Melbourne

Implementing best practice guidelines thorough computerised decision support

Providing meaningful tools for
cardiovascular risk and diabetes management

- Sunday, 23rd October 2005

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XIII Cochrane Colloquium

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Overview

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- Background
  - The need for action
- Aims of the tool
  - What are we hoping to achieve?
- The PREDICT tool
  - Creating the rules
  - PREDICT CVD-Diabetes in action
- Impact so far
  - Before-After study
- Lessons learnt
  - Issues identified in implementing CCDS (eDS)
- Further work planned

Background

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- Cardiovascular disease (CVD) is the leading cause of global mortality.
  - 17 million/year, leading cause of death in 5 of 6 WHO regions
- CVD is the leading cause of death in NZ
  - kills 11,000/yr (40% of all deaths, 2001)
  - mortality rates 2-fold in Pacific Islanders, 2 to 3-fold in Maori
- Effective, evidence-based interventions are available
  - aspirin, antihypertensives, lipid lowering agents

There are problems….

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- Large gap between best evidence and current practice
  - Only 45% of CHD survivors have total cholesterol <4.5mmol/L
  - Only 60% of CHD survivors have BP less than 140/90mmHg
  - Fewer than 40% of people eligible for statins are treated
- Variation in practice
  - 40% variation in statin treatment rates between health districts
  - Unknown gap between ethnic and socioeconomic groups
- Applicability of CVD risk calculations to the NZ population
  - Based on data from Framingham, Massachusetts, USA
  - Limited applicability to Maori and Pacific Islanders in NZ

The solution

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- Evidence-based, best practice guideline
  - Screening criteria
  - 5-year risk charts
  - Multiple-risk factor evaluation
  - Lifestyle management
  - Pharmacological intervention
- Diabetes
  - integral to CVD risk and management
  - guidelines released together
  - cross-linked sections in each

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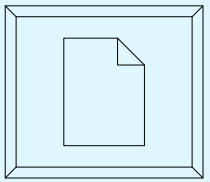
Stop pretending that the writing of guidelines can of itself achieve anything

David Jewell, ed. Br J Gen Pract 2003



Guideline implementation

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- Implementation strategies are many and varied
  - No good evidence to discriminate between different implementation strategies (Grimshaw 2004)
- Computerised clinical decision support is one strategy
  - Clinical improvement in care delivery 64% (Garg 2005)
  - Effects on patient outcome understudied and when studied, inconsistent
- Reasons to believe NZ primary care doctors would adopt…….

NZ GPs and computers 2003

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- 98.6% use specifically designed patient management system software
- 71.8% use computers for full clinical notes
- 87.6% use system that has built-in lab request or lab results function AND use this function
- 95% record screening information or keep disease registers on their PMS
- 90.7% record prescriptions on their PMS

Information Technology Systems in General Practice; 2003;
RNCGP Research Unit, Dept General Practice, University of Otago

Aims

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PREDICT CVD-Diabetes aims to

- Promote systematic CVD risk assessment
- Provide electronic medical record of CVD risk
- Provide evidence-based decision support based on patient-specific profile
  - Improve adherence to best practice
  - Tailored patient education/info
- Provide a database of non-identifiable patient data that can be linked to event data
  - Validation or development of new risk equations for NZ, specifically for Maori/Pacific Islanders

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Real-time CCDS – 'the ultimate guideline'

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Evidence-based systematic risk assessment
& disease management

Patient-practitioner interaction

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Continuous Quality improvement tool

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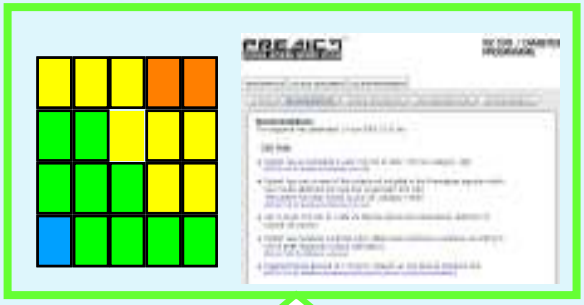
Patient population

Patient-practitioner interaction



audit practice against guidelines

patient-specific risk factor profile and Rx

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Systematic evaluation and monitoring

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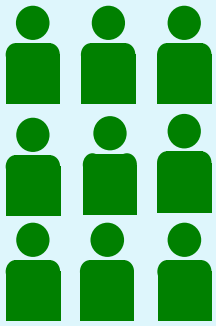


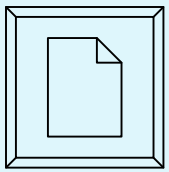
Patient population

All clinical data sent via secure internet connection

Stored anonymous CVD risk profiles

Evaluation and monitoring

DHB or PHO population needs assessment & service planning



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Epidemiological database

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Enrolled population

Electronic medical record

Patient-practitioner interaction

patient-specific outcomes: hospital admissions, deaths

patient-specific CVD risk factor profiles

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NZ risk prediction (Maori/non-Maori)

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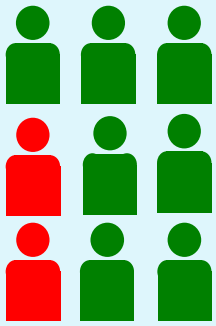
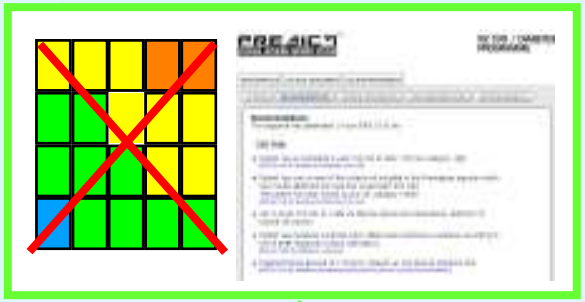


Enrolled population

Electronic medical record



patient-specific outcomes: hospital admissions, deaths

Link with encrypted NHI

patient-specific CVD risk factor profiles

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Overview

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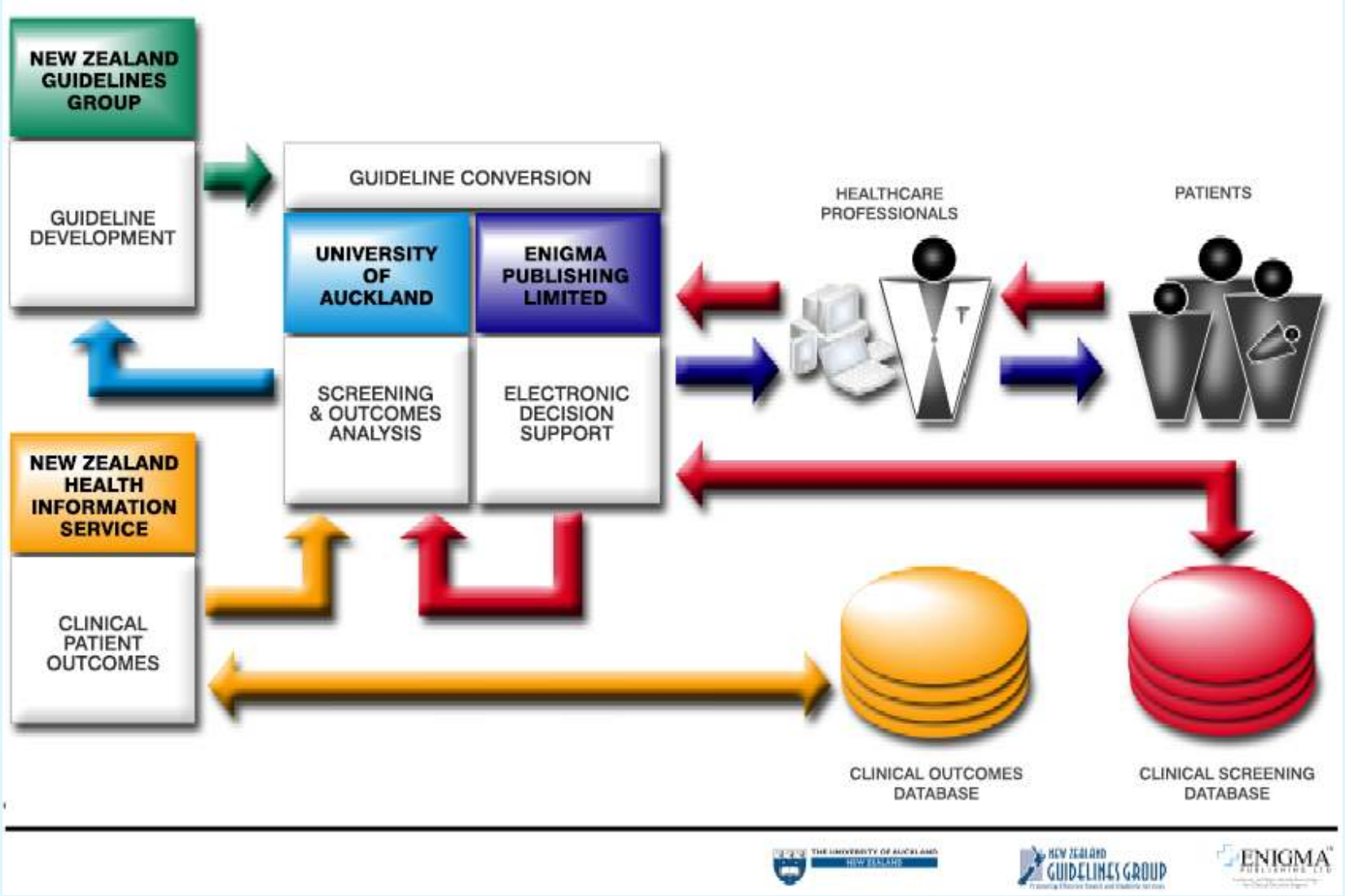

Guideline translation process

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RECOMMENDATIONS: MANAGEMENT OF BLOOD PRESSURE

The higher the calculated cardiovascular risk, the more aggressive the management of modifiable risk factors, including blood pressure, should be.	C
People presenting after an acute myocardial infarction should be considered for a beta blocker and ACE inhibitor irrespective of blood pressure level concurrently with intensive lifestyle advice. This should be given in association with other appropriate medication, such as aspirin and a statin.	A
People presenting after an acute ischaemic stroke or transient ischaemic attack should have blood pressure lowering medication unless the person has symptomatic hypotension. This medication should be given in addition to other appropriate medication such as aspirin, statins or warfarin, if indicated. Treatment should start concurrently with intensive lifestyle advice. It is usually advisable to wait for a few days before starting blood pressure lowering medication.	A
Everyone with blood pressure consistently greater than 170/100 mm Hg should have prompt and specific lifestyle	C

Guideline translation process

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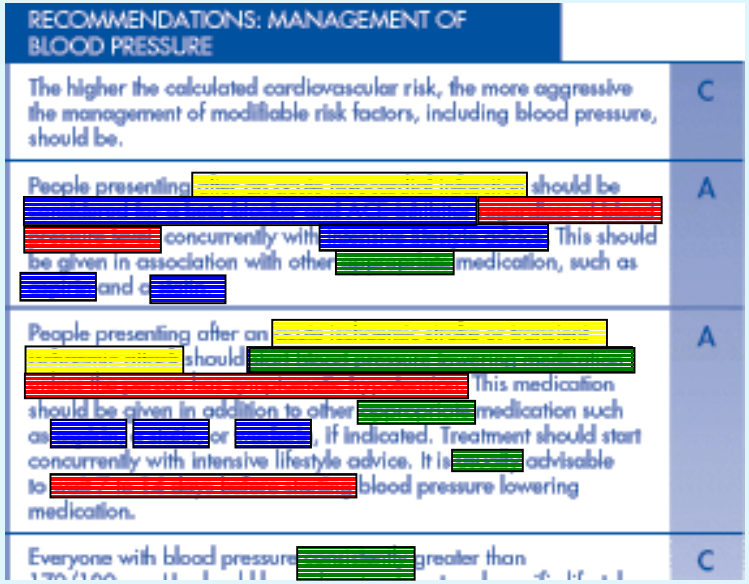
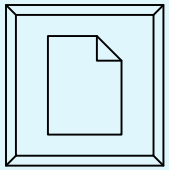

