

## The pattern of anxiolytic and hypnotic management by Australian general practice trainees

SIMON M. HOLLIDAY<sup>1,2</sup>, SIMON MORGAN<sup>3</sup>, AMANDA TAPLEY<sup>3</sup>, KIM M. HENDERSON<sup>3</sup>, ADRIAN J. DUNLOP<sup>1,2</sup>, MIEKE L. VAN DRIEL<sup>4</sup>, NEIL A. SPIKE<sup>5,6</sup>, LAWRENCE A. McARTHUR<sup>7</sup>, JEAN BALL<sup>8</sup>, CHRISTOPHER J. OLDMEADOW<sup>8</sup> & PARKER J. MAGIN<sup>1,3</sup>

<sup>1</sup>School of Medicine and Public Health, Faculty of Health, University of Newcastle, Newcastle, Australia, <sup>2</sup>Drug and Alcohol Clinical Services, Hunter New England Local Health District, Newcastle, Australia, <sup>3</sup>General Practice Training Valley to Coast, Newcastle, Australia, <sup>4</sup>Discipline of General Practice, School of Medicine, University of Queensland, Brisbane, Australia, <sup>5</sup>Department of General Practice, University of Melbourne, Melbourne, Australia, <sup>6</sup>VMA General Practice Training, Melbourne, Australia, <sup>7</sup>Adelaide to Outback GP Training, Adelaide, Australia, and <sup>8</sup>Clinical Research Design, Information Technology and Statistical Support, Hunter Medical Research Institute, Newcastle, Australia

### Abstract

**Introduction and Aims.** Guidelines recommend anxiolytics and hypnotics (A/H) as second-line, short-term medications. We aimed to establish prevalence and associations of A/H prescribing by Australian general practice (GP) trainees. **Design and Methods.** A cross-sectional analysis from a cohort study of vocational trainees from four GP Regional Training Providers during 2010–2013. General practice trainees act as independent practitioners (including for prescribing purposes) while having recourse to advice from a GP supervisor. Practice and trainee demographic data were collected as well as patient, clinical and educational data from 60 consecutive consultations of each trainee each training term. Analysis was at the level of individual problem managed, with the outcome factor being prescription of any anxiolytic or hypnotic. **Results.** Overall, 645 registrars (response rate 94.0%) prescribed 68 582 medications in 69 621 consultations (with 112 890 problems managed). A/Hs were prescribed for 1.3% of problems managed and comprised 2.2% of all prescriptions. They were prescribed particularly for insomnia (28.2%) or anxiety (21.8%), but also for many 'off-label' indications. Significant associations of A/H prescriptions were: patient-level (greater age, Aboriginal and Torres Strait Islander status, English-speaking background, being new to the trainee but not to the practice); trainee-level (male) and consultation-level (longer duration, pre-existing problem, specialist referral not being made). Prescribing was significantly lower in one of the four Regional Training Providers. **Discussion and Conclusions.** GP trainees, inconsistent with most guideline recommendations, prescribe A/Hs mainly as maintenance therapy to unfamiliar and older patients. Our results suggest that changes in management approaches are needed which may be facilitated by support for psychotherapeutic training. [Holliday SM, Morgan S, Tapley A, Henderson KM, Dunlop AJ, van Driel ML, Spike NA, McArthur LA, Ball J, Oldmeadow CJ, Magin PJ]. The pattern of anxiolytic and hypnotic management by Australian general practice trainees. *Drug Alcohol Rev* 2016;00:000-000].

**Key words:** anti-anxiety agents, drug overdose, family practice, general practitioners, hypnotics and sedatives.

Simon M. Holliday BMed FACHAM FRACGP FACRRM DA DipRACOG GradDipA&DSt, GradCertClinEpidemiology, Conjoint Lecturer, School of Medicine and Public Health, Faculty of Health, University of Newcastle and Staff Specialist, Drug and Alcohol Clinical Services, Hunter New England Local Health District, Simon Morgan MPH&TM, FRACGP, Medical Educator, Amanda Tapley BBiomedical Science(Hons), Research Officer, Kim M. Henderson BNurs, Grad Dip. Health Soc. Sci., Research Manager, Adrian J. Dunlop PhD FACHAM, Conjoint Associate Professor, School of Medicine and Public Health, Faculty of Health, University of Newcastle and Area Director and Senior Staff Specialist, Drug and Alcohol Clinical Services, Mieke L. van Driel PhD, FRACGP, Professor, Neil A. Spike MBBS, FRACGP, Director of Medical Education and Training, VMA General Practice Training, Lawrence A. McArthur MBBS, FRACGP, Director of Medical Education and Training, Jean Ball BMath, Grad Dip Med Stat, Statistician, Christopher J. Oldmeadow PhD, BMathematics (Hon), Senior Statistician, Parker J. Magin PhD, FRACGP, Conjoint Professor, School of Medicine and Public Health, Faculty of Health, University of Newcastle and Medical Educator, General Practice Training Valley to Coast. Correspondence to Dr Simon M. Holliday, Albert St Medical Centre, PO Box 834, 78 Albert St, Taree, NSW 2430, Australia. Tel: 02 6552 5533; Fax: 02 6552 4249; E-mail: simon.holliday@albertstmc.com

Received 20 July 2015; accepted for publication 05 February 2016.

