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To cite this article: James Pearlman, Simon Morgan, Mieke van Driel, Kim Henderson, Amanda Tapley, Patrick McElduff, John Scott, Neil Spike, Allison Thomson & Parker Magin (2015): Continuity of care in general practice vocational training: prevalence, associations and implications for training, *Education for Primary Care*

To link to this article: <http://dx.doi.org/10.1080/14739879.2015.1101871>



Published online: 18 Dec 2015.



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Continuity of care in general practice vocational training: prevalence, associations and implications for training

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ABSTRACT

Continuity of care is a defining characteristic of general practice. Practice structures may limit continuity of care experience for general practice registrars (trainees). This study sought to establish prevalence and associations of registrars' continuity of care. We performed an analysis of an ongoing cohort study of Australian registrars' clinical consultations. Primary outcome factors were 'Upstream' continuity (having seen the patient prior to the index consultation) and 'Downstream' continuity (follow-up organised post-index consultation). Independent variables were registrar, practice, patient, consultation and educational factors. 400 registrars recorded 48,114 consultations. 43% of patients had seen the registrar pre-index consultation, and 49% had follow-up organised. 'Upstream' continuity associations included registrar seniority, Australian medical qualification, practice billing policy, smaller practice size, registrar's previous training in the practice, chronic disease and older, female patients (but not registrar full-time/part-time status). Associations of 'Downstream' continuity included non-Australian qualification, billing, chronic disease and the patient having seen the registrar previously. Consultations prompting follow-up were more complex: longer duration, involving more problems and generating more learning goals. There was, however, evidence for limited educational utility of this 'continuity'. In our study, continuity of care in Australian registrars' training experience is modest. Associations are complex, but may inform initiatives to increase in-training continuity.

ARTICLE HISTORY

Received 20 May 2015
Revised 22 July 2015
Accepted 31 July 2015

KEYWORDS

Vocational training;
continuity of care; trainee
experience; GP training

What is already known

- Continuity of care is a defining characteristic of general practice and is associated with health care system efficiency and improved patient outcomes and patient satisfaction
- There are concerns that changing general practice structures may be creating a relative deficit of experience of 'interpersonal' continuity of care (a personal relationship of doctor and patient) in GP vocational training

What this work adds

- Levels of continuity of care in Australian GP trainees' clinical experience are modest
- The continuity of care that they do experience with older chronic disease patients (a demographic with particular continuity of care needs) may not necessarily be of high educational utility

Suggestions for future research

- Further research on the methods to increase a registrar's experience of continuity of care, especially for chronic, complex and geriatric medicine, is indicated
- A shared care model of supervisor-registrar for patients with chronic disease may be a suitable model for future enquiry

Background

Primary care is recognised as the most important tier in health systems, and one of the defining characteristics of primary care is continuity of care.[1] Definitions of

continuity of care have been debated for much of the past century.[2–5] Haggerty et al. define continuity of care as, 'a series of discrete health care events ... with two core elements: care over time and a focus on individual patients.'

[2] Guthrie et al. divide continuity of care into three categories: informational (such as medical records), management (continuity through a multidisciplinary team) and interpersonal (a personal relationship between doctor and patient).[3,4]

Interpersonal continuity of care enhances health care system efficiency,[5–7] is associated with improved patient outcomes[1,8–12] and is highly valued by both doctors and patients.[3,4,13–17] In elderly patients with complex and/or chronic disease, interpersonal continuity of care with their primary care practitioner is strongly associated with improved health outcomes, lower rates of emergency department presentation, lower risk of hospitalisation and decreased aggregate health care costs.[5,10–13] Continuity of care is also associated with reductions in the frequency in attendance of patients with complex and/or chronic disease.[5,14] These factors are all vitally important in the context of an ageing population.[18]

With recent shifts in policy towards open-access patient scheduling in general practice (family medicine), there is a risk of compromising this vital facet of the doctor–patient relationship (interpersonal continuity of care).[3,5,6,9,14,15,17–21] If compromised, the provision of efficient ‘quality care’ would solely depend on medical records (informational continuity), the general health care team and management protocols (management continuity).[3,14,17,18,22]

General practice training in Australia follows an apprenticeship model, whereby registrars (trainees) learn experientially whilst working independently, but under the general supervision of experienced general practitioners (GPs).[23] Deficits in continuity of care during training are anticipated to have serious implications in the education and training of GPs, especially in training for management of chronic/complex disease.[24–26]

GP registrar exposure to patient presentations has been little researched, though differences in patient exposure between registrars and their supervisors have been noted.[27–29]

In this study, we aimed to establish the prevalence of, and factors associated with, continuity of care experience of Australian GP registrars in their clinical training. We aimed to establish the prevalence and associations of both interpersonal continuity related to registrar–patient contact prior to the index consultation (‘Upstream’ interpersonal continuity) and organisation of a planned follow-up contact after the index consultation (‘Downstream’ continuity). Within ‘Downstream’ continuity, we examined both interpersonal and informational continuity.

