Associations of anticipated prescribing of long-acting reversible contraception by general practice registrars

A cross-sectional study

Rachel Turner, Amanda Tapley, Elizabeth Holliday, Jean Ball, Sally Sweeney, Parker Magin

Background and objective
Long-acting reversible contraception (LARC) is highly effective, but uptake in Australia is low. The aim of this study was to establish general practice registrars' LARC training/insertion experience, as well as frequency of and factors associated with choosing LARC in response to clinical vignettes.

Methods
This was a cross-sectional questionnaire-based study of general practice registrars in NSW or ACT. The questionnaire elicited a contraceptive management response to three clinical vignettes. The outcome factor in each of three multivariate logistic regression analyses was: 'LARC chosen' or 'LARC not chosen'.

Results
Of 223 registrars, 18.5% had received intrauterine device (IUD) insertion training, and 9.4% had inserted IUD in general practice. For contraceptive implants, these figures were 64.3% for training and 50.3% for insertion. Significant multivariate associations (all odds ratios >2.5) of choosing LARC in at least one vignette included Australian medical graduate, female gender and confidence in knowledge regarding IUD/implant.

Discussion
Modest proportions of general practice registrars have training in, and in-practice experience of, LARC insertion. The most notable association with choice of LARC was confidence in knowledge regarding LARC.

LONG-ACTING REVERSIBLE CONTRACEPTION (LARC) is defined as a contraceptive method administered less frequently than monthly,[1] and includes the copper intrauterine device (IUD), levonorgestrel IUD, subdermal etonogestrel implant and medroxyprogesterone injection.[1,2] These are the most effective methods of contraception.[3] However, the uptake of these methods in Australia is low, with LARC users accounting for 12.5% of women using contraception.[4] Over 50% of women will have an unplanned pregnancy,[5] with 26% of pregnancies in Australia being unplanned.[6] One in four pregnancies in Australia were terminated in 2002,[7] although Australian termination rates appear to be declining – the figures decreased to 18% in South Australia in 2016.[8] Increasing the uptake of LARC is proposed to be an effective strategy to reduce unplanned pregnancy and termination,[9] and there is evidence that contraceptive counselling focusing on LARC is effective in reducing unintended pregnancy.[10]

Knowledge gaps and suboptimal training of healthcare providers are key barriers to increased LARC use.[11] If healthcare providers provide women with a comprehensive contraceptive consultation that includes discussion of LARC, there is a significant increase in LARC uptake.[12,13] General practitioner (GP) knowledge regarding the efficacy and appropriate use of LARC is limited.[14] Common misconceptions are that IUDs are unsuitable for young women, nulliparous women or those with previous ectopic pregnancy.[15] Additionally, insertion of contraceptive implants and IUDs requires additional training, involving expense, time and commitment to maintain skills.[9,11]

The training and behaviour of general practice registrars are important indicators of future primary care provision. These authors' previous work[16] showed that the majority of general practice registrars' prescriptions for contraception are for the oral contraceptive pill (OCP) and suggested that general practice registrars find prescription of LARC challenging when compared with prescription of non-LARC methods.

The aim of this study was to establish what training and experience general practice registrars have received in relation to LARC, and to explore their 'theoretical' decision making in response to a series of clinical vignettes.

Methods

Study design

This was an anonymous cross-sectional questionnaire-based online study.

Questionnaire

The questionnaire contained three clinical vignettes (Table 1), designed to elicit registrars' anticipated contraception prescribing practice. In each vignette the first-line contraception choice (given the clinical and contextual information provided, and current evidence-based

guideline recommendations) was LARC. Vignettes entailed aspects of common LARC misconceptions: LARC use, particularly IUD, in young nulliparous women (vignette 1); and IUD use in women with a history of ectopic pregnancy (vignette 2). For each vignette, participating registrars were advised the patient had no preconceived preference and was willing to proceed with any contraception method recommended, and that either the registrar or someone else in the practice was able to insert.

