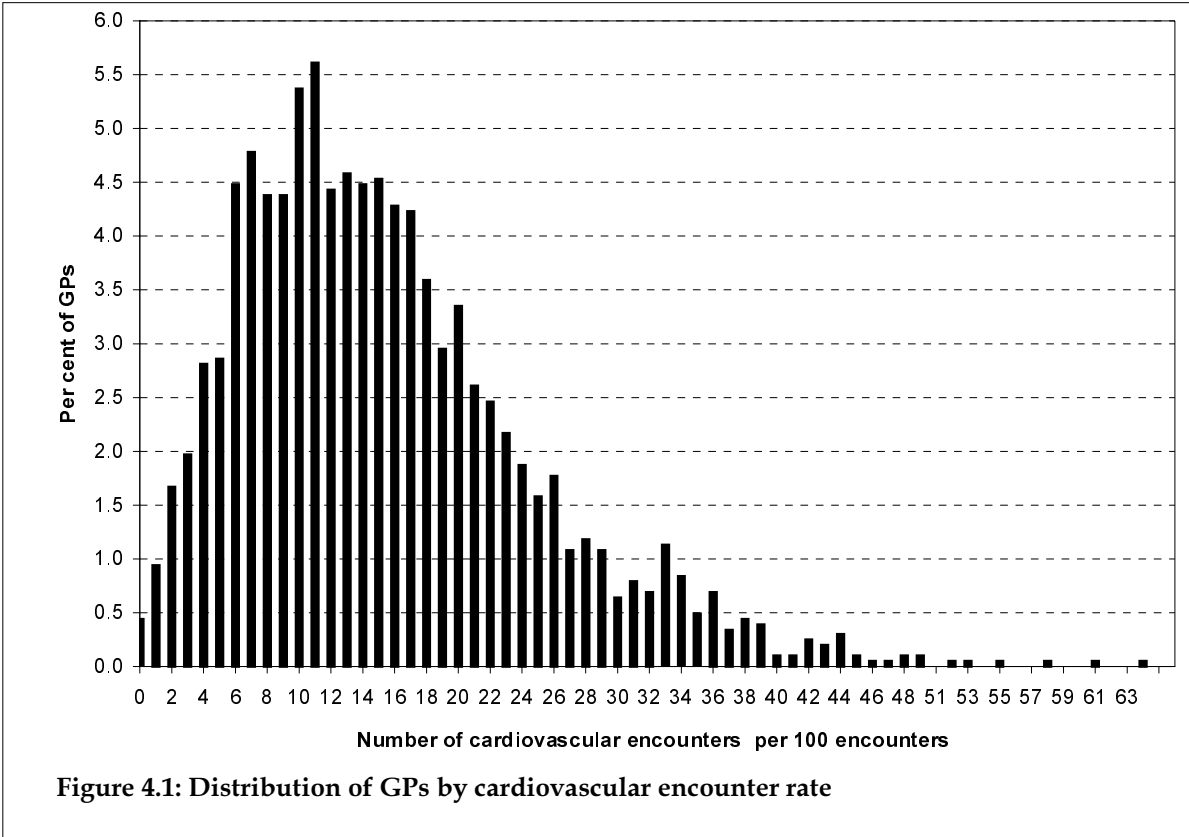# 4 GPs and cardiovascular encounter rates

This chapter describes the relationship between GP characteristics and the number of cardiovascular problems managed. It further investigates GP and practice characteristics as possible predictors of high rates of management of cardiovascular problems. This may provide researchers with an indication of the types of GPs who manage cardiovascular problems more frequently. This would allow them to select particular GP groups for interventions and so provide the most cost-effective approach to attempted behaviour change.

4.1 Distribution of GPs by cardiovascular encounter rate

Of the 2,031 GPs who participated in BEACH during 1998–00, there were only nine GPs who did not manage at least one cardiovascular problem.

