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Whittaker, R., Bramley, D., Wells, S., Stewart, A., Selak, V., Furness, S., . . . Jackson, R. (2006). Will a web-based cardiovascular disease (CVD) risk assessment programme increase the assessment of CVD risk factors for Māori? *New Zealand Medical Journal*, *119*(1238), 2077. Retrieved from http://www.nzma.org.nz/journal/read-the-journal/all-issues/2000-2009/2006

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THE NEW ZEALAND MEDICAL JOURNAL
Vol 119 No 1238 ISSN 1175 8716

Will a web-based cardiovascular disease (CVD) risk assessment programme increase the assessment of CVD risk factors for Māori?

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Abstract

Background Māori suffer disproportionately from cardiovascular disease despite the national priority of reducing inequalities. National guidelines on the clinical management of CVD risk recommend a comprehensive risk assessment be completed as a prerequisite for identifying patients most likely to benefit from treatment.

Methods A retrospective audit of GPs using PREDICT-CVD (an electronic risk assessment and management tool) was designed with adequate explanatory power for Māori to determine if it could increase CVD risk assessment without increasing inequalities. 1680 electronic medical records (EMRs) prior to implementation and 1884 after implementation of PREDICT were audited.

Results Documentation of CVD risk increased from 3.2% of EMRs to 14.7% of EMRs in Māori, and from 2.8% to 10.5% in non-Māori. The documentation of individual CVD risk factors also increased post-implementation of the tool.

Conclusions The implementation of PREDICT-CVD was as likely to increase documentation of CVD risk assessment and risk factors in Māori as in non-Māori. However documentation was still low in Māori despite known high prevalence of CVD risk factors. A comprehensive quality-driven implementation programme is recommended, including targeting risk assessment for those most in need.

Cardiovascular disease (CVD) is the leading cause of death for Māori.[1] Despite priority being placed on CVD by the health system in New Zealand (NZ), inequalities in cardiovascular health outcomes have a negative impact on Māori.[2] Māori also have high prevalence of many cardiovascular risk factors, such as smoking,[3] diabetes, high cholesterol, and elevated blood pressure.[4]

Waitemata District Health Board (WDHB), in concordance with the Ministry of Health's national priority areas,[5] has a focus on CVD prevention and on reducing inequalities.[6] Current New Zealand guidelines recommend cardiovascular risk assessment and management for all Māori men over 35 years of age and Māori women over 45 years of age—and 10 years later for people of non-Māori, non-Pacific, non-Indian subcontinent ethnicity.[7]

A web-based tool to facilitate risk assessment and management in primary care (PREDICT-CVD) has been developed in New Zealand and implemented using the brand name "Prompt" in ProCare Health Limited (a group of three Primary Health Organisations (PHOs) under one Management Services Organisation). This PREDICT–CVD programme is integrated into the patient management system to allow systematic cardiovascular risk assessment and provide within-seconds

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evidence-based patient-tailored decision support according to the national guidelines for the management of cardiovascular risk.

Prior to supporting the implementation of such a tool, Waitemata DHB sought evidence that the use of PREDICT-CVD would not adversely impact inequalities. Therefore a retrospective before-after study was designed to investigate the effect of PREDICT-CVD on documentation of CVD risk and risk factors for Māori and non-Māori.

Methods

Eligible general practitioners (GPs) were those who had used MedTech32 electronic medical records for at least 1 year, had installed PREDICT-CVD in their practice prior to May 2004, and used systems categorising patients according to their registered GP.

They were invited by ProCare Health Ltd to participate in the study. Researchers conducted electronic queries to create lists of patients meeting the NZ guideline criteria for cardiovascular risk assessment (Māori/Pacific/Indian subcontinent men aged 35 years and over; Māori/Pacific/Indian subcontinent women aged 45 years and over—and 10 years later respectively for others), who had visited an eligible GP within a 4-week period that was either 1 month after the GP first used PREDICT or the same 4-week period 1 year earlier (pre-PREDICT period).