The questionnaire also elicited training and experience in insertion of IUDs and implants.

Study setting

Participants were registrars training with a single regional training organisation (RTO) that is responsible for general practice training across New South Wales (NSW) and the Australian Capital Territory (ACT), which accounts for training of 32% of Australian general practice registrars.[17] RTOs are government-funded, not-for profit, geographically defined GP vocational training organisations.

Data-collection methods

Registrars were invited to participate via email. They were invited to complete the questionnaire via a link to SurveyMonkey. The initial invitation was followed up by a repeat invitation three weeks later. The questionnaire did not allow registrars to skip questions. Consent was implicit in participants' completion of the anonymous questionnaire.

Eligibility criteria

Inclusion criteria

Inclusion criteria were NSW or ACT general practice registrars currently in a general practice–based term.

Variables

Outcome variable

The outcome factors were the responses to each of the three vignette items as 'LARC chosen' (defined as selecting either 'IUD', 'implant' or 'injection') or 'LARC not chosen' (defined as selecting either 'condoms', 'progesterone-only pill' [POP] or 'combined oral contraceptive pill' [COCP]).

Clinical vignettes are valid methods that directly focus on clinicians' process of care in actual clinical practice.[18] They have been used in previous studies of Australian general practice registrars.[19,20]

Table 1. Clinical vignettes*

Vignette 1	*Sarah, 18, attends to discuss contraceptive options. She is in a relationship with her 18-year-old boyfriend. Last year she fell pregnant and had a termination. She does not want to have children until she has finished her current university degree. Sarah has no other medical problems, is on no regular medication and does not smoke. She has no family history of note. On examination, her BMI is 20, blood pressure is 120/80.*
Vignette 2	*Maddy, 38 years old attends to discuss contraceptive options. She is married with 2 children. She is G3P2, having had a previous salpingectomy for ectopic pregnancy prior to her first child. She has no medical problems. She reports heavy periods which she dislikes, which have been recently investigated with no pathology found. She is up to date with routine cervical screening and a recent STI screen was negative. She has no family history of note. She is on no regular medications. She is a non-smoker. On examination her BMI is 23 and blood pressure is 119/72.*
Vignette 3	*Nigella, 45, divorced from her husband of 20 years last year and has recently started a new relationship. She attends to discuss contraception. She has regular periods every 28 days, and bleeds for 5 days with normal flow. She recently had a normal cervical screening test and STI testing for chlamydia and gonorrhoea which were negative. She has a past medical history of hypothyroidism for which she takes thyroxine 150mcg once daily. She is a non-smoker. On examination, her BMI is 24, and her blood pressure is 129/79.*

**These vignettes appear as they were used in the study and have not been edited.*
BMI, body mass index; STI, sexually transmissible infection

Independent variables

Registrar demographics included gender, age, current general practice term, part-time or full-time training, country of primary medical qualification (Australia or international) and number of full-time equivalent (FTE) GPs in the registrar's current practice.

Variables related to reproductive health experience were work experience (having previously worked in family planning or sexual health, or having completed a hospital rotation in obstetrics and gynaecology), postgraduate qualification (either completing the Diploma of Royal Australian and New Zealand College of Obstetrics and Gynaecology [DRANZCOG] or the Family Planning Alliance Australia National Certificate in Reproductive and Sexual Health [FPAANCRSH], or overseas equivalents).

Variables related to LARC training and experience were completion of IUD or implant insertion training, IUD or implant insertion experience in general practice, and disagreement with the questionnaire item 'I do not feel that I know enough about these methods to discuss with my patients'.

Statistical methods

For each clinical vignette, the proportion of registrars choosing LARC was calculated with 95% confidence intervals (CIs). Descriptive statistics for independent variables included frequencies for categorical variables and mean with standard deviation[21] for continuous variables. Frequencies of categorical variables were compared between outcome categories ('LARC chosen' or 'LARC not chosen') using Chi-squared tests for all variables, except when Fisher's exact test was appropriate. For continuous variables, means were compared using a t-test.

