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ORIGINAL RESEARCH

General practice trainees' clinical experience of dermatology indicates a need for improved education: A cross-sectional analysis from the Registrar Clinical Encounters in Training Study

Georgina Whiting,[1,2] Parker Magin,[3,4] Simon Morgan,[5] Amanda Tapley,[3] Kim Henderson,[3] Chris Oldmeadow,[6] Jean Ball,[6] Mieke van Driel,[7] Neil Spike,[8] Lawrie McArthur,[1] John Scott[5] and Nigel Stocks[1]

[1]*School of Population Health and Clinical Practice, University of Adelaide, Adelaide, South Australia,* [2]*Adelaide to Outback General Practice Training, North Adelaide, South Australia,* [3]*GP Synergy, Liverpool, New South Wales,* [4]*School of Medicine and Public Health, University of Newcastle, Newcastle, New South Wales,* [5]*General Practice Training Valley to Coast, Mayfield, New South Wales,* [6]*Hunter Medical Research Institute, Newcastle, NSW Australia,* [7]*School of Medicine, University of Queensland, Brisbane, Queensland, and* [8]*Eastern Victoria GP Training, Hawthorn, Victoria, Australia*

ABSTRACT

Background/Objectives: Skin conditions are commonly encountered in general practice but dermatology is underrepresented in undergraduate medical courses. Australian and international studies have shown that the dermatological diagnostic ability of general practitioners (GPs) is suboptimal, contributing to increased dermatology outpatient referrals. Dermatological experience in GP vocational training is thus of particular importance. We aimed to document the prevalence of skin disease presentations and the range of skin diseases encountered by GP trainees. We also sought to establish associations of GP trainee's skin disease experience, including their personal characteristics, consultation factors, and the actions arising from the consultation.

Methods: This study took place in the Registrars Clinical Encounters in Training (ReCEnT) study. ReCEnT is an ongoing, prospective, multi-site cohort study of Australian GP trainees' consultations. A descriptive cross-sectional analysis was performed on trainees' consultation data.

Results: In total, 645 individual trainees contributed data from 84 615 consultations. Altogether, 11% of all problems managed were skin problems. Infections, dermatitis, injury and wounds were the most common presentations. Associations of consultations for skin problems (compared with all other problems) included seeking in-consultation advice, planning patient follow up and generating learning goals.

Conclusions: These findings suggest GP trainees find skin problems challenging and may indicate a need for more and better targeted undergraduate and GP trainee education.

Key words: education, epidemiology, general practice, graduate medical, skin diseases.

Correspondence: Dr Georgina Whiting, Cohealth Collingwood, 365 Hoddle Street, Collingwood, Vic. 3066, Australia.
Email: georgina.whiting@cohealth.org.au

Georgina Whiting, FRACGP. Parker Magin, PhD. Simon Morgan, FRACGP. Amanda Tapley, BBiomedSci. Kim Pinkerton, BNurs. Chris Oldmeadow, PhD. Jean Ball, BMath. Mieke VanDriel, FRACGP. Neil Spike, FRACGP. Lawrie McArthur, FRACGP, John Scott, B.CompSci. Nigel Stocks, MD.

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Abbreviations:

GP	general practitioner
ICPC-2 plus	International Classification of Primary Care
NESB	non–English-speaking background
ReCEnT	Registrars Clinical Encounters in Training
RTP	regional training provider

INTRODUCTION

Skin conditions are among the most common problems encountered in general practice (family medicine) in Australia and are managed at 17% of all consultations.[1] As well as representing significant patient morbidity, skin disease may be the initial presentation of serious systemic conditions such as infection or malignancy, necessitating prompt and accurate diagnosis and management. In particular, skin cancers are a leading cause of death[2] and the most common reason for medical specialist referral in Australia.[1]

Despite the burden of skin disease in Australia, relatively little time is allocated to dermatology in Australian medical schools[3] or in undergraduate medical training in the UK and USA.[4,5] In addition, junior doctor hospital posts in dermatology are sparse.[3] Thus, GP trainees have limited experience of, and training in, skin disease prior to commencing community-based training.

