CVD generates either one or two datasets; the first dataset is generated on all patients assessed and includes a CVD risk factor profile and estimate of 5-year CVD risk.

A second extended dataset that includes risk assessment and risk management is generated if the practitioner uses PREDICT to provide individualised management advice based on a patient's CVD risk. This is typically requested for high-risk patients. This latter dataset includes more extensive information on CVD risk factors and current drug and non-drug management of CVD risk. The data from these two patient data sets formed the basis for this study.

When clinicians use PREDICT, ethnicity data are automatically transferred from the patient management system. The New Zealand Health Information Service recommend the categorisations of Statistics New Zealand for self-reported ethnicity.⁶ For the purpose of these analyses, ethnicity data from PREDICT were categorised into two groups: Māori and non-Māori (European and other, Pacific, Indian, and other Asian peoples).

All data were analysed using SAS 9.1 statistical software. Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated for Māori compared with non-Māori using a logistic regression model that adjusted for age group and sex. For continuous data, mean differences and 95% CIs were calculated using a general linear model that adjusted for age group and sex.

Subgroup analysis was undertaken for those patients with a personal history of CVD and the smaller subgroup of those with a history of ischaemic heart disease (IHD). A logistic regression model adjusting for age group and sex was used to test the association of Māori compared to non-Māori of having had a revascularisation procedure (percoronary intervention such as a stent or angioplasty, or coronary artery bypass graft—PCI or CABG).

Ethical approval: The PREDICT project was approved by the Auckland Ethics Committee (AKY/03/12/314).

Results

Between 2002 and February 2006, PREDICT-CVD collected and stored 20,614 CVD risk assessments. Of these, 1450 (7%) were for Māori patients and 19,164 (93%) for non-Māori patients. The mean age of Māori patients was 53.2 years for Māori and 46% were female. For non-Māori the mean age was 56.5 years and 44% were female.

Table 1 presents ORs and mean differences with 95% CIs for CVD risk factors for all Māori and all non-Māori patients adjusted by age group and sex.

Table 1. CVD risk factor profiles for all Māori compared to all non-Māori

CVD risk factor	Māori (n=1450) n (%)	non-Māori (n=19,164) n (%)	Odds ratio or mean difference ORs (95% CI) RDs (95% CI)
Smoking	471 (32)	2200 (11)	3.51 (3.12–3.96)
Diabetes mellitus	353 (24)	2642 (14)	2.23 (1.96–2.53)
History CVD	215 (15)	2126 (11)	1.88 (1.61–2.21)
Ischaemic heart disease	152 (10)	1575 (8)	1.75 (1.45–2.10)
Stroke/Transient ischaemic attack	67 (5)	495 (3)	2.36 (1.80–3.08)
Peripheral vascular disease	37 (3)	291 (1)	2.22 (1.56–3.16)
Family history CVD	484 (33)	5077 (26)	1.31 (1.16–1.46)
Mean systolic blood pressure (mmHg)	138	135	2.30 (1.34–3.26)
Mean diastolic blood pressure (mmHg)	84	81	2.81 (2.25–3.36)
Mean total cholesterol/HDL ratio	4.3	4.1	0.22 (0.15–0.28)

Odds ratios and mean differences adjusted for age group and sex.

Within this cohort of ProCare patients, Māori were three times more likely to be smokers than non-Māori. Māori patients were also twice as likely to have diabetes and a personal history of CVD (IHD, stroke or transient ischaemic attack, and peripheral vascular disease) as non-Māori.

The reporting of a family history of CVD was 30% higher for Māori compared to non-Māori. On average, body mass index, systolic and diastolic blood pressures, and total cholesterol/HDL ratios were higher for Māori compared to non-Māori.

Of the 20,614 patients screened, 2341 (11%) had a history of CVD. Of this group of high-risk patients, 215 (9%) were Māori and 2126 (91%) non-Māori. Management data (i.e. the second PREDICT dataset described in the Methods section) was available for 1363 (58%) of these patients, with a greater proportion of Māori (66%) than non-Māori (57%) patients having both risk assessment and risk management datasets completed.