Figure 4.1: Distribution of GPs by cardiovascular encounter rate

The rate of cardiovascular encounters per GP varied widely, ranging from 0 to 64 per 100 encounters (Figure 4.1). The median cardiovascular encounter rate was 14 and the mean

15.3 with a standard deviation of 9.2. The cardiovascular encounter rates for the majority (70.1%) of GPs therefore fell between 6.1 and 24.5 per 100 encounters. The most common rate of cardiovascular encounters was 11 of the 100 recorded (5.6% of GPs).

4.2 Cardiovascular encounter rates by GP characteristics

The relative encounter rates for particular groups of GPs are presented in Table 4.1.

Male GPs had a significantly higher rate of encounters with at least one cardiovascular problem (16.1 per 100 total encounters, 95% CI: 15.6–16.6) than did female practitioners (13.6 per 100 encounters, 95% CI: 12.9–14.2).

There was a trend of increasing cardiovascular encounter rates as GP age increased. GPs aged 55 or more had a significantly higher cardiovascular encounter rate (18.2 per 100 encounters, 95% CI: 17.3–19.1) than those aged 45–54 years (15.8 per 100, 95% CI: 15.1–16.5), those aged 35–44 years (13.7 per 100, 95% CI: 13.1–14.3), and those aged less than 35 years (10.6 per 100, 95% CI: 9.6–11.6).

There was no significant association between GP place of graduation and cardiovascular encounter rate. GPs who worked 6–10 sessions per week had a significantly higher cardiovascular encounter rate (15.8 per 100 encounters, 95% CI: 15.3–16.3) than practitioners who worked fewer than 6 sessions per week (13.5 per 100, 95% CI: 12.4–14.6) or those working 11 or more sessions per week (15.1 per 100, 95% CI: 14.2–16.0).

There was a significant trend of increasing cardiovascular encounter rates with decreased size of practice, solo practitioners having higher rate of cardiovascular encounters (18.0 per 100, 95% CI: 16.9–19.0) than those in practices of 2–4 GPs (16.1 per 100, 95% CI: 15.5–16.8), those in practices of 5–10 GPs (14.0 per 100, 95% CI: 13.4–14.5) or those in large group practices of 11 or more GPs (10.7 per 100, 95% CI: 9.5–11.9).

The State/Territory-specific cardiovascular encounter rates ranged from 8.5 per 100 encounters in the Northern Territory to 16.8 per 100 in New South Wales. The New South Wales rate was significantly higher than that of the Northern Territory, the Australian Capital Territory (10.8 per 100, 95% CI: 8.8–12.8), Queensland (13.2 per 100, 95% CI: 12.5–14.0), South Australia (14.8 per 100, 95% CI: 13.6–16.0), and Western Australia (13.6 per 100, 95% CI: 12.5–14.8).

Using categories of the Rural, Remote and Metropolitan Area classification (RRMA)[242], the GPs were grouped according to the rurality of their major practice location. GPs from small rural (including remote) areas had a significantly higher cardiovascular encounter rate (16.9 per 100 encounters, 95% CI: 16.1–17.7) than those from metropolitan areas (15.0 per 100, 95% CI: 14.5–15.5). The cardiovascular encounter rate for large rural areas (15.0 per 100 encounters, 95% CI: 13.6–16.3) was not significantly lower than that of small rural areas; however, the smaller sample size from the large rural areas generated wide confidence intervals which may affect the accuracy of this comparison.

The cardiovascular encounter rate for GPs who conducted more than half of their consultations in a language other than English (17.2 per 100 encounters, 95% CI: 15.9–18.6) was significantly higher than that of their counterparts (15.1 per 100, 95% CI: 14.7–15.5).

GPs who did not hold Fellowship of the Royal Australian College of General Practitioners (FRACGP) had a significantly higher cardiovascular encounter rate (16.0 per 100

encounters, 95% CI: 15.5–16.5) than those who were Fellows of the RACGP (13.8 per 100, 95% CI: 13.1–14.5).