Consistent with this relative deficit in training, a number of Australian and international studies have shown that GPs have difficulty in diagnosing various skin lesions.[6–8] Suboptimal training leads to some doctors lacking confidence or feeling anxious when performing skin checks[9,10] and to a greater number of dermatology outpatient referrals.[5,8] Considered together with the high prevalence of skin disease, it is not surprising that continuing medical education in dermatology is consistently sought after by established GPs.[11]

The Royal Australian College of General Practitioners expects the patient mix and clinical experiences of vocational trainees to be similar to that of established independent GPs.[12] A very basic overview of the problems managed by Australian GP trainees, including the prevalence of skin conditions, can be found in the existing literature.[13] However, the content and associations of GP trainees' consultations involving skin disease are not well documented.

Knowledge of the prevalence of skin disease presentations is fundamental to the planning of training for primary health-care clinicians.[14] Furthermore, decision-making in skin diseases is influenced by a wide range of contextual factors[15] and, therefore, an understanding of the wider epidemiology of skin disease in general practice is essential.

We sought to establish the prevalence of skin problems in the clinical experiences of community-based Australian GP trainees. We also sought to establish associations with GP trainees' skin disease experience, including demographics, consultation factors and the actions arising from the consultation.

METHODS

This study took place as part of the Registrar Clinical Encounters in Training (ReCEnT) project.

ReCEnT

ReCEnT is an ongoing prospective multi-site cohort study of GP trainees' consultations. The methodology is described in detail elsewhere.[16] Four of Australia's geographically based GP regional training providers (RTP) from four of Australia's six states participated in ReCEnT during the period included in this analysis. Trainees perform data collection during each of three or four 6-month community-based terms during their training.[17]

The initial data collection includes the personal characteristics of both the trainee and their practice. The trainees then record the consultation details and educational aspects of 60 consecutive clinical consultations. Diagnoses and problems managed are coded using the International Classification of Primary Care (second edn) (ICPC-2 PLUS) classification system.[18]

Outcome factor

The outcome factor in this study was a diagnosis or problem seen by the trainee being recorded as a skin condition, that is, one coded in the ICPC-2 chapter 'skin (S)'.

Independent variables

Independent variables related to trainee, patient, practice and consultation. The trainees' factors were their age, gender, part-time/full-time status, training term, previous work at the current practice and country of medical qualification. The patients' factors were their age, gender, Aboriginal or Torres Strait Islander status, non–English-speaking background status (NESB), and patient/practice status: new patient to the practice, new patient to the trainee (but not to the practice) and existing patient (seen previously by the registrar).

Practice factors were: practice size (number of full-time equivalent GPs), RTP, rurality, and bulk-billing status (that is, there is no financial cost to the patient for the consultation). The practice postcode was used to define the Australian Standard Geographical Classification Remoteness Area classification[19] (the degree of rurality) of the practice location and the practice location's Socioeconomic Index for Area Relative Index of Disadvantage.[20]

Consultation factors were: the duration of the consultation, the number of problems and diagnoses managed, if the problem was new, whether pathology or imaging was ordered, if follow up of the problem was planned, or if specialist referral was made. In addition, educational consultation factors were: whether the trainee sought in-consultation assistance from any source (including the trainee's clinical supervisor, a specialist, another non-medical health professional, electronic resources or books) and whether they generated any personal learning goals from the problem.

Statistical analysis

This was a cross-sectional analysis of consultations from the longitudinal ReCEnT study. Eight rounds of data analysis, 2010–2013, were included in the analysis. Analysis was at the level of individual diagnosis/problem rather than individual consultation.

To test associations of a diagnosis/problem seen by trainees being a skin condition, simple and multiple logistic regressions were used within a generalised estimating equations framework to account for the repeated measures on trainees. All variables with a P value < 0.20 and relevant effect size in the univariate analysis were included in the multiple regression models.

In order to examine our research questions, three models were built, each with 'diagnosis/problem being a skin condition' as the dependent variable. To examine the question of associations of an individual diagnosis/problem being a skin condition, patient, practice and trainee independent variables were entered in the regression model.

To examine the question in which ways the content of consultations involving skin disease differs from other consultations, the above variables were entered in a model along with the following additional variables: consultation duration, sources of clinical assistance accessed by the trainee for the diagnosis/problem, and the number of problems dealt with in the consultation.

