

Problems managed by Australian general practice trainees: results from the ReCEnT (Registrar Clinical Encounters in Training) study

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WHAT IS ALREADY KNOWN IN THIS AREA

- Broad clinical exposure is a key element of comprehensive training.
- There are particular clinical areas in which GP trainees require satisfactory exposure and training to meet emerging health needs, including complex, chronic disease management.
- There are differences in the clinical exposure of trainees and trainers, with trainees seeing less chronic disease and more acute minor illness.

WHAT THIS WORK ADDS

- This is the first published study on the content and nature of patient encounters with trainees in Australian general practice training.
- Trainees manage almost exactly the same number of problems per encounter as established GPs.
- Trainees see a different patient demographic and different clinical spectrum compared to established GPs, with more new patients, more new problems and less chronic disease.
- Trainees have a relative lack of opportunity for continuity of care with patients.

SUGGESTIONS FOR FUTURE WORK OR RESEARCH

- To explore the associations of continuity of care and chronic disease management.
- To examine changes in individual trainee clinical exposure over the course of training.
- To implement and evaluate models of trainee management of chronic problems.

Keywords: general practice training, medical education, patient case-mix

SUMMARY

Background

Previous studies have found that general practitioner (GP) trainees (registrars) see a different spectrum of clinical problems compared to trainers, including less chronic disease and more acute minor illness. Our aim was to describe the case mix of first-term Australian GP trainees.

Methods

This was a cross-sectional analysis of trainee consultations. Descriptive analyses were used to report patient demographics and the number and type of problems managed.

Results

Two-hundred-and-three trainees provided data on 36 182 consultations and 55 740 problems. Overall, 60.7% of patients seen were female and 56.2% were new to the trainee. Trainees managed a mean of 154.1 problems per 100 encounters. Problems managed most commonly were respiratory (23.9 per 100 encounters), general/unspecified (21.8) and skin (16.4). New problems comprised 51.5% of the total, and 22.4% of problems were chronic diseases.

Conclusion

Trainees gain reasonably broad exposure overall in terms of patient demographics and problems managed. In comparison to established GPs, trainees managed the same mean number of problems, but the nature of problems managed was different, with more new patients, more new problems and less chronic disease. Our findings have significant implications for GP training in Australia.

INTRODUCTION

Consulting with patients is the core learning activity of general practice training in Australia.

Trainees (registrars) learn by the 'apprenticeship model', seeing patients in the general practice setting under the supervision of accredited GP supervisors. Ideally, the content of each trainee's clinical experience should include 'common and significant conditions'¹ and be similar to that of non-trainee (established) Australian GPs. This is reflected in the curricula, assessments and accreditation criteria of the Royal Australian College of General

Practitioners (RACGP)² and the Australian College of Rural and Remote Medicine (ACRRM).³

Broad clinical exposure is a key element of comprehensive training. The development of sound clinical reasoning skills appears to be dependent on exposure to an 'adequate database of clinical cases'.⁴ Satisfactory patient mix has been found to contribute to the effectiveness of clinical rotations in medical students.⁵ In addition, there are some particular clinical areas in which trainees require satisfactory exposure and training to meet the emerging health needs of the Australian community, including complex, chronic disease management.⁶

The content of clinical encounters in the general practice setting has been described in studies from a number of countries,⁷⁻¹¹ including the Bettering the Evaluation and Care of Health (BEACH) programme in Australia.¹² More specifically, a number of studies have described differences in the clinical exposure of trainees and trainers, with trainees seeing less chronic disease and more acute minor illness.¹³⁻¹⁹ These studies, however, were small and are now relatively old. More recently, companion studies from the Netherlands have found that patient mix in trainees was generally well distributed across ages and organ systems,²⁰ but there was a significant underexposure to chronic disease compared to trainers.²¹ Despite its importance, both clinically and educationally, to date there have been no peer-reviewed publications on the content and nature of patient encounters with trainees in Australian general practice training.

