Sex of the GP — 20 years on

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ABSTRACT

Objective: Previous research with the Australian Morbidity and Treatment Survey (1990–1991) showed significant differences in general practitioner characteristics and patient mix of male and female GPs. Even after adjusting for these, it was seen that male and female GPs managed different types of medical conditions. The proportion of female GPs increased from 19.6% in 1990–1991 to 37.1% in 2009–2010. This study investigates whether differences remain two decades later.

Design and setting: Analysis of 2009–2010 Bettering the Evaluation and Care of Health (BEACH) data examining GP characteristics, patient encounter characteristics, patient reasons for encounter (RFE), problem types managed and management methods used, by GP sex. Whether GP sex was an independent predictor of problem types being managed, or management methods used, was tested using multiple logistic regressions and Poisson regression.

Participants: 988 GPs recorded 98 800 GP–patient encounters.

Main outcome measure: Adjusted differences in clinical activity of male and female GPs.

Results: After adjustment, compared with male GPs, females recorded more RFEs about general and unspecified issues and endocrine, female genital, pregnancy and family planning problems; and fewer concerning the musculoskeletal, respiratory, skin and male genital systems. Female GPs managed more general and unspecified, digestive, circulatory, psychological, endocrine, female genital and social problems; recorded nearly 20% more clinical treatments and referrals; recorded nearly 10% more imaging and pathology tests; and 4.3% fewer medications.

Conclusions: After two decades, even with increased numbers of female GPs, the differences in problems managed by male and female GPs remain, and will probably continue. Female GPs use more resources per encounter, but may not use more resources in terms of annual patient care.

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Over the past 20 years in Australia, the proportion of active general practitioners who are female has almost doubled, from 19.6%[1] in 1990–1991 to 37.1% in 2009–2010.[2] The increased participation of women in the GP workforce, in Australia and abroad, has led to examination of differences between male and female GPs.

Australian and overseas studies show that compared with males, female GPs are more likely to be younger,[3,4] have longer consultations,[5-9] work fewer hours,[10] manage more female genital problems[4,5,11] and social problems,[5,12] see female patients[6] (and female patients are more likely to prefer to see a female GP[5,13,14]), and have a patient-oriented consultative style.[7,12,15] Female GPs are more likely to hold Fellowship of the Royal Australian College of General Practitioners (FRACGP),[3] work in a group practice,[3,4] provide preventive care,[12,16] use psychosocial counselling,[7] make referrals[17] and prescribe fewer medications.[15]

However, most of these variables correlate. For example, if female patients prefer seeing female GPs, then female GPs will see more female patients and so will manage more female genital problems and social problems. If female GPs manage more of these problems, they would use more tests and psychosocial counselling. To test the extent to which GP sex independently affects clinical practice, we must control for all other variables.

One of the first studies[18] controlling for these other factors was carried out in Australia using data from the 1990–1991 Australian Morbidity and Treatment Survey.[1] It examined the effect of GP sex on patients' "reasons for encounter" (RFEs) (adjusting for other GP and patient characteristics), and the effect of GP sex on the morbidity managed (adjusting for patients' RFEs and other GP and patient characteristics).

After adjustment, patients seeing female GPs were more likely to have RFEs related to endocrine, psychological, pregnancy, female genital and social issues, and less likely to have RFEs related to the eyes or ears, or the musculoskeletal, respiratory, skin or male genital systems. After further statistical adjustment, female GPs were found to manage more general, psychological, pregnancy, female genital and social problems. The authors concluded that, while some differences were due to the mix of patients and their RFEs, other differences were "inherent" to the sex of the GP. In our study we investigated whether these inherent differences remain with today's GPs, or if they have levelled out with the increased numbers of female GPs.

METHODS

We analysed data from the Bettering the Evaluation and Care of Health (BEACH) program, April 2009 – March 2010. BEACH is a continuous, paper-based, national study of general practice activity in Australia. Sampling and methods have been described in detail elsewhere.[2] In summary, each year about 1000 GPs from a national, rolling random sample (drawn by the Department of Health and Ageing) participate. Each participating GP provides patient and encounter information for 100 consecutive encounters with consenting, unidentified patients.