Table 2 presents ORs and mean differences with 95% CIs for CVD risk factors and management variables for Māori compared to non-Māori with a history of known CVD. Within this group of patients, Māori were more likely than non-Māori to be smokers, to have diabetes, a family history of CVD and a high BMI. However, Māori were more likely to be prescribed antiplatelet or anticoagulant, antihypertensive, and lipid-lowering medications. As a result, Māori and non-Māori in this subgroup had comparable blood pressure and serum lipid measurements.

Table 2. CVD risk factor and management profiles for Māori compared to non-Māori with a personal history of CVD

CVD risk assessment or risk management variable	Māori (n=215)	non-Māori (n=2126)	Odds ratio or mean difference (95% CI)
Risk assessment variable	n (%)	n (%)	
Smoking	69 (32)	264 (12)	2.96 (2.14–4.10)
Diabetes mellitus	95 (44)	550 (26)	2.26 (1.69–3.02)
Family history CVD	88 (41)	656 (31)	1.17 (1.04–1.31)
Mean systolic blood pressure (mmHg)	135	135	0.15 (-2.57–2.86)
Mean diastolic blood pressure (mmHg)	81	80	1.26 (-0.18–2.70)
Mean total cholesterol/HDL ratio	4.2	3.9	0.32 (0.15–0.49)
PREDICT risk management module used in consultation*	143 (66)	1220 (57)	1.41 (1.05–1.91)
Risk management variable	n (%)	n (%)	
Anticoagulants	106 (74)	861 (71)	1.43 (0.96–2.17)
Antihypertensives	111 (78)	857 (70)	1.60 (1.06–2.48)
Lipid-lowering medications	88 (61)	746 (61)	1.04 (0.72–1.50)
Triple pharmacotherapy	69 (48)	539 (44)	1.24 (0.87–1.77)
Mean body mass index	32	29	2.83 (1.75–3.90)
Mean total cholesterol (mmol/L)	5.2	5.2	-0.03 (-0.24–0.17)
Mean HDL cholesterol (mmol/L)	1.4	1.4	-0.08 (-0.17–0.00)
Mean LDL cholesterol (mmol/L)	3.0	3.0	-0.07 (-0.26–0.11)
Mean triglycerides (mmol/L)	2.1	1.9	0.24 (0.05–0.43)

Odds ratios and mean differences adjusted for age group and sex; *PREDICT includes both risk assessment and risk management modules (see Methods); The risk management module is typically used for high risk patients

A further subset analysis of those with a history of ischaemic heart disease (IHD) (n=1727) was undertaken to determine access to revascularisation procedures. Only 18% of Māori (27/152) compared with 30% of non-Māori (473/1575) patients with a history of IHD had undergone a revascularisation procedure. Māori had approximately half (OR=0.46, 95%CI: 0.34-0.83) the revascularisation rate as non-Māori in this cohort of patients.

Discussion

This paper has reported differences between Māori and non-Māori CVD risk assessments undertaken opportunistically in the first 3½ years of a large pilot of a web-based clinical decision support programme in routine general practice.

Baseline CVD risk assessments were completed for over 20,000 patients aged 35 years and older from ProCare, a large Auckland-based primary care organisation, establishing one of the largest cohorts of Māori and non-Māori ever assembled in New Zealand. Of these assessments, 7% (1450) were from Māori patients.

The mean age of Māori participants was 53 years while non-Māori participants were on average 3 years older, complying toward (but not meeting) current guideline recommendations and the higher age specific CVD risk of Māori. This indicates that more can be done to risk assess Māori at a younger age. The higher prevalence of CVD risk factors among Māori in this study was similar to previous studies.