RECOMMENDATIONS: MANAGEMENT OF BLOOD PRESSURE

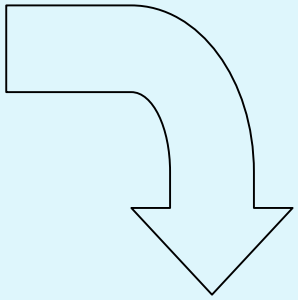
The higher the calculated cardiovascular risk, the more aggressive the management of modifiable risk factors, including blood pressure, should be. C

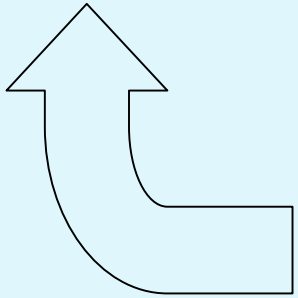
People presenting should be concurrently with This should be given in association with other medication, such as and a A

People presenting after an should This medication should be given in addition to other medication such as or , if indicated. Treatment should start concurrently with intensive lifestyle advice. It is advisable to blood pressure lowering medication. A

Everyone with blood pressure greater than C







	A	B	C	D
3	IHD (PVD and GLD na)	ACE (No, NT, Yes) ARB (No, NT, Yes) BB (No, NT, Yes)	other drugs (No/NT, Yes)	BP <130/80, BP>130/80
4		9	2	2
5	stroke (PVD and GLD na)	ACE (No, NT, Yes) ARB (No, NT, Yes)	other drugs (No/NT, Yes)	BP <130/80, BP>130/80
6		6	2	2
7	stroke and IHD (PVD and GLD na)	ACE (No, NT, Yes) ARB (No, NT, Yes)	other drugs (No/NT, Yes)	BP <130/80, BP>130/80
8		6	2	2
9	PVD only (GLD na)	ACE (No, NT, Yes) ARB (No, NT, Yes)	other drugs (No/NT, Yes)	BP <130/80, BP>130/80

PREDICT CVD-Diabetes

A brief tour

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- Patient demographics
  - Integrated into PMS
  - Pre-population of demographic data held in record
- Clinical data
  - Pre-population of lab results (if they exist in the record)
- Medication data
  - Manually completed (but once entered stored in record)
- Additional data required for diabetics
  - If diabetic, tool has ability to switch to UKPDS risk formula
  - Additional information about retinal, neurological screens
  - Additional lab and medication fields required

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Open integration with PMS

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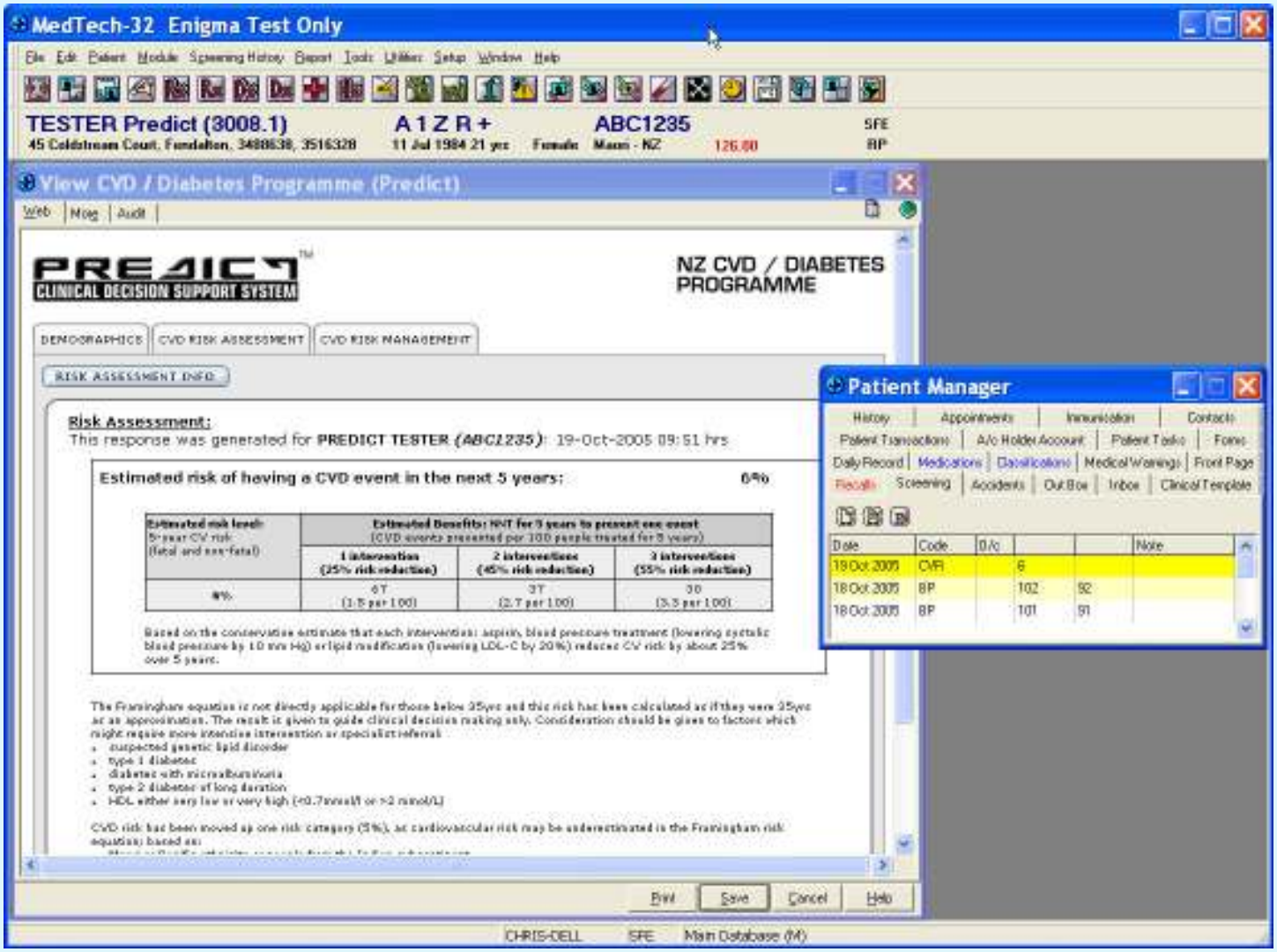

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Patient demographics

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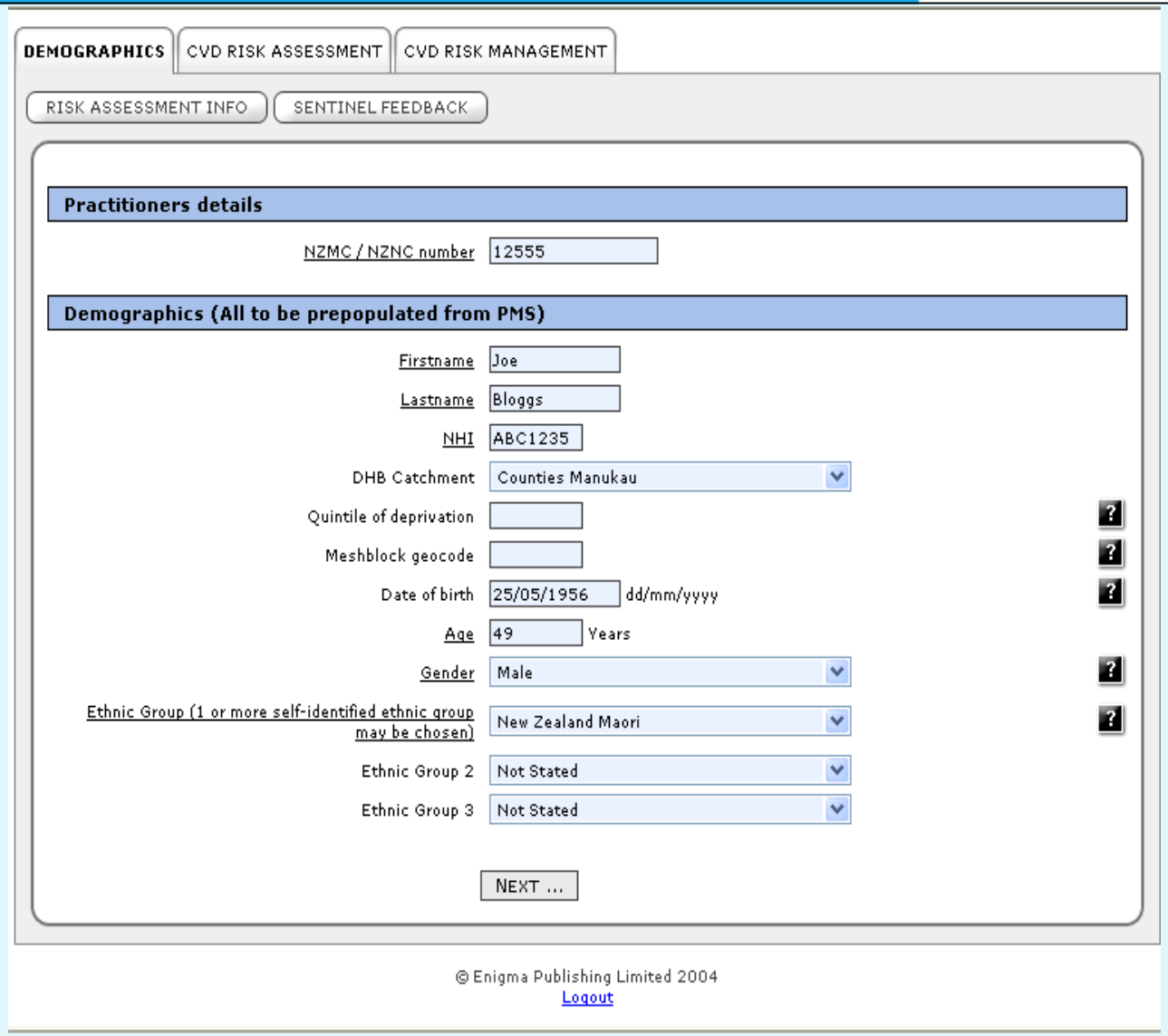

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CVD risk assessment: clinical data

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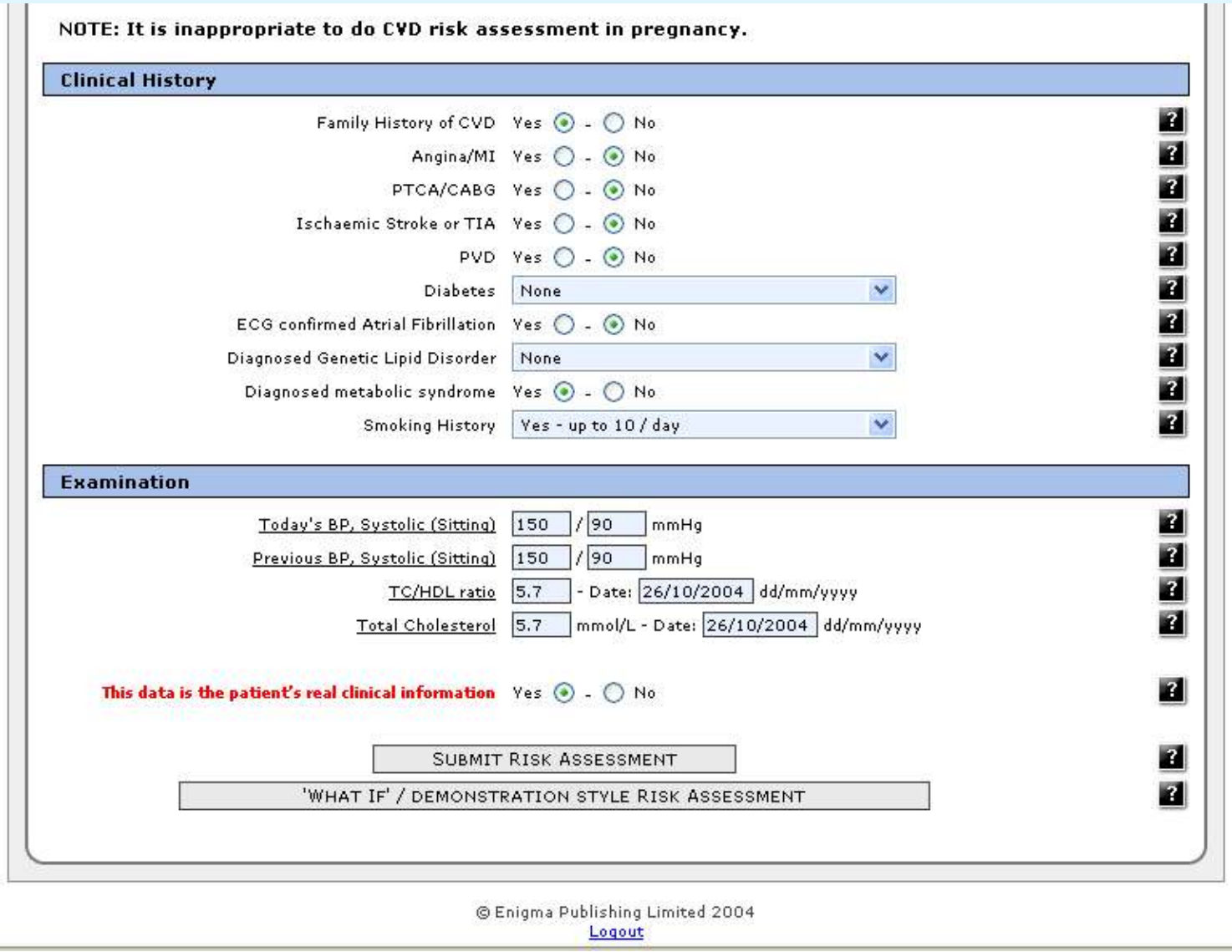

NOTE: It is inappropriate to do CVD risk assessment in pregnancy.