## Introduction

Benzodiazepines were first introduced in 1959 for the 'control of personal and emotional problems' as safe substitutes for alcohol or barbiturates [1]. Benzodiazepines and the subsequently introduced Z-Drugs (BZD) are functionally equivalent modulators of the GABA<sub>A</sub> receptors [1]. They are mainly used for anxiolytic and/or hypnotic (A/H) effects, for alcohol withdrawal or as anticonvulsants, muscle-relaxants or anaesthesia induction agents [2]. Much of the evidence base for their efficacy is several decades old, of variable methodological quality and characterised by short durations of treatment and follow up [2–5]. The relative utility, efficacy, toxicities and misuse potential of BZDs generate considerable debate [2,6–9].

Some commentary calls for BZDs to be first line therapy for anxiety and/or insomnia [6,7]. However, most guidelines and international recommendations reserve BZDs for cautious short-term use in severe or disabling cases or as second-line options [2,10–13]. Frequently prescribed long-term [1], by four months an estimated 15% of patients on benzodiazepines are dependent, a rate increasing to 50% after two years [14]. Assessing A/H usage is problematic as conventional diagnostic criteria for dependency are weighted towards illicit substance use. These criteria may apply poorly amongst the elderly using BZDs as prescribed by their doctors and, thus, may lead to significant under-estimation of the prevalence of dependency [15]. The Coroners Court of Victoria has observed amongst overdose deaths that the vast majority involve pharmaceuticals (87%) with most involving A/Hs particularly BZDs [16]. The Coroner noted several 'sub-optimal' clinical themes were commonly associated with such deaths. These included BZDs being prescribed upon request at first consultation, on an ongoing basis for an extended period, or without any attempt to establish who else was prescribing them or whether there was concurrent opioid analgesic use.

A/Hs are predominantly prescribed by general practitioners (GP) [17]. Thus in order to characterise any 'sub-optimal' clinical themes and to improve quality use of A/H medicines, it is important to identify which GPs are prescribing, in what context and to whom [12,18]. This requires detailed and reliable consultation-level data. Australian residents receive subsidies for selected medications through the government-run Pharmaceutical Benefits Scheme which subsidises 71% of the BZDs dispensed with this de-identified data accessible publicly [19]. This data is incorporated by the Department of Health and Ageing (Drug Utilisation Sub-Committee) with estimates of non-subsidised prescriptions from a survey of 370 community pharmacies [10,19]. This database still may significantly underestimate A/H utilisation and contain incomplete or little data on prescriber or patient age, gender or diagnosis [10,13,17,19]. Calls have been made for population-based studies to explore

individual level data and identify poor quality use of medicines particularly in disadvantaged populations, such as non-English speaking populations or Aboriginal and Torres Strait Islanders [10,12]. Such studies would inform interventions to develop education for prescribers [12], especially early-career and in-training GPs.

A database suitable for such a study is generated by the Australian General Practice Training Program. The program involves a minimum of 18 months post-hospital vocational training in accredited training general practices with regular educational release workshops. GP trainees have regular teaching or supervision sessions with their accredited GP trainers, whom they may also access for advice and support in an 'apprenticeship-like model.' However, trainees essentially function as independent practitioners (including for prescribing purposes). Four of Australia's 17 GP Regional Training Providers spanning four Australian states (New South Wales, Victoria, South Australia and Tasmania) participate in the Registrar Clinical Encounters in Training (ReCEnT) project. ReCEnT is an ongoing multi-site cohort study of GP trainees' (registrars') in-consultation clinical experience. In this study of Australian GP trainees, we aim to establish the prevalence, nature and associations of A/H prescribing by using contemporaneously recorded detailed individual trainee consultation data.

## Methods

The ReCEnT methodology has been described in detail elsewhere [20]. Briefly, initial data collection involves trainee's demographic, education, work experience and current practice characteristics. Trainees then record the details of 60 consecutive clinical consultations (using a paper-based encounter form) once during each six-month training term. The encounter form data encompasses four broad areas: patient demographics, diagnoses or problems managed (hereafter referred to as problems), management and educational training aspects. As data collection is designed to reflect a 'normal' week of general practice, consultations in specialised clinics (e.g. vaccination clinics) are excluded. Only office-based consultations, not home or nursing home visits, are included. The study encompasses general practices across all rural–urban classifications from major city to very remote [21].

Data in the current analysis is from eight rounds of data collection, 2010–2013 and was confined to patients 16 years of age or older.

### Outcome factors

The primary outcome factor in this study was the prescription of an A/H as defined by International Anatomical Therapeutic Chemical codes 'N05B' and 'N05C' [22].

Our data included the specific medication and route of administration, but not the dose. Each prescription of each International Anatomical Therapeutic Chemical-coded medication was linked directly to the problem for which it was prescribed.

### *Independent variables*

Independent variables related to trainee, patient, practice and consultation.

Trainee factors were age, gender, training term, country of medical qualification (Australia/international) and the number of half-day sessions worked per week.