Our aim was to describe the case mix of Australian GP trainees, including demographics of patients and the number and nature of clinical problems managed.

METHODS

The Australian General Practice Training (AGPT) programme currently involves a minimum three-year full-time equivalent commitment. This comprises a minimum of three six-month terms in the general practice setting. Trainees typically move practice locations each six-month training term.

This was a cross-sectional analysis of GP trainee consultations as part of the Registrar Clinical Encounters in Training (ReCEnT) cohort study. The study methodology has been described in detail elsewhere.²² Briefly, ReCEnT is undertaken in four general practice regional training providers (RTPs), encompassing urban, rural and remote practices in four Australian states.

Participating trainee characteristics and characteristics of their practice were recorded. Trainees recorded the details of 60 consecutive patient encounters, representing approximately one week of consultations, each six-month training term. Data collection was conducted around the mid-point of the term. All trainees who had included three rounds of data collection (equivalent to 18 months' training) were included in the analysis.

Trainees underwent orientation in how to complete the patient encounter forms and recorded encounter data on a paper-based data collection instrument. Consultation data included patient demographics; duration of consultation; problems managed; investigations ordered; prescriptions written; follow-up arranged; and referrals made.

'Problems managed' was defined as the 'single most likely provisional diagnosis'. In cases where there was no clear provisional diagnosis, trainees were asked to record symptoms, e.g. headache; preventive care activities, e.g. Pap smear; or processes, e.g. completion of drivers' licence forms. Trainees were asked to record at least one and up to four problems per patient encounter (consultation). Only problems actually dealt with at the encounter were recorded. Trainees also recorded whether the problem was old or new (where new was either a new problem to the patient, or a new episode of a recurrent problem).

Data on problems managed were classified using the *International Classification of Primary Care*, second edition (ICPC2-plus), disease classification system.²³ Chronic diseases were classified according to a list developed from the ICPC.²⁴ For the analysis of the most frequently managed problems, where a problem might apply to more than one disease chapter (body system) heading (for example check-up or prescriptions), this chapter heading was ignored, and the problem was grouped with all similar problems. This was to make the data directly comparable with other data documenting Australian general practitioners' clinical activity.

Descriptive analyses were used to report patient demographics and the number and type of problems managed. STATA/SE 11.2 was used to complete the statistical analysis.

Ethical considerations

All data were stored in password-protected databases. Data are identified only by the trainees' study identification number. The list linking the trainees name to the trainee identification number is stored in a separate password-protected location to the trainees' project data. All patient data are recorded in a non-identifiable form at the point of collection.

Ethical approval for the study was obtained from the Human Research Ethics Committee of the University of Newcastle, NSW, Australia.

RESULTS

Participants

A total of 203 trainees contributed data to the analysis. Overall, 62.6% of the trainees were female, with a mean age of 32.6 years (SD 6.9). Trainees who did their primary medical degree in Australia

comprised 70.0% and 14.1% of all trainees worked half-time (2½ days/week) or less. Table 1 displays the characteristics of participating trainees.

Table 1 Demographic and practice characteristics of trainee participants

Characteristic	n, % (95% CI)
Sex	
Male	76, 37.4 (30.7, 44.2)
Female	127, 62.6 (55.8, 69.3)
Mean age in years	32.6 (SD 6.9)
Place of graduation	
Australia	142, 70.0 (63.6, 76.3)
Overseas	61, 30.0 (23.7, 36.4)
Full-time status	
3–5 days/week	174, 85.9 (83.0, 88.7)
≤ 2½ days/week	29, 14.1 (11.3, 17.0)

Patients

Trainees returned data on 36 182 individual patient encounters. Table 2 presents the demographics of the patients seen. The mean age of patients overall was 39.8 years (SD 23.7). Overall, 60.7% (95% CI: 60.2–61.2) of patients seen were female. Female trainees saw a mean of 67.5% (95% CI: 66.9–68.1) female patients, compared to a mean of 49.3% (95% CI: 48.4–50.1) female patients for male trainees. Of all patients, a mean of 6.3% (95% CI: 6.1–6.6) were new to the practice and 56.2% (95% CI: 55.7–56.7) were new to the trainee.