Methods

We analysed data from eight rounds of data collection, 2010–2013, of the Registrar Clinical Experiences in Training (ReCEnT) project.

Registrar Clinical Experiences in Training

The ReCEnT project is described in detail elsewhere.[30] Briefly, ReCEnT is an ongoing cohort study of the in-practice clinical experiences of GP registrars. ReCEnT is a multi-site study involving registrars from four regional training providers (RTPs) across four (New South Wales, Victoria, South Australia and Tasmania) of the six Australian states.

All registrars at the four RTPs complete data collection as part of their training programme. This involves each registrar completing a round of data collection in each of their three or four six-month (full-time equivalent) terms in general practice posts. Registrars may consent to the use of their data for research purposes.

Registrars complete a questionnaire prior to each data collection round, eliciting demographic data of themselves and their current practice.

Consultation data are recorded via a paper-based patient encounter form. Approximately mid-term during each training term, the registrars record demographic, clinical and educational details of 60 consecutive consultations. The selection of study variables for recording was informed both by previous literature in the area and the clinical and educational experience of the project team. Only office-based, not home or nursing home, consultations are recorded.

Outcome factors

Continuity of care is a multifaceted construct, and inherently difficult to measure.[4,13] We created two primary outcome measures: ‘Upstream’ and ‘Downstream’ continuity. Together, these measures of continuity allow us to characterise interpersonal continuity in the registrars’ clinical experiences.

‘Upstream’ interpersonal continuity, having previously (that is, prior to the index consultation) had a consultation or consultations with the patient, was based on the patient encounter form response to the question, ‘new patient to the registrar’.

For ‘Downstream’ continuity, we were primarily interested in interpersonal continuity manifested by the organisation of personal follow-up. This outcome was based on the response to a question eliciting the organisation of formal follow-up, and if it was to be with the registrar.

In addition to the two primary outcomes, above, a secondary outcome measure related to ‘Downstream’ interpersonal vs. ‘Downstream’ informational continuity of care. For those patients who had a follow-up contact organised, this was whether the follow-up was with the registrar (interpersonal) or with another GP in the practice (informational). Patients with follow-up organised for both registrar and another GP were excluded from this analysis. This outcome variable allowed us insights into the nature of continuity of care in registrars’ experiences.

Independent variables

Independent variables related to registrar, patient, practice, consultation and educational aspects of the consultation.

Registrar factors were age, gender, training term, training pathway enrolled in (exclusively rural training location, or training in urban locations ± rural locations), place of medical qualification (Australia/international) and full-time/part-time status.

Patient factors were age, gender, Indigenous (Aboriginal or Torres Strait Islander) status, new patient to the practice and new patient to the registrar.

Practice factors included rurality/urbanicity, practice size (number of GPs), and if the practice routinely bulk-billed (that is, the consultation fee is paid to the GP by government with no expense to the patient). Practice postcode was used to define the Australian Standard Geographical Classification-Remoteness Area (ASGC-RA [31] (the degree of rurality) of the practice location and to define the practice location’s Socioeconomic Index for Area (SEIFA) Relative Index of Disadvantage.[32]

Consultation factors were duration of consultation, whether a practice nurse was involved in the consultation, the number of diagnoses/problems dealt with, whether a problem/diagnosis was chronic disease, and if pathology was ordered or a specialist referral made. Diagnoses/problems were coded according to the International Classification of Primary Care, second edition classification system (ICPC-2 plus).[33] Chronic disease diagnoses were defined using a system derived by O’Halloran et al. [34] employing the ICPC2-plus rubrics and codes.

Educational factors were if the registrar sought clinical assistance during the consultation (from their supervisor/trainer, from a specialist, from an allied health practitioner or from electronic or hard-copy resources) and if the registrar in the consultation generated personal learning goals to be pursued later.

Statistical analysis

This was a cross-sectional analysis of data from the longitudinal ReCEnT project.

Proportions of consultations in which each of the two primary outcome factors, ‘Upstream’ interpersonal continuity and ‘Downstream’ interpersonal continuity, occurred were calculated with 95% CIs.

Also calculated were proportions of consultations for the secondary outcome: whether ‘Downstream’ continuity was ‘interpersonal’ (with the registrar) rather than ‘informational’ (with another GP in the practice).

