

# Opportunistic electronic reminders

## *Improving performance of preventive care in general practice*

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### BACKGROUND

Preventive care is an important role for general practitioners, yet opportunities for prevention are often missed.

### METHOD

We provided an automatic electronic record preventive care reminder system for 12 preventive care activities for one 10 doctor practice. All patients who attended were randomised by the terminal digit of their record number.

### RESULTS

The control uptake of opportunistic prevention was low; ranging from 1.5% (tetanus immunisation) to 27% (influenza immunisation). The reminders increased this by significant but small amounts for four out of 12 activities (immunisation for tetanus and pneumococcus and recording of allergies and weight), insignificant increases for four (mumps, measles and rubella immunisation, recording of smoking, and taking of cervical smears and of blood pressure), and insignificantly decreased influenza immunisation, and screening for diabetes and hyperlipidaemia.

### DISCUSSION

Opportunistic electronic reminders have the potential to increase preventive care in general practice.

Prevention is an important task of general practice. As 85% of Australians visit a general practitioner every year,<sup>1,2</sup> there are many opportunities for this to take place. Australian GPs are increasingly using computers for patient case notes.<sup>3</sup> More patients receive preventive care when doctors are reminded.<sup>4-11</sup> Most evidence for this comes from trials conducted in North American hospital based or academic practices with paper based reminders. A trial of on-screen reminders generated by the doctor's computer in one general practice demonstrated effectiveness.<sup>12</sup> In Australia, preventive care increased after the introduction of opportunistic on-screen reminders in one practice.<sup>13-17</sup>

A more sensitive measure is the uptake of opportunities rather than of patients offered prevention. In a North American academic primary health care clinic trial, the proportion of opportunities taken to provide influenza immunisation by doctors using computer generated medical records and reminders increased in comparison with those using paper medical records and no reminders.<sup>18</sup> We set out to increase opportunistic prevention of Australian GPs using computer medical records with reminders.

### Methods

We designed a quasi randomised controlled trial in a practice (*Figure 1*) where none of the authors practised. The practice GPs agreed on the prevention activities for which they would receive reminders, with the relevant

patient age group and intervals. These were largely concordant with the then current Royal Australian College of General Practitioners' Guidelines<sup>19</sup> (*Table 1*).

We were unable to measure advice to patients about screening mammography because we did not ask the GPs specifically to record such advice, and because of waiting times at the local screening mammography unit that also recalled patients directly. Also, patients could refer themselves directly.

The main outcome measure was the proportions of preventive care opportunities taken for patients in the intervention and control groups for each preventive activity. The GPs were not blinded to the allocation of patients to the intervention or control groups. Data were analysed by 'intention to treat' using univariate log binomial regression using generalised estimating equations.

Ethical approval was obtained from the University of Adelaide and Flinders University, South Australia.

### Results

The baseline characteristics of the patients allocated to the two experimental groups were similar (*Table 2*). The overall control take up of opportunistic preventive activities was low – 27% for influenza immunisation, and as low as 1.5% for tetanus immunisation (*Table 3*). The GPs took significantly greater opportunities for patients in the intervention group compared to patients in the control group for four items: recording of allergies, recording of