Univariate and multivariate logistic regressions with outcome factor 'LARC chosen' or 'LARC not chosen' were used to establish factors associated with choosing LARC for each vignette.

Univariate logistic regression analyses were conducted for each covariate. Covariates with a univariate *P* value <0.20 were considered for inclusion in the multiple regression model.

Once the model with all significant covariates was fitted, model reduction was assessed. Covariates that were no longer significant (at *P* <0.2) in the multivariate model were tested for removal from the model. If the covariate's removal did not substantively change the resulting model, the covariate was removed from the final model. A substantive change to the model was defined as any covariate in the model having a change in the effect size (odds ratio) of greater than 10%.

The regressions modelled the log-odds that the correct response was given for each clinical vignette.

Analyses were programmed using STATA 14.0 and SAS V9.4.

Ethical approval

Ethical approval for this study was obtained from the University of Newcastle Human Research Ethics Committee (H-2018-0184).

Results

A total of 223 registrars completed the questionnaire (response rate 25%). Participating registrars' characteristics are presented in Table 2. Regarding previous experience, 118 (53%) registrars had completed a hospital rotation in obstetrics and gynaecology, and 14 (6.3%) had ever worked in family planning or sexual health. Thirty-eight (17%) had completed the FPAANCRSH (or equivalent), and 16 (7.2%) had completed the DRANZCOG. Thirty-eight (19%) registrars had received training in IUD insertion. Eighteen registrars (9.4%) had ever inserted an IUD in general practice. A total of 128 (64%) had received training in insertion of the contraceptive implant. Ninety-six (50%) had ever inserted the implant in general practice.

Univariate associations of choosing LARC versus non-LARC methods for each vignette are presented in Table 3. The multivariate logistic regression results for selecting LARC versus non-LARC for each vignette are presented in Table 4.

Table 2. Participating registrar demographics (n = 223)

Variable		Mean (SD)
Registrar age (years)		34.6 (7.5)
	Class	**Total n (%)**
Registrar gender	Female	150 (67.3)
Qualified as doctor in Australia	Yes	161 (72.2)
Registrar full or part time	Part time	57 (25.6)
	Full time	166 (74.4)
Term	Term 1	74 (33.2)
	Term 2	66 (29.6)
	Term 3	83 (37.2)
Practice size	Small (1–5 GPs)	132 (59.2)
	Large (>5 GPs)	91 (40.8)
Postgraduate qualifications in reproductive health	Yes	50 (22.4)

GPs, general practitioners; SD, standard deviation

For vignette 1 (a nulliparous young patient; Table 1), 141 (69.5%; 95% CI: 62.7, 75.5) registrars chose LARC as the best option, 127 (62.5%) selected a contraceptive implant and 14 (6.9%) selected an IUD. No registrars selected the injection. For non-LARC methods, 57 (28.1%) chose the COCP, five (2.5%) chose barrier methods and no registrars selected the POP. Choice of a LARC was significantly associated with Australian primary medical degree (OR: 3.4; 95% CI: 1.62, 7.15) and disagreement with the statement that they did not know enough about LARC to discuss with patients (OR: 2.87; 95% CI 1.21, 6.84).

For vignette 2 (a woman with a history of ectopic pregnancy; Table 1), 161 (79.3%; 95% CI: 73.1, 84.4) registrars chose a LARC method, with 142 (70%) selecting an IUD, 18 (8.9%) selecting a contraceptive implant and one (0.5%) selecting the injection. For non-LARC methods, 41 (20.2%) registrars chose the COCP, one (0.5%) chose condoms and no registrars selected the POP. The choice of a LARC method was significantly associated with the registrar being female (OR: 2.99; 95% CI: 1.44, 6.22).