To examine the question of whether actions arising from skin disease diagnoses/problems differ from those arising from other diagnoses/problems, all variables entered in the previous models were entered in a new model along with the following additional variables: learning goals generated by the trainee, specialist referrals made and number of pathology and imaging tests ordered for the diagnosis/problem.

These three models were built because whether a patient presents with a skin disease will plausibly be influenced by patient, trainee and practice factors, but the evaluation of these influences may be compromised by the inclusion in the model of factors operating once the consultation is progressing. Similarly, the evaluation of the content of the consultation may be compromised by the inclusion in this model of actions arising from the consultation.

The most common skin conditions seen by trainees were assessed with descriptive statistics using a categorisation of skin diseases constructed from ICPC-2 codes by the research team. Analyses were programmed using SAS v9.4 (SAS Institute Inc., Cary, NC, USA) and Stata v13.1 (Statacorp, College Station, TX, USA).

Ethics approval

Ethics approval was obtained from the University of Newcastle Human Research Ethics Committee, reference H-2009-0323.

RESULTS

In all, 645 individual trainees (response rate 94%) contributed data from 84 615 consultations. Overall, 131 423 problems were managed, of which 13 929 were skin problems (11% of all problems). The characteristics of trainees and practices are presented in Table 1. The most common skin presentations were skin infections (22%), dermatitis (12%), skin injury and wound management (9%), and unspecified rash (4.9%) (See Table 2).

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

Variable	Class	*n*, % (95% CI) or mean (SD)
Trainees' variables (n = 645)		
Trainees' gender	Male	202, 34 (30.4–37.8)
	Female	425, 66 (62.2–69.6)
Qualified as a doctor in Australia	Yes	480, 76 (72.2–78.9)
Trainees' age (years)	Mean (SD)	32.8 (6.6)
Trainee-term or practice-term variables (n = 1426)		
Trainee training term	Term 1	557, 39 (36.5–41.6)
	Term 2	488, 34 (31.8–36.7)
	Term 3	306, 22 (19.3–23.6)
	Term 4	75 5 (4.1–6.4)
Trainee worked at the practice previously	Yes	413, 29 (27.0–31.7)
Trainee works full time[†]	Yes	1091, 78 (76.1–80.5)
Practice routinely bulk bills[‡]	Yes	234, 17 (14.6–18.5)
Number of GPs working at the practice	1–5	454, 33 (30.1–35.0)
	6–10+	941, 68 (65.0–69.9)
Rurality of practice	Major city	827, 58 (55.4–60.6)
	Inner regional	424, 30 (27.4–32.1)
	Outer regional, remote or very remote	175, 12 (10.6–14.0)
SEIFA index (decile) of practice (28)	Mean (SD)	5.4 (2.8)

[†]Eight or more sessions per week. [‡]The practice routinely bulkbills (that is, there is no financial cost to the patient for the consultation). SEIFA, socioeconomic index for area relative index of disadvantage.

Table 2 Frequencies of most commonly encountered skin problems

Problem	Frequency (% of all skin problems)
Skin infection	22
Bacterial	14
Fungal	6
Viral excluding warts	2
Dermatitis	12
Skin injury and wound management	9
Rash unspecified	5
Warts	5
Localised skin lesion or swelling unspecified	4
Acne	4
Skin check	3
Skin cancer	4
NMSC	4
Melanoma	1
Premalignant skin lesion	3
Ulcers	2

NMSC, non-melanoma skin cancer.

Characteristics associated with a diagnosis/problem as a skin problem are presented in Table 3. The regression model for predictors of diagnoses/problems being skin problems, including patient, trainee and practice

Table 3 Characteristics associated with the consultation involving a skin condition (n = 131 423)