Problems managed

There were 55 740 problems managed during the 36 182 encounters, a rate of 154.1 problems per 100 encounters (95% CI: 152.7–155.3). Overall, only one problem was managed in 61.6% of encounters, with two problems managed in 26.0%, three problems in 9.0%, and four problems in 3.3%. Over half of all the problems managed (51.5% (95% CI: 51.1–51.9)) were new. Overall, 22.4% (95% CI: 22.1–22.8) of problems managed were classified as chronic diseases.

The most common organ systems were respiratory (15.5%), general and unspecified (14.2%), skin (10.6%) and musculoskeletal (9.8%). Table 3 presents the rates of exposure to ICPC-2 disease chapter headings. Female trainees managed more female genital and pregnancy problems, with male trainees managing more male genital problems. Figure 1 and Table 3 display the patient mix by ICPC-2 disease chapter heading and rate of encounter by trainee gender.

The top 20 most frequently managed problems are listed in Table 4. These 20 problems accounted for 39.4% of all problems managed.

Table 2 Patient characteristics by gender of trainee

Patient characteristic	Trainees		
	Male % (95% CI)	Female % (95% CI)	All trainees % (95% CI)
Sex			
Male	50.7 (49.9, 51.6)	32.5 (31.9, 33.1)	39.3 (38.8, 39.8)
Female	49.3 (48.4, 50.1)	67.5 (66.9, 68.2)	60.7 (60.2, 61.1)
Age			
<1	2.7 (2.4, 3.0)	2.8 (2.6, 3.0)	2.7 (2.6, 2.9)
1–4	6.6 (6.2, 7.0)	6.4 (6.1, 6.7)	6.5 (6.2, 6.7)
5–14	8.9 (8.5, 9.4)	7.9 (7.5, 8.2)	8.3 (8.0, 8.6)
15–24	11.6 (11.1, 12.2)	13.4 (12.9, 13.8)	12.7 (12.4, 13.0)
25–44	26.3 (25.6, 27.1)	28.7 (28.1, 29.3)	27.8 (27.4, 28.3)
45–64	24.8 (24.0, 25.5)	25.2 (24.6, 25.7)	25.0 (24.6, 25.5)
65–74	9.5 (9.0, 10.0)	8.4 (8.0, 8.7)	8.8 (8.5, 9.1)
75+	9.6 (9.1, 10.1)	7.3 (7.0, 8.7)	8.2 (7.9, 8.4)
Mean (years) (SD)	40.7 (24.4)	39.2 (23.3)	39.8 (23.7)
New patient to practice	6.1 (5.7, 6.5)	6.5 (6.1, 6.8)	6.3 (6.1, 6.6)
New patient to trainee	54.3 (53.5, 55.2)	57.3 (56.6, 57.9)	56.2 (55.7, 56.7)

Table 3 Clinical exposure for all trainees by ICPC2 disease chapter heading and trainee sex