Three logistic regression models within a generalised estimating equations framework (to account for the repeated measures on registrars) were constructed with, respectively, each of the two primary outcome factors and one secondary outcome factor as dependent variables. For the models involving ‘Downstream’ continuity, all independent variables were entered in the models. For the model involving ‘Upstream’ continuity, registrar, patient and practice variables were entered. The only consultation variable entered in this model was ‘chronic disease’ as other consultation variables would not have influenced the index presentation to the registrar.

All analyses were programmed in SAS v9.2 (SAS Institute, North Carolina, USA) or Stata 11 (StataCorp, Texas, USA).

Results

A total of 400 individual registrars (response rate 94.7%) contributed 831 registrar-rounds of data (including details of 48,114 individual consultations).

The demographics of the participating registrars and practices are presented in Table 1.

‘Upstream’ interpersonal continuity

Of registrars’ consultations, 56.9% [95% CI: 56.5–57.3] of the patients were being seen for the first time (that is, 43.1% [95% CI: 42.7–43.5] had been seen by the registrar prior to the index event, representing ‘Upstream’ continuity). Univariate associations of a patient seeing the registrar for the first time are presented in Table 2.

The regression model with the dependant variable of ‘the patient seeing the registrar for the first time’ is presented in Table 3. Seeing the registrar for the first time represents a *lack* of ‘Upstream’ continuity. Thus, registrar factors significantly associated with ‘Upstream’ continuity were registrar ‘seniority’ (being beyond their 1st term of training), medical qualification in Australia and having worked at the practice previously. Patient factors significantly associated with ‘Upstream continuity’ were greater age, and being female. The practice factors significantly associated with ‘Upstream continuity’ were if the practice was small (less than six GPs), routinely bulk-billed patients (there is no cost for the patient for a consultation)

Table 1. Participating registrar (trainee), registrar-term and practice characteristics.

Variable	Class	n	% (95% CIs) or mean (SD)
<i>Registrar variables (n = 400)</i>			
Registrar gender	Male	125	31.3% (26.7–35.8)
	Female	275	68.8% (64.2–73.3)
Pathway registrar enrolled in	General	310	77.7% (73.6–81.8)
	Rural	89	22.3% (18.2–26.4)
Qualified as a doctor in Australia	No	106	26.8% (22.4–31.1)
	Yes	290	73.2% (68.9–77.6)
Registrar works fulltime	No	175	21.4% (18.6–24.2)
	Yes	642	78.6% (75.8–81.4)
Registrar age (years)	Mean (SD)		33.03 (6.73)
Registrar year of graduation	Mean (SD)		2004.2 (5.75)
<i>Registrar-term or practice-term variables (n = 831)</i>			
Registrar training term	Term 1	333	40.1% (36.7–43.4)
	Term 2	290	34.9% (31.7–38.1)
	Term 3	156	18.8% (16.1–21.4)
	Term 4	52	6.3% (4.6–7.9)
Registrar worked at the practice previously	No	541	71.2% (68.0–74.4)
	Yes	219	28.8% (25.6–32.0)
Does the practice routinely bulk bill	No	691	84.7% (82.2–87.2)
	Yes	125	15.3% (12.8–17.8)
Number of GPs working at the practice	1–5	260	31.8% (28.6–35.0)
	6–9	445	54.5% (51.0–57.9)
	Ten or more	112	12.7% (11.3–16.1)
Rurality of practice	Major City	454	54.8% (51.4–58.2)
	Inner Regional	276	33.3% (30.1–36.5)
	Outer regional, remote or very remote.	99	11.9% (9.7–14.2)
SEIFA ^a Index (decile) of practice	Mean (SD)		989.2 (68.5)

^aSocioeconomic Index for Area (SEIFA) relative index of disadvantage.

and being located in a lower socio-economic status postcode. The consultation factor significantly associated with 'Upstream continuity' was the consultation involving a chronic disease.

'Downstream' interpersonal continuity

Of registrars' consultations, 49.4% [95% CI: 48.9–49.8] of the patients had follow-up planned with the registrar. The univariate associations of this 'Downstream' interpersonal continuity are presented in Table 4.

The regression model for 'Downstream' interpersonal continuity is presented in Table 5. Registrar factors that were significantly associated with 'Downstream' interpersonal continuity were as follows: if they had qualified as a doctor outside Australia and increased length of time since graduation. Patient factors significantly associated with 'Downstream' interpersonal continuity were being aged between 20 and 60 years, being new to the practice and also new to the registrar. The practice factor significantly associated with 'Downstream' interpersonal continuity was that patients were routinely bulk-billed. Consultation factors significantly associated with 'Downstream' interpersonal continuity were the consultation involving a chronic disease, the registrar generating learning goals, the consultation lasting longer and if there were more problems/diagnoses addressed in the consultation.