Practice factors included practice size (number of full-time equivalent GPs) and if the registrar reported that the practice routinely bulk-billed (that is, there was no financial cost to the patient for the consultation). Postcode was used to define practice rurality/urbanicity using the Australian Standard Geographical Classification-Remoteness Area classification of the practice location [21]. Postcode also defined the practice location's Socioeconomic Index for Area (SEIFA) Relative Index of Disadvantage [23]. SEIFA describes each geographical area in terms of people's access to material and social resources, and their ability to participate in society. SEIFA scores for our analysis were converted to deciles, with lower decile scores representing relative disadvantage. Patient factors were age, gender, Aboriginal and Torres Strait Islander status, non-English speaking background and if the patient was new to the practice or new to the trainee. Consultation factors were duration (measured contemporaneously by the registrar in minutes), the number of problems managed, the ordering of imaging or pathology and whether a referral or scheduled follow up was made. Educational factors included whether the trainee sought assistance, advice or information during the consultation or generated learning goals for subsequent attention.

Prescriptions were each coded as 'initial,' if provided for the first time for that specific medical problem, or else as 'continuing'.

Problems were coded according to the International Classification of Primary Care, second edition classification system (ICPC-2 PLUS) [24]. Trainees could code each problem as either 'new' or 'pre-existing.' The former included initial episodes, exacerbations of recurrent problems, or any problems (regardless of duration) which were being managed medically for the first time. Problems categorised as 'Chronic diseases' were coded via an existing classification system derived from ICPC-2 PLUS [25].

### *Statistical analysis*

This was a cross-sectional analysis of patient consultations from the longitudinal ReCEnT study. The unit of

analysis was the individual problem rather than the individual consultation.

Percentages of trainees' problems managed with A/Hs (A/H problems) were calculated, with 95% confidence intervals.

To test associations of an A/H being prescribed, simple and multiple logistic regression were used within a generalised estimating equations framework, to account for within person correlation (the clustering of patients within registrars trainees), with a compound symmetry working correlation matrix to model correlations from repeated measures from a trainee. The generalised estimating equations approach models the lack of independence in the data because of some trainees being inherently more or less likely to prescribe among the patients they see (clustered observations). Wald statistic based confidence intervals and hypothesis tests were used to assess statistical significance of estimated parameters with Huber-White sandwich standard errors.

All independent variables (above) with a *P* value less than 0.20 and a relevant effect size in the univariate analysis were included in the multiple regression model. Variables which had a small effect size and were no longer significant in the multivariate model were removed from the final model as long as the variable's removal did not change the resultant model. A regression model was built with the dependent variable 'any A/H prescribed'. Statistical analyses used SAS v9.3. Predictors were considered statistically significant if the *P* value was <0.05.

### *Ethics approval*

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

## **Results**

Overall, 645 individual trainees (response rate 94.0%) contributed 1426 recording cycles (including details of 69 621 individual consultations, 112 890 problems and 68 582 medications prescribed). The demographics of the participating trainees and practices are presented in Table 1. A/Hs were prescribed in 1456 (2.1% of total [95% confidence interval (CI) 2.0–2.2]) patient consultations and for 1473 (1.3% of total [95% CI 1.2–1.4]) problems, accounting for 1513 (2.2% [95% CI 2.1–2.3]) of all prescriptions. The majority of A/Hs prescribed were diazepam ( $n = 609$ , 40.3%, 95% CI 37.1–43.6) or temazepam (435, 28.8%, 95% CI 26.1–31.6) (further details in Supporting Information). One and two A/Hs were provided in 94.7% and 5.3% of PMWA/Hs problems managed with A/Hs, respectively. A/Hs were initiated in 415 (30.2% [95% CI 27.8–32.7]) A/H problems and

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

Variable	Class	<i>n</i>	%	(95% CI) or Mean (SD)
<i>Registrar variables (n = 645)</i>				
Registrar gender	Female	425	65.9%	(62.2–69.6)
Pathway registrar enrolled in	General (as against rural)	494	77.0%	(73.7–80.2)
Qualified as a doctor in Australia	Yes	480	75.6%	(72.2–78.9)
Registrar age (years)	Mean (SD)			32.8 (6.6)
Registrar year of graduation	Mean (SD)			2005.1 (5.6)
<i>Registrar-term or practice variables (n = 1426)</i>				
Registrar Training Term	Term 1	557	39.1%	(36.5–41.6)
	Term 2	488	34.2%	(31.8–36.7)
	Term 3	306	21.5%	(19.3–23.6)
	Term 4	75	5.3%	(4.1–6.4)
Registrar worked at the practice previously	Yes	413	29.4%	(27.0–31.7)
Registrar works fulltime (>7 half-day sessions per week)	Yes	1091	78.3%	(76.1–80.5)
Does the practice routinely bulk bill	Yes	234	16.6%	(14.6–18.5)
Number of GPs working at the practice	6 or more	941	67.5%	(65.0–69.9)
Rurality of practice (21)	Major city	827	58.0%	(55.4–60.6)
	Inner regional	424	29.7%	(27.4–32.1)
	Outer regional, remote or very remote	175	12.3%	(10.6–14.0)
SEIFA <sup>a</sup> Index (decile) of practice (23)	Mean (SD)			5.4 (2.8)

<sup>a</sup>Socioeconomic Index for Area (SEIFA) Relative Index of Disadvantage (lower scores indicate relative disadvantage). CI, confidence interval; GP, general practitioner.

provided for continuing use in 959 (69.8% [95% CI 67.3–72.2]) A/H problems. A/Hs were prescribed for 150 individual ICPC-2 PLUS conditions, with only 50.0% for hypnosis ( $n = 416$ , 28.2%, 95% CI 25.6–31.1) or anxiolysis ( $n = 321$ , 21.8%, 95% CI 19.5–24.3) (further details in Supporting Information). There were 92 A/H problems (6.4%) where an opioid analgesic was co-prescribed. There were three urinary drug screens requested with A/H prescribing, and no contacts recorded with either regulators or prescription monitoring programs.