For vignette 3 (no recognised obstacles to LARC use), 162 (79.8%; 95% CI: 73.7, 84.8) registrars chose a LARC method, with 126 (62.1%) selecting an IUD, 31 (15.3%) selecting a contraceptive implant and five (2.5%) selecting the injection. For non-LARC methods, 19 (9.4%) registrars selected the COCP, six (3.0%) selected the POP and 16 (7.8%) selected condoms. The choice of a LARC method was significantly associated with disagreement with the statement that they did not know enough about LARC to discuss with patients (OR: 2.99; 95% CI: 1.25, 7.15).

Discussion

For all clinical vignettes, most registrars recognised a LARC modality as the first-line option. In practice, most prescriptions issued by general practice registrars are for non-LARC methods.[16] Comparing results of this 'theoretical' prescribing with actual prescribing from these authors' previous research will help understand how much the modest uptake of LARC prescribing is due to knowledge deficits as opposed to alternative barriers.

Table 3. Characteristics associated with vignettes

		Vignette 1			Vignette 2			Vignette 3		
Variable	**Class**	**LARC not chosen**	**LARC chosen**	***P* value**	**LARC not chosen**	**LARC chosen**	***P* value**	**LARC not chosen**	**LARC chosen**	***P* value**
Registrar gender	Male	26 (42%)	38 (27%)	0.034	24 (57%)	40 (25%)	<0.001	24 (57%)	40 (25%)	<0.001
	Female	36 (58%)	103 (73%)		18 (43%)	121 (75%)		18 (43%)	121 (75%)	
Registrar term	Term 1	25 (40%)	40 (28%)	0.072	15 (36%)	50 (31%)	0.14	15 (36%)	50 (31%)	0.14
	Term 2	20 (32%)	39 (28%)		16 (38%)	43 (27%)		16 (38%)	43 (27%)	
	Term 3	17 (27%)	62 (44%)		11 (26%)	68 (42%)		11 (26%)	68 (42%)	
Registrar FTE status	Full time	53 (85%)	97 (69%)	0.013	38 (90%)	112 (70%)	0.006	38 (90%)	112 (70%)	0.006
	Part time	9 (15%)	44 (31%)		4 (10%)	49 (30%)		4 (10%)	49 (30%)	
Australian qualifications	No	27 (44%)	27 (19%)	<0.001	15 (36%)	39 (24%)	0.13	15 (36%)	39 (24%)	0.13
	Yes	35 (56%)	114 (81%)		27 (64%)	122 (76%)		27 (64%)	122 (76%)	
Number of GPs in practice	1–5 GPs	34 (55%)	83 (59%)	0.59	20 (48%)	97 (60%)	0.14	20 (48%)	97 (60%)	0.14
	>5 GPs	28 (45%)	58 (41%)		22 (52%)	64 (40%)		22 (52%)	64 (40%)	
Work experience	No	27 (44%)	68 (48%)	0.54	22 (52%)	73 (45%)	0.42	22 (52%)	73 (45%)	0.42
	Yes	35 (56%)	73 (52%)		20 (48%)	88 (55%)		20 (48%)	88 (55%)	
Postgraduate qualifications	No	54 (87%)	104 (74%)	0.035	39 (93%)	119 (74%)	0.009	39 (93%)	119 (74%)	0.009
	Yes	8 (13%)	37 (26%)		3 (7%)	42 (26%)		3 (7%)	42 (26%)	
Training/ experience with IUD, implants	No training, not inserted either	25 (44%)	43 (32%)	0.061	15 (43%)	53 (34%)	0.35	15 (43%)	53 (34%)	0.35
	Training in at least one, not inserted either	12 (21%)	19 (14%)		7 (20%)	24 (15%)		7 (20%)	24 (15%)	
	Training in at least one, inserted at least one	20 (35%)	72 (54%)		13 (37%)	79 (51%)		13 (37%)	79 (51%)	
Perceived knowledge of IUD, implants	No	24 (39%)	19 (13%)	<0.001	14 (33%)	29 (18%)	0.031	14 (33%)	29 (18%)	0.030
	Yes	38 (61%)	122 (87%)		28 (67%)	132 (82%)		28 (67%)	132 (82%)	
Registrar age	Mean (22)	35 (8)	34 (7)	0.58	35 (9)	34 (7)	0.60	35 (9)	34 (7)	0.60