Tobacco consumption is more prevalent among Māori than non-Māori, and has declined less for Māori over the last 20 years.⁷ Diabetes prevalence among Māori is three and five times higher for males and females respectively compared to New Zealand Europeans.⁸

The observation of greater CVD risk associated with increased body mass index, blood pressure, and cholesterol levels for Māori compared to non-Māori is also consistent with other New Zealand cross-sectional surveys.⁹⁻¹⁴

Robust epidemiological and clinical trial evidence supports the use of anticoagulant, antihypertensive, and lipid-lowering medications for the secondary prevention of CVD.¹⁵⁻¹⁸ Encouragingly, for those patients with a history of CVD, Māori were more likely than non-Māori to be receiving (and taking) these pharmacotherapies given the comparable systolic blood pressure; and total, HDL, and LDL cholesterol levels.

This may indicate that primary healthcare practitioners are intensifying their efforts given the highlighted Māori health disparities. However, (unless contraindicated) all those with known CVD should be receiving antiplatelet or anticoagulant, antihypertensive, and lipid-lowering treatment in the secondary prevention of coronary heart disease.

Disappointingly, we found that only 58% of those with known CVD had risk management data available, and of those less than half were receiving all three drug therapies described above. This represents a significant gap between evidence-based secondary prevention and the clinical reality in primary care. Therefore, targeting risk assessment to those groups most in need is not enough.

Systematic risk management must follow risk assessment and be subject to a quality-driven implementation programme.⁵

Of concern, this study suggests that Māori with known IHD receive significantly fewer revascularisation procedures than non-Māori. Indeed, this is consistent with the findings of other studies.¹⁹⁻²²

After controlling for differences in age, sex, and deprivation, one study found that CABG and PCI intervention rates for Māori patients were about half those of non-Māori.²³ It is unacceptable that Māori have greater exposure to CVD health risks and less access to high-quality secondary healthcare services in New Zealand.

Differential access to health services is a likely contributor to Māori CVD inequalities.²⁴ The health sector has a statutory responsibility and key role to ensure that access to healthcare for Māori is equitable.²⁵

This study has highlighted that there are a number of opportunities to optimise management for Māori with CVD. They include the revision of coronary scoring and surgical prioritisation methods; providing full funding for drug therapies, including plant sterol and stanol-fortified spreads;²⁶ and more intensive management and monitoring of risk factors at the whānau (extended family) level.

In conjunction with drug treatment, non-drug interventions for Māori at high risk should include intensive lifestyle advice about cardioprotective diets and physical activity as well as ready access to smoking cessation programmes that are Māori specific. These opportunities could become realities with increased funding for

healthcare practitioners who actively manage and monitor high risk Māori patients and their whānau.

In addition, cardiovascular health research investment that is weighted to Māori and aimed at improving Māori CVD inequalities is needed.

Possible misclassification bias associated with ethnicity data collected by PREDICT-CVD was not addressed in these analyses. An ethnicity validation substudy is currently being analysed (A. Lindsay, personal communication, 2006). This cross-sectional analysis will compare patient ethnicity data recorded in PREDICT-CVD to self-reported ethnicity recorded via a postal questionnaire (using the standard ethnicity question recommended by the 2004 report on Ethnicity Data Protocols for the Health and Disability Sector²⁷).

Over time, it will be possible to link this large and continually expanding PREDICT dataset with national data on hospital admissions and deaths. Linkage will enable us to generate New Zealand population CVD-risk prediction equations.

Māori-specific equations will replace the Framingham equations based on a white, largely middle-class, North American population. New Zealand will then have a world class CVD and diabetes data repository from which information on the burden and management of these chronic conditions can be generated and acted upon.

Note: PREDICT-CVD was developed by the University of Auckland and Enigma Publishing Ltd in collaboration with ProCare Health Ltd, Counties Manukau District Health Board, Ministry of Health, National Heart Foundation, New Zealand Guidelines Group, and MedTech Global Ltd.

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