Clinical History

Family History of CVD	Yes ◉ - ○ No
Angina/MI	Yes ○ - ◉ No
PTCA/CABG	Yes ○ - ◉ No
Ischaemic Stroke or TIA	Yes ○ - ◉ No
PVD	Yes ○ - ◉ No
Diabetes	None
ECG confirmed Atrial Fibrillation	Yes ○ - ◉ No
Diagnosed Genetic Lipid Disorder	None
Diagnosed metabolic syndrome	Yes ◉ - ○ No
Smoking History	Yes - up to 10 / day

Examination

Today's BP, Systolic (Sitting)	150 / 90 mmHg
Previous BP, Systolic (Sitting)	150 / 90 mmHg
TC/HDL ratio	5.7 - Date: 26/10/2004 dd/mm/yyyy
Total Cholesterol	5.7 mmol/L - Date: 26/10/2004 dd/mm/yyyy
This data is the patient's real clinical information	Yes ◉ - ○ No

SUBMIT RISK ASSESSMENT

'WHAT IF' / DEMONSTRATION STYLE RISK ASSESSMENT

Logout

PREDICT CVD-Diabetes

Captures detailed epidemiological data

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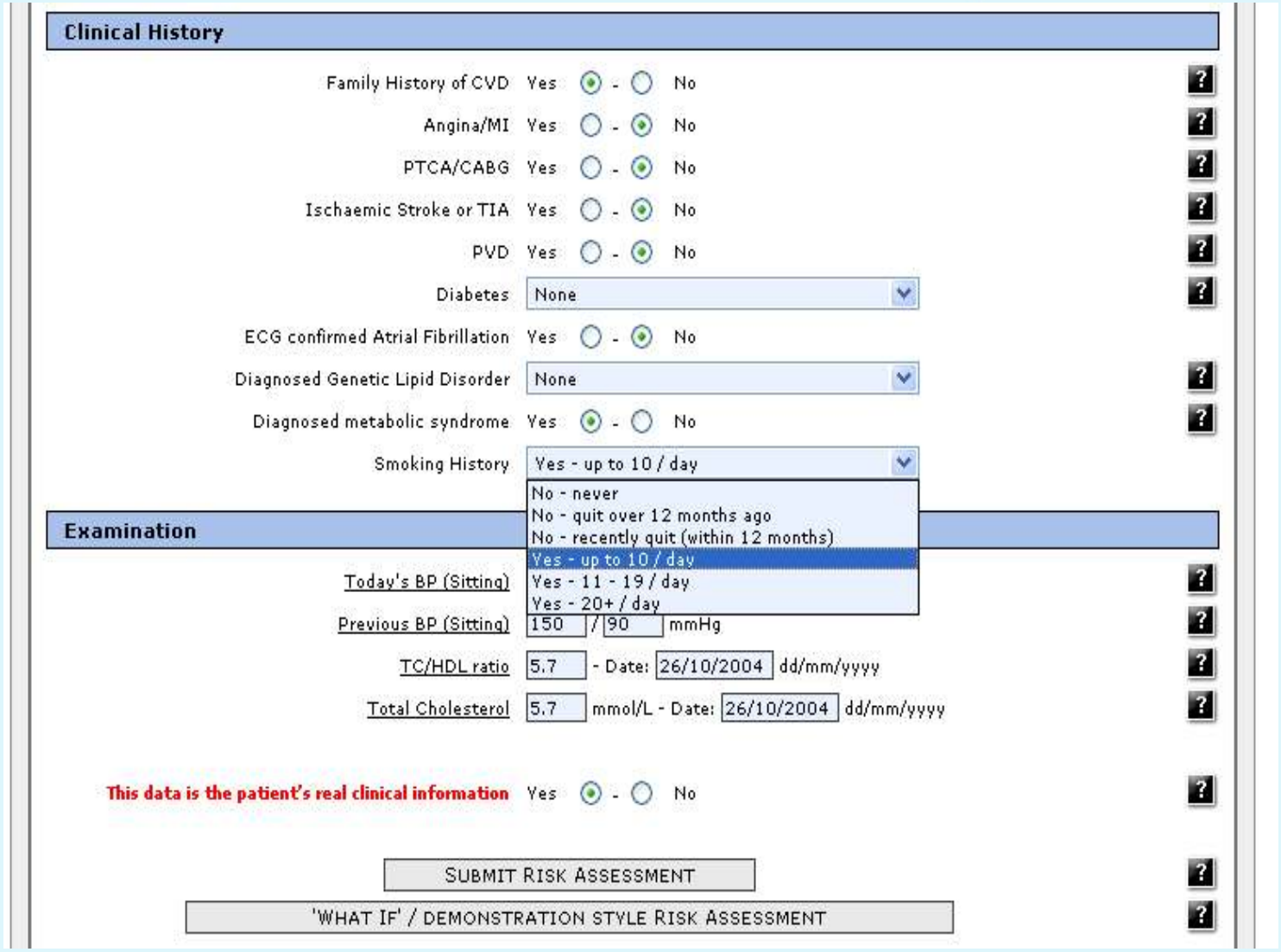

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CVD risk assessment: Diabetics

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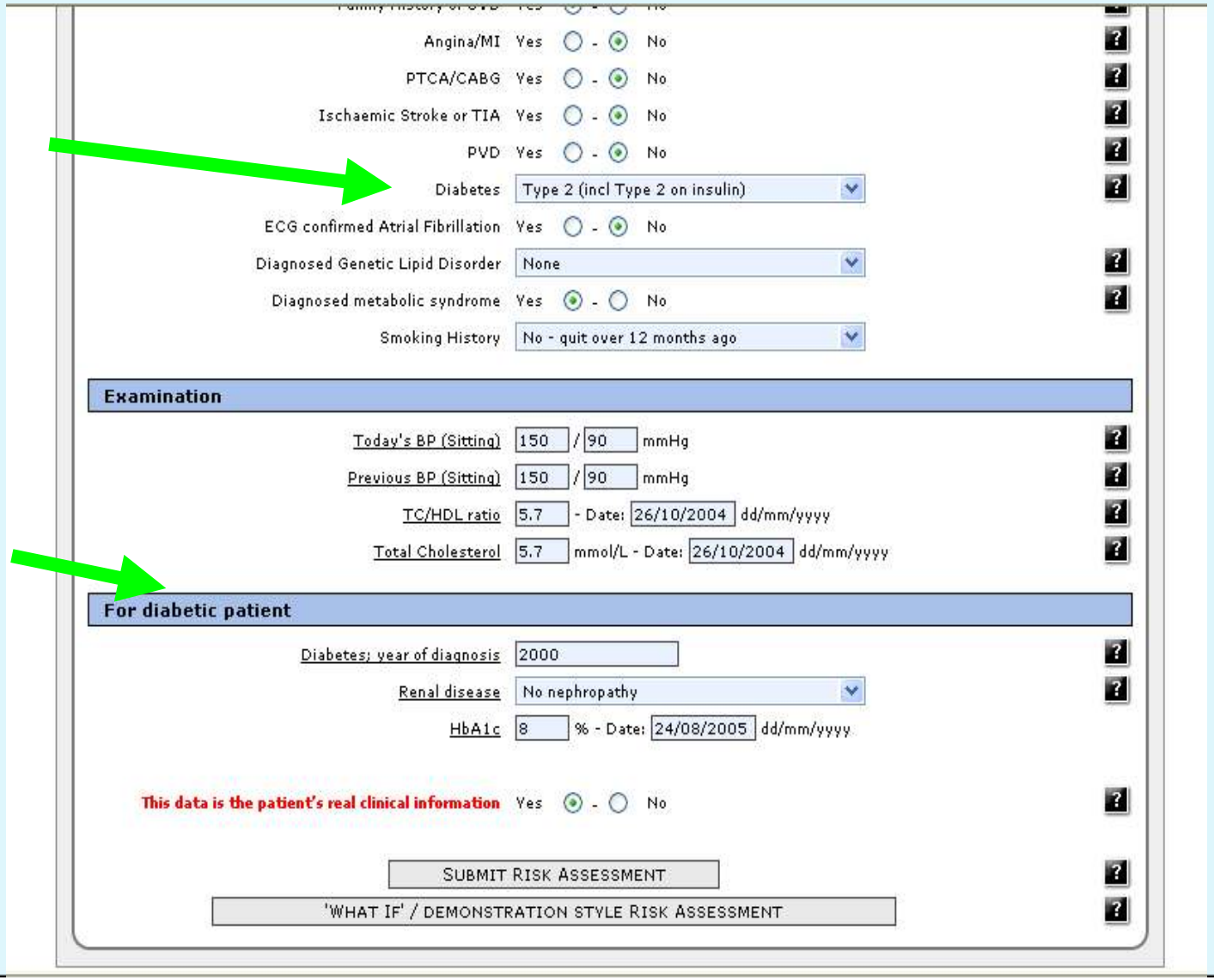

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CVD risk assessment

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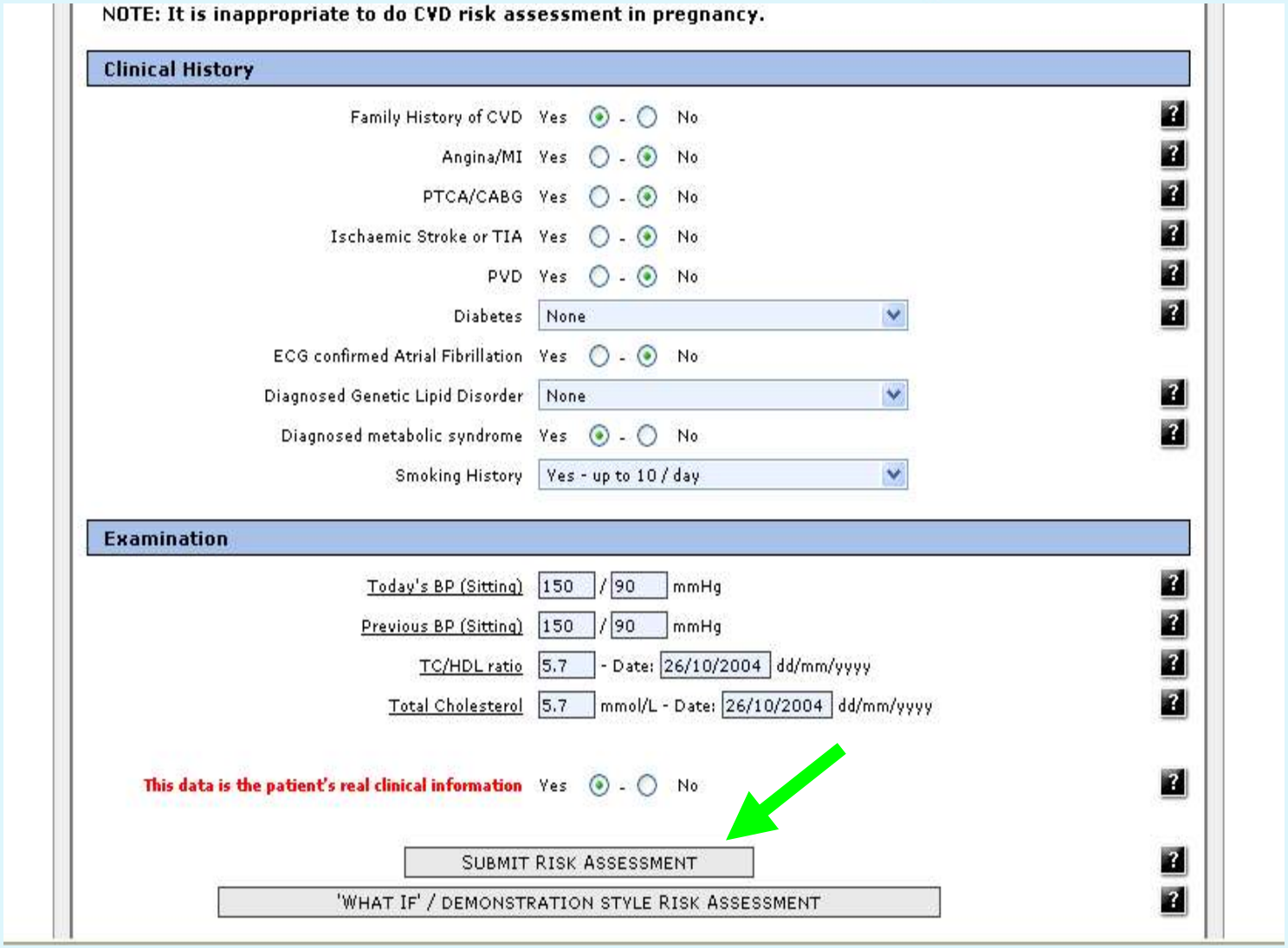

