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# Preventive activities during consultations in general practice

## *Influences on performance*

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### BACKGROUND

The relationship between the performance of opportunistic preventive activities in general practice consultations and characteristics of patients, general practitioners, consultations and preventive opportunities is poorly understood.

### METHODS

We recorded the performance of 11 preventive care activities by 10 GPs in one practice and examined the associations of performance of the preventive activities and the characteristics of the patients, GPs, consultations and preventive opportunities.

### RESULTS

Every patient, GP, consultation and preventive opportunity characteristic studied was independently significantly associated with the performance of at least two of the preventive activities.

### DISCUSSION

These findings suggest ways of designing more effective reminders, particularly for patients least likely to receive prevention counselling.

The prevention or early detection of disease in its early and often asymptomatic stages is an important task of general practice. Over 85% of Australians visit their general practitioner every year (mean 6.5 times), representing many opportunities for preventive care.<sup>1,2</sup>

Patient age, gender, and number of visits during the previous year are significantly associated with the performance of preventive activities,<sup>3,4</sup> while patients' self reported 'health status' is not.<sup>3</sup> The performance by women GPs of some preventive activities, particularly Pap testing, is higher than that of male GPs.<sup>4-7</sup> Preventive activities are more common in longer consultations than shorter ones.<sup>8</sup> We found no studies of the relationship between performance of preventive activities and the level of fee billed for the consultation, elapsed time since the preventive activity had become due, the ordinal number of the opportunity, or the number of other preventive opportunities at the same consultation. Previous studies of 'provider continuity' have not examined whether patients' usual GPs within a practice are more likely to perform preventive activities within consultations than other GPs within the same practice.<sup>1-5</sup>

### Methods

Data were derived from a randomised controlled trial of opportunistic reminders for 11 preventive care activities by 10 GPs in one practice during a 1 year period.<sup>6</sup> We made several definitions: an 'opportunity

to perform a preventive activity' indicated for the patient's age and sex, had not been performed within the interval intended by the GPs, and the patient had neither refused nor was ineligible for it; and the 'patient's usual GP' seen for more than 50% of consultations during the study (coding 'no usual GP' if patients did not see one more than 50% of consultations). Consultations were either 'shorter' (Medicare items 3 or 23, taking <20 minutes), or 'longer' (items 36 or 44, taking ≥20 minutes). Patient co-payments for fees charged were defined as 'nil' (fee charged at the Medicare benefit level), '≤\$5.00' or '>\$5.00'. The date on which each activity was due was defined from: the date on which it was recorded as last performed, plus the interval specified; if never performed, the date on which the patient had reached the starting age for that activity; if before the date of the patient's first visit to the practice, then the first visit date was used. The influenza immunisation season was defined as between the first day of the study (9 March 1998) and 30 June 1998, and because this was only a short period, time elapsed since influenza immunisation became due was not calculated.

Each opportunity that occurred during the trial for the GPs to perform that activity for that patient was numbered in order. It is likely that for many patients, the GPs will have had opportunities before the start of the trial to perform various preventive activities, but because data were not available to allow

**Table 1. Independent associations of characteristics with the performance of preventive activities: multivariate relative risks (95% CI)**