FTE, full-time equivalent; GPs, general practitioners; IUD, intrauterine device; LARC, long-acting reversible contraception; SD, standard deviation

The findings emphasise the discrepancy between knowledge and real-world practice, and suggest barriers to LARC use beyond lack of knowledge. However, the findings suggest that, like established GPs,[11] general practice registrars do not recommend IUDs to nulliparous women. For an older, parous woman, most registrars chose the IUD. This suggests that registrars are aware of the efficacy of LARC methods but may lack training in the specifics of eligibility.

GPs require specific training in the insertion of the contraceptive implant and IUD, and completion of this is inadequate.[11,22] A solution could be the introduction of LARC insertion training at the general practice registrar level. Many registrars in the participating RTO received training in insertion of the contraceptive implant as part of their mandatory training. This was not the case for IUD insertion training. The present results reflect this and suggest that the majority of those who have received training in implant insertion also insert in practice. This supports the suggestion that provision of IUD insertion training within registrars' educational programs would lead to increased IUD insertion

Table 4. Multivariate associations with vignettes

		Vignette 1				Vignette 2				Vignette 3			
		Univariate		Adjusted		Univariate		Adjusted		Univariate		Adjusted	
Variable	**Class**	**OR (95% CI)**	***P* value**	**OR (95% CI)**	***P* value**	**OR (95% CI)**	***P* value**	**OR (95% CI)**	***P* value**	**OR (95% CI)**	***P* value**	**OR (95% CI)**	***P* value**
Registrar FTE status	Part time	2.67 (1.21, 5.89)	0.015	1.67 (0.69, 4.03)	0.25	4.16 (1.41, 12.3)	0.010	2.44 (0.81, 7.40)	0.11	–	–	–	–
Australian qualifications	Yes	3.26 (1.69, 6.27)	0.004	3.40 (1.62, 7.15)	0.001	–	–	–	–	–	–	–	–
Postgraduate qualifications	Yes	2.40 (1.05, 5.52)	0.039	1.54 (0.58, 4.09)	0.39	4.59 (1.35, 15.6)	0.015	2.46 (0.74, 8.22)	0.14	4.43 (1.30, 15.1)	0.017	2.45 (0.71, 8.41)	0.16
Training/ experience with IUD, implants	Training in at least one, inserted at least one	2.09 (1.04, 4.21)	0.038	1.64 (0.73, 3.66)	0.23	–	–	–	–	3.66 (1.59, 8.44)	0.002	1.85 (0.70, 4.83)	0.21
Referent: No training, not inserted either	Training in at least one, not inserted either	0.92 (0.38, 2.21)	0.853	0.87 (0.34, 2.21)	0.76	–	–	–	–	1.53 (0.57, 4.11)	0.40	1.29 (0.46, 3.59)	0.63
Perceived knowledge of IUD, implants	Yes	4.06 (2.01, 8.19)	<0.001	2.87 (1.21, 6.84)	0.017	–	–	–	–	3.71 (1.75, 7.84)	0.001	2.99 (1.25, 7.15)	0.013
Registrar gender	Female	–	–	–	–	4.03 (1.99, 8.19)	0.001	2.99 (1.44, 6.22)	0.003	–	–	–	–
Registrar term	Term 2	–	–	–	–	0.81 (0.36, 1.82)	0.60	0.55 (0.23, 1.33)	0.19	1.46 (0.65, 3.30)	0.36	1.04 (0.42, 2.60)	0.93
Referent: Term 1	Term 3	–	–	–	–	1.85 (0.79, 4.38)	0.16	1.45 (0.59, 3.51)	0.42	3.21 (1.34, 7.71)	0.009	1.71 (0.63, 4.60)	0.29

–, not applicable; CI, confidence interval; FTE, full-time equivalent; IUD, intrauterine device; OR, odds ratio

in practice. A recent Australian trial has found that a combination of GP training on contraceptive effectiveness counselling and rapid access to LARC insertion clinics resulted in greater patient uptake of LARC.[13] Thus, registrars' insertion training should be supplemented with contraceptive counselling training in RTO education and training programs.