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CVD risk assessment

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Estimated risk of having a CVD event in the next 5 years: **18%**

Estimated risk level: 5-year CV risk (fatal and non-fatal)	**Estimated Benefits:** NNT for 5 years to prevent one event (CVD events prevented per 100 people treated for 5 years)		
	1 intervention (25% risk reduction)	**2 interventions (45% risk reduction)**	**3 interventions (55% risk reduction)**
18%	22 (4.5 per 100)	12 (8.1 per 100)	10 (9.9 per 100)

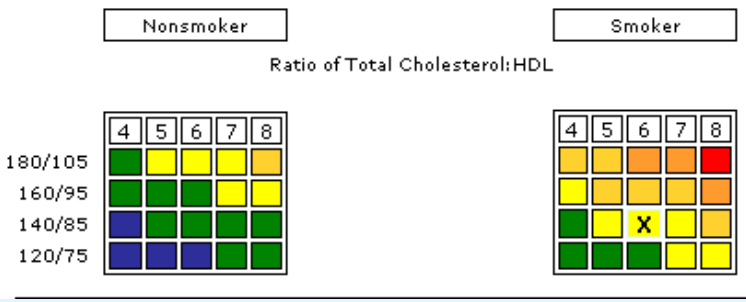
Based on the conservative estimate that each intervention: aspirin, blood pressure treatment (lowering systolic blood pressure by 10 mm Hg) or lipid modification (lowering LDL-C by [illegible]%) reduces CV risk by about 25% over 5 years.

CVD risk has been moved up one risk category (5%), as cardiovascular risk may be underestimated in the Framingham risk equation; based on:

- family history of premature coronary heart disease or ischaemic stroke in a first-degree male relative before the age of 55 years or a first-degree female relative before the age of 65 years
- Maori or Pacific ethnicity or people from the Indian subcontinent
- metabolic syndrome

Cardiovascular Disease: Baseline Risk and Treatment Benefit

NO DIABETES
(With a 5% upward risk adjustment applied)



PREDICT CVD-Diabetes

Doctor, what if I quit smoking?

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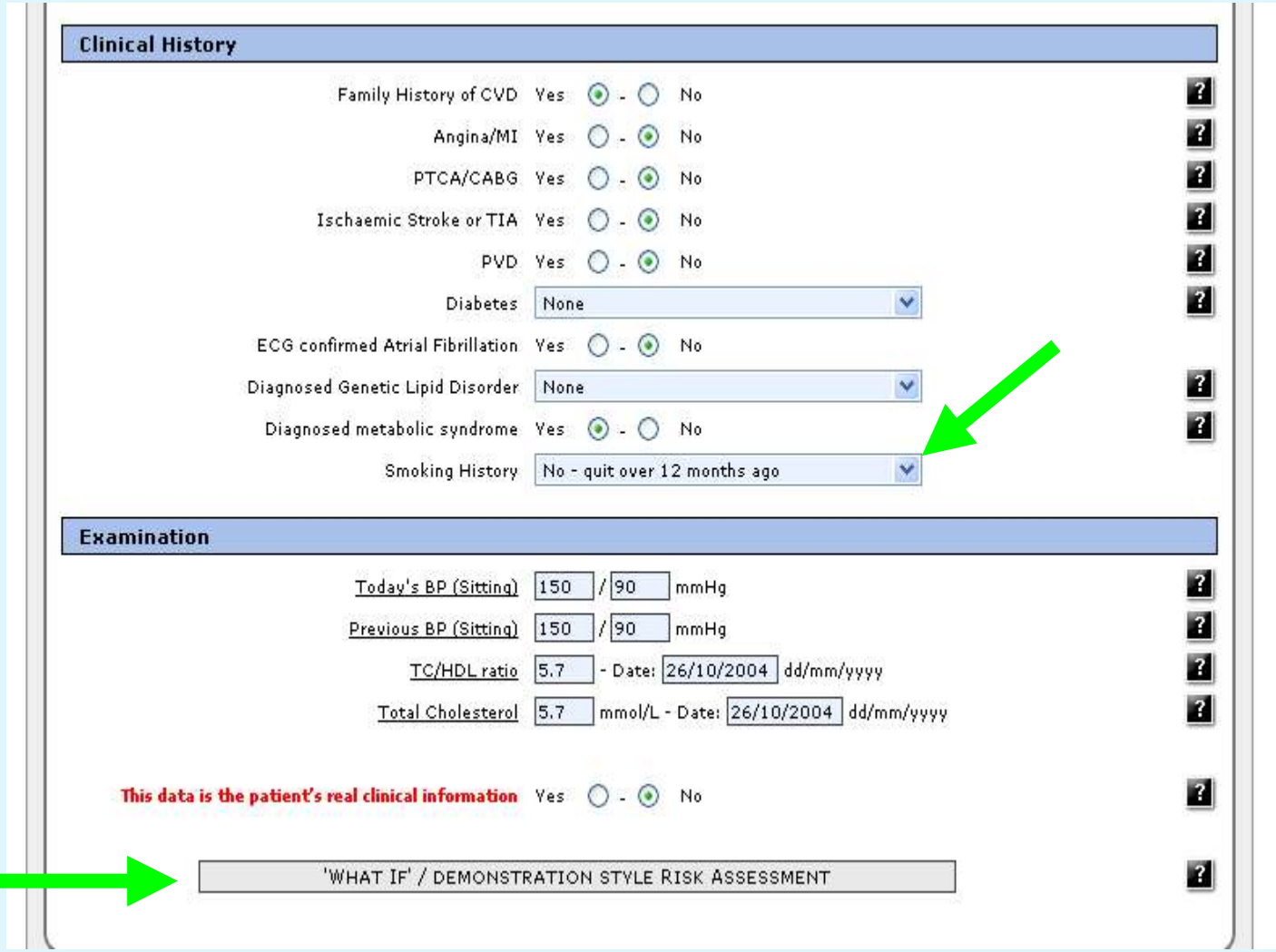

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Doctor, what if I quit smoking?

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This response was generated: 28-Sep-2005 16:46 hrs

Estimated risk of having a CVD event in the next 5 years: **12%**

Estimated risk level: 5-year CV risk (fatal and non-fatal)	**Estimated Benefits: NNT for 5 years to prevent one event** (CVD events prevented per 100 people treated for 5 years)		
	1 intervention (25% risk reduction)	**2 interventions (45% risk reduction)**	**3 interventions (55% risk reduction)**
12%	33 (3.0 per 100)	19 (5.4 per 100)	15 (6.6 per 100)

Based on the conservative estimate that each intervention: aspirin, blood pressure treatment (lowering systolic blood pressure by 10 mm Hg) or lipid modification (lowering LDL-C by 20%) reduces CV risk by about 25% over 5 years.

CVD risk has been moved up one risk category (5%), as cardiovascular risk may be underestimated in the Framingham risk equation; based on:

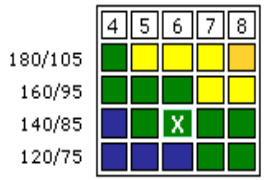
- family history of premature coronary heart disease or ischaemic stroke in a first-degree male relative before the age of 55 years or a first-degree female relative before the age of 65 years
- Maori or Pacific ethnicity or people from the Indian subcontinent
- metabolic syndrome

Cardiovascular Disease: Baseline Risk and Treatment Benefit

NO DIABETES
(With a 5% upward risk adjustment applied)

Nonsmoker | Smoker

Ratio of Total Cholesterol:HDL



PREDICT CVD-Diabetes

CVD risk management: clinical data

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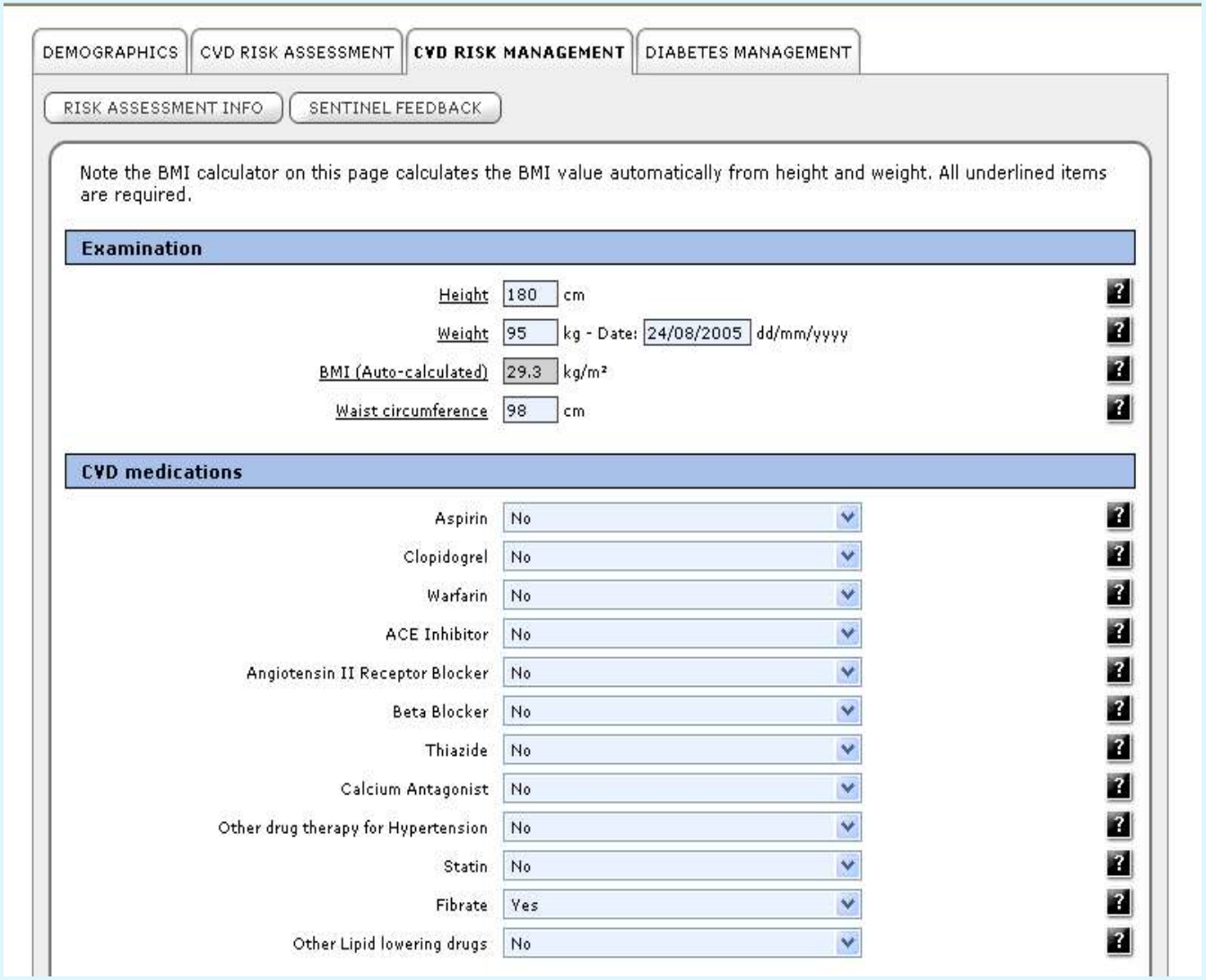