We weighted the April 2009 – March 2010 dataset (of about 100 000 encounters) to match the age–sex distribution of all GPs in the sample frame and for each GP's activity level (measured by number of Medicare GP items claimed). The annual weighted BEACH encounter samples have repeatedly been demonstrated to be representative of all encounters claimed through Medicare.[2]

GP-related data elements include age (years), sex, years in practice, country of graduation, FRACGP status (yes or no), size and postcode of practice. Practice postcodes were used to define major cities using the Australian Standard Geographical Classification.[19]

The information collected at BEACH encounters includes patient age and sex, Indigenous status (self-reported by patient), non-English speaking background

1 Patient reason for encounter, and problem managed at encounter, with male and female GPs (univariate and multivariate analyses)

	Reason for encounter (95% CI)			Problems managed (95% CI)			
	Rate of specific RFE/100 encounters (unadjusted)		Model A* adjusted OR	Rate of problems managed/100 encounters (unadjusted)		Model B1† adjusted OR	Model B2‡ adjusted OR
ICPC-2 chapter	Male GP (*n* = 72 906)	Female GP (*n* = 28 443)	Female cf. male GP = 1	Male GP (*n* = 72 906)	Female GP (*n* = 28 443)	Female cf. male GP = 1	Female cf. male GP = 1
General and unspecified	40.4 (38.9–41.9)	48.6 (47.1–50.2)§	1.33 (1.24–1.43)¶	18.1 (17.1–19.1)	22.7 (21.6–23.8)§	1.10 (1.00–1.21)¶	1.03 (0.94–1.15)
Blood, blood forming organs, immune mechanisms	1.4 (1.2–1.5)	1.4 (1.2–1.6)	1.18 (0.96–1.45)	1.5 (1.4–1.7)	1.5 (1.4–1.7)	0.96 (0.81–1.13)	0.88 (0.74–1.03)
Digestive	9.8 (9.4–10.3)	9.7 (9.2–10.2)	0.99 (0.93–1.07)	10.5 (10.1–11.0)	11.0 (10.5–11.5)	1.18 (1.06–1.31)¶	1.03 (0.93–1.14)
Eye	2.4 (2.2–2.5)	2.3 (2.1–2.5)	0.90 (0.80–1.01)	2.5 (2.3–2.7)	2.3 (2.2–2.5)	0.92 (0.74–1.13)	0.79 (0.65–0.97)¶
Ear	3.6 (3.4–3.8)	3.6 (3.3–3.8)	1.03 (0.93–1.13)	3.7 (3.5–3.9)	3.6 (3.4–3.9)	0.90 (0.76–1.06)	0.81 (0.69–0.96)¶
Circulatory	10.4 (9.7–11.0)	9.2 (8.4–10.0)	1.08 (0.97–1.21)	17.0 (16.1–17.9)	15.8 (14.8–16.7)	1.13 (1.01–1.25)¶	0.93 (0.84–1.03)
Musculoskeletal	16.6 (15.6–17.6)	12.4 (11.8–12.9)§	0.75 (0.68–0.83)¶	17.6 (16.6–18.6)	14.8 (14.1–15.5)§	1.05 (0.96–1.16)	0.94 (0.85–1.02)
Neurological	4.4 (4.2–4.7)	4.2 (3.9–4.5)	0.93 (0.83–1.04)	3.5 (3.3–3.7)	3.4 (3.2–3.7)	1.09 (0.95–1.24)	0.96 (0.84–1.09)
Psychological	8.3 (7.7–8.8)	9.0 (8.4–9.6)	1.11 (1.00–1.22)	11.6 (10.9–12.3)	13.5 (12.8–14.3)§	1.22 (1.07–1.38)¶	1.02 (0.91–1.14)
Respiratory	23.2 (22.0–24.5)	21.8 (20.4–23.1)	0.91 (0.84–1.00)¶	22.3 (21.3–23.2)	21.9 (20.8–23.0)	1.06 (0.93–1.21)	0.95 (0.83–1.08)
Skin	15.2 (14.5–15.9)	13.7 (13.2–14.3)§	0.87 (0.80–0.95)¶	16.9 (16.1–17.7)	15.5 (15.0–16.1)	1.07 (0.97–1.17)	0.98 (0.90–1.07)
Endocrine, metabolic, nutritional	6.0 (5.6–6.5)	6.2 (5.7–6.7)	1.16 (1.04–1.28)¶	12.0 (11.4–12.7)	14.2 (13.4–15.0)§	1.27 (1.14–1.41)¶	1.06 (0.96–1.16)
Urinary system	2.6 (2.4–2.8)	2.8 (2.5–3.0)	1.04 (0.93–1.17)	3.1 (2.9–3.3)	3.6 (3.4–3.9)§	1.13 (0.98–1.30)	1.02 (0.88–1.17)
Pregnancy, childbearing, family planning	2.5 (2.2–2.8)	5.8 (5.3–6.3)§	1.49 (1.28–1.74)¶	2.8 (2.5–3.1)	6.5 (6.0–7.0)§	1.19 (1.00–1.42)	0.98 (0.81–1.18)
Female genital system, breast	2.4 (2.2–2.6)	10.6 (10.0–11.3)§	2.91 (2.63–3.22)¶	2.9 (2.7–3.1)	12.0 (11.4–12.7)§	1.71 (1.51–1.93)¶	1.47 (1.31–1.65)¶
Male genital	1.5 (1.3–1.6)	0.6 (0.5–0.7)§	0.75 (0.60–0.95)¶	2.2 (2.0–2.4)	1.10 (1.0–1.2)§	1.08 (0.89–1.31)	1.00 (0.82–1.21)
Social problems	1.1 (1.0–1.2)	1.3 (1.1–1.4)	1.18 (0.97–1.42)	0.7 (0.6–0.8)	1.1 (1.0–1.3)§	1.70 (1.36–2.13)¶	1.46 (1.17–1.83)¶