The univariate associations of A/H problems are presented in Table 2 with the multivariate model presented in Table 3.

In the multivariate model, the Regional Training Provider with the highest adjusted odds of prescribing had an odds of prescribing that was almost 50% higher than the referent group training provider (Regional Training Provider 1) [odds ratio 1.46 (CIs: 1.16, 1.84)]. Patient factors positively associated with A/Hs were older age, Aboriginal and Torres Strait Islander status, and the patient being new to the registrar (though not to the practice). Patients of non-English speaking background were less likely to be prescribed A/Hs. The only trainee association was male gender. A/Hs were more likely to be prescribed for a pre-existing rather than a new problem, but were less likely to be prescribed for ‘chronic’ problems. Consultations where A/Hs were prescribed were marginally, but statistically significantly, longer than

other consultations. A/H prescribing was associated with less ordering of imaging and pathology and with fewer referrals.

## Discussion

Trainees prescribed A/Hs predominantly as on-going prescriptions for pre-existing problems at their first consultation with a patient who had attended the practice previously. Higher prescribing rates correlated with patient age, location and ethnicity which may place particular patient groups at greater risk of A/H-associated morbidity or mortality.

### Findings in the context of other literature

One study in Australian general practice found anxiolytics and hypnotics to be prescribed at a frequency of 1.2 and 0.9 respectively per 100 problems. These figures are not directly comparable with our finding of the frequency proportion of A/H problems (1.3%), as their study population also included children under the age of 16 and nursing home patients [26].

We found an almost 50% variation in A/H prescribing between Regional Training Providers. A/Hs are minimally regulated by State authorities and so this disparity, previously described between Australian states [19], is

**Table 2.** Univariate associations of independent variables with A/H prescriptions

Variable	Class	Prescribed A/H		P
		No (n = 111 417)	Yes (n = 1473)	
Age group	16–34	31 761 (99%)	277 (0.9%)	<0.0001
	35–64	52 492 (98%)	800 (1.5%)	
	65+	25 037 (99%)	377 (1.5%)	
Patient gender	Male	38 257 (99%)	497 (1.3%)	0.4171
	Female	70 114 (99%)	941 (1.3%)	
Aboriginal and Torres Strait Islander	No	104 579 (99%)	1365 (1.3%)	<0.0001
	Yes	1159 (97%)	32 (2.7%)	
	No	99 429 (99%)	1356 (1.3%)	
Non-English speaking background	Yes	6966 (99%)	49 (0.7%)	0.0001
	Male	36 734 (98%)	568 (1.5%)	
Registrar gender	Female	74 683 (99%)	905 (1.2%)	0.0005
	Part time	24 180 (99%)	326 (1.3%)	
Registrar work-load	Full time	84 694 (99%)	1111 (1.3%)	0.7927
	Term 1	44 600 (99%)	616 (1.4%)	
	Term 2	37 163 (99%)	480 (1.3%)	
	Term 3	23 950 (99%)	303 (1.2%)	
Training term/post	Term 4	5704 (99%)	74 (1.3%)	0.6814
	No	77 507 (99%)	1019 (1.3%)	
	Yes	32 382 (99%)	437 (1.3%)	
	No	26 700 (99%)	336 (1.2%)	
Worked at the practice previously	Yes	82 933 (99%)	1117 (1.3%)	0.2888
	No	36 731 (99%)	484 (1.3%)	
Qualified as doctor in Australia	Small (1–5 FTE GPs)	72 346 (99%)	960 (1.3%)	0.8775
	Large (6+ FTE GPs)	91 849 (99%)	1231 (1.3%)	
Practice size	No	18 643 (99%)	228 (1.2%)	0.2725
	Yes	64 228 (99%)	845 (1.3%)	
Practice routinely bulk bills	Major city	33 148 (99%)	425 (1.3%)	0.8599
	Inner regional	14 041 (99%)	203 (1.4%)	
Rurality [21]	Outer regional, remote, very remote	40 851 (99%)	473 (1.1%)	0.0083
	1	13 244 (98%)	208 (1.5%)	
	2	11 218 (99%)	166 (1.5%)	
	3	46 104 (99%)	626 (1.3%)	
Regional Training Provider	4	50 663 (99%)	674 (1.3%)	0.0554
	Returning patient	50 471 (99%)	679 (1.3%)	
	New to registrar	7065 (99%)	71 (1.0%)	
	New to practice	58 162 (98%)	1178 (2.0%)	
Patient/practice status	No	53 255 (99%)	295 (0.6%)	<0.0001
	Yes	83 387 (99%)	1188 (1.4%)	
New problem	No	27 676 (99%)	284 (1.0%)	<0.0001
	Yes	102 523 (99%)	1458 (1.4%)	
Chronic condition	No	8894 (99.8%)	15 (0.2%)	<0.0001
	Yes			

(Continues)