	Skin problems			
Variable	Class	No (n = 117 494)	Yes (n = 13 929)	P value
Patients' age group (years)	0–14	15 163 (86)	2463 (14)	< 0.0001
	15–34	29 673 (90	3432 (10)	
	35–64	48 254 (91)	5038 (10)	
	65+	22 635 (89)	2779 (11)	
Patients' gender	Male	41 971 (88)	5902 (12)	< 0.0001
	Female	72 617 (91)	7630 (10)	
Aboriginal or Torres Strait Islander	Yes	1334 (91)	135 (9)	0.1438
Non–English-speaking background	Yes	7296 (92)	661 (8)	< 0.0001
Patient/practice status	Existing patient of trainee	51 459 (90)	5831 (10)	0.0007
	New to trainee	54 999 (89)	6715 (11)	
	New to practice	7762 (89)	986 (11)	
Trainees' gender	Male	38 876 (89)	4966 (11)	< 0.0001
	Female	78 618 (90)	8963 (10)	
Trainees' age	Mean (SD)	33.0 (6.7)	33.0 (6.7)	0.5675
Trainee full time or part time	Part time[†]	25 497 (90)	2833 (10)	0.0083
	Full time	89 349 (89)	10 787 (11)	
Training term/post	Term1	46 888 (89)	5641 (11)	0.0981
	Term2	39 454 (89)	4725 (11)	
	Term3	25 209 (90)	2831 (10)	
	Term4	5943 (89)	732 (11)	
Worked at practice previously	Yes	33 885 (90)	3979 (11)	0.3847
Qualified as doctor in Australia	Yes	87 569 (89)	10 393 (11)	0.9967
Practice size	Small (< 6 FTE GPs)	38 269 (90)	4346 (10)	0.0295
	Large (≥ 6 FTE GPs)	76 807 (89)	9277 (11)	
Practice routinely bulk bills	Yes	19 572 (90)	2163 (10)	0.0365
Rurality	Major city	68 375 (90)	8026 (11)	0.6973
	Inner regional	34 521 (89)	4161 (11)	
	Outer Regional/remote/very remote	14 598 (89)	1742 (11)	
SEIFA index	Mean (SD)	5.3 (2.8)	5.5 (2.8)	0.0025
Regional training provider	1	42 397 (89)	5098 (11)	0.1934
	2	13 896 (90)	1544 (10)	
	3	12 015 (90)	1395 (10)	
	4	49 186 (89)	5892 (11)	
Consultation duration	Mean (SD)	18.6 (9.7)	17.5 (10)	< 0.0001
Number of problems	Mean (SD)	2.0 (1.0)	1.8 (1)	< 0.0001
New problem	Yes	58 455 (88)	7807 (12)	< 0.0001
Sought help any source	Yes	14 949 (83)	2972 (17)	< 0.0001
Imaging ordered	Yes	9351 (97)	318 (3)	< 0.0001
Follow up ordered	Yes	52 108 (89)	6399 (11)	0.0007
Learning goals	Yes	16 200 (87)	2415 (13)	< 0.0001
Referral ordered	Yes	14 664 (93)	1169 (7)	< 0.0001
Pathology ordered	Yes	20 932 (93)	1475 (7)	< 0.0001

[†]Seven or fewer sessions per week. FTE, full-time equivalent; SEIFA, socioeconomic index for area relative index of disadvantage.

independent variables, is presented in Table 4. The regression models for consultation variable associations of skin disease diagnoses/problems and for actions arising from skin disease diagnoses/problems are presented in Table 5 and 6, respectively.

Cutaneous patient presentations were significantly associated with the patient being younger (OR 1.33 [95% CI: 1.25–1.42], compared to referent of age 15–34), male (female versus male OR 0.77 [95% CI: 0.74–0.81]), and of NESB (OR 0.76 [95% CI: 0.69–0.83]). Patients presenting with skin conditions were also more likely to be new to the practice (OR 1.11 [95% CI: 1.03–1.21]) or new to the trainee (OR 1.06 [95% CI: 1.01–1.10]. There were no significant trainee or practice factors.

The diagnosis/problem being a skin condition was significantly associated with the problem being new (OR 1.24 [95% CI: 1.17–1.31]), and the trainee seeking in-consultation advice or assistance (OR 1.91 [95% CI: 1.80–2.04]).

When considering trainee actions arising from consultations, cutaneous patient presentations were significantly associated with planning more in-practice follow up (OR 1.18 [95% CI: 1.13–1.24]) and generating more learning goals (OR 1.16 [95% CI: 1.08–1.24]). These skin diagnoses/problems were also associated with ordering less imaging (OR 0.25 [95% CI: 0.22–0.29]) and pathology (OR 0.50 [95% CI: 0.46–0.54]), and generating less referrals (OR 0.62 [95% CI: 0.57–0.68]).