RFE = reason for encounter. OR = odds ratio. cf = compared with. * Model A: for patient RFEs; covariates controlled for were GP and practice characteristics (age [number of years in practice was excluded from the models as it has been shown to be highly correlated with the age of the GP[21]], sex, Fellowship of the Royal Australian College of General Practitioners and practice size) and patient characteristics (sex, age, Commonwealth health care card holder). † Model B1: for problem types managed; covariates controlled for were all variables from Model A plus presence or absence of a patient RFE from an ICPC-2 chapter. ‡ Model B2: for problem types managed; covariates controlled for were all variables from Model B1 plus number of problems managed at encounter (1–4). § Significant difference. ¶ Significant difference ($P < 0.05$). ◆

status (self-reported by patient), if a patient is new to the practice, place of consultation, up to three patient RFEs and up to four problems managed. GPs are instructed to describe the problem under management at the highest diagnostic level possible. For each problem, management data include medications, pathology and imaging orders and referrals. Problems and RFEs were classified according to the International Classification of Primary Care (version 2) (ICPC-2).[20]

Ethics approval for the BEACH program was obtained through the University of Sydney Human Research Ethics Committee and the Australian Institute of Health and Welfare Ethics Committee.

Statistical methods

The BEACH study uses a single-staged cluster design, with a cluster of encounters around each GP. In all our analyses, we adjusted for this cluster using survey procedures in SAS (SAS Institute Inc, Cary, NC, USA) or STATA version 11.2 (StataCorp, College Station, Tex, USA). We used percentages to describe characteristics of the GPs in the sample, and rates per 100 encounters for encounter-based comparisons. Statistical significance of differences was determined by non-overlapping 95% confidence intervals.