**Table 2.** (Continued)

Variable	Class	Prescribed A/H		P
		No (n = 111 417)	Yes (n = 1473)	
Follow up ordered	No	60 754 (99%)	822 (1.3%)	0.5023
	Yes	50 663 (99%)	651 (1.3%)	
Learning goals	No	95 764 (99%)	1287 (1.3%)	0.1788
	Yes	15 653 (99%)	186 (1.2%)	
Referral ordered	No	97 618 (99%)	1310 (1.3%)	0.1550
	Yes	13 799 (99%)	163 (1.2%)	
Sought help from any source	No	94 833 (99%)	1270 (1.3%)	0.3568
	Yes	16 584 (99%)	203 (1.2%)	
<sup>a</sup> Registrar age	Median (min, max)	31 (22, 61)	31 (23, 61)	0.3407
<sup>a</sup> SEIFA Index (23) <sup>b</sup>	Median (min, max)	5.0 (1.0, 10)	5.0 (1.0, 10)	0.5868
<sup>a</sup> Consultation Duration	Median (min, max)	17 (0.0, 120)	17 (1.0, 96)	0.0666
<sup>a</sup> Number of problems	Median (min, max)	2.0 (1.0, 4.0)	2.0 (1.0, 4.0)	0.9256
<sup>a</sup> Number of pathology tests	Median (min, max)	0.0 (0.0, 12)	0.0 (0.0, 9.0)	<0.0001

Note: numbers may not add up to n because of missing data. <sup>a</sup>Because of analysis at problem/diagnosis rather than consultation level, frequency tables should be interpreted with caution. Reported frequencies at the problem/diagnosis level may not reflect observed frequencies at the subject level. <sup>b</sup>Socioeconomic Index for Area (SEIFA) Relative Index of Disadvantage (lower scores indicate relative disadvantage). A/H, anxietytics and hypnotics; FTE, Full Time Equivalent.

unlikely to reflect regulatory influence. Rather it is more likely to reflect differences in liberality of clinical prescribing cultures [27]. Similar regional variations in A/H prescribing were found across the USA, unrelated to regional variations in disease prevalence [18]. This study also found higher prescribing rates were associated with poorer health outcomes, including overdoses, falls and abuse [18].

In 6.2% of A/H problems an opioid analgesic was concurrently prescribed, while for all problems, the equivalent proportion was 2.4% [28]. Given that we only had data on co-prescribing at individual consultations, and not on the entire patient regimen, the 6.2% is likely to be an under-estimation. As the Coroners Court of Victoria noted [16], such co-prescribing is problematic, in that BZDs have shown to be significant contributors to 31% of US opioid deaths [18] and 55% of Victorian heroin-related deaths [12].

Half of all indications for A/H prescriptions were for insomnia and anxiety (28.2% and 21.8% indications respectively). The most common treatment provided by GPs for insomnia is the provision of an A/H [5,29,30] despite their limitations, including tolerance and adverse effects, such as disturbed sleep architecture and rebound insomnia after discontinuation [5]. Cognitive behavioural therapies, such as sleep restriction or stimulus control, have been found to have similar effect sizes to A/Hs, however with sustained benefits [3,5]. As anxiolytics, BZDs are indicated only for acute symptom relief, while awaiting first-line therapy to become effective, or as second line therapies or adjunctive therapy for treatment-refractory illness [7,11,12]. Use of BZDs in panic disorder may worsen outcomes from psychotherapy [11]. The majority of other indications that the trainees recorded for A/H prescribing have been described as unrecommended, unspecified or ‘off-label’ [2,11].

A/Hs were more likely to be prescribed to older patients despite anxiety disorders occurring most commonly amongst those aged 25–44 years and insomnia amongst those aged 50–59 years [27,31]. Guidelines consistently warn about the increasing effects of BZDs with age on neuropsychological performance [4,8,11,32,33]. Clinicians often consider ceasing BZDs in the elderly both difficult and unnecessary [9]. In a survey of non-institutionalised older Canadians one quarter reported using BZDs, with the majority of these intending to continue taking them or hoarding them [15].

As found with opioid analgesics [28], Aboriginal and Torres Strait Islanders were more likely to be prescribed A/Hs by trainees. Higher levels of prescribing may predispose to medication misuse or medication mismanagement in this population [13]. A lack of access to culturally appropriate psychosocial services may be a barrier to de-prescribing [13], as may be high rates of chronic illness, including prescribing psychiatric disorders. A systematic

**Table 3.** Logistic regression model of associations of A/H prescriptions

Variable	Class	Univariate		Adjusted	
		OR (95% CI)	P	OR (95% CI)	P
Age group	35–64	1.74 (1.51, 2.00)	<0.0001	1.69 (1.45, 1.97)	<0.0001
Referent: 16–34	65+	1.71 (1.45, 2.01)	<0.0001	1.59 (1.34, 1.90)	<0.0001
Aboriginal and Torres Strait Islander	Yes	2.07 (1.47, 2.90)	<0.0001	2.28 (1.66, 3.12)	<0.0001
Non English speaking background	Yes	0.50 (0.35, 0.71)	0.0001	0.48 (0.33, 0.69)	<.0001
Registrar gender	Male	1.28 (1.11, 1.47)	0.0005	1.19 (1.03, 1.38)	0.0205
Regional Training Provider	2	1.39 (1.12, 1.73)	0.0025	1.46 (1.16, 1.84)	0.0012
Referent: 1	3	1.29 (1.04, 1.60)	0.0190	1.32 (1.05, 1.66)	0.0157
	4	1.18 (1.01, 1.38)	0.0376	1.30 (1.10, 1.53)	0.0020
Patient/practice status	New to practice	0.76 (0.60, 0.97)	0.0257	1.17 (0.90, 1.52)	0.2471
Referent: returning patient	New to registrar	1.01 (0.91, 1.13)	0.8364	1.26 (1.12, 1.42)	0.0001
New problem	Yes	0.27 (0.24, 0.31)	<0.0001	0.25 (0.22, 0.29)	<0.0001
Chronic condition	Yes	0.72 (0.63, 0.83)	<0.0001	0.47 (0.40, 0.56)	<0.0001
Imaging ordered	Yes	0.12 (0.07, 0.20)	<0.0001	0.15 (0.09, 0.25)	<0.0001
Referral ordered	Yes	0.88 (0.75, 1.05)	0.1550	0.80 (0.66, 0.96)	0.0148
Consultation duration		1.01 (1.00, 1.01)	0.0666	1.02 (1.01, 1.02)	<0.0001
Number of pathology tests		0.57 (0.47, 0.69)	<0.0001	0.58 (0.47, 0.71)	<0.0001