These time periods ranged from August 2001 to June 2004, with considerable overlap between pre-PREDICT and post-PREDICT installation time periods. Both time periods were audited retrospectively, and GPs did not know in either period that they would be audited.

The study was designed to provide adequate explanatory power for Māori. Therefore all Māori patients identified, and a randomly selected 15% sample of non-Māori patients identified, were included in the audit of electronic medical records (EMRs).

Patients whose ethnicity was documented as NZ Māori or equivalent (Māori, M, or New Zealand Health Information Service [NZHIS] code 21) in the EMR were included as Māori. Where no ethnicity was recorded, patients were assumed to be non-Māori.

Trained and experienced audit nurses conducted the EMR audits in the general practices, recording any cardiovascular risk notation (range, %, text description), and any documentation of smoking status (smoker, non-smoker, past smoker), cholesterol level (total cholesterol:HDL ratio or total cholesterol), blood pressure measurements, and diabetes status (type 1 or type 2 diabetes stated, diabetes documented as absent; or no documented diagnosis but evidence of impaired glucose tolerance, raised HbA1c, or prescriptions for insulin/test strips/oral hypoglycaemics).

All analyses were conducted using SAS statistical software Version 9.1. For the outcomes of interest, the proportions for the total population were derived from Māori and non-Māori sampling populations. To calculate odds ratios together with 95% confidence intervals, a multivariate analysis was conducted using a mixed logistic regression model in which GPs were regarded as random effects and all other variables regarded as fixed effects.

The model included the practice that the GP worked in and patient characteristics that may influence GP risk-assessment behaviour: age, gender, ethnicity, presence of existing cardiovascular disease, diabetes, High Use Health Card (HUHC – for those with medical conditions requiring frequent GP visits), and Community Services Card (CSC – for low income families). To assess if documentation of risk or risk factors differed by ethnicity after the implementation of PREDICT, an interaction term was used.

The PREDICT-CVD Evaluation Study gained ethics approval from the Auckland Regional Ethics Committee (AKY/04/07/185).

Results

Of the 107 eligible GPs, 84 (78.5%) consented to participate (4 were absent from their practices, 1 could not be contacted, and 18 declined). Four practices were unable to supply data, thus leaving 80 contributing GPs.[8]

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A total of 3564 audits were conducted (1680 in the pre-PREDICT period and 1884 in the post-installation period). Māori participants made up 28.2% (n=474) of audited EMRs in the pre-PREDICT period, and 25.7% (n=484) in the post-PREDICT period.

The audited Māori participants were significantly different from the non-Māori participants in all parameters evaluated. Māori participants were younger (due to the different sampling criteria from the screening guidelines) with very few aged over 74 years; were more likely to be male, have diabetes, and a CSC; and were less likely to have a HUHC and previous CVD, than non-Māori participants.

The characteristics of Māori participants did not differ greatly between the two time periods. The only significant difference among non-Māori participants was a higher level of previous CVD in the post-PREDICT period (25% of participants compared to 21% in the pre-PREDICT period, Chi-squared=5.65, p=0.0175).

Table 1. Characteristics of Māori and non-Māori audited populations

Variable	Māori N=958		Non-Māori N=2606	
	n	%	n	%
Age				
35–44yrs	187	19.5	38	1.5
45–54yrs	360	37.6	378	14.5
55–64yrs	227	23.7	796	30.5
65–74yrs	133	13.9	664	25.5
75–84yrs	44	4.6	579	22.2
85–94yrs	7	0.7	142	5.5
Over 95yrs	0	0	9	0.3
Difference between Māori & non-Māori participants: Chi Square 760.73 p< 0.0001				
Gender				
Female	445	46.5	1352	51.9
Male	513	53.5	1254	48.1
Difference between Māori & non-Māori participants: Chi Square 8.26 p= 0.0041				
High Use Health Card (HUHC) status				
No HUHC	881	92.0	2332	89.5
HUHC	77	8.0	274	10.5
Difference between Māori & non-Māori participants: Chi Square 4.84 p=0.028				
Community Services Card (CSC) status				
No CSC	484	50.5	1495	57.4
CSC	474	49.5	1111	42.6
Difference between Māori & non-Māori participants: Chi Square 13.29 p=0.0003				
Diagnosed diabetes or on diabetes treatment				
No Diabetes	740	77.2	2280	87.5
Diabetes	218	22.8	326	12.5
Difference between Māori & non-Māori participants: Chi Square 56.86 p< 0.0001				
Previous cardiovascular disease (CVD) event or on nitrates				
No CVD	801	83.6	2002	76.8
CVD	157	16.4	604	23.2
Difference between Māori & non-Māori participants: Chi Square 19.23 p<0.0001				