ICPC2 Disease Chapter Heading	Rate per 100 encounters (95% CI)			% of all problems managed (95% CI)		
	Male	Female	Total	Male	Female	Total
Blood, blood-forming organs and immune mechanism	1.5 (1.3,1.7)	1.9 (1.7,2.1)	1.7 (1.6,1.9)	1.0 (0.89,1.2)	1.2 (1.1,1.3)	1.1 (1.0,1.2)
Cardiovascular	11.5 (11.0,12.1)	11.1 (10.7,11.6)	11.3 (10.1,11.6)	8.0 (7.7,8.4)	7.0 (6.7,7.2)	7.3 (7.1,7.5)
Digestive	10.2 (9.6,10.7)	10.9 (10.5,11.4)	10.6 (10.3,11.0)	7.1 (6.7,7.5)	6.8 (6.6,7.1)	6.9 (6.7,7.1)
Ear	4.8 (4.5,5.2)	4.6 (4.3,4.9)	4.7 (4.5,4.9)	3.4 (3.1,3.6)	2.9 (2.7,3.1)	3.0 (2.9,3.2)
Endocrine, metabolic and nutritional	8.8 (8.3,9.3)	10.4 (10.0,10.8)	9.8 (9.4,10.1)	6.1 (5.8,6.5)	6.5 (6.3,6.8)	6.3 (6.1,6.5)
Eye	2.4 (2.1,2.7)	2.1 (1.9,2.3)	2.2 (2.0,2.3)	1.7 (1.5,1.8)	1.3 (1.2,1.4)	1.4 (1.3,1.5)
Female genital	2.5 (2.2,2.7)	12.7 (12.3,13.2)	8.9 (8.6,9.2)	1.7 (1.5,1.9)	8.0 (7.7,8.3)	5.8 (5.6,6.0)
General and unspecified	20.6 (19.8,21.4)	22.6 (22.0,23.2)	21.8 (21.1,22.3)	14.4 (13.9,14.9)	14.1 (13.8,14.5)	14.2 (13.9,14.5)
Male genital	1.9 (1.7,2.2)	0.9 (0.8,1.1)	1.3 (1.2,1.4)	1.3 (1.2,1.5)	0.6 (0.5,0.7)	0.8 (0.7,0.9)
Musculoskeletal	16.6 (15.9,17.3)	14.3 (13.8,14.8)	15.2 (14.8,15.6)	11.6 (11.1,12.0)	9.0 (8.7,9.3)	9.8 (9.6,10.1)
Neurological	3.5 (3.2,3.8)	4.0 (3.7,4.2)	3.8 (3.6,4.0)	2.4 (2.2,2.6)	2.5 (2.3,2.6)	2.5 (2.3,2.6)
Pregnancy, childbearing, family planning	2.9 (2.7,3.2)	6.7 (6.4,7.0)	5.3 (5.1,5.5)	2.1 (1.9,2.3)	4.2 (4.0,4.4)	3.4 (3.3,3.6)
Psychological	11.1 (10.6,11.7)	12.9 (12.5,13.4)	12.3 (11.9,12.6)	7.8 (7.4,8.2)	8.1 (7.8,8.4)	8.0 (7.7,8.2)
Respiratory	24.6 (23.8,25.4)	23.5 (22.9,24.1)	23.9 (23.4,24.4)	17.2 (16.6,17.7)	14.7 (14.4,15.1)	15.5 (15.2,15.8)
Skin	16.6 (16.0,17.3)	16.2 (15.7,16.7)	16.4 (15.9,16.8)	11.6 (11.2,12.1)	10.1 (9.8,10.4)	10.6 (10.4,10.9)
Social problems	0.6 (0.5,0.8)	0.8 (0.7,0.9)	0.7 (0.6,0.8)	0.4 (0.3,0.5)	0.5 (0.4,0.6)	0.5 (0.4,0.5)
Urological	3.2 (2.9,3.5)	4.0 (3.8,4.3)	3.7 (3.5,3.9)	2.2 (2.0,2.4)	2.5 (2.4,2.7)	2.4 (2.3,2.5)