'Downstream' interpersonal continuity vs. 'Downstream' informational continuity

Of registrars' consultations, 89.9% [95% CI: 89.5–90.3] of the patients for whom follow-up was arranged were to be followed up by the registrar (interpersonal) rather than another GP in the practice (informational). The univariate and multivariate associations of a patient having a planned follow-up by the registrar rather than another GP, if there was arranged follow-up, are presented in Table 6.

Factors significantly associated with follow-up being organised with the registrar rather than with another doctor in the practice were the registrar working full-time, the registrar generating learning goals from the consultation, the consultation lasting longer and addressing more problems/diagnoses, smaller practice size (less than six GPs), younger patient age, the patient not being new to the practice and/or registrar, the registrar not seeking assistance during the consultation and a chronic disease not being addressed in the consultation.

Discussion

Comparison of findings with existing literature and interpretation of findings

There have been relatively few studies investigating GPs' experiences of patient continuity of care. The factors that influence continuity of care in GP registrar training have

Table 2. Characteristics associated with seeing the registrar for the first time (representing *lack* of 'Upstream' interpersonal continuity).

Variable	Class	New patient to the registrar		p-Value
		No (n = 20734)	Yes (n = 27380)	
Training term/post	Term 1	6926 (36%)	12294 (64%)	<0.001
	Term 2	7904 (47%)	8775 (53%)	
	Term 3	3965 (44%)	5149 (56%)	
	Term 4	1939 (63%)	1162 (37%)	
Registrar gender	Male	7119 (45%)	8636 (55%)	0.10
	Female	13615 (42%)	18744 (58%)	
Pathway enrolled in	General	15398 (41%)	21748 (59%)	<0.001
	Rural	5254 (49%)	5535 (51%)	
Qualified as a doctor in Australia	No	5610 (42%)	7683 (58%)	0.10
	Yes	14937 (43%)	19425 (57%)	
Registrar works fulltime	No	4271 (43%)	5738 (57%)	0.95
	Yes	16120 (43%)	21264 (57%)	
Does the practice routinely bulk bill	No	17166 (43%)	22889 (57%)	<0.001
	Yes	3202 (44%)	4071 (56%)	
Number of GPs working at the practice/post	1–5	7091 (47%)	8031 (53%)	0.009
	6–9	10897 (42%)	14869 (58%)	
	Ten or more	2403 (37%)	4079 (63%)	
	No	11663 (37%)	19663 (63%)	
Worked at the practice previously	Yes	7266 (57%)	5455 (43%)	<0.001
	Major city	10639 (40%)	15691 (60%)	
Rurality	Inner regional	7206 (45%)	8725 (55%)	0.80
	Outer regional/remote/very remote	2825 (49%)	2919 (51%)	
	No	13236 (39%)	20685 (61%)	
Chronic disease	Yes	7496 (53%)	6695 (47%)	<0.001
	<20	3575 (33%)	7351 (67%)	
Patients age (years)	20 to <40	5340 (41%)	7592 (59%)	<0.001
	40 to <60	5703 (46%)	6822 (54%)	
	60 to <80	4460 (52%)	4165 (48%)	
	80+	1353 (56%)	1071 (44%)	
	Male	7487 (41%)	10675 (59%)	
Patient gender	Female	12828 (44%)	16177 (56%)	<0.001
	No	20509 (43%)	27146 (57%)	
Aboriginal or Torres Strait Islander	Yes	225 (49%)	234 (51%)	0.48
Registrar age (years)	Mean (SD)	32.9 (6.6)	32.9 (7.0)	0.46
SEIFA Index (decile)	Mean (SD)	5.8 (2.5)	6.2 (2.5)	<0.001

Table 3. Characteristics associated with seeing the registrar for the first time (representing *lack* of 'Upstream' interpersonal continuity): model adjusting for registrar, patient and practice variables.