Preventive activity	Patient gender Reference is female patient	Patient age in years	No. visits past 2 years Reference is 0-4 visits	No. long term problems Reference is 0 problems	GP gender Reference is male GP	Usual GP consulted, reference is patient not seeing usual GP
Recording of patients' allergies	NS	0-26 1.00	5-11 0.74 (0.66-0.83)	NS	1.13 (1.01-1.25)	NS
		27-48 1.48 (1.28-1.70)	12+ 0.55 (0.47-0.63)			
		49-95 1.23 (1.05-1.45)				
Recording of patients' smoking status	1.85 (1.49-2.33)	NS	5-11 0.85 (0.66-1.09)	NS	0.64 (0.50-0.81)	0.78 (0.63-0.98)
			12+ 0.37 (0.25-0.55)			
Screening for hypertension	1.15 (1.04-1.27)	20-37 1.00	5-11 0.72 (0.63-0.83)	1 1.34 (1.18-1.52)	NS	NS
		38-53 1.21 (1.09-1.35)	12+ 0.45 (0.37-0.54)	2+ 1.40 (1.20-1.62)		
		54-95 1.17 (1.02-1.33)				
Screening for cancer of the cervix	NA	18-36 1.00	5-11 1.14 (0.96-1.53)	1 1.27 (1.07-1.51)	3.17 (2.68-3.74)	NS
		37-52 1.10 (0.94-1.28)	12+ 0.67 (0.53-0.86)	2+ 0.96 (0.78-1.18)		
		53-69 0.67 (0.54-0.82)				
Recording patients' weight	1.27 (1.12-1.41)	20-39 1.00	5-11 0.81 (0.71-0.93)	1 1.32 (1.15-1.52)	1.59 (1.39-1.82)	NS
		60-95 0.75 (0.64-0.88)	12+ 0.53 (0.45-0.63)	2+ 1.35 (1.17-1.57)		
		40-59 0.89 (0.79-1.01)				
Screening for diabetes	NS	NS	NS	NS	NS	NS
Screening for hyperlipidaemia	1.45 (1.27-1.92)	20-33 1.00	5-11 0.85 (0.67-1.08)	NS	NS	1.44 (1.13-1.84)
		34-46 1.86 (1.40-2.47)	12+ 0.68 (0.50-0.92)			
		47-69 2.65 (2.00-3.50)				
Influenza immunisation	1.16 (1.01-1.33)	NS	NS	1 1.29 (1.06-1.57)	NS	NS
				2+ 1.36 (1.15-1.62)		
MIMR immunisation	NS	NS	NS	NS	NS	NS
Pneumococcal immunisation	NS	NS	NS	NS	NS	NS
Tetanus immunisation	1.27 (1.08-1.49)	0-31 1.00	5-11 0.98 (0.80-1.20)	NS	1.78 (1.46-2.17)	NS
		32-51 1.50 (1.21-1.87)	12+ 0.63 (0.49-0.82)			
		52-95 1.33 (1.02-1.72)				

NS = not statistically significant ( $p=0.05$ )  
NA = not applicable

accurate numbering of opportunities before the start of the study, we ignored them.

We analysed the order that GPs performed preventive activities by examining the number of other preventive activities indicated and due for each patient at the same time. We undertook multivariate log binomial regression and generalised estimating equations analyses using the characteristics being studied and SAS statistical software version 8.2.

## Results

During the trial, 10 507 patients attended for 39 314 consultations during which there were 136 337 opportunities to perform the 11 nominated preventive activities. Patient characteristics significantly associated with higher performance of preventive activities were male gender, middle age, having had fewer consultations during the preceding 2 years, and having more long term health problems (Table 1).

Women GPs were significantly more likely to record patients' allergies and weight, perform Pap tests and tetanus immunisation; but significantly less likely to record patients' smoking status. Patients' usual GPs performed significantly better for lipid screening but significantly worse for recording of smoking status (Table 1).

Consultation characteristics significantly associated with higher performance were longer consultation (but the reverse for influenza immunisation), and fewer other preventive activities being due at the consultation (Table 2). When at least one problem was coded at the consultation, recording of allergies, smoking status and weight were significantly more likely performed, as was screening for hypertension when two or more problems were coded. The opposite held for Pap testing and lipid screening, which were significantly less likely to be performed when one problem was coded. Tetanus immunisation was significantly more likely to be performed when two or more problems were coded, but significantly less likely to be performed when one problem was coded. The billing of a patient co-payment

**Table 2. Independent associations of characteristics with the performance of preventive activities: multivariate relative risks (95% CI)**

