

Electronic decision support –the New Zealand experience

EDS Project of CVD risk assessment and management

Dr Sue Wells

Clinical Project Leader

ProCare-CMDHB CVD Risk Assessment and Management Project



Collaboration

- ProCare Network
- CMDHB Chronic Care Management
- New Zealand Guidelines Group
- National Heart Foundation
- University of Auckland
- Ministry of Health
- Enigma Publishing
- HealthTech Ltd

PREDICT-CVD

Web-based clinical decision support on
CVD risk assessment and
management in primary care

Process of development

- Formation of Clinical Development Team
- Identify evidence-based guidelines and target pop
- Develop dataset –items, definitions,coding, default time period
- Develop rule set
- Decision support contents –four information streams
- Template development- integration with PMS
- Medtech settings adjusted to self-populate
- Secure jetstream internet connection
- Health information privacy- anonymous data, secure messaging, consumer awareness
- MedTech integration with server
- In house testing, sentinel site testing
- GP/PN training and IT facilitation
- Evaluate and improve

February 2002

- Clinical Development team formed
 - Andrew Kerr (Cardiologist CMDHB)
 - Ralph Stewart (Cardiologist ADHB)
 - Diana North (Medical Director NHF)
 - Rod Jackson (Professor Epidemiology)
 - Rob Cook (GP, NZGG Project Manager CVD guidelines)
 - Dean Mackay (ProCare GP)
 - David Roberts (Dietician NHF)
 - Kate Moodabe (Pharmacy Facilitator, ProCare)
 - Sue Wells (Project Manager)

Electronic decision support software functional requirements

- Fully integrated within electronic patient management system
- Systematic CVD risk assessment
- Provide electronic medical record of CVD risk
- Evidence-based decision support based on patient-specific profile
- Tailored patient education/info
- Non-identifiable patient data collected
- Potential validation or development of new risk equations for Maori/PI
- Future adaptability

The Blind Leading the Blind 1568, Painted by Pieter Bruegel the Elder



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Guidelines used

- 1996 NZ Lipid Guidelines
- 2002 Interim Consensus statement
- 2001 NCEP Guidelines
- 2001 ACC/AHA Guidelines
- 1998 NZ Guidelines for moderately raised blood pressure
- 2000 Joint British Recommendations on prevention CHD
- 2001 SIGN Diabetes Guidelines
- 1996 SIGN Obesity Guidelines
- 2002 NZ Smoking Cessation Guidelines

Target population

- All patients with CVD
- All >50yrs
- Between 40-50yrs if;
 - Smoker, hypertensive, overweight or obese
 - Maori or Pacific peoples
- Less than 40yrs if;
 - +ve family history of premature ischaemic CVD
 - diabetes

Dataset

- Critical determinants-collection input variables that will trigger a decision support response
- Extensive stakeholder consultation
- Clinically meaningful in usual GP practice
- Congruent with patient care flow
- Meet ethical and organisational needs
- Aligned with CMDHB diabetes module/Get checked programme
- Minimum dataset- rational arguments for 60-100 variables
- 41 remained

Electronic decision support components

- Rules set
- GP advice and reference source
 - Evidence-based, user friendly format, short, ability to have more complex supporting detail, referenced
- Suggested Actions
 - Check fasting lipids 12/52
- Patient advice
- Patient information
 - Eg, NHF cardioprotective diet, physical activity
 - NHF weblinks to existing pamphlets

Rule 01 - (Lipid)

CLINICAL

AND Family history of previous ischaemic cardiac event first degree relative < age 60:

AND Diabetes:

AND IHD:

OR Genetic lipid disorder:

AND Smoking:

AND PTCA, CABG:

OR PVD:

AND Advised to quit smoking today:

AND Stroke:

AND Pregnant:

MEDICATIONS

AND Aspirin:

AND ACE:

AND Statin:

AND Clopidogrel:

AND Beta-blocker:

AND Fibrate:

AND Warfarin:

AND CA antagonist:

AND Other lipid lowering drug:

AND Thiazide:

AND Anti-hypertensive drug:

EXAMINATION

AND BP systolic: -

AND 5 year CVR RISK: -

AND BP diastolic: -

AND BMI: -

INVESTIGATION

AND LDL/HDL: -

AND Total cholesterol: -

AND LDL cholesterol: -

AND HDL cholesterol: -

AND Triglycerides: -

MANAGEMENT

AND Physical Activity:

AND Green prescription:

AND Heart diet given?:

PROGRAM

AND Control program:

AND Careplan given?:

AND GOALS MET?:

RECOMMENDATIONS:

R2

Lipid profile sub-optimal.
 Establish accurate baseline.
 Consider secondary causes of dyslipidaemia.
 [1996 Lipid Guidelines; Interim Consensus Statement 2002]
 [[Baseline Lipid Profile](#)] [[Secondary Causes of Dyslipidaemia](#)]

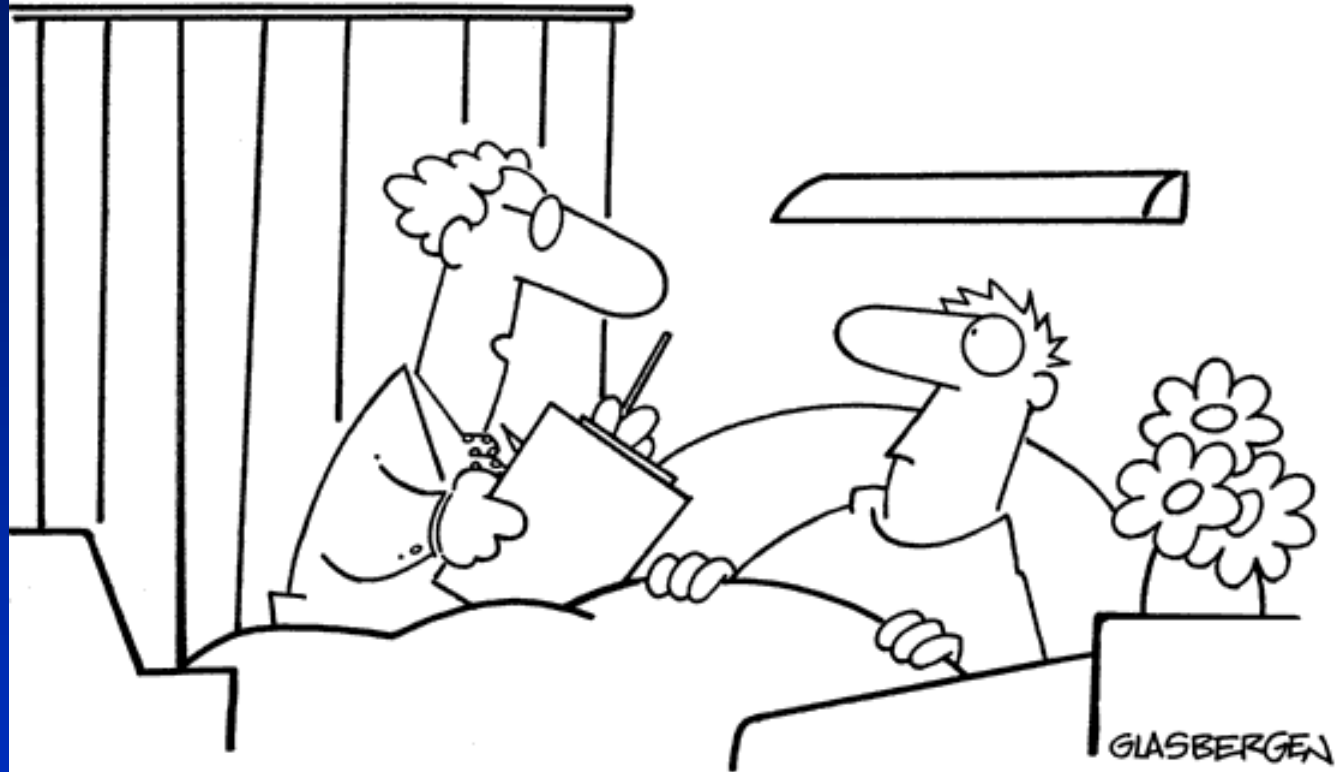
R1

NHF cardioprotective diet and physical activity advice recommended.
 [1996 Lipid Guidelines; Interim Consensus Statement 2002]

R3

Consider starting patient on a statin.