Variable	Class	Univariate		Adjusted	
		OR (95% CI)	p	OR (95% CI)	p
Training term/post <i>Referent: Term 1</i>	Term 2	0.62 (0.57, 0.68)	<0.001	0.77 (0.70, 0.85)	<0.001
	Term 3	0.72 (0.63, 0.83)	<0.001	0.83 (0.73, 0.94)	0.004
	Term 4	0.43 (0.34, 0.55)	<0.001	0.63 (0.49, 0.81)	<0.001
Registrar gender	Female	1.11 (0.98, 1.27)	0.10	1.03 (0.92, 1.15)	0.61
Pathway enrolled in	Rural	0.78 (0.69, 0.89)	<0.001	0.88 (0.75, 1.02)	0.10
Qualified as a doctor in Australia	Yes	0.89 (0.78, 1.02)	0.10	0.81 (0.71, 0.93)	0.002
Does the practice routinely bulk bill	Yes	0.76 (0.66, 0.87)	<0.001	0.82 (0.72, 0.94)	0.004
Number of GPs working at the practice/post <i>Referent: 1–5</i>	6–9	1.09 (0.96, 1.24)	0.19	1.15 (1.03, 1.29)	0.01
	Ten or more	1.33 (1.11, 1.59)	0.002	1.22 (1.03, 1.44)	0.02
Worked at the practice previously	Yes	0.47 (0.43, 0.52)	<0.001	0.56 (0.50, 0.64)	<0.001
Chronic disease	Yes	0.63 (0.60, 0.65)	<0.001	0.68 (0.65, 0.72)	<0.001
Patients age (years) <i>Referent: <20</i>	20 to <40	0.70 (0.66, 0.73)	<0.001	0.72 (0.68, 0.77)	<0.001
	40 to <60	0.61 (0.58, 0.65)	<0.001	0.67 (0.63, 0.72)	<0.001
	60 to <80	0.52 (0.48, 0.55)	<0.001	0.59 (0.54, 0.63)	<0.001
	80+	0.45 (0.40, 0.51)	<0.001	0.51 (0.45, 0.58)	<0.001
Patient gender	Female	0.88 (0.84, 0.91)	<0.001	0.89 (0.86, 0.94)	<0.001
SEIFA Index (decile)		1.05 (1.02, 1.07)	<0.001	1.03 (1.01, 1.06)	0.003

Table 4. Characteristics associated with the patient having follow-up arranged with the registrar ('Downstream' interpersonal continuity).

Variable	Class	Followed up by the registrar		p-Value
		No (n = 20946)	Yes (n = 20410)	
Training term/post	Term 1	8471 (49%)	8750 (51%)	0.03
	Term 2	7460 (51%)	7286 (49%)	
	Term 3	3938 (54%)	3390 (46%)	
	Term 4	1077 (52%)	984 (48%)	
Registrar gender	Male	6866 (51%)	6507 (49%)	0.32
	Female	14080 (50%)	13903 (50%)	
Pathway enrolled in	General	16576 (51%)	15730 (49%)	0.56
	Rural	4296 (48%)	4575 (52%)	
Qualified as a doctor in Australia	No	5013 (43%)	6540 (57%)	<0.001
	Yes	15719 (54%)	13625 (46%)	
Registrar works fulltime	No	4035 (51%)	3874 (49%)	0.29
	Yes	16564 (51%)	16162 (49%)	
Does the practice routinely bulk bill	No	17679 (52%)	16422 (48%)	<0.001
	Yes	2933 (45%)	3592 (55%)	
Number of GPs working at the practice/post	1–5	6148 (49%)	6351 (51%)	0.22
	6–9	11446 (51%)	11000 (49%)	
	Ten or more	2992 (52%)	2731 (48%)	
Rurality	Major city	12254 (51%)	11677 (49%)	0.08
	Inner regional	6397 (52%)	5983 (48%)	
	Outer regional/remote/very remote	2242 (45%)	2694 (55%)	
Worked at the practice previously	No	15158 (51%)	14719 (49%)	0.58
	Yes	5473 (50%)	5441 (50%)	
Patients age (years)	<20	5465 (57%)	4043 (43%)	<0.001
	20 to <40	5568 (49%)	5733 (51%)	
	40 to <60	5042 (47%)	5744 (53%)	
	60 to <80	3582 (50%)	3644 (50%)	
	80+	1022 (51%)	995 (49%)	
Patient gender	Male	8113 (52%)	7543 (48%)	0.001
	Female	12461 (50%)	12468 (50%)	
Aboriginal or Torres Strait Islander	No	20786 (51%)	20192 (49%)	0.35
	Yes	160 (42%)	218 (58%)	
Chronic disease	No	16317 (55%)	13163 (45%)	<0.001
	Yes	4627 (39%)	7247 (61%)	
New patient	Seen registrar before	7327 (42%)	10072 (58%)	<0.001
	New patient to practice	12134 (58%)	8877 (42%)	
	New patient to registrar	1485 (50%)	1461 (50%)	
Practice nurse seen	No	20572 (51%)	20135 (49%)	0.13
	Yes	374 (58%)	275 (42%)	
Any referral	No	17443 (51%)	16681 (49%)	0.76
	Yes	3503 (48%)	3729 (52%)	
Generated learning goals	No	17714 (55%)	14727 (45%)	<0.001
	Yes	2840 (35%)	5281 (65%)	
Sought help from any source	No	18020 (53%)	16163 (47%)	<0.001
	Yes	2926 (41%)	4247 (59%)	
Registrar age (years)	Mean (SD)	32.3 (6.8)	33.0 (6.8)	0.22
Year of graduation	Mean (SD)	2005 (5)	2004 (6)	<0.001
Duration of consultation (hours)	Mean (SD)	0.25 (0.13)	0.32 (0.16)	<0.001
Number of problems	Mean (SD)	0.9 (0.5)	1.0 (0.5)	<0.001
SEIFA Index (decile)	Mean (SD)	6.23 (2.50)	5.95 (2.56)	0.005