Table 4 Characteristics associated with the consultation involving a skin condition: Regression model including 'patient', 'trainee' and 'practice' variables

		Univariate		Adjusted	
Variable	Class	OR (95% CI)	*P* value	OR (95% CI)	*P* value
Patients' age group (Referent age 15–34)	0–14	1.40 (1.31, 1.48)	< 0.0001	1.33 (1.25, 1.42)	< 0.0001
	35–64	0.90 (0.86, 0.95)	0.0001	0.89 (0.85, 0.95)	< 0.0001
	65+	1.06 (1.00, 1.13)	0.0355	1.06 (0.99, 1.13)	0.0756
Patients' gender	Female	0.75 (0.72, 0.78)	< 0.0001	0.77 (0.74, 0.81)	< 0.0001
Non–English-speaking background	Yes	0.77 (0.70, 0.84)	< 0.0001	0.76 (0.69, 0.83)	< 0.0001
Patient/practice status (Referrent existing patient)	New to practice	1.12 (1.04, 1.21)	0.0022	1.11 (1.03, 1.21)	0.0076
	New to trainee	1.07 (1.03, 1.12)	0.0015	1.06 (1.01, 1.10)	0.0204
Trainees' gender	Female	0.89 (0.85, 0.94)	< 0.0001	0.96 (0.91, 1.02)	0.1890
Trainee full or part time	Part time	0.92 (0.87, 0.98)	0.0083	0.95 (0.89, 1.01)	0.1028
Practice size	Large	1.06 (1.01, 1.12)	0.0295	1.04 (0.99, 1.10)	0.1206
Practice routinely bulk bills	Yes	0.93 (0.87, 1.00)	0.0365	0.97 (0.91, 1.04)	0.4390
RTP (Referrent 1)	2	0.92 (0.85, 1.00)	0.0618	0.96 (0.88, 1.05)	0.3868
	3	0.96 (0.89, 1.04)	0.3305	0.96 (0.88, 1.05)	0.3565
	4	1.00 (0.95, 1.06)	0.9913	1.03 (0.97, 1.09)	0.3892
SEIFA Index		1.01 (1.00, 1.02)	0.0025	1.01 (1.00, 1.02)	0.1896

RTP, regional training provider, SEIFA, socioeconomic index for area relative index of disadvantage.

Table 5 Characteristics associated with the consultation including a skin problem: consultation variables in a model adjusted for trainee, patient and practice variables

		Univariate		Adjusted	
Variable	Class	OR (95% CI)	*P* value	OR (95% CI)	*P* value
New problem	Yes	1.30 (1.24, 1.36)	< 0.0001	1.24 (1.17, 1.31)	< 0.0001
Sought help, any source	Yes	1.92 (1.82, 2.03)	< 0.0001	1.91 (1.80, 2.04)	< 0.0001
Consultation duration		0.99 (0.99, 0.99)	< 0.0001	0.99 (0.98, 0.99)	< 0.0001
Number of problems		0.84 (0.82, 0.86)	< 0.0001	0.95 (0.92, 0.98)	0.0004

Table 6 Characteristics associated with the consultation including a skin problem: actions variables in a model adjusted for trainee, patient and practice variables

		Univariate		Adjusted	
Variable	Class	OR (95% CI)	*P* value	OR (95% CI)	*P* value
Imaging ordered	Yes	0.27 (0.24, 0.31)	< 0.0001	0.25 (0.22, 0.29)	< 0.0001
Follow up ordered	Yes	1.08 (1.03, 1.12)	0.0007	1.18 (1.13, 1.24)	< 0.0001
Learning goals	Yes	1.34 (1.27, 1.41)	< 0.0001	1.16 (1.08, 1.24)	< 0.0001
Referral ordered	Yes	0.64 (0.60, 0.69)	< 0.0001	0.62 (0.57, 0.68)	< 0.0001
Pathology ordered	Yes	0.55 (0.51, 0.59)	< 0.0001	0.50 (0.46, 0.54)	< 0.0001

DISCUSSION

This is the first report of the clinical exposure of GP trainees to skin disease. We found that, overall, trainees gain reasonably broad exposure in terms of skin problems managed. We identified several significant associations with the diagnosis/problem being a skin condition, including patient factors, consultation factors, and trainee actions arising from the consultations.