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CVD risk management: clinical data

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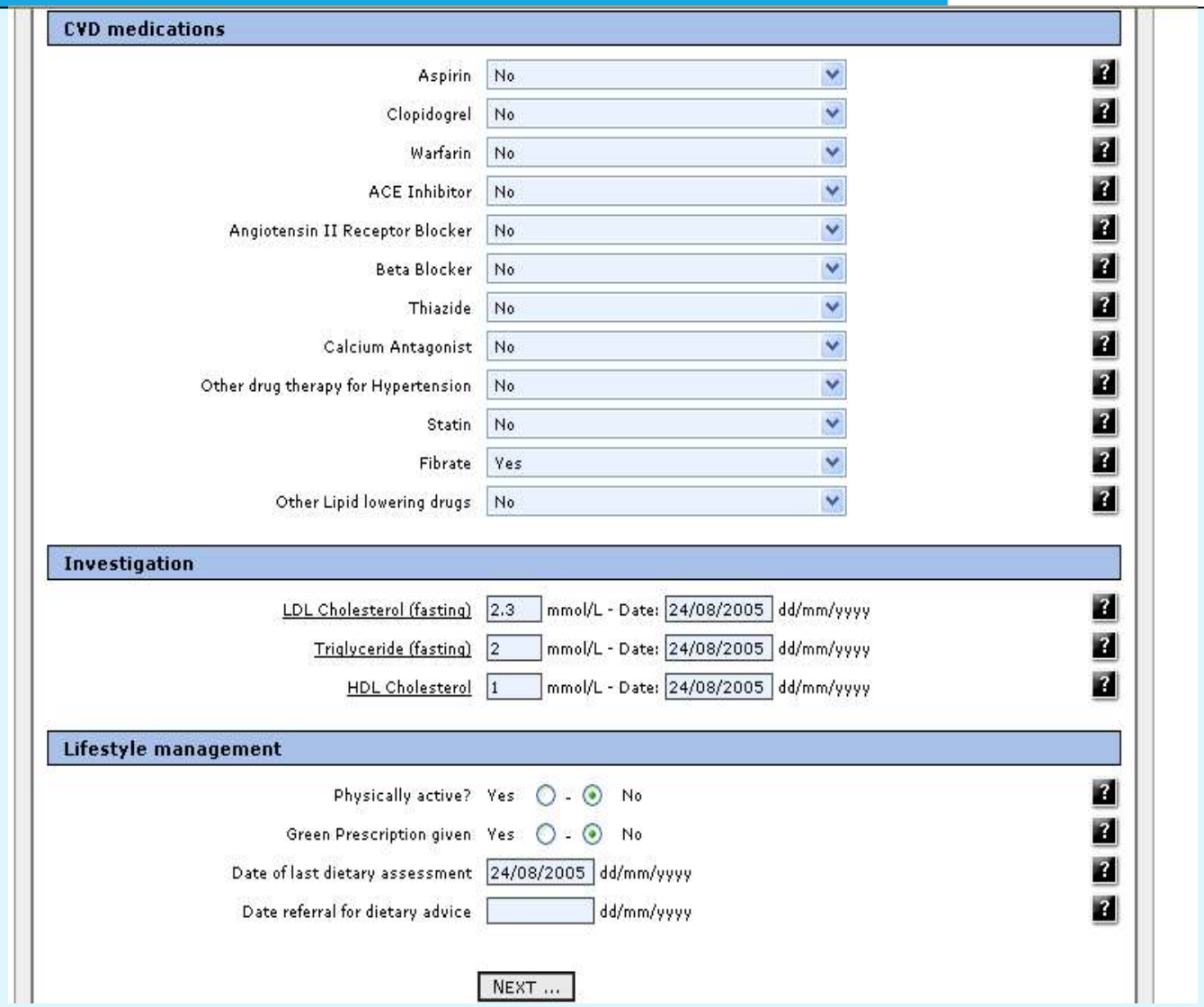

CVD medications

Aspirin	No
Clopidogrel	No
Warfarin	No
ACE Inhibitor	No
Angiotensin II Receptor Blocker	No
Beta Blocker	No
Thiazide	No
Calcium Antagonist	No
Other drug therapy for Hypertension	No
Statin	No
Fibrate	Yes
Other Lipid lowering drugs	No

Investigation

LDL Cholesterol (fasting)	2.3	mmol/L - Date: 24/08/2005	dd/mm/yyyy
Triglyceride (fasting)	2	mmol/L - Date: 24/08/2005	dd/mm/yyyy
HDL Cholesterol	1	mmol/L - Date: 24/08/2005	dd/mm/yyyy

Lifestyle management

Physically active?	Yes - ○	No - ◉
Green Prescription given	Yes - ○	No - ◉
Date of last dietary assessment	24/08/2005 dd/mm/yyyy	
Date referral for dietary advice	dd/mm/yyyy	

NEXT ...

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Diabetes management: clinical data

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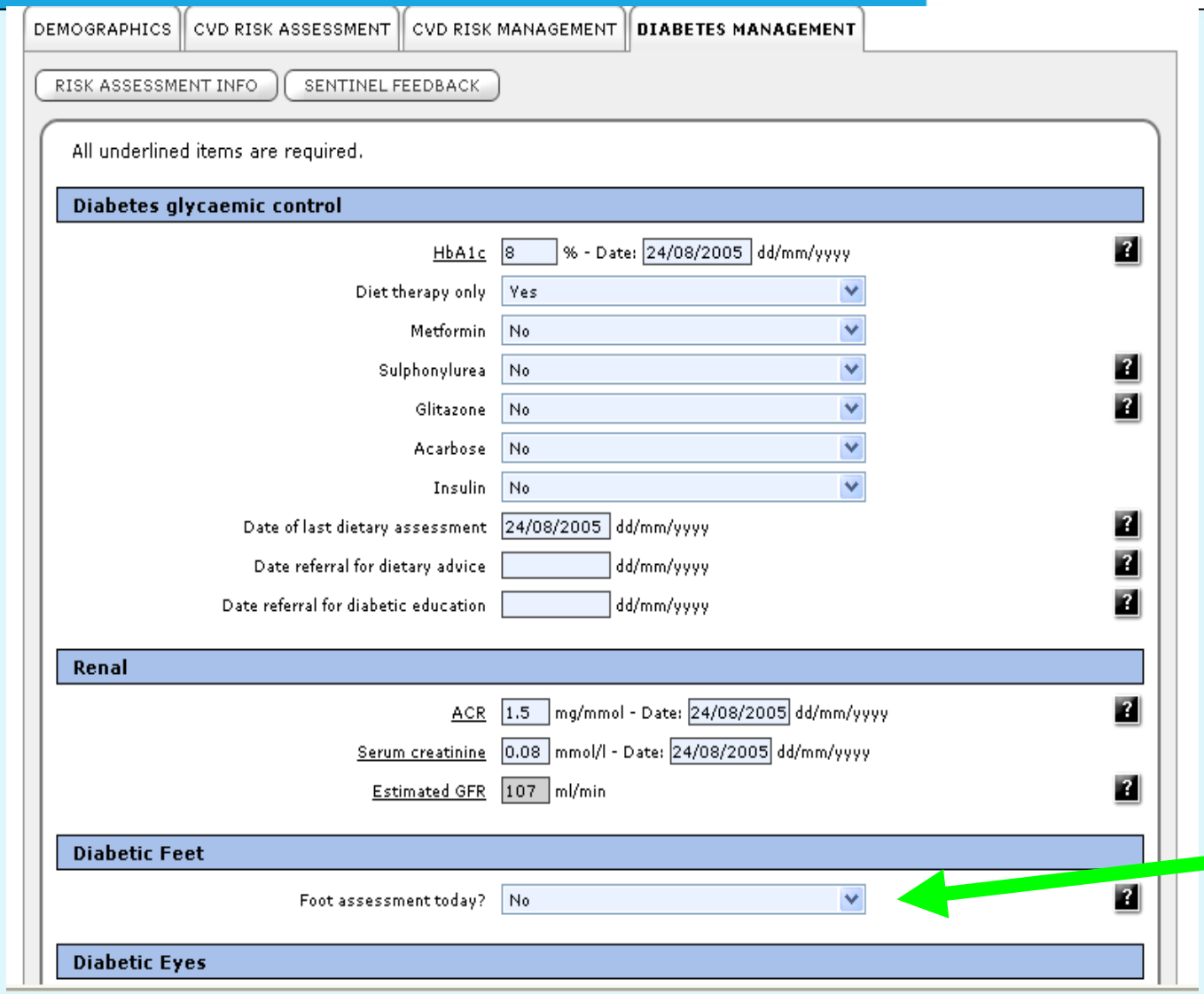

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Feedback: Actions (OrderSets)

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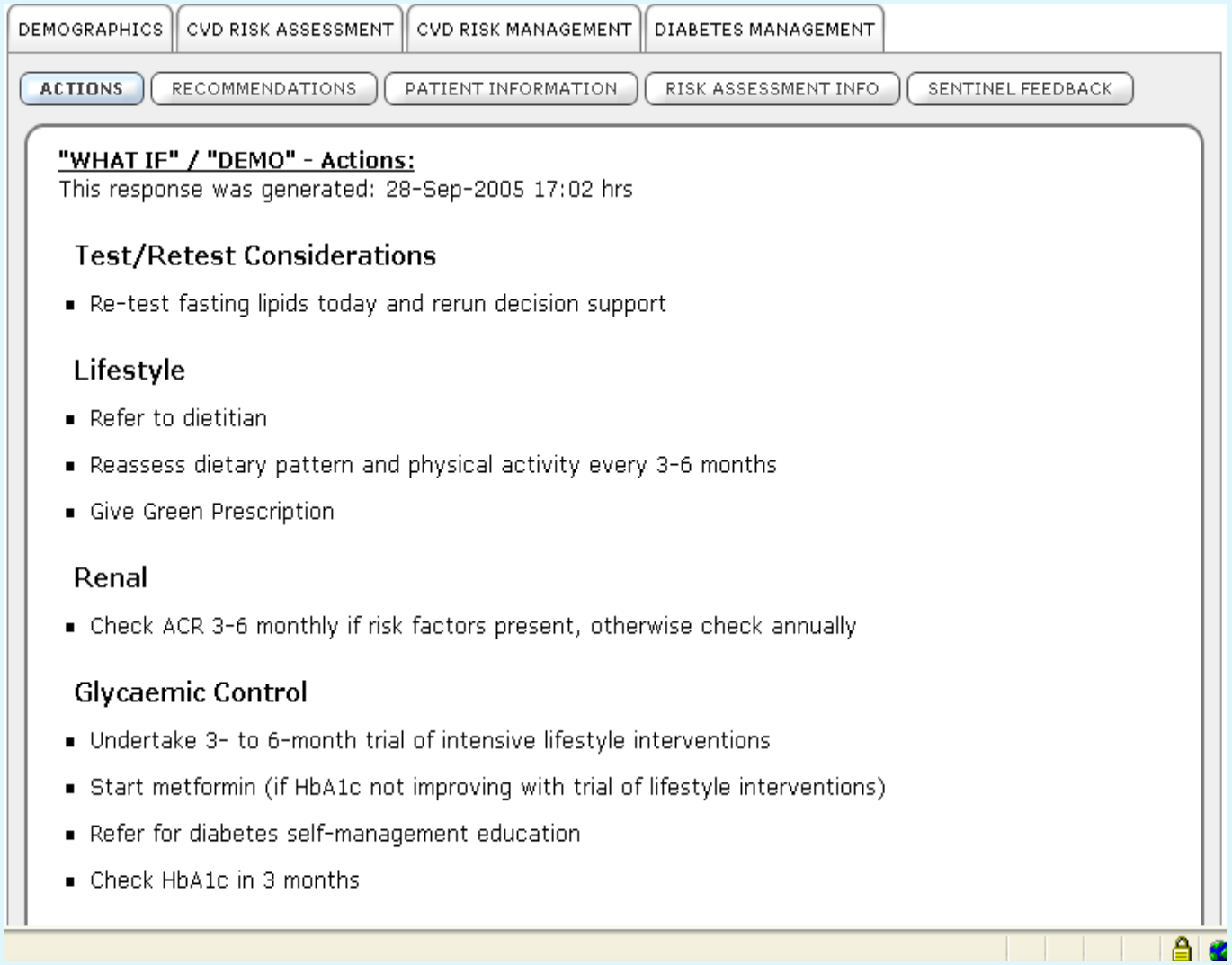