not been researched. As such, many of our results are not directly comparable with existing literature. In some instances, our findings can be interpreted with reference to studies of continuity of care in established GPs. However, no studies have focussed, as we have, on the associations of continuity of care in general practice.

Having worked at a practice previously is associated with 'Upstream' continuity. This is not unexpected, as these registrars will have had more opportunity to establish therapeutic relationships and build rapport with patients.[25,26]

As part-time registrars spend longer in a practice per term (12 months as opposed to 6 months for a full-time registrar), it might be thought that they, too, would have had greater time to establish continuity and thus have greater 'Upstream' continuity. Equally, it may be thought that part-time registrars would have less 'Downstream' continuity as they would have less 'consulting days' and thus less opportunities for follow-up compared to full-time registrars. However, full-time/part-time status was not significant in either the 'Upstream' or 'Downstream' interpersonal continuity models.

Table 5. Characteristics associated with the patient having a follow-up organised with the registrar ('Downstream' interpersonal continuity): model adjusting for registrar, patient, practice and consultation variables.

Variable	Class	Univariate		Adjusted	
		OR (95% CI)	<i>p</i>	OR (95% CI)	<i>p</i>
Training term/post	Term 2	0.92 (0.84, 1.01)	0.10	0.94 (0.84, 1.05)	0.26
<i>Referent: Term 1</i>	Term 3	0.84 (0.71, 0.98)	0.02	0.88 (0.73, 1.07)	0.19
	Term 4	1.05 (0.81, 1.35)	0.71	1.08 (0.82, 1.42)	0.59
	Qualified as a doctor in Australia	Yes	0.71 (0.59, 0.86)	<0.001	0.70 (0.52, 0.93)
Does the practice routinely bulk bill	Yes	1.36 (1.13, 1.64)	0.001	1.26 (1.01, 1.58)	0.04
Rurality	Inner regional	0.90 (0.77, 1.06)	0.22	0.94 (0.79, 1.11)	0.45
<i>Referent: Major City</i>	Outer regional/remote/ very remote	1.11 (0.91, 1.36)	0.31	0.97 (0.74, 1.28)	0.85
Patients age (years)	20 to <40	1.39 (1.31, 1.48)	<0.001	1.16 (1.09, 1.24)	<0.001
<i>Referent: <20</i>	40 to <60	1.49 (1.39, 1.59)	<0.001	1.14 (1.06, 1.21)	<0.001
	60 to <80	1.28 (1.19, 1.39)	<0.001	0.96 (0.89, 1.04)	0.34
	80+	1.24 (1.10, 1.39)	<0.001	0.89 (0.79, 1.01)	0.08
	Patient gender	Female	1.07 (1.03, 1.12)	0.001	1.00 (0.96, 1.05)
Chronic disease	Yes	1.83 (1.72, 1.94)	<0.001	1.41 (1.33, 1.50)	<0.001
New patient	New patient to practice	0.56 (0.53, 0.59)	<0.001	0.59 (0.56, 0.62)	<0.001
<i>Referent: Seen at the practice previously</i>	New patient to registrar	0.73 (0.67, 0.79)	<0.001	0.67 (0.60, 0.73)	<0.001
Generated learning goals	Yes	1.98 (1.82, 2.17)	<0.001	1.48 (1.35, 1.62)	<0.001
Sought help from any source	Yes	1.43 (1.32, 1.55)	<0.001	1.02 (0.93, 1.12)	0.66
Year of graduation		0.97 (0.96, 0.98)	<0.001	0.97 (0.95, 0.99)	0.01
Duration of consultation (hours)		36.9 (28.4, 48.0)	<0.001	20.6 (15.6, 27.1)	<0.001
Number of problems		1.17 (1.08, 1.28)	<0.001	1.16 (1.11, 1.21)	<0.001
SEIFA Index (decile)		0.96 (0.93, 0.99)	0.005	0.98 (0.95, 1.02)	0.30