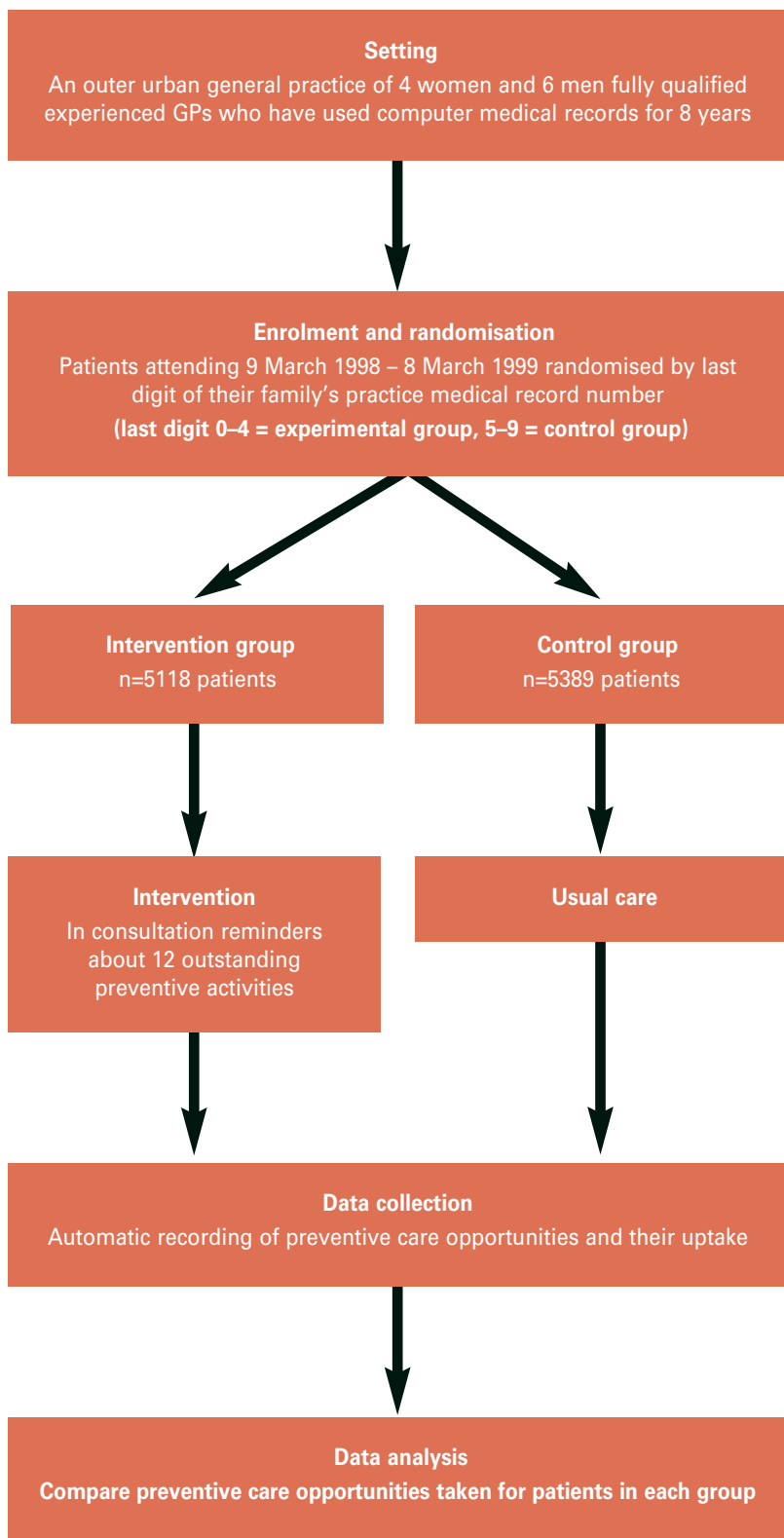


Figure 1. Trial design

27/01/99 MON 09:13AM(1) RESEARCH TEST CLINIC		3 DEM	MR. CONSULT 3.1
DOB: 12/10/54	1	Consultation Data Entry	AGE: 44 years
Patient No/Name-	03816-01	DEMOPATIENT JANE	DEMO STREET
Date-	270199	PH N 1111 1111	DEMO SUBURB 5000
Doctor-	DEM	DR. RESEARCH TEST	PH W 2222 2222
Obj. Findings-	Consultation started at 09:13AM on WEDNESDAY		
Weight-			
Blood Pressure-			
Urine-			
Obj. Findings-			
Assessment-			
	Type Last	Result, finding or action	Next due
	TEST	None on record	11/12/54
	LIFE	None on record	12/10/74
	PAP	07/05/96 RESULT: NORMAL	07/05/98
	WT	26/09/97 Weight 78 kgs	26/09/98
		None on record	TODAY
Treatment-	DNCR		
Plans-			
Referred to-			

Figure 2. The appearance of computer generated reminders for preventive care

weight, pneumococcal immunisation, and tetanus immunisation. There were no significant increases for measles mumps and rubella immunisation, recording of smoking, cervical screening, or blood pressure. There were insignificant decreases for diabetes screening, influenza immunisation, and lipid screening. One GP chose to use the older method of recording case notes and therefore did not receive any reminders.

## Discussion

The GPs' uptake of preventive activities opportunistically was low. Possible reasons include priority for dealing with the patient's acute and chronic health problems, over riding precedent for serious illness or crisis, the perverse incentives for better fee-for-service payment for shorter consultations, and the absence of explicit Medicare rebates for providing preventive care (other than childhood immunisation).