Comparison with existing literature

We found that skin problems accounted for 11% of all GP trainees' problems, which is comparable to that of established Australian GPs (11%).[1] International studies have found a similarly high prevalence of skin conditions in general practice.[21,22]

We have previously established that skin is the third most common ICPC-2 chapter managed by Australian GP trainees[13] (after respiratory, and general and unspecified diseases). This compares with skin being the fourth most common ICPC-2 chapter managed by established Australian GPs, (following respiratory, general and unspecified and musculoskeletal conditions).[1] In the UK, using a different methodology from that of ours (including use of ICD-9 rather than ICPC-2 classification), skin diseases were found to be the most common major disease classification in GP patients.[14]

The most commonly encountered skin problems were skin infection, dermatitis, skin injury and wound management. Data from established Australian GPs, using a different classification of skin diseases to that of ours, show the most commonly encountered problems to be contact dermatitis, malignant neoplasm of the skin, solar keratosis/sunburn and laceration/cut.[1] Malignant neoplasm of the skin accounted for 0.8% of problems managed by established GPs,[1] compared to just 0.4% of trainee problems.

Skin problems were significantly associated with more in-consultation information and advice-seeking, generating more learning goals, and organising more in-practice follow up. The effect sizes of these differences were clinically as well as statistically significant.

We found that trainees were less likely to refer patients with a skin disease than patients with other problems. This is somewhat at odds with the literature on established Australian GPs, which found that dermatologists are the third most common specialists referred to (after orthopaedic and general surgeons), and that malignant skin neoplasm is the most common reason for referral.[1]

While we have demonstrated that the prevalence and diagnoses of skin conditions seen by Australian GP trainees are similar to those of established GPs, there is no literature with which to compare our findings of significant associations of GP dermatology exposure.

Interpretation of the findings

There are substantive differences in the most commonly encountered skin problems between trainees and established GPs. The higher rates of skin infection and injury seen by trainees may be due to the acute nature of these conditions, which often require a prompt appointment with the most accessible practitioner (who is often a trainee).

In contrast, the reasons for our finding that established GPs encounter almost double the amount of skin malignancies that trainees encounter are unclear. The older patient demographic of patients of established GPs is likely to be contributory. We have previously found that GP trainees see a younger patient population than established GPs, and this is once again seen in relation to cutaneous presentations.[13] The discrepancy may also be associated with the greater clinical experience of established GPs, leading to more opportunistic screening for, and incidental findings of, skin malignancies during consultations for other problems, as well as the possibility that trainees diagnoses are more inaccurate and subsequently, they incorrect code skin malignancies.

The associations between the patient being new to the practice or to the trainee, and the problem itself being new, may reflect the high prevalence of acute skin conditions seen by trainees, such as skin infections and lacerations. As suggested above, such presentations require prompt appointment with the most accessible practitioner.

It is no surprise that fewer radiological investigations were ordered for cutaneous presentations. However, the finding that trainees order fewer pathology reports although they frequently manage skin infections may be an indication that trainees require further education on the appropriate use of investigations. Fewer specialist referrals may be a reflection of trainees' greater use of in-consultation advice from supervisors.

As well as seeking more in-consultation information and advice, trainees generated more learning goals and organised more in-practice follow up for skin diagnoses/problems. This would suggest that trainees find the diagnosis and management of skin conditions intrinsically difficult and may not be familiar with the natural history of cutaneous conditions.

Strengths and limitations

The strengths of our study are its size (131 423 problems), response rate (94%) and generalisability (across four of Australia's six states). The response rate is singularly high for a study recruiting GPs.[23] The study involved trainees in practices located across all urban and rural classifications. The large sample size and large number of independent variables collected enabled a detailed multivariate examination of the associations between trainees' consultations and patients with skin conditions.