The RFEs and problems managed were grouped by ICPC-2 chapter. Multiple logistic regression (SAS surveylogistic procedure) was used for three models (A, B and C):

- Model A: measuring the independent effect of GP sex on patient RFEs, after taking into account all identified significant patient and GP characteristics.
- Model B1: measuring the independent effect of GP sex on problems managed after adjusting for all other significant patient and GP characteristics and patient RFEs.
- Model B2: model B1 with the addition of number of problems managed.
- Model C: measuring differences in management methods between male and female GPs using a Poisson regression.

The variables included for the multiple logistic regression models and the Poisson

2 Comparison of male and female general practitioner management rates per 100 encounters and per 100 problems (95% CI)

	Rate per 100 encounters		Rate per 100 problems		Model C* Incident rate ratio Male GP = 1
	Male	Female	Male	Female	Female compared with male GPs
Medications	106.8 (103.1–110.6)	105.9 (101.9–109.9)	71.8 (69.7–73.8)	64.3† (62.3–66.3)	0.957‡ (0.926–0.988)
Clinical treatments	30.8 (28.2–33.4)	45.8† (40.7–51.0)	20.7 (19.0–22.4)	27.8† (24.9–30.8)	1.194‡ (1.076–1.326)
Procedural treatments	22.8 (21.2–24.3)	24.9 (23.5–26.4)	15.3 (14.3–16.3)	15.1 (14.3–16.0)	0.984 (0.916–1.058)
Referrals	12.3 (11.6–13.0)	15.9† (15.0–16.7)	8.5 (8.1–8.9)	10.0† (9.5–10.4)	1.185‡ (1.106–1.269)
Imaging	9.2 (8.7–9.7)	11.1† (10.6–11.6)	6.3 (5.9–6.6)	6.8 (6.5–7.1)	1.081‡ (1.012–1.155)
Pathology	40.4 (38.2–42.7)	56.7† (53.9–59.5)	28.1 (26.7–29.6)	35.6† (34.0–37.2)	1.096‡ (1.031–1.165)

* Model C: for management types used; covariates controlled for were all variables from Model A plus number of problems managed at encounter (1–4) plus presence or absence of a problem managed at encounter from an ICPC-2 chapter. † Significant difference. ‡ Significant difference ($P < 0.05$). ◆

regression model are summarised in footnotes of Box 1 and Box 2.

RESULTS

Between April 2009 and March 2010, 988 GPs participated in the BEACH program; 557 (56.4%) males and 431 (43.6%) females. After weighting, male GPs accounted for 63.0% and females 37.0% of encounters. There were 98 800 encounters recorded, and 101 349 after weighting.

Comparison of GP, patient and encounter characteristics, by GP sex

Compared with male GPs, females were significantly: younger, with fewer years in practice; less likely to work as a sole practitioner; and more likely to hold an FRACGP (Box 3). Compared with patients at male-GP encounters, patients at female-GP encounters were: more often female; more often aged less than 45 years; less often aged 65 years and over; and less likely to hold a Commonwealth health care card. Female GPs recorded significantly more patient RFEs and problems managed than did their male counterparts (Box 3).

Comparison of patient RFEs, by GP sex

Unadjusted analysis showed that, compared with male GPs, female GPs recorded significantly more RFEs about general and unspecified issues, the female genital system, pregnancy and family planning, and fewer RFEs about the musculoskeletal, skin and male genital systems. After adjustment, female GPs recorded more RFEs relating to general and unspecified, endocrine, female genital, pregnancy and family planning matters, and fewer RFEs relating to the musculoskeletal, respiratory, skin and male genital systems, than did male GPs (Model A, Box 1).

Comparison of problems managed, by GP sex

Unadjusted analysis showed that compared with male GPs, female GPs managed significantly more general and unspecified, psychological, endocrine, urological, female genital, pregnancy, family planning and social problems, and fewer musculoskeletal and male genital problems. After adjustment, female GPs were more likely to manage general and unspecified, digestive, circulatory, psychological, endocrine, female genital and social problems (Model B1, Box 1). Using this model, there was no problem type which male GPs were more likely than females to manage. This led us to adjust for the number of problems managed at encounter, since female GPs managed significantly more problems. After this additional adjustment, female GPs remained more likely to manage female genital and social problems, but male GPs were now more likely to manage ear and eye problems (Model B2, Box 1).