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Feedback: Recommendations

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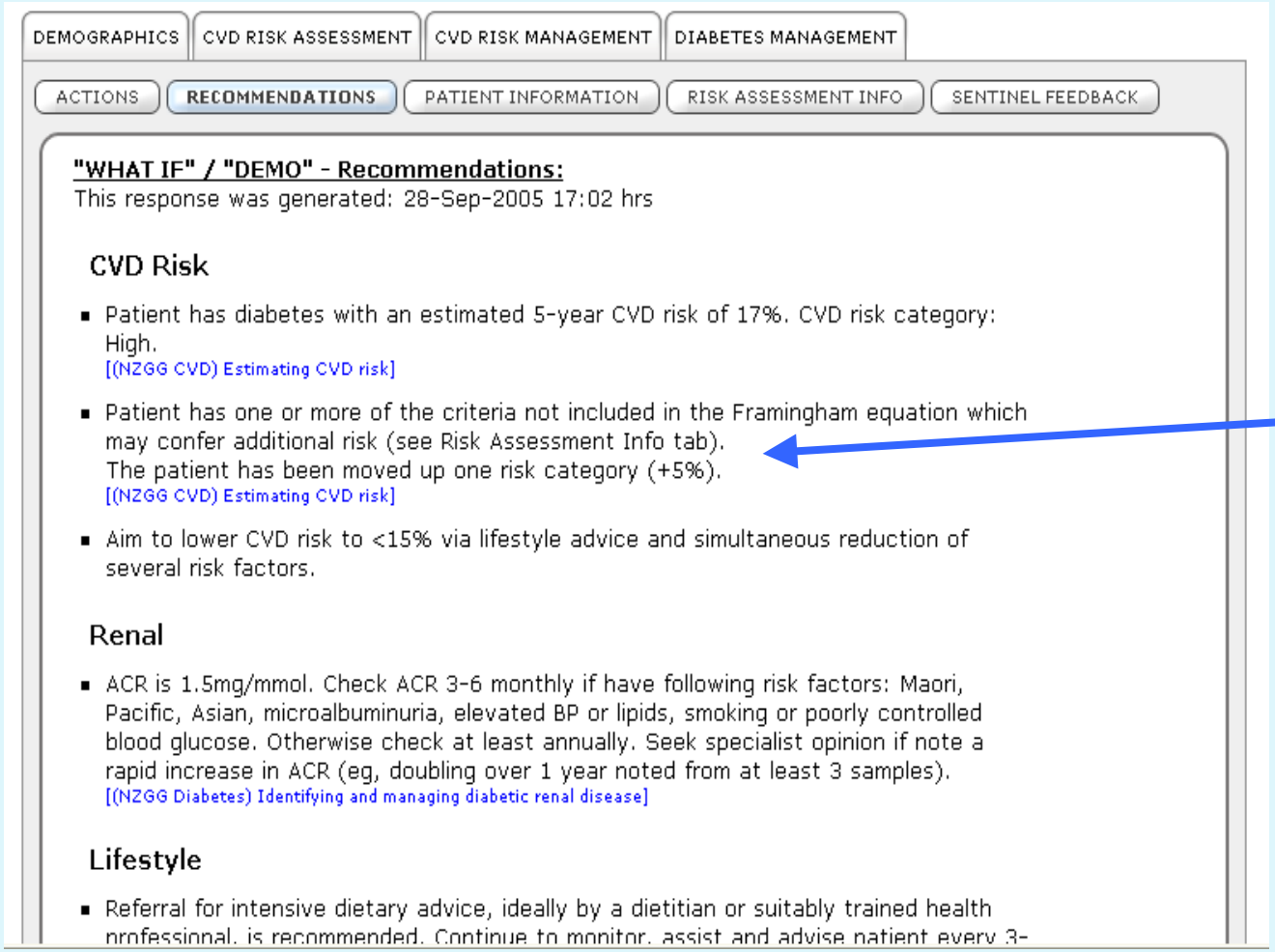

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Feedback: Individualised patient printout

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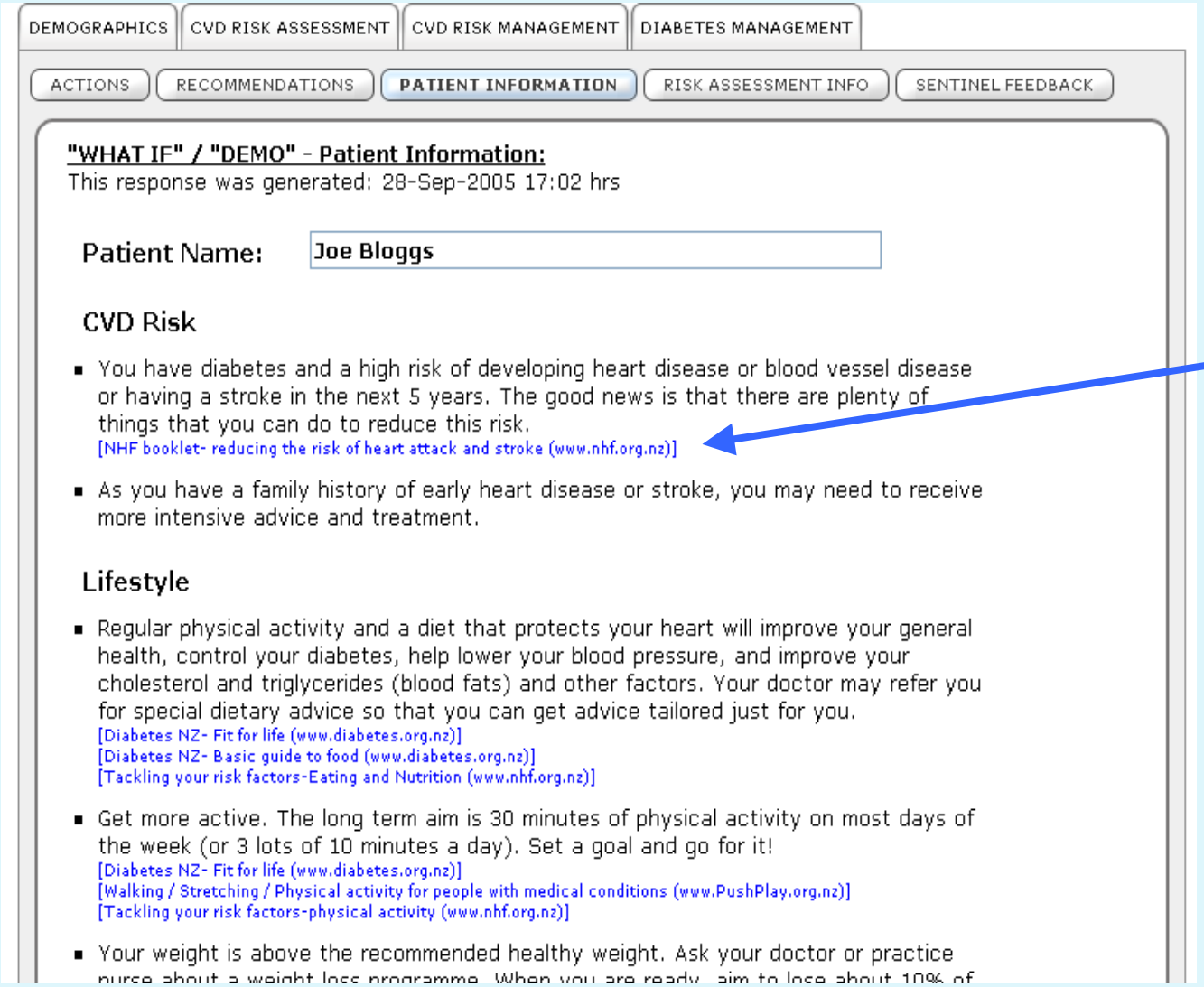

Prompt Evaluation Study

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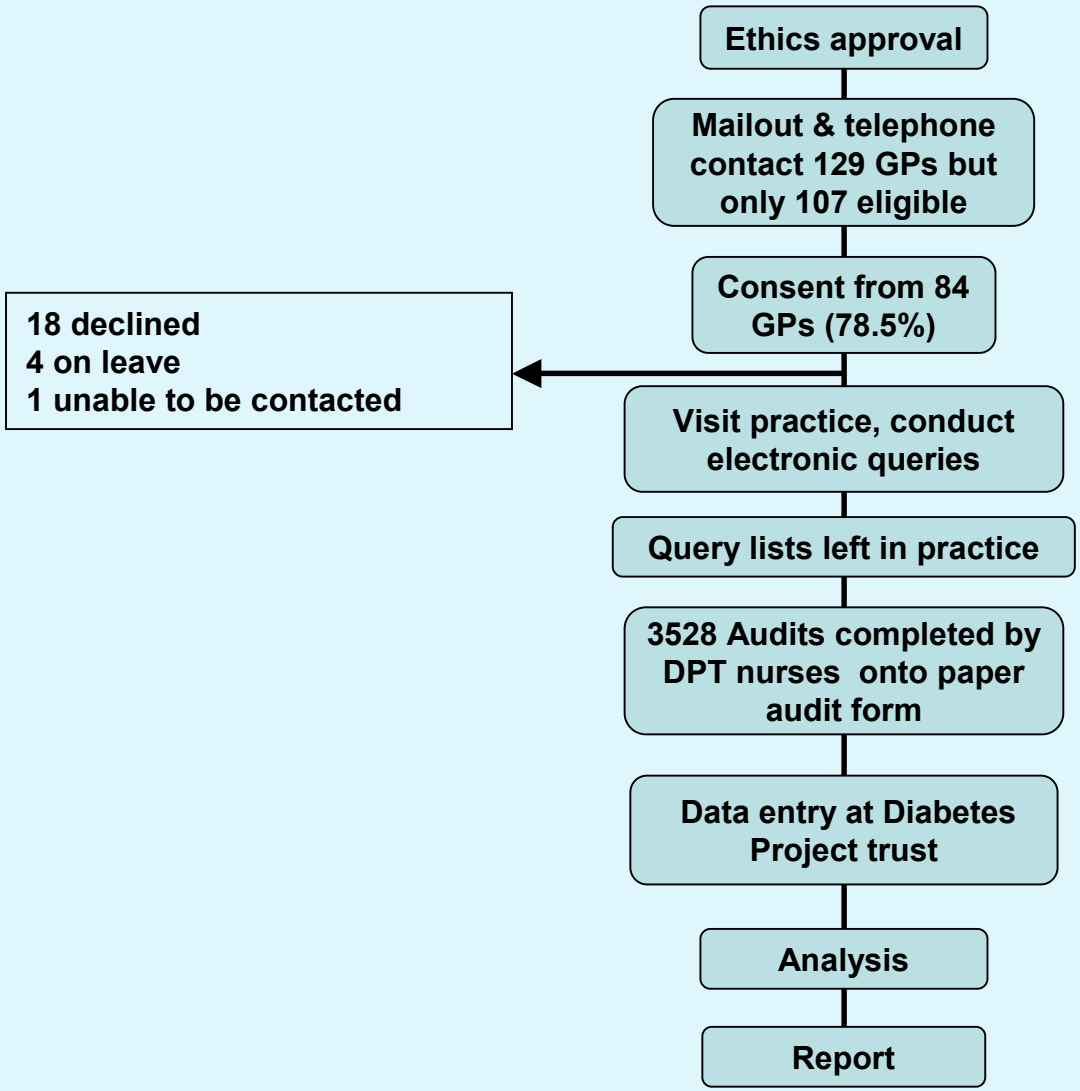