Factors associated with choosing LARC have implications for registrar training in contraception. As a quarter of all general practice registrars obtained their medical qualification outside of Australia,[17] it is important that general practice registrar training addresses gaps in knowledge of LARC. This is particularly relevant, as previous research[16] has shown that general practice registrars' LARC prescribing is associated with rural, compared with major cities, practice location. Since the majority[17] of international medical graduate doctors work in regional and remote regions as a result of Medicare Section 19AB restrictions, they ideally should be prepared to provide LARC in rural regions where rates of unintended pregnancy are highest.[23]

The present findings also suggested that those who feel confident in their knowledge of LARC are more likely to choose LARC. This may have significant educational implications in that self-reflection of learning needs may be a valuable tool in identifying registrars that require additional training. The finding that female registrars are more likely to choose LARC in a scenario involving previous history of ectopic pregnancy suggests there may be differences in adequate reproductive health exposure between male and female trainees. This

reflects previous findings of gender differences in the performing of women's reproductive health–related procedures.[24]

Strengths and limitations

The strength of this research is generalisability to Australian general practice vocational training.

A limitation is the relatively modest response rate of 25%. Although typical for a GP questionnaire study,[25] this may still have introduced volunteer bias, with registrars interested in contraception more likely to respond. If so, the data may overestimate the level of training and experience of registrars in relation to LARC, and overestimate the prevalence of LARC choice in response to the vignettes. A further limitation is that the clinical vignettes did not include patient preference and assumed that any method was available in the practice. In clinical practice, patients may prefer non-LARC contraceptive methods, even after appropriate counselling.[26,27] However, this design has allowed us to postulate that registrar knowledge alone is not the key barrier to LARC prescribing, and that the lower prescribing rates seen in these authors' previous research[16] reflect other factors such as patient factors, training in insertion, time and cost.

A further limitation of the cross-sectional study design is the establishment of association but not causality in relationships of independent variables with the outcomes.

Conclusion

The present findings suggest general practice registrars are aware that LARC is an appropriate first-line option and, taken together with these authors' previous work, establish a seeming discrepancy between knowledge and practice. The findings further suggest implications for general practice vocational training in the need for LARC training in RTO programs, with particular consideration of training in IUD insertion, and in training of male registrars and international medical graduate registrars.

Authors

Rachel Turner MBBS, BSc (Hons), DFSRH, DCH, Academic GP Registrar, Discipline of General Practice, School of Medicine and Public Health, University of Newcastle, Newcastle, NSW; Medical Educator, GP Synergy Research and Evaluation Unit, Mayfield West, NSW

Amanda Tapley BBiomed (Hons), MMedStat, Statistician and Senior Research Officer, GP Synergy Research and Evaluation Unit, Mayfield West, NSW; Conjoint Fellow, School of Medicine and Public Health, University of Newcastle, Newcastle, NSW

Elizabeth Holliday BSc (Hons), PhD, MSc (Stats), Associate Professor of Biostatistics, School of Medicine and Public Health, University of Newcastle, Newcastle, NSW

Jean Ball BMath, GradDipMedStats, Statistician, Clinical Research Design, Information Technology and Statistical Support (CReDITSS) unit, Hunter Medical Research Institute, Newcastle, NSW

Sally Sweeney MBBS, BSc (Med), FRACGP, General Practitioner, Elermore Vale Medical Centre, Elermore Vale, NSW; Conjoint Senior Lecturer, School of Medicine and Public Health, University of Newcastle, Newcastle, NSW

Parker Magin PhD, FRACGP, Director, GP Synergy Research and Evaluation Unit, Mayfield West, NSW; Conjoint Professor, School of Medicine and Public Health, University of Newcastle, Newcastle, NSW

Competing interests: None.