This result suggests that it is the registrar's total previous patient workload within the practice (total hours worked and, thus, number of patient encounters experienced), rather than weekly hours of work, which influences amount of continuity. Part-time and full-time registrars work equivalent numbers of sessions over a training term (and our data collection takes place midway in the respective terms). Thus, the findings may still be consistent with Murray et al.'s finding of primary care clinicians working longer hours having more continuity.[35]

In this study, registrars training in larger GP practices had less 'Upstream' continuity. This is consistent with the literature which finds that in a larger practice, it will be hard to access the same doctor.[36]

A patient having a chronic disease addressed in the consultation was associated with increased 'Upstream' and 'Downstream' interpersonal continuity. This finding is in the context of literature which suggests that patients prefer *not* to see a registrar for complex or chronic disease management.[20,37] We also found, however, that if a follow-up was arranged it was *less* likely to be with the registrar than with another doctor in the practice (that is, more likely to be informational rather than interpersonal 'Downstream' continuity).

Our interpretation of these findings is that patients with chronic disease access care more often and are inherently likely to present more often than other patients

(increasing the chance of having been seen previously by the registrar). Presentation, however (consistent with previous literature), may still be preferentially to their 'usual' GP. Thus, our findings of increased 'Upstream' and 'Downstream' interpersonal continuity may not necessarily reflect interpersonal continuity, as it is usually defined. Patients may be presenting for 'convenience' or 'bureaucratic' purposes, such as routine repeat referrals to specialists or for prescription renewals at times when they are unable to have prompt access to their regular GP.[38] Thus, an organised follow-up, for ongoing management, will be more likely with their 'usual' GP in the practice.

Similarly, increasing patient age was positively associated with both 'Upstream' and 'Downstream' interpersonal continuity for the registrar. However, in the analysis of 'Downstream' interpersonal vs. 'Downstream' informational continuity, of the patients who had a follow-up appointment arranged, increasing patient age was associated with significantly *decreased* odds of an arranged follow-up with the registrar as opposed to being with another GP in the practice. Again, our interpretation of the findings is that older patients, who may present more frequently and who generally have more complex health issues, prefer to be followed up by their 'usual' doctor to receive continuous care, and as such could be reluctant to present to a registrar except for simple or expedient care.[25,26]

Table 6. Characteristics associated with the patient having a planned follow-up with the registrar – among those with a planned follow-up by either the registrar or another GP in the practice (interpersonal vs informational ‘Downstream’ continuity).

Variable	Class	Univariate		Adjusted	
		OR (95% CI)	<i>p</i>	OR (95% CI)	<i>p</i>
Qualified as a doctor in Australia	Yes	0.74 (0.57, 0.94)	0.01	0.68 (0.46, 1.00)	0.05
Registrar works fulltime	Yes	1.27 (1.05, 1.53)	0.01	1.41 (1.14, 1.74)	0.001
Number of GPs working at the practice/post	5–9	0.82 (0.68, 0.98)	0.03	0.81 (0.66, 0.99)	0.04
Referent: 1–4	Ten or more	0.76 (0.57, 1.01)	0.05	0.77 (0.58, 1.01)	0.06
Patients age (years) Referent: <20	20 to <40	0.82 (0.70, 0.96)	0.01	0.64 (0.54, 0.78)	<0.001
	40 to <60	0.56 (0.48, 0.66)	<0.001	0.44 (0.37, 0.53)	<0.001
	60 to <80	0.33 (0.28, 0.40)	<0.001	0.23 (0.19, 0.29)	<0.001
	80+	0.28 (0.23, 0.35)	<0.001	0.19 (0.15, 0.24)	<0.001
Patient gender	Female	1.13 (1.02, 1.24)	0.02	1.07 (0.96, 1.19)	0.25
Chronic disease	Yes	0.92 (0.82, 1.04)	0.17	0.84 (0.73, 0.96)	0.01
New patient Referent: Seen at the practice previously	New patient to practice	0.27 (0.24, 0.30)	<0.001	0.21 (0.18, 0.25)	<0.001
	New patient to registrar	1.18 (0.91, 1.52)	0.22	0.72 (0.52, 0.99)	0.04
Any referral	Yes	1.52 (1.33, 1.74)	<0.001	1.06 (0.90, 1.25)	0.46
Generated learning goals	Yes	1.55 (1.37, 1.76)	<0.001	1.32 (1.14, 1.52)	<0.001
Sought help from any source	Yes	1.12 (0.98, 1.28)	0.08	0.84 (0.73, 0.97)	0.02
Registrar age (years)		1.02 (1.01, 1.04)	0.008	1.01 (0.99, 1.03)	0.40
Year of graduation		0.97 (0.96, 0.99)	0.008	0.99 (0.95, 1.02)	0.43
Duration of consultation (h)		19.1 (11.1, 32.6)	<0.001	14.5 (7.89, 26.6)	<0.001
Number of problems		1.17 (1.10, 1.24)	<0.001	1.12 (1.04, 1.20)	0.003