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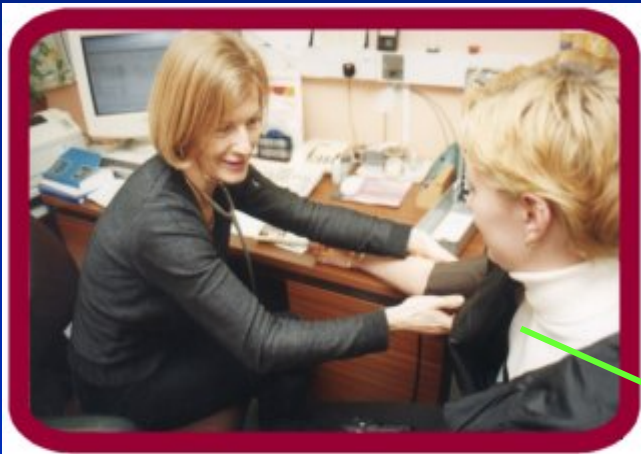


**“I think you need a heart transplant, my associate
thinks you need a bypass, and our computer
thinks you just need to be rebooted.”**

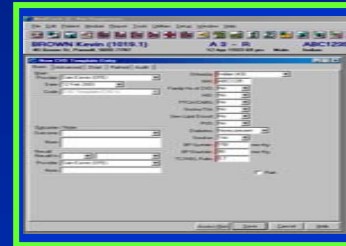
What does it look like?

Predict web-based disease management

Patient-practitioner interaction



Opens patient electronic medical record



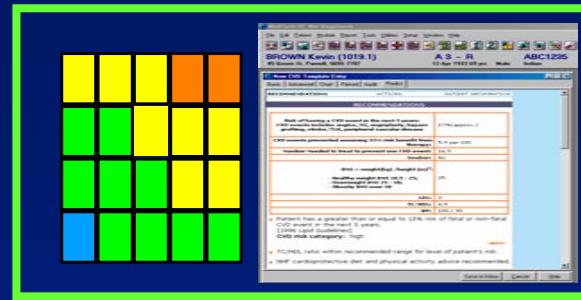
opens PREDICT web page within patient record

patient-specific risk factor profile



Predict

estimate
CVD risk



Rx
advice

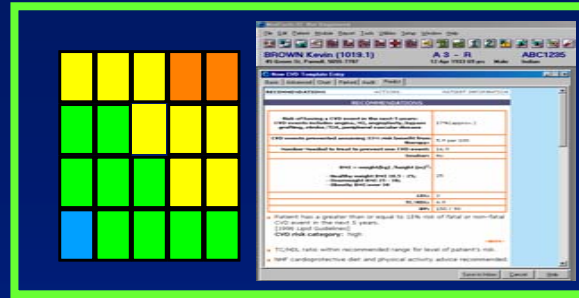


Patient-practitioner
interaction

patient-specific risk
factor profile

Predict

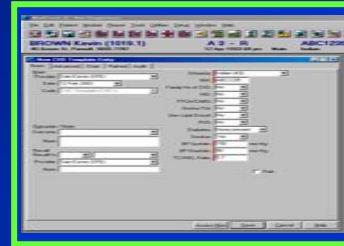
estimate
CVD risk



Rx
advice



Patient-practitioner
interaction




Print lab form or
prescription

Print out patient
advice

Risk assessment: data

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File Edit Patient Module Report Tools Utilities Setup Window Help



BROWN Kevin (1019.1) **A 3 - R** **ABC1235**
45 Green St, Parnell, 5655 7787 12 Apr 1933 70 yrs Male Indian

New CVD Template Entry

Basic | **Advanced** | Chart | Parked | Audit

Main

Provider: Sam Eaves (SFE)
Date: 19 Feb 2004
Code: CVD Template (CVD I)

Ethnicity: Indian (43)
NHI: ABC1235
Family Hx of CVD: No
IHD: No
PTCA/CABG: No
Stroke/TIA: No
Gen Lipid Disord: No
PVD: No
Diabetes: None present
Smoker: Yes
BP-Systolic: 150 mm Hg
BP-Diastolic: 90 mm Hg
TC/HDL Ratio: 5.7

Outcome / Note
Outcome:
Note: Outcome for this measurement

Recall
Recall In:
Provider: Sam Eaves (SFE)
Note:

Park

Assess Risk Save Cancel Help

Risk Assessment: results

MedTech-32 Sue Wells

File Edit Patient Module Report Tools Utilities Setup Window Help

BROWN Kevin (1019.1) **A 3 - R** **ABC1235**
 45 Green St, Parnell, 5655 7787 12 Apr 1933 70 yrs Male Indian