Funding: This project is supported by The Royal Australian College of General Practitioners with funding from the Australian Government under the Australian General Practice Training program. The funders had and will have no role in study design, collection, management, analysis and interpretation of data; writing of the report; and the decision to submit the report for publication.

Provenance and peer review: Not commissioned, externally peer reviewed.

Correspondence to:
rachel.h.turner@newcastle.edu.au

Acknowledgements

The authors would like to acknowledge the general practice registrars, general practitioner supervisors and practices who have participated in the Registrar Clinical Encounters in Training (ReCEnT) project.

References

1. National Collaborating Centre for Women's and Children's Health. Long-acting reversible contraception: The effective and appropriate use of long-acting reversible contraception. London, UK: RCOG Press, 2005.
2. Mazza D, Harrison C, Taft A, et al. Current contraceptive management in Australian general practice: An analysis of BEACH data. Med J Aust 2012;197(2):110–14. doi: 10.5694/mja11.11599.
3. Winner B, Peipert JF, Zhao Q, et al. Effectiveness of long-acting reversible contraception. N Engl J Med 2012 May 24;366(21):1998–2007. doi: 10.1056/NEJMoa1110855.
4. Richters J, Fitzadam S, Yeung A, et al. Contraceptive practices among women: The second Australian study of health and relationships. Contraception 2016;94(5):548–55. doi: 10.1016/j.contraception.2016.06.016.
5. Marie Stopes International. Real choices: Women, contraception and unplanned pregnancy. Melbourne, Vic: Marie Stopes International, 2008. Available at www.mariestopes.org.au/wp-content/uploads/Real-Choices-Key-Findings.pdf [Accessed 24 August 2020].
6. Taft AJ, Shankar M, Black KI, Mazza D, Hussainy S, Lucke JC. Unintended and unwanted pregnancy in Australia: A cross-sectional, national random telephone survey of prevalence and outcomes. Med J Aust 2018;209(9):407–08. doi: 10.5694/mja17.01094.
7. Chan A, Sage LC. Estimating Australia's abortion rates 1985–2003. Med J Aust 2005;182(9):447–52. doi: 10.5694/j.1326-5377.2005.tb06783.x.
8. SA Health Pregnancy Outcome Unit. Pregnancy Outcome in South Australia 2016. Adelaide, SA: SA Health, 2018.
9. Mazza D, Bateson D, Frearson M, Goldstone P, Kovacs G, Baber R. Current barriers and potential strategies to increase the use of long-acting reversible contraception (LARC) to reduce the rate of unintended pregnancies in Australia: An expert roundtable discussion. Aust N Z J Obstet Gynaecol 2017;57(2):206–12. doi: 10.1111/ajo.12587.
10. Madden T, Paul R, Maddipati R, Buckel C, Goodman M, Peipert JF. Comparison of unintended pregnancy at 12 months between two contraceptive care programs: A controlled time-trend design. Contraception 2019;100(3):196–201. doi: 10.1016/j.contraception.2019.05.009.
11. Hoggart L, Walker S, Newton VL, Parker M. Provider-based barriers to provision of intrauterine contraception in general practice. BMJ Sex Reprod Health 2018;44(2):82–89. doi: 10.1136/bmjsrh-2017-101805.
12. McNicholas C, Madden T, Secura G, Peipert JF. The contraceptive CHOICE project round up: What we did and what we learned. Clin Obstet Gynecol 2014;57(4):635–43. doi: 10.1097/GRF.0000000000000070.
13. Mazza D, Watson CJ, Taft A, et al. Increasing long-acting reversible contraceptives: The Australian Contraceptive ChOice pRoject (ACCORd) cluster randomized trial. Am J Obstet Gynecol 2020;222 Suppl 4:S921.e1–13. doi: 10.1016/j.ajog.2019.11.1267.
14. Eisenberg DL, Secura GM, Madden TE, Allsworth JE, Zhao Q, Peipert JF. Knowledge of contraceptive effectiveness. Am J Obstet Gynecol 2012;206(6):479.e1–9. doi: 10.1016/j.ajog.2012.04.012.
15. Middleton AJ, Naish J, Singer N. General practitioners' views on the use of the levonorgestrel-releasing intrauterine system in young, nulligravid women, in London, UK. Eur J Contracept Reprod Health Care 2011;16(4):311–18. doi: 10.3109/13625187.2011.580864.
16. Turner R, Tapley A, Sweeney S, et al. Prevalence and associations of prescribing of long-acting reversible contraception by general practitioner registrars: A secondary analysis of ReCEnT data. BMJ Sex Reprod Health 2020;46(3):218–25. doi: 10.1136/bmjsrh-2019-200309.
17. Taylor R, Clarke L, Edwards D. Australian General Practice Training Program national report on the 2018 National Registrar Survey. Camberwell, Vic: Australian Council for Educational Research, 2018. Available at research.acer.edu.au/higher_education/66 [Accessed 24 August 2020].
18. Peabody JW, Luck J, Glassman P, Dresselhaus TR, Lee M. Comparison of vignettes, standardized patients, and chart abstraction: A prospective validation study of 3 methods for measuring quality. JAMA 2000;283(13):1715–22. doi: 10.1001/jama.283.13.1715.
19. Holliday S, Hayes C, Dunlop A, et al. Protecting pain patients. The evaluation of a chronic pain educational intervention. Pain Med 2017;18(12):2306–15. doi: 10.1093/pm/pnx018.
20. Magin PJ, Morgan S, Tapley A, et al. Reducing general practice trainees' antibiotic prescribing for respiratory tract infections:

An evaluation of a combined face-to-face workshop and online educational intervention. Educ Prim Care 2016;27(2):98–105. doi: 10.1080/14739879.2015.1106085.

21. Björnsdóttir I, Kristinsson KG, Hansen EH. Diagnosing infections: A qualitative view on prescription decisions in general practice over time. Pharm World Sci 2010;32(6):805–14. doi: 10.1007/s11096-010-9441-6.
22. Black KI, Bateson D, Harvey C. Australian women need increased access to long-acting reversible contraception. Med J Aust 2013;199(5):317–18. doi: 10.5694/mja12.11832.
23. Rowe H, Holton S, Kirkman M, et al. Prevalence and distribution of unintended pregnancy: The Understanding Fertility Management in Australia National Survey. Aust N Z J Public Health 2016;40(2):104–09. doi: 10.1111/1753-6405.12461.
24. Aghajafari F, Tapley A, van Driel ML, et al. Gender differences in Australian general practice trainees performing procedures related to women's reproductive health: A cross-sectional analysis. Aust J Gen Pract 2018;47(10):721–26. doi: 10.31128/AJGP-03-18-4527.
25. Bonevski B, Magin P, Horton G, Foster M, Girgis A. Response rates in GP surveys – Trialling two recruitment strategies. Aust Fam Physician 2011;40(6):427–30.
26. Paul R, Huysman BC, Maddipati R, Madden T. Familiarity and acceptability of long-acting reversible contraception and contraceptive choice. Am J Obstet Gynecol 2020;222 Suppl 4:S884.e1–e9. doi: 10.1016/j.ajog.2019.11.1266.
27. Claringbold L, Sanci L, Temple-Smith M. Factors influencing young women's contraceptive choices. Aust J Gen Pract 2019;48(6):389–94. doi: 10.31128/AJGP-09-18-4710.

correspondence **ajgp@racgp.org.au**