Preventive activity	Consultation length Reference is item 3 or 23 consultation (<20 minutes)	No. of preventive activities due at consultation Reference is 1 or 2 activities due	No. problems coded at consultation Reference is 0 problems coded	Patient co-payment billed Reference is nil co-payment billed
Recording of patients' allergies	1.23 (1.10–1.38)	3–4 0.85 (0.74–0.98) 5+ 0.70 (0.61–0.81)	1 2.76 (2.43–3.12) 2+ 3.43 (2.97–3.97)	NS ≤ \$5.00 1.42 (0.98–2.05) > \$5.00 1.91 (1.32–2.77)
Recording of patients' smoking status	1.46 (1.14–1.87)	NS	1 2.46 (1.96–3.09) 2+ 2.31 (1.72–3.11)	≤ \$5.00 1.41 (1.18–1.67) > \$5.00 1.68 (1.41–2.00)
Screening for hypertension	1.71 (1.54–1.90)	3–4 0.83 (0.62–1.10) 5+ 0.61 (0.46–0.82)	1 0.93 (0.83–1.04) 2+ 1.33 (1.17–1.51)	≤ \$5.00 1.43 (1.13–1.82) > \$5.00 1.59 (1.25–2.03)
Screening for cancer of the cervix	1.77 (1.52–2.05)	NS	1 0.39 (0.32–0.47) 2+ 0.85 (0.72–1.00)	≤ \$5.00 1.41 (1.18–1.67) > \$5.00 1.42 (1.19–1.71)
Recording patients' weight	2.35 (2.09–2.63)	3–4 0.79 (0.67–0.93) 5+ 0.55 (0.46–0.67)	1 1.43 (1.24–1.65) 2+ 1.78 (1.52–2.10)	NS
Screening for diabetes	2.63 (1.61–4.29)	NS	NS	≤ \$5.00 0.57 (0.44–1.75) > \$5.00 0.75 (0.58–0.98)
Screening for hyperlipidaemia	2.82 (2.27–3.50)	3–4 0.74 (0.53–1.02) 5+ 0.51 (0.36–0.72)	1 0.74 (0.58–0.94) 2+ 0.89 (0.66–1.19)	≤ \$5.00 0.60 (0.52–0.70) > \$5.00 0.53 (0.37–0.76)
Influenza immunisation	0.68 (0.53–0.87)	NS	NS	≤ \$5.00 0.63 (0.44–0.92) > \$5.00 0.66 (0.43–1.00)
MMR immunisation	NS	3–4 0.42 (0.25–0.72)	NS	NS
Pneumococcal immunisation	NS	NS	NS	NS
Tetanus immunisation	NS	3–4 0.76 (0.61–0.94) 5+ 0.61 (0.48–0.78)	1 0.75 (0.60–0.94) 2+ 2.22 (1.76–2.78)	NS

NS = not statistically significant ( $p > 0.05$ )  
NA = not applicable

**Table 3. Independent associations of characteristics with the performance of preventive activities: multivariate relative risks (95% CI)**

Preventive activity	Reminder displayed Reference is no reminder displayed	Opportunity ordinal number Reference is first opportunity during trial to perform the activity	Years since preventive activity became due Reference is <1 year since due, except SMOKE 0-2 years since due
Recording of patients' allergies	2.58 (2.35-2.83)	2nd 0.54 (0.48-0.61) 3rd 0.40 (0.34-0.48)	NS
Recording of patients' smoking status	NS	2nd 0.37 (0.28-0.50) 3rd 0.27 (0.18-0.42)	2-<6 0.73 (0.57-0.93) 6+ 0.63 (0.48-0.83)
Screening for hypertension	1.72 (1.56-1.90)	2nd 0.61 (0.53-0.70) 3rd 0.51 (0.42-0.62)	1-<3 1.35 (1.20-1.52) 3+ 0.97 (0.86-1.10)
Screening for cancer of the cervix	1.20 (1.05-1.38)	2nd 0.75 (0.63-0.89) 3rd 0.48 (0.38-0.62)	1-<4 1.11 (0.94-1.31) 4+ 0.71 (0.56-0.89)
Recording patients' weight	1.70 (1.52-1.89)	2nd 0.55 (0.47-0.64) 3rd 0.42 (0.34-0.51)	NS
Screening for diabetes	NS	NS	1-<4 2.50 (1.29-4.84) 4+ 5.86 (2.62-13.10)
Screening for hyperlipidaemia	NS	2nd 1.56 (1.23-1.99) 3rd 1.01 (0.73-1.38)	1-<5 1.91 (1.47-2.48) 5+ 1.68 (1.27-2.21)
Influenza immunisation	1.30 (1.13-1.50)	2nd 0.62 (0.52-0.74) 3rd 0.09 (0.06-0.15)	NA
MMR immunisation	NS	2nd 0.57 (0.32-1.02) 3rd 0.43 (0.26-0.70)	1-<3 3.41 (2.47-4.72)
Pneumococcal immunisation	2.20 (1.47-3.27)	2nd 0.24 (0.13-0.44) 3rd 0.20 (0.10-0.40)	NS
Tetanus immunisation	2.41 (2.03-2.85)	2nd 0.57 (0.46-0.71) 3rd 0.51 (0.39-0.68)	NS