A/H, anxiolytics and hypnotics; CI, confidence interval; OR, odds ratio.

review has found anxiety disorders range in prevalence amongst Aboriginal and Torres Strait Islanders from 17.2% to 58.6% and reported post-traumatic stress disorder rates vary from 14.2% to 55.2% [34].

A/Hs were infrequently prescribed for new problems. This is consistent with prescribing patterns of established GPs who are frequently unaware of where or when the prescribed BZD was commenced [9,30]. While BZDs are said to have a positive risk-to-benefit profile for use up to 2–4 weeks, our study supports commentaries that their provision is uncommonly time limited [2], reflecting the many barriers to de-prescribing [32]. Our cross-sectional data cannot describe individual patient illness and medication trajectories. However the following associations of A/Hs prescription are instructive. We found that A/H prescriptions are associated with ‘pre-existing’ rather than ‘new’ problems; with ‘continuing’ rather than ‘initial’ prescriptions; with patients being new to the trainee but not to the practice; and were not associated with the seeking of collegiate advice. Taken together, an interpretation of these findings is that trainees may be simply repeating the prescription of their practice colleagues. This may reflect an inherent power imbalance as trainees’ colleagues are frequently their supervisors and employers as well. Trainees may have presumed their colleagues had endorsed continued prescribing and thus perpetuated potentially inappropriate prescribing [32].

A/H problems were less likely to generate referrals than were other problems. A similar difference has also been described amongst established GPs when managing both anxiety and insomnia [30,31]. From 2001, Medicare provided funding to GPs to undertake training and deliver psychotherapies, but this scheme was infrequently

utilised [31]. Since 2006, the training requirements were dropped and referrals to psychologists became subsidised by Medicare after the GP completed of specific documentation [13,31]. This pathway has been utilised beyond budgetary forecasts, despite the potential barrier of the subsidy not covering the psychologist’s full fee [13,31]. Potential barriers to the making of psychology referrals to assist in de-prescribing include that they may seem too slow to patients and reportedly seem unimportant to clinicians [9] or trainees. Psychological skills are critical for the initial management of both anxiety and insomnia, for the management of BZD dependence [8] and for de-prescribing [11]; the latter ideally addressing withdrawal symptom management as well as the underlying psychopathology [8]. Most trainees lack advanced psychotherapeutic skills and, based on the infrequency of referrals, may not consider non-pharmacological options.

#### *Strengths and limitations*

Strengths of our study include a large sample size from four of Australia’s eight states and territories across all rural–urban classifications with a response rate singularly high for a study of GPs [35]. Publically available datasets substantially under-estimate A/H dispensing [10], but this data captures both subsidised and non-subsidised prescribing. The contemporaneous recording of detailed patient, prescriber, practice and consultation variables and the diagnostic indication (that is, ICPC-2 problem) for prescription, all linked to the individual prescription, is a particular strength. This combination of this linkage and a high response rate is unique.

Limitations of this analysis include its cross-sectional ‘consultation snapshot’ nature and lack of data on full medication regimens as well as what was actually dispensed or consumed. We also do not have data on patients’ psychiatric status beyond the diagnosis for which the medication was prescribed, on repeats provided or on dosages. We have not included data from specialised clinics, home visits or nursing home visits, and our ‘broad brush’ analysis does not allow assessment of appropriateness or quality of trainees’ individual prescribing decisions. While our large sample size is a strength of the study, it entails the possibility of some statistically significant findings being of questionable clinical significance and the effect size of findings should always be considered. GP registrar data may not be generalisable to the GP population. However, this is the first study to specifically examine early career doctors’ prescribing of A/Hs and the data will inform the development of educational interventions to improve their quality use.

#### *Recommendations for practice, policy and further research*

Like most primary care health systems, Australian general practice is time poor and funded by a fee-for-service model [26]. Pharmaceuticals are more rapidly and inexpensively provided than psychotherapies which may be reflected in an estimated 13% of Australians taking daily psychotropic medications [1,10]. If psychological approaches are to be recommended as first line therapies as against the initiation or continuation of A/Hs [5], there are implications for education and training and for government. Models of care will have to be funded, constructed, evaluated and implemented to facilitate non-pharmacological strategies. Funding for this may be problematic as the majority of medical education is currently sponsored by pharmaceutical companies [36] and, otherwise, academic medical education research is characterised by chronic underfunding [37]. Ideally education should target care provision for vulnerable groups (our findings suggest that these include older patients and Aboriginal and Torres Strait islander populations) and address: communicating about the cognitive and psychomotor benefits of A/H de-prescribing [38], negotiation skills about prescribing guidelines, improved psychotherapy skills [8] and the importance of multidisciplinary care [9].