A limitation of the study is its dependence on the diagnostic competence of trainees. This might be expected to be less than that of established GPs (which has been demonstrated to be modest).[6–8] However, while these issues may affect the frequencies of specific skin conditions managed, this limitation is likely to be minimal and to have negligible effect on the major outcome factor: skin condition/not skin condition.

Implications for educational practice

Our data suggest Australian GP trainees find dermatology to be both very common and highly challenging. This probably results from their limited exposure and formal teaching in dermatology during their undergraduate training and pre-vocational hospital experience. Many Australian and international studies have recommended training in this area be optimised.[3–5]

In terms of postgraduate training, a recent Scottish study found that GP trainees retrospectively rated a hospital rotation in dermatology to be the third most useful hospital rotation in preparation for general practice training, ranking behind emergency and paediatrics.[24] Other studies have shown that primary care trainees who have completed an undergraduate dermatology rotation feel better prepared to diagnose and treat common skin conditions[4] and that the diagnostic accuracy of trainees is positively associated with their prior experience in dermatology.[10] There are, however, obvious limitations to providing dermatology rotations at both undergraduate and postgraduate levels, including capacity, funding and time constraints.

We argue that GP trainees enter training inadequately prepared to manage the high burden of skin disease in general practice, and that this learning need should be a high priority during vocational training.

The ongoing demand from established GPs for continuing medical education in dermatology[11] suggests that trainers themselves find dermatology challenging and may not feel optimally equipped to assist trainees in the diagnosis and management of skin conditions. In specialist dermatology training the role of the trainer is vital,[25] and the same can be assumed in general practice. This argues for access to adequate education for the established practitioner also.

An alternative to face-to-face teaching is the development of online teaching modules. It has been shown that the introduction of an online dermatology teaching resource can improve the perceived educational experience of medical students despite a reduction in their clinical learning opportunities.[3] No comparisons have been made at the postgraduate level, but teledermatology has been proved efficient in the clinical practice of established GPs[26] and could have a role in carefully selected situations in GP vocational training.

Our study shows that even though trainees are exposed to an adequate case mix of dermatology presentations, they seek greater assistance, generate more learning goals and organise more patient follow up than established GPs when confronted by a skin condition. These factors suggest that greater formal out-of-practice training should be implemented as an important complement to in-practice teaching and supervision, to the benefit of trainee, supervisor and, consequently, patient.

Implications for future research

There is a need to evaluate the existing delivery of the dermatology curriculum at both undergraduate and postgraduate levels. Future work should also include an assessment of trainer confidence and ability to provide support to trainees managing skin conditions, and an assessment of resources accessed by both trainer and trainee. Furthermore, there is a need to explore specific areas of clinical enquiry, including the use of clinical tools such as the dermatoscope. Finally, developing, implementing and assessing an affordable model of combined clinical and online education in the field of dermatology for GP trainees would be a suitable area for further research.

CONCLUSIONS

Skin conditions are a common presentation in Australian general practice, producing high patient morbidity. The accurate diagnosis and management of skin conditions is an essential competency for clinicians.

Our findings suggest that trainees find dermatology particularly challenging. This is despite seeing skin conditions in a similar proportion of clinical consultations to established GPs. We believe that our study can help inform the design of measures aimed at improving the delivery of dermatology training for Australian and international GP trainees.