Table 4.1: Cardiovascular encounter rates by selected GP characteristics

GP characteristic	Number of encounters	Number of cardiovascular encounters	Per cent of total cardiovascular encounters (n = 31,161)[a]	Cardiovascular encounter rate per 100 encounters[a]	95% LCL	95% UCL
Sex						
Male	141,800	22,850	73.3	16.1	15.6	16.6
Female	61,300	8,311	26.7	13.6	12.9	14.2
Age (missing = 8)						
< 35 years	15,000	1,593	5.1	10.6	9.6	11.6
35–44 years	69,400	9,503	30.5	13.7	13.1	14.3
45–54 years	65,300	10,335	33.2	15.8	15.1	16.5
55+ years	52,600	9,595	30.8	18.2	17.3	19.1
Place of graduation (missing = 4)						
Australia	151,700	23,375	75.0	15.4	14.9	15.9
UK	17,700	2,672	8.6	15.1	13.8	16.3
Other	33,300	5,067	16.3	15.2	14.2	16.2
Sessions per week (missing = 18)						
< 6 per week	28,000	3,775	12.1	13.5	12.4	14.6
6–10 per week	135,600	21,404	68.7	15.8	15.3	16.3
11+ per week	37,700	5,696	18.3	15.1	14.2	16.0
Size of practice (missing=1,900)						
Solo	35,400	6,365	20.4	18.0	16.9	19.0
2–4 GPs	81,600	13,155	42.2	16.1	15.5	16.8
5–10 GPs	71,400	9,958	32.0	14.0	13.4	14.5
11+ GPs	12,800	1,372	4.4	10.7	9.5	11.9
State						
New South Wales	75,400	12,655	40.6	16.8	16.1	17.5
Victoria	44,700	7,268	23.3	16.3	15.4	17.1
Queensland	39,600	5,235	16.8	13.2	12.5	14.0
South Australia	17,000	2,509	8.1	14.8	13.6	16.0
Western Australia	16,500	2,250	7.2	13.6	12.5	14.8
Tasmania	4,700	733	2.4	15.6	13.4	17.8
Australian Capital Territory	3,000	324	1.0	10.8	8.8	12.8
Northern Territory	2,200	187	0.6	8.5	6.3	10.7

(continued)

Table 4.1 (continued): Cardiovascular encounter rates by selected GP characteristics

GP characteristic	Number of encounters	Number of cardiovascular encounters	Per cent of total cardiovascular encounters (n = 31,161)[a]	Cardiovascular encounter rate per 100 encounters[a]	95% LCL	95% UCL
RRMA category[b]						
Metropolitan	150,500	22,561	72.4	15.0	14.5	15.5
Large rural	15,000	2,248	7.2	15.0	13.6	16.3
Small rural	37,600	6,352	20.4	16.9	16.1	17.7
More than 50% of consultations in languages other than English (missing = 12)						
Yes	21,600	3,724	12.0	17.2	15.9	18.6
No	180,300	27,225	87.4	15.1	14.7	15.5
Hold FRACGP (missing = 29)						
Yes	58,800	8,127	26.1	13.8	13.1	14.5
No	141,400	22,606	72.6	16.0	15.5	16.5
Total	203,100	31,161	100.0	15.3	14.9	15.7

(a)   Missing data removed.

(b)   Rural, Remote and Metropolitan Area classification: Metropolitan—RRMA groups 1 & 2; Large rural— RRMA groups 3 & 6; Small rural—RRMA groups 4, 5 & 7 [243].

Note: Shading indicates statistically significant differences between groups. UCL—upper confidence limit, LCL—lower confidence limit.