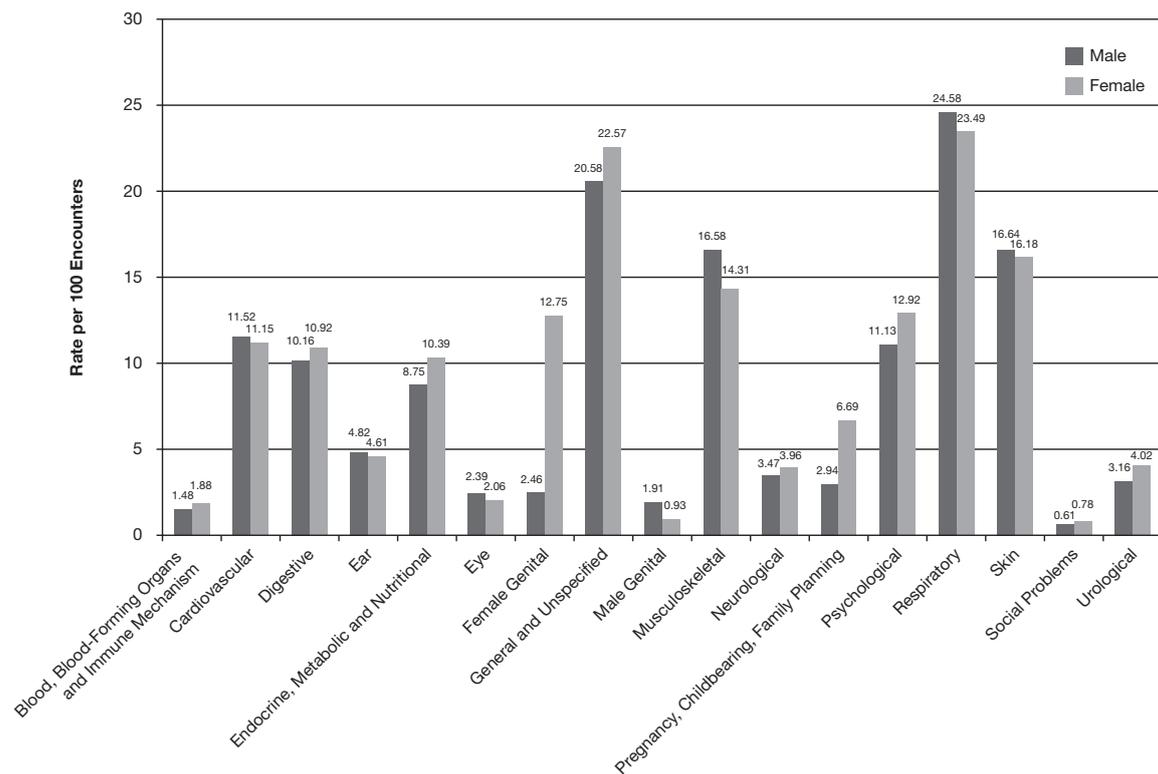


Figure 1 Rates of problems managed by disease chapter heading and trainee gender

Table 4 The top 20 most commonly managed problems

Condition	% all problems managed (95% CI)
Check-up – all	6.02 (5.82, 6.23)
Acute upper respiratory infection	5.02 (4.83, 5.21)
Hypertension	3.47 (3.31, 3.62)
Immunisation/vaccination – all	3.31 (3.16, 3.46)
Depression	2.56 (2.43, 2.70)
Prescription – all	2.52 (2.39, 2.66)
Back complaint	1.74 (1.63, 1.85)
Lipid disorder	1.47 (1.37, 1.58)
Urinary tract infection	1.29 (1.20, 1.39)
Anxiety	1.24 (1.15, 1.34)
Test results – all	1.24 (1.15, 1.34)
Tonsillitis	1.23 (1.14, 1.33)
Gastroenteritis	1.21 (1.12, 1.31)
Arthritis – all	1.16 (1.07, 1.25)
Observation/health education/advice/diet	1.10 (1.02, 1.20)
Diabetes – all	1.04 (0.96, 1.13)
Sprain/strain	1.00 (0.92, 1.09)
Otitis media	0.94 (0.86, 1.02)
Oral contraception	0.93 (0.85, 1.01)
Administration procedure – all	0.87 (0.79, 0.95)

DISCUSSION

Main findings

This is the first published study of the clinical exposure of GP trainees in Australia. We found that trainees gain reasonably broad exposure overall in terms of patient demographics and problems managed. We identified contrasting patterns of clinical exposure in male and female trainees.