Comparison of management methods used, by GP sex

Compared with males, female GPs recorded significantly more referrals, imaging, pathology and clinical treatments (such as advice, education and counselling) per 100 encounters. However, after taking into account the higher number of problems managed by female GPs, male GPs recorded significantly more medications per 100 problems than did female GPs, while female GPs still recorded more clinical treatments, referrals and pathology tests. After adjustment, when compared with male GPs, female GPs recorded an estimated 4.3% less medication, 19.4% more clinical treatments, 18.5% more referrals, 8.1% more imaging orders and 9.6% more pathology test orders (Box 2).

DISCUSSION

Two decades after the previous study, our results show that clear differences in the problems managed by male and female GPs remain. The effect of other GP characteristics, the patient mix and patients' demand for care account for some of these differences but, even after controlling for these factors, female GPs remain more likely to manage problems of a psychosocial, female-specific or general nature. These are similar findings to those of 20 years ago. Moving beyond the previous study, we also found differences in management practices that were inherent to GP sex, with female GPs more often using clinical treatments, pathology tests, referrals and imaging.

As found in previous studies, female GPs were younger,[3,4,18] less likely to work as a sole practitioner[3,4,18] and more likely to hold FRACGP status.[3] These results are all consistent with the influx of new female registrars,[21] as younger GPs are more likely to work in larger practices[22] and hold FRACGP.[22]

As suggested by previous research, the patients at female-GP encounters were more likely to be female[6,18] and younger.[18] In the Australian Morbidity and Treatment Survey, seven out of 10 female-GP encounters were with female patients,[18] and two decades later, this has not changed. This is surprising, since we had hypothesised that as female GPs increased their share of the GP workforce (and workload) they would see proportionally more male patients.

3 General practitioner, patient and encounter characteristics by GP sex (95% CI)

	Male GPs ($n = 557$)	Female GPs ($n = 431$)
GP characteristic	**Proportion of GPs at encounter**	
Age (years) *[missing data]*	*[5]*	*[1]*
< 35	3.7% (2.3–5.1)	12.3% (8.9–15.6)
35–44	17.2% (14.1–20.3)	26. 2% (22.0–30.4)
45–54	30.8% (27.0–34.7)	35.8% (31.4–40.2)
⩾ 55	48.3% (44.1–52.5)	25.7% (21.2–30.2)
FRACGP *[missing data]*	47.0% (42.9–51.2) *[0]*	59.4% (54.7–64.1) *[2]*
Years in practice *[missing data]*	*[0]*	*[5]*
< 10	12.6% (9.9–15.3)	25.8% (21.5–30.1)
10–19	23.3% (19.8–26.8)	30.2% (25.9–34.6)
⩾ 20	64.1% (60.1–68.0)	43.9% (39.2–48.7)
Size of practice *[missing data]*	*[8]*	*[3]*
Sole GP	13.2% (10.3–16.0)	4.6% (2.6–6.7)
2–5 GPs	40.4% (36.2–44.5)	44.6% (39.8–49.3)
6 or more GPs	46.5% (42.3–50.7)	50.8% (46.0–55.6)
Country of graduation *[missing data]*	*[1]*	*[0]*
Australia	67.7% (63.8–71.6)	74.8% (70.6–78.9)
Overseas	32.3% (28.4–36.2)	25.2% (21.1–29.4)
Practice location *[missing data]*	*[0]*	*[0]*
Major city/metropolitan	67.3% (63.4–71.3)	71.9% (67.7–76.2)
Non-major city/rural	32.7% (28.7–36.6)	28.1% (23.8–32.3)
	Male-GP encounters ($n = 55\,700$)	**Female-GP encounters ($n = 43\,100$)**
Patient characteristic	**Proportion of patients at encounter**	
Sex *[missing data]*	*[512]*	*[377]*
Male	48.8% (48.1–49.6)	28.6% (27.6–29.5)
Female	51.2% (50.4–51.9)	71.4% (70.5–72.4)
Age (years) *[missing data]*	*[1229]*	*[832]*
< 25	20.7% (19.7–21.6)	23.3% (22.2–24.3)
25–44	22.0% (21.1–22.9)	26.3% (25.2–27.5)
45–64	27.4% (26.7–28.2)	26.5% (25.7–27.4)
⩾ 65	29.9% (28.4–31.4)	23.9% (22.2–25.5)
New to practice *[missing data]*	7.5% (6.8–8.3) *[597]*	8.1% (7.1–9.2) *[663]*
Commonwealth health care card holder *[missing data]*	47.8% (45.8–49.8) *[4339]*	40.8% (38.5–43.0) *[3156]*
Indigenous patient *[missing data]*	1.2% (0.9–1.6) *[5328]*	1.3% (0.7–2.0) *[3557]*
Non-English speaking background *[missing data]*	8.7% (6.7–10.7) *[5344]*	9.6% (6.8–12.3) *[3607]*
Encounter characteristic	**Proportion of encounters**	
Home visit	0.54% (0.40–0.67)	0.55% (0.27–0.83)
Residential age care visit	1.3% (0.9–1.7)	1.2% (0.8–1.6)
	Rate per 100 encounters	
Patient RFE	151.8 (149.6–154.0)	163.1 (159.9–166.2)
Problems managed	148.8 (146.1–151.6)	164.7 (161.4–168.0)