4.3 Characteristics of GPs with high, medium and low cardiovascular encounter rates

In this section, the characteristics of GPs are compared on the basis of their cardiovascular encounter rate. The participating GPs were divided into three groups according to their cardiovascular encounter rate. The low cardiovascular encounter rate group was defined as those GPs whose cardiovascular encounter rate was less than 6 per 100 encounters (the mean minus one standard deviation). The group with a medium cardiovascular encounter rate consisted of those GPs whose cardiovascular encounter rate was within the range of the mean (9.1 per 100 encounters) plus or minus one standard deviation (i.e. 6–24 per 100 encounters). The high cardiovascular encounter rate group was defined as those GPs whose cardiovascular encounter rate was above this range. The characteristics of the GPs falling into each of these cardiovascular encounter rate groups are compared in Table 4.2.

Table 4.2: Characteristics of GPs in the high, medium and low cardiovascular encounter groups

GP variable		GPs with low cardiovascular encounter rate (*n* = 217)				GPs with medium cardiovascular encounter rate (*n* = 1,514)				GPs with high cardiovascular encounter rate (*n* = 300)			
		Number	Per cent	95% LCL	95% UCL	Number	Per cent	95% LCL	95% UCL	Number	Per cent	95% LCL	95% UCL
Sex	Male	142	65.4	59.1	71.8	1,031	68.1	65.7	70.4	245	81.7	77.3	86.1
	Female	75	34.6	28.2	40.9	483	31.9	29.6	34.3	55	18.3	13.9	22.7
Age	< 35	37	17.1	12.1	22.2	109	7.2	5.9	8.5	4	1.3	0.0	2.6
	35–44	70	32.4	26.1	38.7	565	37.5	35.0	39.9	59	19.7	15.2	24.3
	45–54	61	28.2	22.2	34.3	492	32.6	30.3	35.0	100	33.4	28.1	38.8
	55+	48	22.2	16.6	27.8	342	22.7	20.6	24.8	136	45.5	39.8	51.2
Place of graduation													
	Australia	156	72.2	66.2	78.2	1,139	75.4	73.2	77.6	222	74.0	69.0	79.0
	UK	19	8.8	5.0	12.6	132	8.7	7.3	10.2	26	8.7	5.5	11.9
	Other	41	19.0	13.7	24.3	240	15.9	14.0	17.7	52	17.3	13.0	21.6
Years in general practice													
	< 2	2	0.9	0.0	2.2	12	0.8	0.3	1.2	1	0.3	0.0	1.0
	2–5	37	17.3	12.2	22.4	102	5.8	5.5	8.1	3	1.0	0.0	2.2
	6–10	49	22.9	17.2	28.6	251	16.7	14.8	18.6	33	11.2	7.6	14.8
	11–19	57	26.6	20.7	32.6	538	35.8	33.4	38.2	64	21.7	17.0	26.4
	20+	69	32.2	25.9	38.6	599	39.9	37.4	42.4	194	65.8	60.3	71.2
Sessions per week													
	< 6	41	19.0	13.7	24.3	208	13.9	12.1	15.6	31	10.4	6.9	13.9
	6–10	131	60.6	54.1	67.2	1016	67.7	65.4	70.1	209	70.4	65.1	75.6
	11+	44	20.4	15.0	25.8	276	18.4	16.4	20.4	57	19.2	14.7	23.7
Size of practice													
	Solo	31	14.4	9.6	19.1	233	15.5	13.7	17.4	90	30.3	25.0	35.6
	2–4	67	31.0	24.8	37.2	618	41.2	38.7	43.7	131	44.1	38.4	49.8
	5–10	88	40.7	34.1	47.3	557	37.2	34.7	39.6	69	23.2	18.4	28.1
	11+	30	13.9	9.2	18.5	91	6.1	4.9	7.3	7	2.4	0.6	4.1
Rurality	Metropolitan	190	87.6	83.1	92.0	1091	72.1	69.8	74.3	224	74.7	69.7	79.6
	Large rural	11	5.1	2.1	8.0	122	8.1	6.7	9.4	17	5.7	3.0	8.3
	Small rural	16	7.4	3.9	10.9	301	19.9	17.9	21.9	59	19.7	15.1	24.2
> 50% non-English consultation													
	Yes	16	7.4	3.9	11.0	152	10.1	8.6	11.6	48	16.2	12.0	20.4
	No	199	92.6	89.0	96.1	1,355	89.9	88.4	91.4	249	83.8	79.6	88.0
FRACGP	Yes	77	36.2	29.6	42.7	448	30.0	27.7	32.3	63	21.4	16.7	26.1
	No	136	63.8	57.3	70.4	1,046	70.0	67.7	72.3	232	78.6	73.9	83.3
Total		**217**	**100.0**	..	..	**1514**	**100.0**	..	..	**300**	**100.0**	..	..