Prior to PREDICT installation, Māori had slightly higher recording of cardiovascular risk than non-Māori (in 3.2% vs 2.8% of EMRs). Where the EMR contained information on all the risk factors necessary to conduct a risk assessment but overall

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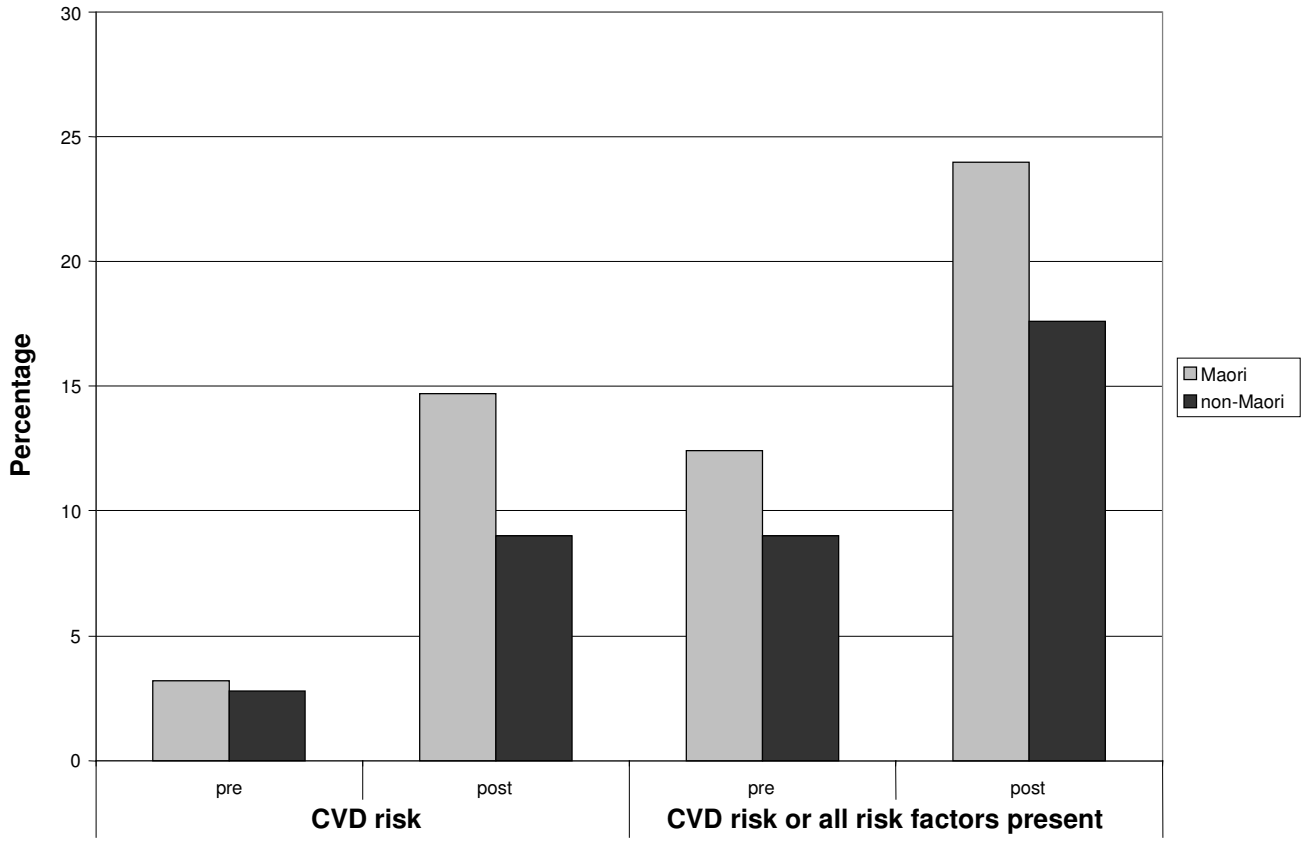
risk was not documented, the GP may have used a paper-based risk assessment chart to calculate CVD risk but not documented it in the EMR. The baseline proportion of EMRs with *either* risk documented *or* all necessary risk factors documented was 12.4% in Māori and 9% in non-Māori. (Figure 1)