FRACGP = Fellow of the Royal Australian College of General Practitioners. RFE = reason for encounter. ◆

We also found that female GPs were less likely to see patients who were Commonwealth health care card holders, which probably relates to their seeing fewer older patients. Unlike the earlier study, we did not find male GPs doing more home visits, probably due to reduced frequency of home visits by both sexes.

Differences in patient RFEs given to male and female GPs remained after adjustment. This shows that patients, no matter what age or sex they are, still select GPs based on their sex for presentation of specific types of problems (especially sex-specific problems).

In our study, there was no difference in patient presentation rates of psychological or social RFEs to male or female GPs, either before or after adjustment, whereas in the previous study, patients presented more of both RFEs to female GPs, before and after adjustment. This suggests that patients now present with such problems equally often to both sexes, and that earlier preferences to take them to a female GP have disappeared. However, psychological and social problems were managed more by female GPs, before and after adjustment. This may suggest that female GPs are more attuned to the possible presence of such problems in their patients, which in turn may be related to their patient-focused consultative style.[7,12,15]

While female genital problems remained more likely to be managed by female GPs after adjustment, pregnancy and family planning problems did not, suggesting that their higher rate of management by female GPs is determined by patients rather than GPs.

Higher rates of clinical treatments and test orders add to the body of evidence that female GPs provide more preventive care.[11,12,16] Individual encounters provided by female GPs take up more resources than those provided by male GPs, as female GPs have longer consultations,[8,9] and our study shows that they refer and test more often.

A limitation of our study is that the data are cross-sectional, the denominator being individual problems or encounters. We know from the Australian medical labour force survey[10] that male GPs work longer hours. This, combined with their shorter consultations,[8,9] means that male GPs will perform more consultations in a year. If patients of male GPs visit them more often, it is possible that over 1 year, patients of male GPs will receive a similar amount of counselling and number of tests and referrals as those seeing female GPs. One must

also consider whether statistically significant results presented are of genuine clinical significance.

This study shows that, other things being equal, for female and male GPs, patients bring different problems to be managed, different problems are managed and different management methods are used. It seems that the Australian general practice workforce is split by GP sex into groups practising different styles of medicine. The types of RFEs and problems managed more often by female GPs are similar to those found in data 20 years ago,[18] suggesting that these differences may continue. Further research into how often male and female GPs see their patients in a year is needed to examine whether the higher use of resources per female-GP encounter (through additional tests and referrals) translates to higher or lower resource use overall.

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COMPETING INTERESTS

None relevant to this article declared (ICMJE disclosure forms completed).

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