Long-term A/Hs prescribing in the elderly, ‘off-label’ or in conjunction with opioids suggests an evidence-practice disparity [12,13]. This may risk individual and public health harms and should be discouraged.

The PBS currently subsidises most BZDs. But simply re-scheduling of all BZDs to make them less accessible as recommended by the Coroners Court of Victoria [16] may generate new harms from substitution by off-

label use of atypical anti-psychotics or cannabis [5,19,39]. Given our finding that some trainee A/H prescribing seems to be perpetuation of colleagues’ (including trainers’) prescribing decisions, targeted education should involve trainers as well as trainees.

#### *Implications for further research*

Our recommendation for new models of care involving an emphasis on non-pharmacological care of insomnia and anxiety will require rigorous evaluation. The ReCEnT study, with its longitudinal methodology and detailed data collection, may provide an opportune framework for evaluating such educational interventions.

### **Conclusion**

Trainees’ A/H prescribing practices frequently resemble those practices highlighted in Coroner’s reports. Prescribing decisions may often involve presentations of patients whose long-term problems have been previously pharmacologically managed by their colleagues, discordant with most prescribing guidelines. Trainees may be uncomfortable with psychotherapeutic strategies and this may limit their options for the initiation, continuation and withdrawal of A/Hs. Patients deserve a standard of care where doctors can offer evidence-based alternatives to A/Hs and have sufficient psychological management skills to minimise exposure and harms from long-term usage. Regulators and educators concerned about the over-prescribing of A/Hs need to look at equipping GP trainees and their trainers with the non-pharmacological tools to manage insomnia, anxiety, pain and A/H de-prescribing.

### **Acknowledgements**

The authors would like to thank those GP trainees who permitted their data to be used for research purposes.

### **Conflict of interests**

This study was supported by a competitive grant from the Mental Health, Drugs and Alcohol Office of the NSW Ministry of Health.

The project is also 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.