The reminders caused only a modest increase in opportunistic uptake. There are several possible reasons for this: one may be that the reminders were displayed by date order of when due, rather than any more logical priority. Another is that the reminders may have made the GPs more aware of the preventive care needs of all their patients, with the result that they increased their provision of preventive care to patients in the control group. The GP who used the older method of recording his consultation notes could not have been influenced by the reminders. All of these factors will probably have decreased any intervention effect.

The GPs took 26% of opportunities to administer influenza vaccine to intervention patients and 27% for control patients. This contrasts with the findings of a trial of reminders only for influenza vaccine, in which doctors who received reminders took 61% of

**Table 1. Comparison of recommendations in the RACGP Guidelines for Preventive Activities in General Practice<sup>19</sup> and intentions of GPs in the study**

Preventive activity	RACGP guidelines	Study GPs' intentions
Smoking status	From 18 years: no interval specified	At least once from 17 years
Recording of allergies	Not mentioned	At least once from birth
Blood pressure to screen for hypertension	Every 1–2 years from 16 years	Biennially from 20 years
Weight measurement	At least every few years	Every year from 20 years
Serum glucose to screen for diabetes	Not routinely: based on risk factors, including age	Every 5 years from 65 years
Screening for hyperlipidaemia	At least once for men aged 45–65 years	Every 5 years from 20 years, for both genders
Cervical (Pap) test	Biennially from 18–70 years	(Same)
Screening mammography for breast cancer	Biennially from 50–70 years	(Same)
Tetanus vaccine	Primary course starting at 2 months, then 10 yearly from 15 years	(Same)
Measles, mumps and rubella vaccine	First dose at 1 year, second at 10–16 years	(Same)
Influenza vaccine	Every year from 65 years	(Same)
Pneumococcal vaccine	Consider once over 65 years	Every 5 years from 65 years

**Table 2. Baseline comparison of experimental groups**

Characteristic of patients	Intervention	Control
Proportion women, %	56	57
Mean age at end of trial, years (standard deviation)	36.0 (21.7)	35.4 (21.9)
Median number of services in 6 months before start of trial, median (interquartile range)	1 (0–2)	1 (0–2)
Median fees charged per consultation in 6 months before trial, median (interquartile range)	\$21 (\$0–59)	\$21 (\$0–56)
Median number of long term problems coded before trial, median (interquartile range)	0 (0–1)	0 (0–1)

**Table 3. Effect of reminders on the uptake of preventive activities**

Preventive activity	Preventive opportunities		Opportunities taken for preventive activity		Relative changes in preventive activities performed (95% CI)
	Control	Intervention	Control	Intervention	
Tetanus immunisation	15 089	11 947	222 (1.5)	333 (2.8)	1.89 (1.59, 2.25)
Recording of allergies	13 713	10 991	682 (5.0)	991 (9.0)	1.81 (1.63, 2.02)
Pneumococcal immunisation	2370	2079	39 (1.6)	58 (2.8)	1.70 (1.10, 2.62)
Recording of weight	11 592	10 476	567 (4.9)	654 (6.2)	1.28 (1.13, 1.44)
Measles, mumps and rubella immunisation	523	446	43 (8.2)	46 (10.3)	1.25 (0.82, 1.93)
Smoking status	9407	8908	171 (1.8)	181 (2.0)	1.12 (0.90, 1.39)
Cervical smear	4833	4387	348 (7.2)	343 (7.8)	1.09 (0.91, 1.29)
Blood pressure	4404	4370	666 (15.1)	677 (15.5)	1.02 (0.90, 1.16)
Diabetes screening	1900	1858	47 (2.5)	45 (2.4)	0.98 (0.65, 1.48)
Influenza immunisation	912	935	248 (27.2)	245 (26.2)	0.96 (0.78, 1.18)
Lipid screening	7929	7268	215 (2.7)	176 (2.4)	0.89 (0.73, 1.09)

opportunities, compared to 37% for doctors who did not receive reminders.<sup>18</sup> Differences in setting, design, outcome measurements and the numbers of preventive activities for which reminders were issued may explain the apparently greater absolute uptake of influenza vaccine and greater effect of reminders in the latter trial.

There was possible information overload from the multiple reminder messages presented. In future both these problems could be addressed. Nevertheless, despite the disappointing absolute effect, the relative increases in preventive care activities in our findings suggest that automated opportunistic reminders have the potential to improve the provision of preventive care in Australian general practice.

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### Implications of this study for general practice

- GPs take few opportunities during consultations to provide recommended preventive care.
- They can be reminded to do so during consultations by clinical electronic record additions.
- The small increases in prevention suggest this system should be refined for greater effect.

Conflict of interest: none declared.

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