There was an increase in the recording of risk after the installation of PREDICT for both Māori and non-Māori. This increase appears greater in Māori participants (from 3.2% of EMRs to 14.7% of EMRs) than in non-Māori (from 2.8% to 10.5% of EMRs), although it was not statistically significant.

When the recording of CVD risk factors was included, documentation of risk or risk factors increased from 12.4% to 24.0% of EMRs for Māori and 9.0% to 17.6% for non-Māori, but again this increase was not statistically different between Māori and non-Māori.

Figure 1. Proportion of EMRs with CVD risk, and risk factors, documented pre- and post-PREDICT by Māori and non-Māori



The recording of both smoking and diabetes status was higher for Māori than non-Māori in both periods. The recording of smoking status for Māori increased from 49.6% of EMRs prior to PREDICT to 59.3% in the post PREDICT period. Recording of diabetes status also increased from 21.5% to 23.3% (Table 2). The increase in the

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recording of all risk factors from pre- to post-installation was not statistically different for Māori compared to non-Māori.

Table 2. Proportion of EMRs with risk factors documented

Variable	Pre-Prompt period		Post-Prompt period		Difference in pre- to post- increase between Māori & non-Māori: p value*
	Māori N=474 % (n)	Non-Māori N=1206 % (n)	Māori N=484 % (n)	Non-Māori N=1400 % (n)	
CVD risk	3.2 (15)	2.8 (34)	14.7 (71)	10.5 (147)	0.28
CVD risk or risk factors present	12.5 (59)	9.0 (108)	24.0 (116)	17.6 (246)	0.44
Smoking status	49.5 (235)	38.3 (462)	59.3 (287)	47.9 (670)	0.58
Diabetes status	21.5 (102)	14.0 (169)	23.4 (113)	15.2 (213)	0.53
Blood pressure	71.5 (339)	85.8 (1035)	83.7 (405)	92.8 (1299)	0.62
TC/HDL or total cholesterol	57.6 (273)	64.3 (776)	69.2 (335)	72.9 (1021)	0.23

*Model includes: age, gender, presence of CVD, diabetes, HUHC, CSC.

Discussion

As District Health Boards have a legislative mandate to reduce inequalities and improve Māori health, it was considered vital for Waitemata DHB to assess the potential effect of a comprehensive cardiovascular risk assessment and management programme on inequalities prior to the introduction of such a programme. Therefore an evaluation study was designed specifically to have adequate explanatory power for Māori.

The use of this methodology could be considered an innovation by the DHB as it attempts to find ways to increase health service responsiveness to the need to reduce health inequalities. This type of study methodology could also be used in the future by other DHBs in order to evaluate new or existing services and their impact on inequalities.

The results of this study are encouraging in that risk factor documentation and risk assessment increased similarly for both Māori and non-Māori after the installation of the PREDICT-CVD risk assessment tool. It appears that this type of tool will not increase inequalities and, if applied in an appropriate manner, could potentially lead to a reduction in inequalities. However, introduction of the risk assessment tool alone is not enough as evidenced by the low overall level of documented risk assessment.