This interpretation, if confirmed by other studies, may have significant implications for GP vocational education. Not only may chronic disease and aged-care be experienced less frequently by GP registrars compared to their supervisors and established GPs [39]; their aged-care and chronic disease continuity may well be of limited ‘educational quality’ or ‘educational utility’, if the consultations tend to consist of simple and/or ‘bureaucratic’ problems, rather than involving the complexities of true chronic disease management.

A longer consultation duration and if the registrar generated learning goals during the consultation, were both associated with greater ‘Downstream’ interpersonal continuity. These might be thought to represent consultations in which the registrar makes an ‘investment’ in the patient, through longer consultation duration and the generation of learning goals to be addressed prior to following-up the patient.

Strengths and limitations of the study

The registrar participants in the ReCEnT study were from four RTPs in four of Australia’s six states, making the results broadly generalisable to Australian GP registrars. The results are also relevant to other countries with similar ‘apprenticeship model’ general practice vocational training programmes, such as in the United Kingdom. There was an excellent response rate of 94.7% (very high in studies of GPs) [40] and excellent statistical power provided by 48,114 consultations.

The use of ‘Upstream’ and ‘Downstream’ as measures of interpersonal continuity and of our measure of ‘interpersonal’ vs. ‘informational’ Downstream continuity have not been validated. They do, however, have face validity and reflect responses to straightforward contemporaneous in-consultation recording. Our outcome measures of ‘Downstream’ continuity, however, were based on *organising* follow-up appointments rather than actual follow-up attendances.

It should also be noted that quantity of continuity of care (which we are confident we have measured reliably) does not necessarily equate to educational quality or educational utility of that continuity. Our use of a comparison of informational and interpersonal ‘Downstream’ continuity and triangulation of findings from our three statistical models, however, has allowed us to explore this issue indirectly (see below).

Implications for educational and workforce practice and policy

Our finding of no difference in interpersonal continuity of care for part-time registrars despite their reduced work-hours per week is reassuring in view of previous expressions of concern regarding continuity of care being compromised by part-time practice.[41,42] The association of ‘Upstream’ continuity with having worked at the practice in a previous term suggests that ‘repeat’ terms in the same practice could be encouraged

(currently in Australian training, at least one change of practice within each registrars' three training terms is mandatory and registrars may change practices with each change of term).

There is strong evidence that registrars see less chronic disease than qualified GPs.[27–29,39,43,44] Coupled with the interpretation of our findings, that geriatric and chronic disease exposure within GP registrar training may often be for 'convenience' or 'bureaucratic' reasons – reflecting an imperative for access rather than for substantive interpersonal continuity of care – will make this issue even more problematic in GP vocational training. This will need to be addressed throughout a registrar's training, either at a practice level (through the steering of patients,[29] or other supervisor-initiated means),[45] or at an RTP level (through educational interventions designed to supplement registrars' clinical experiences in these key areas).

Implications for future research

Further research on the methods to increase a registrar's experience of continuity of care, especially for chronic, complex and geriatric medicine, is needed. A shared care model of supervisor–registrar for patients with chronic disease may be a suitable model for future enquiry.

Conclusion

This study has established, for the first time, factors associated with registrars' experience of continuity within their general practice vocational training. We have also found evidence that the current experience of continuity of care of registrars for older chronic disease patients may not necessarily be of high educational utility. These findings should inform training strategies in countries with 'apprenticeship' GP training models to ensure adequate experience of continuity for registrars.

Acknowledgements

The authors would like to acknowledge and thank the registrars, supervisors and practices involved in the project.

Funding

No external funding for the project. The project was funded by the participating educational organisations: General Practice Training Valley to Coast, the Victorian Metropolitan Alliance, General Practice Training Tasmania and Adelaide to Outback GP Training Program. These organisations are funded by the Australian Commonwealth Government.

Ethical approval

The ReCEnT study has approval from the University of Newcastle Human Research Ethics Committee, Reference H-2009-0323.

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