Characteristics of audited populations before and after introduction of Prompt

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	Pre-Prompt (n=1677)	Post-Prompt (n=1851)
Maori	473 (28%)	480 (26%)
Non-Maori	1204 (72%)	1371(74%)

No differences between Pre-Prompt and Post-Prompt groups in terms of age, gender, ethnicity, HUHC, CSC

Risk Assessment by GPs before and after introduction of Prompt

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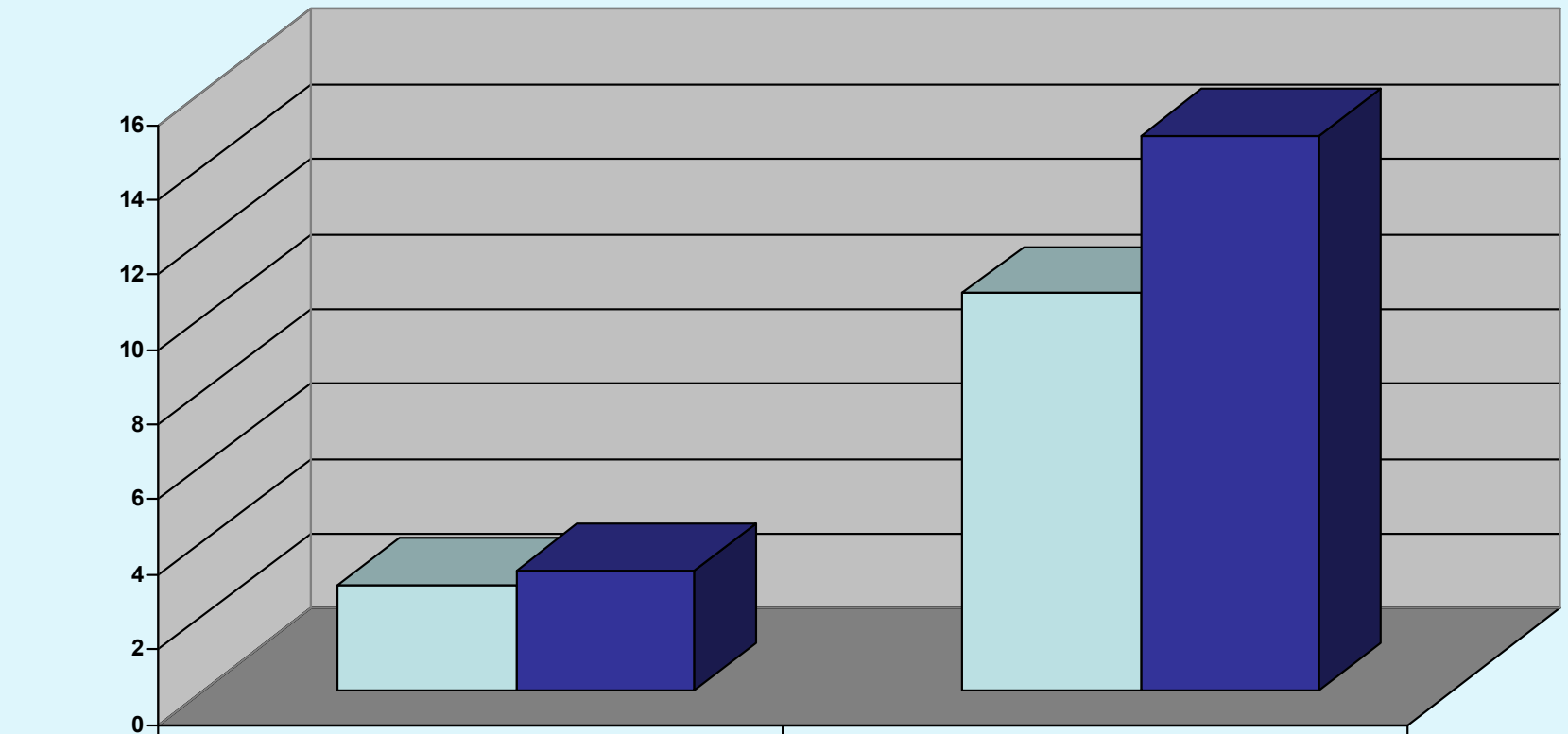

	Pre-Prompt	Post-Prompt
non-Maori	2.8	10.6
Maori	3.2	14.8

Adj OR non-Maori 4.73; 3.14-7.10

Adj OR Maori 5.44; 2.88-10.27

Documented Smoking Status

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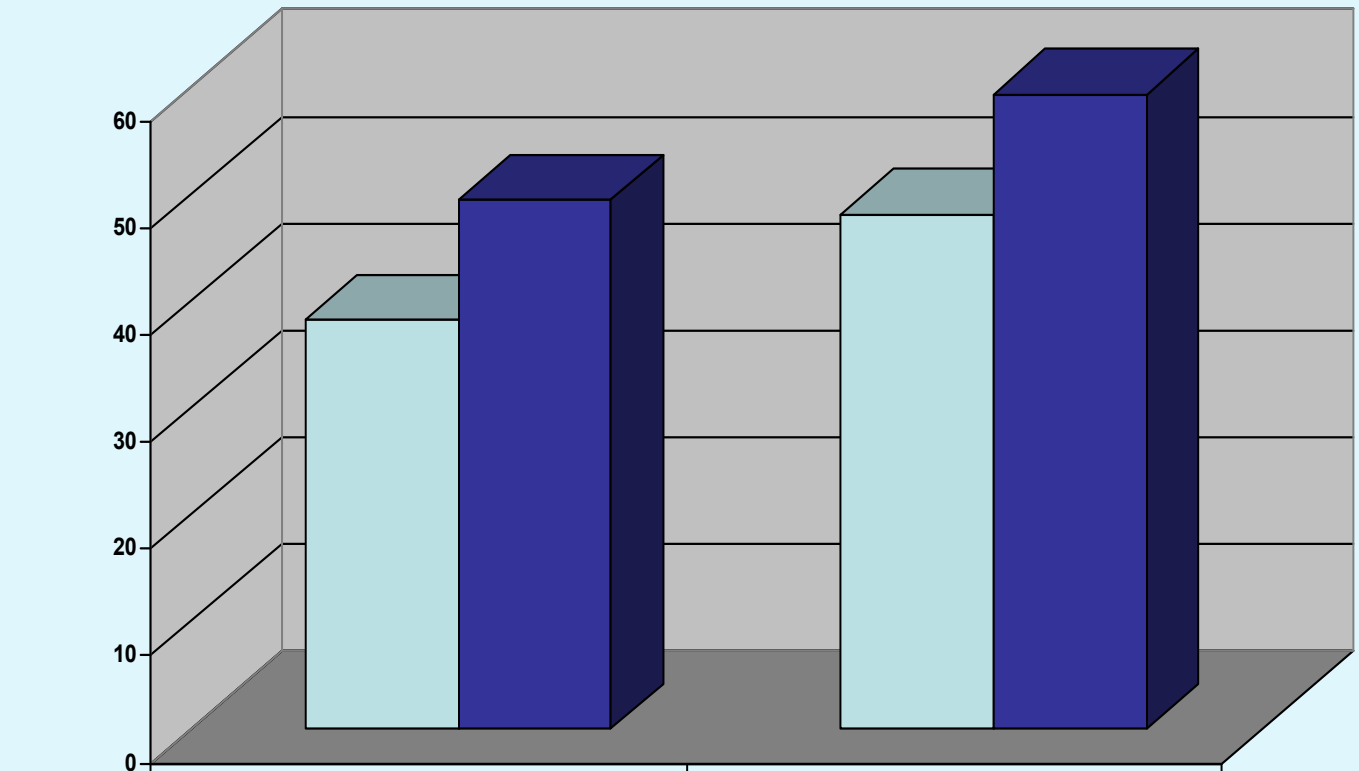

	Pre-Prompt	Post-Prompt
non-Maori	38.3	48.2
Maori	49.5	59.4

Adj OR non-Maori 1.61; 1.36-1.92

Adj OR Maori 1.39; 1.04-1.86

Documented Blood Pressure

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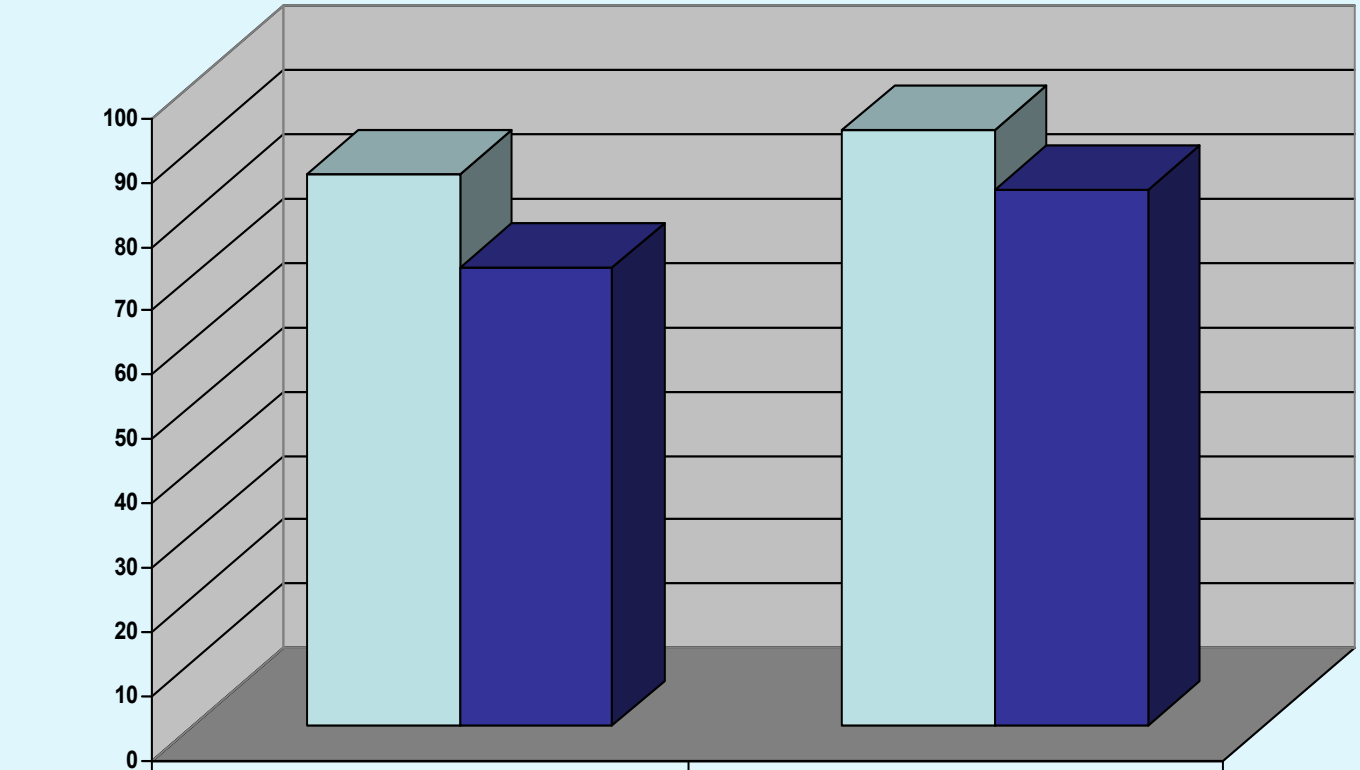

	Pre-Prompt	Post-Prompt
non-Maori	86	92.9
Maori	71.5	83.5

Adj OR non-Maori 2.44; 1.85-3.22

Adj OR Maori 2.08; 1.48-2.93

Documented Cholesterol (TC or TC/HDL)