Note: Shading indicates statistically significant differences between the groups. UCL—upper confidence limit, LCL—lower confidence limit.

37

When compared with the GPs in the medium and low cardiovascular encounter rate groups, GPs in the high cardiovascular encounter rate group were more likely to

- be male
- be aged 55+ years
- have been in practice for more than 10 years
- be a solo practitioner or in a practice of 2–4 GPs
- be in rural locations
- conduct more than 50% of their consultations in a language other than English

and were less likely to:

- be Fellows of the RACGP
- be in practices with more than 5 GPs
- be aged less than 44 years
- practise in metropolitan practices.

4.4 GP characteristics by cardiovascular encounter rate: analysis of variance

The factors that affected the GPs' cardiovascular encounter rate were identified using analysis of variance and linear regression. Of the 2,031 GPs, 1,876 had data recorded for all variables of interest. The analysis of variance was restricted to these 1,876 GPs.

Univariate analysis

The proportion of variance in cardiovascular encounter rates explained by each variable alone was determined using simple linear regression. Results are shown in Table 4.3.

Table 4.3: Univariate analysis of GP characteristics and cardiovascular encounter rates

Variable	Regression coefficient	Effect size (standard beta)	Per cent of variance explained	F-value	P-value
GP characteristics	..	..	**9.01**	**13.67**	**0.0001**
GP sex	2.549	0.128	1.64	32.36	0.0001
GP age	..	..	5.77	39.64	0.0001
Annual A1 Medicare claims	-0.000	-0.026	0.07	1.35	0.245
Place of graduation	..	..	0.01	0.13	0.875
Years in practice	..	..	6.31	43.62	0.0001
Sessions per week	..	..	0.82	8.05	0.0003
More than 50% of consultations in languages other than English	2.048	0.069	0.48	9.40	0.0022
Hold FRACGP	-2.196	-0.109	1.20	23.60	0.0001
Practice characteristics	..	..	**4.69**	**19.12**	**0.0001**
Size of practice	..	..	4.18	28.22	0.0001
Location of practice	..	..	0.69	6.77	0.0012

Note: F-value = the test statistic, P-value = the significance level.

Variables that were significant univariate predictors of cardiovascular encounter rates when fitted alone were sex, age, years in practice, sessions worked per week, more than 50% of consultations in languages other than English, Fellowship of the Royal Australian College of General Practitioners (FRACGP), practice location, and size of practice.

Multivariate analysis

Multiple linear regression was used to determine which of the possible explanatory variables were useful in predicting the cardiovascular encounter rate. When all variables of interest were entered, the model explained 11.5% of the variance in cardiovascular encounter rates. The full additive model explained a significant amount of the variance in cardiovascular encounter rates ($F(19, 1927) = 13.13$, $p = 0.0001$).

The model was reduced using backward elimination with predictor variables fitted in 'families' in the following order: 'GP characteristics', 'practice characteristics'. Families were reduced in order, the variables most directly related to cardiovascular encounter rates (GP characteristics) being reduced first, after adjusting for practice characteristics.