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REFERENCES

1. Britt H, Miller G, Henderson J *et al.* General Practice Activity in Australia 2012–13. Canberra: Australian Institute for Health and Welfare, 2013.
2. Australian Bureau of Statistics 3303.0 Causes of death, Australia, 2012. Available from URL: http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/3303.0main+features100012012. (Accessed 12 April 2016)
3. Singh DG, Boudville N, Corderoy R *et al.* Impact on the dermatology educational experience of medical students with the introduction of online teaching support modules to help address the reduction in clinical teaching. *Australas. J. Dermatol.* 2011; **52**: 264–9.
4. Hansra NK, O'Sullivan P, Chen CL *et al.* Medical school dermatology curriculum: are we adequately preparing primary care physicians? *J. Am. Acad. Dermatol.* 2009; **61**: 23–9 e1
5. Sladden MJ, Graham-Brown RA. How many GP referrals to dermatology outpatients are really necessary? *J. R. Soc. Med.* 1989; **82**: 347–8.
6. Morrison A, O'Loughlin S, Powell FC. Suspected skin malignancy: a comparison of diagnoses of family practitioners and dermatologists in 493 patients. *Int. J. Dermatol.* 2001; **40**: 104–7.
7. Tran H, Chen K, Lim AC *et al.* Assessing diagnostic skill in dermatology: a comparison between general practitioners and dermatologists. *Australas. J. Dermatol.* 2005; **46**: 230–4.
8. Van Rijsingen MCJ, Hanssen SCA, Groenewoud JMM *et al.* Referrals by general practitioners for suspicious skin lesions: the urgency of training. *Acta Derm. Venereol.* 2014; **94**: 138–41.
9. Sinclair R. Skin checks. *Aust. Fam. Physician* 2012; **41**: 464–9.
10. Gerbert B, Maurer T, Berger T *et al.* Primary care physicians as gatekeepers in managed care. Primary care physicians' and dermatologists' skills at secondary prevention of skin cancer. *Arch. Dermatol.* 1996; **132**: 1030–8.
11. Allan JA, Schaefer D, Stocks N. Improving the learning needs survey by using four approaches. *Aust. Fam. Physician* 2005; **34**: 84–6.
12. Royal Australian College of General Practitioners Curriculum 2011. Available at URL: http://curriculum.racgp.org.au/. (Accessed 17 October 2014).
13. Morgan S, Henderson K, Tapley A *et al.* Problems managed by Australian general practice trainees: results from the ReCenT (Registrar Clinical Encounters in Training) study. *Educ. Prim. Care.* 2014; **25**: 140–8.
14. Schofield JK, Fleming D, Grindlay D *et al.* Skin conditions are the commonest new reason people present to general practitioners in England and Wales. *Br. J. Dermatol.* 2011; **165**: 1044–50.
15. Hajjaj FM, Salek MS, Basra MK *et al.* Nonclinical influences, beyond diagnosis and severity, on clinical decision making in dermatology: understanding the gap between guidelines and practice. *Br. J. Dermatol.* 2010; **163**: 789–99.
16. Morgan S, Magin PJ, Henderson KM *et al.* Study protocol: the Registrar Clinical Encounters in Training (ReCEnT) study. *BMC. Fam. Pract.* 2012; **13**: 50.
17. Morgan S, Henderson K, Tapley A *et al.* How we use patient encounter data for reflective learning in family medicine training. *Med. Teach.* 2015; **37**(10): 897–900.

18. Britt H. A new coding tool for computerised clinical systems in primary care – ICPC plus. *Aust. Fam. Physician* 1997; **26**(Suppl 2): S79–82.
19. Australian Standard Geographical Classification (ASGC) 2006. Available at URL: http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/3E15ACB95DA01A65CA2571AA0018369F/File/121602006.pdf. (Accessed 17 October 2014).
20. Australian Bureau of Statistics. 2039.0 Information paper: an introduction to socioeconomic indexes of areas (SEIFA), 2006. Available at URL: http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/D729075E079F9FDECA2574170011B088/File/20390_2006.pdf. (Accessed 17 October 2014).
21. Fleischer AB Jr, Herbert CR, Feldman SR *et al.* Diagnosis of skin disease by nondermatologists. *Am. J. Manag. Care.* 2000; **6**: 1149–56.
22. Julian CG. Dermatology in general practice. *Br. J. Dermatol.* 1999; **141**: 518–20.
23. Bonevski B, Magin P, Horton G *et al.* Response rates in GP surveys – trialling two recruitment strategies. *Aust. Fam. Physician* 2011; **40**: 427–30.
24. Capewell S, Stewart K, Bowie P *et al.* Trainees' experiences of a four-year programme for specialty training in general practice. *Educ. Prim. Care.* 2014; **25**: 18–25.
25. Farrant P, Cohen SN, Burge SM. Attributes of an effective trainer: implications of the views of UK dermatology trainees. *Br. J. Dermatol.* 2008; **158**: 544–8.
26. Van der Heijden JP, de Keizer NF, Bos JD *et al.* Teledermatology applied following patient selection by general practitioners in daily practice improves efficiency and quality of care at lower cost. *Br. J. Dermatol.* 2011; **165**: 1058–65.