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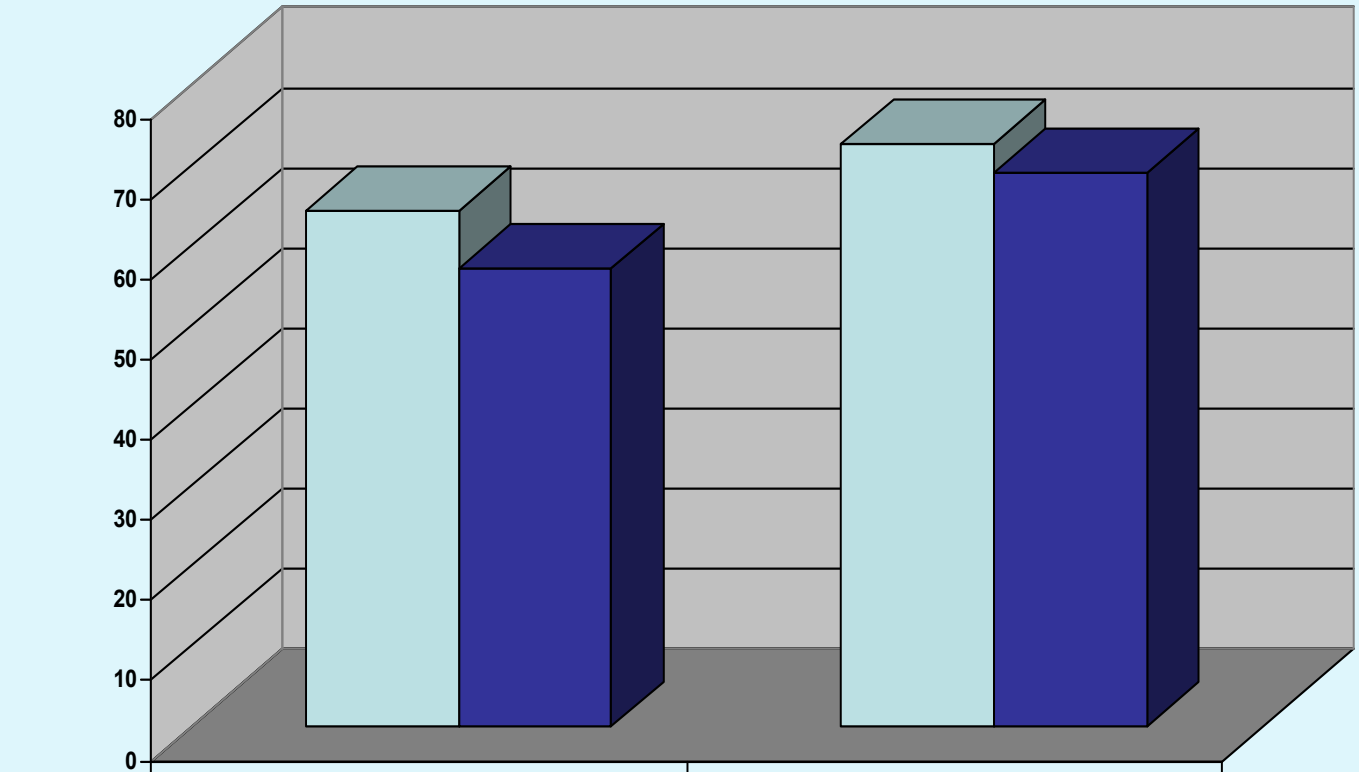

	Pre-Prompt	Post-Prompt
non-Maori	64.3	72.8
Maori	57.1	69

Adj OR non-Maori 1.52; 1.28-1.80

Adj OR Maori 1.59; 1.19-2.13

Documented diabetes status (Diabetes type, IGT, or none)

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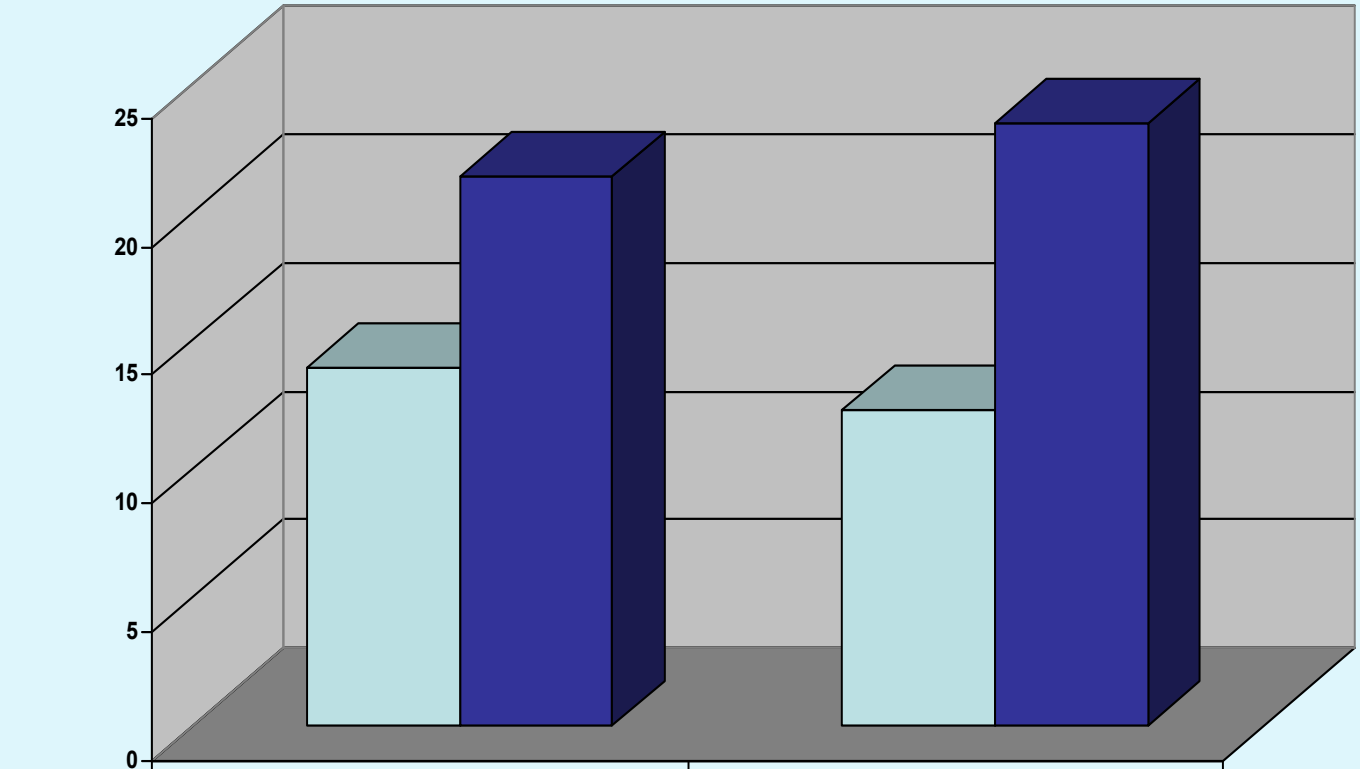

	Pre-Prompt	Post-Prompt
non-Maori	14	12.3
Maori	21.4	23.5

Adj OR non-Maori 1.08; 0.86-1.34

Adj OR Maori 1.05; 0.76-1.46

Documented Previous History CVD

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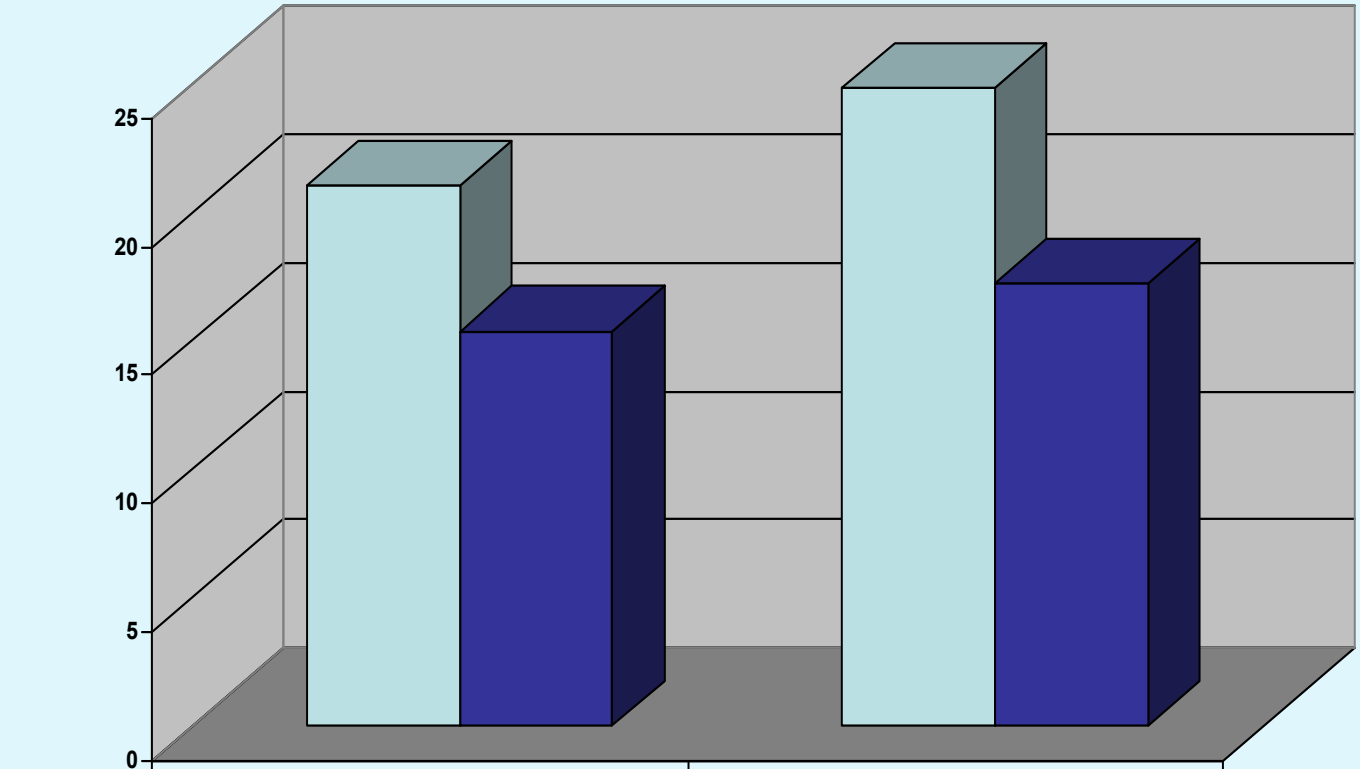

	Pre-Prompt	Post-Prompt
non-Maori	21.1	24.9
Maori	15.4	17.3

Adj OR non-Maori 1.23; 1.02-1.49 Adj OR Maori 1.03; 0.71-1.51

Issues identified as central to implementing PREDICT (and other CCDS systems?)

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- Define the clinical (and information need) clearly
- Ensure there is a shared vision
  - Funders, practitioners, IT team(s), communities
- Ensure the systems are in place
  - Human – champions, project manager, training, peer support, QA
  - Technical – platforms, connectivity, minimum datasets, QA, change control
- Localisation (where appropriate)
- Incentives (not always financial)
- Audit and feedback
- Sustainable infrastructure to support over the long-term

Further work planned

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Getting more evidence into practice

- Add new CDSS modules
  - Stroke, AF, Cardiac rehabilitation

Generating more evidence

- Validation of data entered into the forms
  - Ethnicity, Risk factors
- Profile of risk factors
  - by ethnicity, by NZ deprivation score, by GeoCode
- Naturalistic study of the impact of PREDICT on outcomes
  - Effect of screening tool on adherence to best practice
  - Subsequent impact of adding CCDS management advice

Acknowledgements
CVD-Diabetes tool development

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- Many GPs, PNs, and medical/nursing/pharmacy/specialists
- New Zealand Guidelines Group
- CVD and Diabetes guideline committees
- National Cardiovascular Advisory Group
- Maori Cardiovascular Group
- Ministry of Health Clinical Services Directorate
- National Heart Foundation
- Diabetes NZ
- PHOs –ProCare, HealthWest,
- CMDHB (CCM programme, MMH CCU and Whitiora)
- WDHB (Prompt Evaluation Study)
- University of Auckland
- Enigma Publishing Ltd
- HealthTech Ltd
- Health Research Council

Waitemata District Health Board
Te Wai Awhina

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Promoting Effective Health and Disability Services

ENIGMA™ PUBLISHING LTD

MINISTRY OF HEALTH

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PROMPT evaluation study

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Thank you
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your kind attention

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