If a family was significant (global alpha = 0.1) when fitted last, it was reduced further by fitting each individual variable last. Significant variables (alpha = 0.05) or those that improved the fit of the model were kept. The reduced family was then fitted first and the next family fitted last. The final reduced model is summarised in Table 4.4.

The results of this multivariate analysis suggest that the indicators for higher cardiovascular rates are:

- male GPs (versus female)
- GPs aged 35–44 years or older (versus those aged less than 35 years)
- GPs working 6–10 sessions per week (versus those working part time)
- GPs who graduated in Australia (versus those who graduated in the UK or other countries)
- GPs who conducted more than half of their consultations in a language other than English (versus those with fewer than 50% of these consultations)
- Practices with 10 or fewer GPs (versus practices with 11 or more GPs)
- GPs from small rural practices (versus those from urban practices).

Together, the independent predictors explained 10.6% of the variance in cardiovascular encounter rates ($F(14, 1946) = 16.32$, $p = 0.0001$). Age of GP was the strongest independent predictor of cardiovascular encounter rates, which uniquely explained 3.7% of the variance. It was followed by the size of practice, which accounted for 2.0% of the variance uniquely.

The univariate analysis did not find an association between place of graduation and cardiovascular encounters. However, the effect of place of graduation was being masked by GP age, which has a significant positive association with cardiovascular encounters. GPs who graduated overseas were, on average, older than Australian graduates. The multivariate analysis revealed that for GPs of the same age group, Australian graduates had a higher rate of cardiovascular encounters than overseas graduates.

Table 4.4: Final model of independent predictors of GP cardiovascular encounter rates

Predictor (explanatory variable)		Regression coefficient[a]	Effect size (standard Beta)[b]	T-value (F-partial)	P-value[c]	Per cent of unique variance[d]
Sex						
Versus Female	Male	1.17	0.06	2.52	0.0119	1.64
Age		. .	. .	(26.81)	0.0001	3.72
Versus < 35	35-44	2.98	0.15	3.74	0.0002	. .
	45–54	4.63	0.24	5.67	0.0001	. .
	55+	6.92	0.33	7.99	0.0001	. .
Place of graduation		. .	. .	(5.23)	0.0054	0.48
Versus Other	Australia	1.47	0.07	2.65	0.0082	. .
	UK	-0.14	-0.00	-0.16	0.8699	. .
Sessions per week		. .	. .	(9.39)	0.0001	0.87
Versus < 6	6–10	1.72	0.09	2.83	0.0047	. .
	11+	-0.25	-0.01	-0.33	0.7406	. .
> 50% non-English consultations						
Versus No	Yes	1.48	0.05	2.30	0.0214	0.35
Size of practice		. .	. .	(14.43)	0.0001	2.00
Versus 11+	Solo	5.73	0.24	6.00	0.0001	. .
	2–4	4.15	0.24	4.83	0.0001	. .
	5–10	2.83	0.15	3.29	0.0010	. .
Location of practice		. .	. .	(4.38)	0.0127	0.41
Versus metropolitan	Large rural	0.14	0.00	0.18	0.8570	. .
	Small rural	1.53	0.07	2.95	0.0033	. .

(a)   Unit change in cardiovascular encounter rate for every unit change in the predictor variable. Units are original measurement units. Negative values represent a reduction in cardiovascular encounter rates with an increasing rate of the predictor.

(b)   The standardised effect of the variable on cardiovascular encounter rates. Measured as standard deviation change in cardiovascular encounter rate for every standard deviation change in the predictor.

(c)   Significance when all other variables in the model are held constant.

(d)   The percentage of variance in cardiovascular encounter rates attributable uniquely to the variable, after taking into account the variance explained by all other variables in the model.

4.5 Conclusion

This analysis has demonstrated the characteristics of GPs who see more cardiovascular problems. These results could be considered in the selection of GPs for educational interventions in the area of cardiovascular disease management.