New CVD Template Entry

Basic | Advanced | Chart | Parked | Audit | Predict

CVD RISK ASSESSEMENT

CVD RISK ASSESSMENT

Risk of having a CVD event in the next 5 years: CVD events includes angina, MI, angioplasty, bypass grafting, stroke/TIA, peripheral vascular disease	31%(approx.)
CVD events prevented assuming 33% risk benefit from therapy:	10.5 per 100
Number Needed to treat to prevent one CVD event:	9.5

Cardiovascular Disease: Baseline Risk and Treatment Benefit

NO DIABETES

	Nonsmoker					Smoker				
	Ratio of Total Cholesterol:HDL									
	4	5	6	7	8	4	5	6	7	8
180/105	*	*	*	*	*	*	*	*	*	*
160/95					*	*	*	*	*	*
140/85					*	*	*	X	*	*
120/75					*	*	*	*	*	*

RISK
5 year CVD risk (non fatal and fatal)

BENEFIT (1)
CVD events prevented per 100 treated

BENEFIT (2)
Number needed to treat for 5 years to prevent 1 event

NOTES
 • If BP consistently >170/100 antihypertensive medication may be

Save to Inbox | Cancel | Help

Risk assessment: results

MedTech-32 Not Registered

File Edit Patient Module Report Tools Utilities Setup Window Help

BROWN Kevin (1019.1) **A 3 - R** **ABC1235**
 45 Green St, Parnell, 5655 7787 12 Apr 1933 69 yrs Male Indian

New CVD Template Entry

Basic | Advanced | Chart | Parked | Audit | Predict

CVD RISK ASSESSEMENT

CVD RISK ASSESSMENT

Risk of having a CVD event in the next 5 years: CVD events includes angina, MI, angioplasty, bypass grafting, stroke/TIA, peripheral vascular disease	19%(approx.)
CVD events prevented assuming 33% risk benefit from therapy:	6.6 per 100
Number Needed to treat to prevent one CVD event:	15.2

Cardiovascular Disease: Baseline Risk and Treatment Benefit

NO DIABETES

	Nonsmoker					Smoker				
	Ratio of Total Cholesterol:HDL									
	4	5	6	7	8	4	5	6	7	8
180/105	*	*	*	*	*	*	*	*	*	*
160/95					*	*	*	*	*	*
140/85			X		*	*	*	*	*	*
120/75					*	*	*	*	*	*

RISK	BENEFIT (1)	BENEFIT (2)	NOTES
5 year CVD risk (non fatal and fatal)	CVD events prevented per 100	Number needed to treat for 5 years to	<ul style="list-style-type: none"> If BP consistently >170/100 antihypertensive

Save to Inbox Cancel Help

Risk Management: data

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File Edit Patient Module Report Tools Utilities Setup Window Help

BROWN Kevin (1019.1) **A 3 - R** **ABC1235**
45 Green St, Parnell, 5655 7787 12 Apr 1933 70 yrs Male Indian 0.00

New CVD Template Entry

Basic Advanced Chart Parked Audit Predict

Main

Provider: Sam Eaves (SFE)
Date: 19 Feb 2004
Code: CVD Template (CVD II)

Height: 180 cms
Weight: 90 kgs
BP (2) - Systolic: 150 mm Hg
BP (2) - Diastolic: 90 mm Hg

Outcome / Note
Outcome:
Note:

Recall
Recall In:
Provider:
Note:

Pregnant: No
Aspirin: No
Clopidogrel: No
Warfarin: No
ACE: No
B-Blockers: No
Thiazide: No
Ca Antagonist: No
Other BP drugs: No
Statins: No
Fibrates: No
Other LL drugs: No
Fasting TC/HDL: 5.7
Fasting Tot. Chol.: 5.7 mmol/l

Fasting HDL: 1 mmol/l
Fasting LDL: 3 mmol/l
Fasting TG: 2.4 mmol/l
NHF Diet Advice: Yes
Physical Activity: Yes
Green Rx: No
Smoke Quit Advice: Yes

CVD Risk: 31.1 % Park

Prompt Save Cancel Help

Risk management: recommendations

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File Edit Patient Module Report Tools Utilities Setup Window Help

BROWN Kevin (1019.1) **A 3 - R** **ABC1235**
 45 Green St, Parnell, 5655 7787 12 Apr 1933 70 yrs Male Indian 0.00