## References

- [1] Hood SD, Norman A, Hince DA, Melichar JK, Hulse GK. Benzodiazepine dependence and its treatment with low dose flumazenil. *Br J Clin Pharmacol* 2014;77:285–94.
- [2] Lader M. Benzodiazepine harm: how can it be reduced? *Br J Clin Pharmacol* 2014;77:295–301.
- [3] Huedo-Medina TB, Kirsch I, Middlemass J, Klonizakis M, Siriwardena AN. Effectiveness of non-benzodiazepine hypnotics in treatment of adult insomnia: meta-analysis of data submitted to the Food and Drug Administration. *BMJ* 2012;345:e8343.
- [4] Glass J, Lanctôt KL, Herrmann N, Sproule BA, Busto UE. Sedative hypnotics in older people with insomnia: meta-analysis of risks and benefits. *BMJ* 2005;331:1169.
- [5] Trauer JM, Qian MY, Doyle JS, Rajaratnam SMW, Cunnington D. Cognitive behavioral therapy for chronic insomnia: a systematic review and meta-analysis. *Ann Intern Med* 2015;163:191–204.
- [6] Hall-Porter JM, Curry DT, Walsh JK. Pharmacologic treatment of primary insomnia. *Sleep Medicine Clinics* 2010;5:609–25.
- [7] Starcevic V. The reappraisal of benzodiazepines in the treatment of anxiety and related disorders. *Expert Rev Neurother* 2014;14:1275–86.
- [8] Gould RL, Coulson MC, Patel N, Highton-Williamson E, Howard RJ. Interventions for reducing benzodiazepine use in older people: meta-analysis of randomised controlled trials. *Br J Psychiatry* 2014;204:98–107.
- [9] Bourgeois J, Elseviers MM, Azermai M, Van Bortel L, Petrovic M, Vander Stichele RR. Barriers to discontinuation of chronic benzodiazepine use in nursing home residents: perceptions of general practitioners and nurses. *European Geriatric Medicine* 2014;5:181–7.
- [10] Stephenson CP, Karanges E, McGregor IS. Trends in the utilisation of psychotropic medications in Australia from 2000 to 2011. *Aust N Z J Psychiatry* 2013;47:74–87.
- [11] Katzman M, Bleau P, Blier P, *et al.* Canadian clinical practice guidelines for the management of anxiety, posttraumatic stress and obsessive-compulsive disorders. *BMC Psychiatry* 2014;14(Suppl 1):83.
- [12] National Drug Strategy (Australia). National Pharmaceutical Drug Misuse Framework for Action (2012–2015): a matter of balance. Canberra, Australian Capital Territory; National Drug Strategy; 2013 12 December 2013, iv, 81 pp.
- [13] Nicholas R, Lee N, Roche A. Pharmaceutical drug misuse in Australia: complex problems, balanced responses. Adelaide: Flinders University, 2011.
- [14] Royal College of Psychiatrists. Substance misuse in older people: an information guide. 2015 Apr 2015;. Report No.
- [15] Voyer P, Préville M, Cohen D, Berbiche D, Béland S-G. The prevalence of benzodiazepine dependence among community-dwelling older adult users in Quebec according to typical and atypical criteria. *Can J Aging* 2010;29:205–13.
- [16] Jamieson A, editor Pharmaceutical drugs in fatal overdose: a coroner's perspective. International Medicine in Addiction Conference; 21 March 2015; Melbourne <http://www.coronerscourt.vic.gov.au/find/publications/coroners+prevention+unit+-+pharmaceutical+drugs+in+fatal+overdose> (accessed April 22, 2015).
- [17] Hollingworth SA, Siskind DJ. Anxiolytic, hypnotic and sedative medication use in Australia. *Pharmacoepidemiol Drug Saf* 2010;19:280–8.
- [18] Paulozzi L, Mack K, Hockenberry J. Vital signs: variation among states in prescribing of opioid pain relievers and benzodiazepines—United States, 2012. Washington, DC: US Department of Health and Human Services, 2014 1 July 2014.
- [19] Islam MM, Conigrave KM, Day CA, Nguyen Y, Haber PS. Twenty-year trends in benzodiazepine dispensing in the Australian population. *Intern Med J* 2014;44:57–64.
- [20] Morgan S, Magin P, Henderson K, *et al.* Study protocol: the registrar clinical encounters in training (ReCEnT) study. *BMC Fam Pract* 2012;13:50.
- [21] Australian Bureau of Statistics. 12160—Australian Standard Geographical Classification (ASGC). 2010. p. Available at: <http://www.abs.gov.au/ausstats/abs@.nsf/mf/1216.0> [Accessed 6 April 2011].
- [22] WHO Collaborating Centre for Drug Statistics Methodology. WHO Collaborating Centre for Drug Statistics Methodology, Guidelines for ATC classification and DDD assignment 2013. Oslo, Norway: WHOCC, 2012:284.
- [23] Australian Bureau of Statistics. 2039.0—information paper: an introduction to Socio-economic Indexes of Areas (SEIFA). 2006. p. Available at: <http://www.abs.gov.au/ausstats/abs@.nsf/mf/2039.0> [accessed 6 April 11].
- [24] Britt H. A new coding tool for computerised clinical systems in primary care—ICPC plus. *Australian family physician*. 1997 1997/07;26 Suppl 2:S79–82. PubMed PMID: 9254947.
- [25] O'Halloran J, Miller GC, Britt H. Defining chronic conditions for primary care with ICPC-2. *Fam Pract* 2004;21:381–6.
- [26] Britt H, Miller G, Henderson J, *et al.* General practice activity in Australia 2013–14 2014 Nov 14, 2014; General practice series no. 36 [191 p.]. Available from: <http://ses.library.usyd.edu.au/handle/2123/11882>.
- [27] Paulozzi LJ, Strickler GK, Kreiner PW, Koris CM. Controlled substance prescribing patterns — prescription behavior surveillance system, eight states, 2013. *MMWR Surveill Summ* 2015;64:1–14.
- [28] Holliday S, Morgan S, Tapley A, *et al.* The pattern of opioid management by Australian general practice trainees. *Pain Med* 2015;16:1720–31.
- [29] Bourgeois J, Elseviers MM, Bortel LV, Petrovic M, Vander Stichele RH. Sleep quality of benzodiazepine users in nursing homes: a comparative study with nonusers. *Sleep Med* 2013;14:614–21.
- [30] Charles J, Harrison C, Britt H. Insomnia. *Aust Fam Physician* 2009;38:283.
- [31] Harrison C, Charles J. Mental health. In: Britt H & Miller GC, eds. General practice in Australia, health priorities and policies 1998 to 2008. GEP 24. Canberra: Australian Institute of Health and Welfare, 2009:229–53.
- [32] Anderson K, Stowasser D, Freeman C, Scott I. Prescriber barriers and enablers to minimising potentially inappropriate medications in adults: a systematic review and thematic synthesis. *BMJ Open* 2014;4:e006544.
- [33] Block CK, Logue E, Thaler NS, *et al.* The interaction between medical burden and anticholinergic cognitive burden on neuropsychological function in a geriatric primary care sample. *Arch Clin Neuropsychol* 2015;30:105–13.
- [34] Black EB, Ranmuthugala G, Kondalsamy-Chennakesavan S, Toombs MR, Nicholson GC, Kisely S. A systematic review: identifying the prevalence rates of psychiatric disorder in Australia's indigenous populations. *Aust N Z J Psychiatry* 2015;49:412–29.
- [35] Bonevski B, Magin P, Horton G, Foster M, Girgis A. Response rates in GP surveys—trailing two recruitment strategies. *Aust Fam Physician* 2011;40:427–30.
- [36] Pokorny AMJ, Gittins CB. Dangerous liaisons: doctors-in-training and the pharmaceutical industry. *Intern Med J* 2015;45:1085–8.
- [37] Archer J, McManus C, Woolf K, *et al.* Without proper research funding, how can medical education be evidence based? *BMJ* 2015;350:h3445.
- [38] Curran H, Collins R, Fletcher S, Kee S, Woods B, Liffé S. Older adults and withdrawal from benzodiazepine hypnotics in general practice: effects on cognitive function, sleep, mood and quality of life. *Psychol Med* 2003;33:1223–37.
- [39] Whiting PF, Wolff RF, Deshpande S, *et al.* Cannabinoids for medical use: a systematic review and meta-analysis. *JAMA* 2015;313:2456–73.

## Supporting information

Additional Supporting Information may be found in the online version of this article at the publisher's web site.