NS = not statistically significant ( $p \geq 0.05$ )  
NA = not applicable

associated with higher performance of recording of smoking status and weight, screening for hypertension and Pap testing, but with lower performance of lipid screening, influenza, and measles, mumps, rubella (MMR) immunisation.

Characteristics of preventive opportunities significantly associated with higher performance were a reminder being displayed, and being the first opportunity during the study to perform the activity. The opposite held for lipid screening, which was most likely to be performed at the second opportunity (Table 3). When the preventive activity had been due for longer, performance was significantly higher for MMR immunisation and for screening for hypertension, hyperlipidaemia and diabetes, but significantly lower for recording of smoking status and Pap testing.

### Discussion

The study was limited by: possible validity problems (we cannot be sure the medical records reflected the true preventive status of patients), using only one practice, the low absolute numbers of opportunities taken for prevention which reduced the power of the study, and our method of determining the 'usual GP' for each patient was arbitrary and potentially flawed.

We found that consulting the usual GP was associated with better performance only of lipid screening. In contrast, performance of recording of smoking status was worse, perhaps because the usual GP was more likely to be aware, or to think they were aware, of well known patients' smoking status.

That increasing numbers of preventive activities decreased the odds of other preventive activities taking place in a consultation is not surprising – GPs can devote only limited time and energy to prevention. The association between higher performance of some preventive activities (ie. smoking status, hypertension, Pap testing) with charging out of pocket fees may be explained by three possibilities: to do so may have taken more effort

(the greater service was charged for), or conversely GPs felt a greater obligation to provide better care to patients who were paying out of pocket for their care, or sociodemographic differences may be responsible for the higher performance.

That the longer a preventive activity had been due (therefore prevention more likely) was expected - that it did not hold for smoking was not. We cannot explain this.

One of the most striking findings was the decreasing odds of prevention with each subsequent opportunity. Perhaps this was simply miscoding: patients who were ineligible or had refused not being recorded by the GP. Another was the finding that differed from previous studies<sup>9,10</sup> by showing six preventive activities were significantly more commonly performed for male patients than females, and that three preventive activities were more commonly performed in patients with long term health problems.<sup>10</sup>

We found it is possible to use routinely recorded clinical and billing data to estimate the relative odds of preventive activities being performed. This data collection suggests some innovative and sophisticated means of improving preventive care in the future, including the better design of reminder systems. Practice computer systems could be designed to monitor each GP's performance to 'learn' when each is less likely to perform particular preventive activities so that appropriate reminders are launched.

#### Implications of this study for general practice

- The likelihood of GPs undertaking opportunistic preventive activities varies with:
  - the number of preventive activities due at the consultation
  - socioeconomic indicators
  - type of preventive activity
  - patient demographic factors, and
  - GP gender.
- Further research is needed to confirm these findings.
- This data collection suggests some innovative and sophisticated means of improving preventive care in the future.

Conflict of interest: none declared.

#### Acknowledgments

Thanks to the Medical Benefits Fund of Australia, SmithKlineBeecham and the Commonwealth Government's PHCRED program for funding, to the GPs who participated in the study, Dr Jan Ravet for the use of his original computer programs and for technical advice, and to Nicole Pratt, Heather McElroy and Kristyn Willson for their assistance with the statistical analyses.

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