Comparison with previous studies

In comparison to findings in established Australian general practices (derived from a study employing similar methodology to ours),²⁵ trainees overall saw a considerably younger population of patients. We found that 30.2% of patients seen by trainees were less than 25 years (compared to 20.0% by established GPs) and only 17.0% of patients were 65 years and older (compared to 29.7%). This was consistent with the findings of previous international studies.^{13–16} Trainees were substantially younger than established GPs (mean age 32.6 years compared to 49.3 years for established GPs),²⁶ which may partly explain this difference. Practitioner age has previously been shown to independently influence clinical practice, including age of patients seen.²⁷

Approximately two-thirds of trainees in our study were female, consistent with the national trainee population.²⁸ This compares to only 39.4% of the established Australian GP workforce being female.²⁶ In a setting of an appreciable gender difference between the two groups, the proportion of female patients seen by trainees (60.7%) was somewhat greater than that of established GPs (56.5%).²⁵ Female trainees saw more female patients than male trainees, a finding consistent with previous studies of GPs in Australia²⁹ and internationally.^{13,20}

Interpersonal continuity of care is one of the distinguishing features of general practice²⁹ and has been shown to improve patient satisfaction³⁰ and patient outcomes.³¹ GP trainees have been shown to value continuity of care³² but a lack of exposure to longitudinal care has been identified previously as an educational issue for GP training.³³ We found a high rate of new patients to the trainees (56.2%), demonstrating a relative lack of opportunity for continuity of care. This is likely to reflect the trainee's newness to the practice but may also be related to other trainee, practice and patient factors.

Trainees managed almost exactly the same number of problems per encounter as their established GP counterparts (154.1 per 100 encounters compared to 153.8 in established GPs).²⁵ The proportion of encounters with more than one problem was also very similar to established GPs.²⁵ This may indicate that the number of problems dealt with in an individual consultation is dictated more by patient demand than by practitioner factors. Alternatively, it may reflect that GP trainees develop skills in prioritising problems early in their professional development.

Broad clinical exposure is a critical element of comprehensive training, and this is reflected in the core competencies of Australian^{2,3} and international^{34,35} curricula. We found that trainees had a broad exposure across ICPC disease chapter headings. However, trainees were exposed to a different disease profile compared to established GPs. They saw more respiratory problems (23.9 per 100 encounters compared to 20.0 per 100 encounters) and general and unspecified presentations (21.8 per 100 encounters compared to 18.5); about the same amount of skin (16.4 per 100 encounters compared to 16.7) and psychological illness (12.3 per 100 encounters compared to 13.0); and less cardiovascular (11.3 per 100 encounters compared to 17.2) and endocrine disease (9.8 per 100 encounters compared to 13.5).²⁵

As well, we found substantial differences in both the rate of new problems (51.5% compared to 38.1%) and chronic disease (22.4% compared to 36.2%) between trainees and established GPs.²⁵ In general, the top 20 conditions managed by trainees were very similar to those of established GPs.²⁵

These findings are consistent with a number of previous international studies which found that trainees see more new patients; more new problems; more acute, minor problems; and fewer older patients with chronic diseases, compared to established GPs.^{13–16,20} This has previously been attributed to patient demographic differences (younger patients),

previous trainee experience and patient allocation systems.^{14,15}

Strengths and limitations

Our study has a number of strengths. The trainee participants had very similar demographics (age, sex and country of qualification) to the national Australian GP trainee cohort.²⁸ As well, we conducted this study in four regional training providers across four Australian states, making the findings broadly generalisable to Australian general practice training overall.