In future we recommend introduction be accompanied by a comprehensive implementation programme to ensure that the entire target population is assessed. Also, the ensuing management of risk still needs to be followed up to ensure that risk assessment does lead to better treatment and health outcomes, and to avoid differences in treatment by ethnicity.

It is of interest that the recording of cardiovascular risk and risk factors for Māori was so low in this population given the demonstrated high prevalence of cardiovascular risk factors in Māori in other studies. For example, the New Zealand Health Survey

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(2002/03) found that 23.7% of Māori adults had been told they had high blood pressure (vs 17.6% European/Other) and 15.9% high cholesterol (vs 14.6% European/Other).[9] Also CVD is known to occur at an earlier age in Māori, as reflected in the cardiovascular risk guidelines recommendation to screen this group 10 years earlier. Should Māori patients be prioritised for risk assessment and risk factor documentation, the health gains are likely to be large.

The documentation of smoking and diabetes status were higher in Māori than non-Māori. Just under one in every two Māori are smokers compared to one in every five non-Māori, [3] and the prevalence of diabetes is 6.7% in Māori compared to 2.4% in European/Others. [9] Therefore documentation is likely to be higher among Māori if GPs are more likely to record a positive finding than a negative one.

The audited sample contained very few older Māori. This is likely to be influenced by the fact that Māori live (on average) 8–10 years less than non-Māori.[10] There were also low numbers of Māori participants with a HUHC, which is surprising given the high prevalence of diabetes and other chronic conditions in Māori. This could reflect inadequate targeting of this tool.

There was a lower rate of documented previous CVD in Māori than non-Māori in this group. The reasons for this are unknown but should be explored further.

Limitations of the study—Māori are known to be proportionately under-enrolled in PHOs in some areas [11] therefore it is possible that the ProCare Health Ltd enrolled population may not be fully representative of the Māori population of the Auckland region. Differences in access to primary care for Māori, even when enrolled, may also have affected selection of participants.

Also, the definition of ethnicity may lead to classification error, as there was considerable variability across practices in the recording of ethnicity (NZHIS codes, other codes, free text). In the ProCare Health Ltd-enrolled population at the time of this study, 12.3% of patients had no ethnicity recorded [personal communication Ken Leech, ProCare Health Ltd, 2005], and an ensuing audit of ethnicity coding found that less than 2% of audited patients had more than one ethnicity recorded.[12]

In this study 7.2% of audited EMRs had no ethnicity stated and these were coded as non-Māori, which may have resulted in undercounting of Māori participants. It is not known whether the documented ethnicity was self-identified by the patient or assigned by the practice.

Suggestions for the future—The implementation of the PREDICT-CVD tool should not occur in isolation without a comprehensive quality-driven programme. Aspects of such a programme could include: education for primary care staff concerning the importance of documenting disease risk factors, even if these are found to be absent/negative; active recalling of patients meeting the NZ guideline criteria from PHO-registered population lists; a standard approach to the documentation of ethnicity in primary care; automatic prompts for EMRs of patients who meet the criteria for risk assessment according to the New Zealand guidelines; and targeting risk assessment for those most in need (in particular Māori and Pacific). It should also include taking risk assessment into community settings to provide access for those not currently engaged with primary care.

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An ongoing challenge for DHBs is the requirement to explore and implement healthcare practices that will lead to a reduction in health inequalities.

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Acknowledgements: This study was supported by funds from Waitemata District Health Board and The Future Forum while Sue Wells is the recipient of a National Heart Foundation Research Fellowship.

We also thank Elaine Horn, Kate Moodabe, and all the GPs from ProCare Health Ltd for participating in the study; their practice teams for making us feel welcome; the audit nurses and staff from the Diabetes Project Trust; and Waitemata DHB Cardiovascular Technical Advisory Group for recommending we undertake the study.

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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