New CVD Template Entry

Basic | Advanced | Chart | Parked | Audit | Predict

RECOMMENDATIONS ACTIONS PATIENT INFORMATION

RECOMMENDATIONS

Risk of having a CVD event in the next 5 years: CVD events includes angina, MI, angioplasty, bypass grafting, stroke/TIA, peripheral vascular disease	31%(approx.)
CVD events prevented assuming 33% risk benefit from therapy:	10.5 per 100
Number Needed to treat to prevent one CVD event:	9.5
Smoker:	Yes
BMI = weight(kg) /height (m)²: - Healthy weight BMI 18.5 - 25; - Overweight BMI 25 - 30; - Obesity BMI over 30	28
LDL:	3
TC/HDL:	5.7
BP:	150 / 90

▶ Patient has a greater than or equal to 20% risk of fatal or non-fatal CVD event in the next 5 years.
 [1996 Lipid Guidelines]
CVD risk category: very high

[<more>](#)

▶ **Lipid Targets**

LDL	<= 3.3
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Save to Inbox Cancel Help

Risk management: Action Plan

The screenshot shows a medical software window titled "MedTech-32 Sue Wells". The patient information bar displays: **BROWN Kevin (1019.1)**, **A 3 - R**, **ABC1235**, **45 Green St, Parnell, 5655 7787**, **12 Apr 1933 70 yrs**, **Male**, **Indian**, and **0.0**. The main window is titled "New CVD Template Entry" and has tabs for "Basic", "Advanced", "Chart", "Parked", "Audit", and "Predict". The "ACTIONS" tab is selected, showing a list of recommendations under the heading "ACTIONS".

RECOMMENDATIONS	ACTIONS	PATIENT INFORMATION
ACTIONS		
	<ul style="list-style-type: none">▶ Give dietary and physical activity advice.▶ Check BP 12/52 or earlier prn▶ Start BP therapy. [If BP still elevated after a 12-week lifestyle trial.]▶ Repeat lipid test (fasting) if required, to establish accurate baseline.▶ Check fasting lipids 12/52.▶ Start statin. [If TC/HDL ratio greater than 5 after a 6- to 12-week lifestyle trial.]▶ Start aspirin.▶ Assess willingness to quit (or encourage continued abstinence if quit within last 12 months).	

At the bottom of the window are three buttons: "Save to Inbox", "Cancel", and "Help".

Risk Management: patient care plan

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File Edit Patient Module Report Tools Utilities Setup Window Help

BROWN Kevin (1019.1) **A 3 - R** **ABC1235**
45 Green St, Parnell, 5655 7787 12 Apr 1933 70 yrs Male Indian 0.0

New CVD Template Entry

Basic | Advanced | Chart | Parked | Audit | Predict

RECOMMENDATIONS	ACTIONS	PATIENT INFORMATION
PATIENT INFORMATION		
FIRSTNAME: <input type="text"/>	SURNAME: <input type="text"/>	
Risk of having a CVD event in the next 5 years: CVD events includes angina, MI, angioplasty, bypass grafting, stroke/TIA, peripheral vascular disease	31%(approx.)	
Smoker:	Yes	
BMI (Measure of Body Mass): - Healthy weight BMI 18.5 - 25; - Overweight BMI 25 - 30; - Obesity BMI over 30 BMI = weight(kg) / height(m) ²	25	
LDL("bad" cholesterol):	3.0	
TC/HDL(cholesterol ratio that best predicts the risk of having a CVD event):	5.7	
BP(blood pressure):	150 / 90	

▶ You have a very high risk of developing heart disease, stroke or blood vessel disease in the next 5 years. But there are plenty of things that you can do to reduce this risk. [<more>](#)

▶ Regular physical activity and a healthy heart diet is recommended to lower blood pressure and improve 'bad' cholesterol, triglycerides (blood fats) and other factors that can affect your heart.

Save to Inbox | Cancel | Help

Strategy offers patients

- Personalised advice
- Evidence-based information
- Consistent messages
- Shared knowledge and decision making

Strategy offers GPs

- Fully integrated into PMS
- Self-populates
- Real-time
- Evidence based recommendations tailored to the patient
- Assists lifestyle management eg. NHF diet, Green Rx, smoking cessation
- Personalised patient-specific action/care plans
- Track patient care over time
- Development multidisciplinary team
- Audit care against guidelines

Where are we up to?