We used a paper-based collection system. Though electronic formats have previously been used for tracking patient encounters, there is little evidence that this format improves accuracy or completeness of data collection.³⁶ Due to the large and diverse variety of software packages in Australian general practices, efficient extraction of routinely collected electronic data is currently impossible.³⁷ Furthermore, routinely recorded data in Australian general practice are also likely to be of relatively poor quality compared to deliberately collected records. There is evidence that data obtained specifically from encounter forms are more comprehensive and more reliably coded than those obtained from medical records in the Australian general practice setting.³⁸

Trainees were required to record the details of 60 consecutive patient encounters, equivalent to approximately one week of consultations for a full-time first-term trainee. This figure was derived as a reasonable balance between trainee acceptability (time taken to complete forms) and representativeness of clinical and educational exposure. Though a modest number of patients for the individual trainee, we have presented aggregated data of the clinical exposure of a cohort of 203 trainees from over 30 000 consultations.

Data were collected at the mid-point of the six-month (full-time equivalent) training term. However, as collection was staggered across the four participating training providers, and part-time trainees collected data at a different time to full-time trainees (mid and end-year), there was no anticipated influence of seasonal variation on disease exposure across the cohort.

While we have not conducted a study directly comparing trainee and established GP clinical exposure, we coded our data using ICPC2-plus, thus enabling close comparison with other Australian studies. ICPC2-plus is the international standard for classifying primary care data and the validity of this system has previously been demonstrated.³⁹

Limitations of this study include having only presented descriptive statistics and having not attempted to analyse associations of any of the parameters we have presented. Our intention in this paper was, however, confined to 'mapping the territory' of Australian GP trainee clinical encounters, about which there is no previous published literature.

Implications for educational practice and policy

Our findings have implications, and applications, for general practice training at many levels. Provision of normative cohort patient encounter data allows individual trainees to reflect on their comparative clinical exposure. Greater diversity of patient mix (in the presence of effective supervision) has been shown to enhance learning in medical students^{5,40} (though not examination performance⁴¹). There is no strong evidence to link adequacy of clinical exposure to GP trainee competence development, however, these findings highlight the need to carefully monitor patient mix. Gaps in clinical exposure can be addressed within the practice by selective booking of patients^{42,43} or other educational interventions like targeted tutorials. Trainees may be placed in a complimentary practice in future training terms to address exposure gaps.⁴⁴

We have demonstrated that Australian GP trainees have a relative lack of exposure to chronic disease during their training. Concerns have been previously raised about limited exposure of GP trainees to chronic and complex diseases.^{6,21,45} Compounding this, reluctance of older patients with chronic conditions to see trainees has been recently described.⁴⁶ In the context of a growing burden of chronic disease and multi-morbidity both in Australia⁴⁷ and internationally, relative underexposure to managing chronic conditions has significant implications for quality and comprehensiveness of GP training. Our findings reinforce the need to develop models of complex and chronic disease management for trainees which provide quality learning, as well as appropriate care and continuity for patients.

Analysis of case mix has been used by medical schools for programme evaluation and curriculum review.^{48,49} The identification of gaps in clinical exposure in the practice setting, both overall and by trainee gender, allows better articulation of external educational programmes with practice-based experience and teaching.

Implications for further research

We have presented an overview of the in-practice clinical experience of general practice trainees. Particular aspects of trainee clinical exposure demand individual focused analyses, including associations of continuity and chronic disease management. The ReCEnT study methodology, as a cohort study, will also allow examination of changes in trainee clinical exposure over the course of training.

CONCLUSION

We have described the case mix of Australian GP trainees, including demographics of patients and the

number and nature of clinical problems managed. These results suggest that trainees see a different patient demographic and somewhat different clinical spectrum compared to established GPs – more new patients, more new problems and less chronic disease. Our findings reinforce the importance of monitoring real-life clinical exposure and mapping this against curriculum objectives. We believe that our findings have significant implications for GP training in Australia.

Conflicts of interest

None declared.

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