- ProCare implementation (August 2002)
- >130 GPs , approx 12,000 risk profiles
- Quality improvement- content, template changes
- CMDHB Chronic Care Management CVD roll-out (Jan 2004)
- Coronary Care Unit Middlemore Hospital 2004
- CMDHB Integrated care server integration (Sept 2002)
- Brief evaluation early adopters
- Prompt Evaluation Study currently underway
- Updating EDS to include new guidelines-CVD and Diabetes

CVD risk assessment by early adopters of PREDICT in ProCare (n = 25 GPs)

	Before PREDICT	After PREDICT
1-2x per month	25%	0%
1-2x per week	75%	50%
5-10x per week	0%	38%
10-20x per week	0%	12%

*Moodabe and Wells 2003
(unpublished)*

GP Feedback

“This is the first time that a computer gives US anything back”

“allows us to be the good guys for a change and get on with helping patients to choose what to manage first”

“ I like to print the patient care plan out and then ask my nurse to discuss the Heart Foundation diet”

“A patient the other day asked if I could take him through Prompt again and see what the experts thought about him now”

GP Feedback

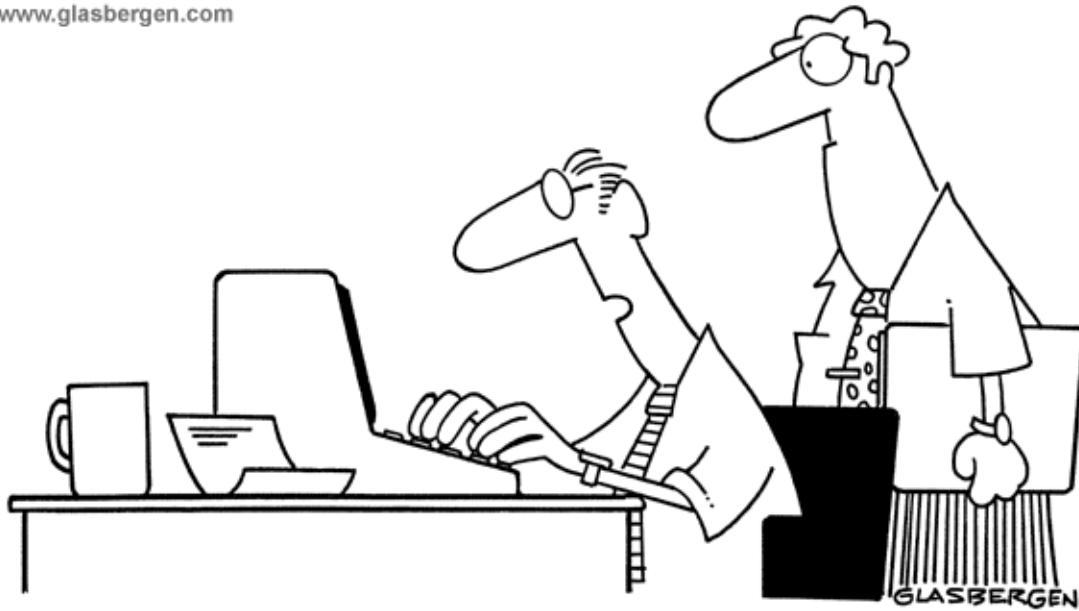
- *“I’ve given up doing Prompt.... We changed MedTech versions and now I have to put in everything”*
- *“We have a patient who is absolutely furious. I told her she was at low risk and she had a heart attack the next week”*
- *“I never remember that its there- we have so many programmes at the moment all demanding our attention”*
- *“It’s a question of time.....when your waiting room is full to overflowing, doing extra things is nigh on impossible”*

Some Learnings

- Be very clear what you are trying to achieve
- Know the systems and systems barriers within which Drs and nurses work
- Know the clinical process and points where different decisions are made
- Work very closely (every step) with the future users of the tool- ensures both credibility and usability
- Work very closely with IT team (lots of different solutions to one problem)
- Quality of the product and patient safety is paramount (evidence-base, transparency where evidence is lacking, version control, testing within and between systems)

Most NZ GPs have computers but...

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**"I've been using the same computer since 1980.
They can't replace it without violating the
company's age discrimination policies."**

Key issues for successful introduction

- Degree of Computerisation/familiarity
- Systems development incl integration with PMS and support
- Agreed source of knowledge
- Uptake by providers (user friendly, helpful- all other goals are secondary)
- Training of healthcare providers to use tool
- Organisational investment in IT support

Acknowledgments

- CVD Steering Group
- Clinical Development Team
- ProCare Network
- CMDHB Chronic Care Management
- New Zealand Guidelines Group
- National Heart Foundation
- University of Auckland
- Ministry of Health
- Enigma Publishing
- HealthTech Ltd