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The value of extended short-term medical training placements in smaller rural and remote locations on future work location: a cohort study

Matthew R McGrail,[1] Bushra F Nasir ,[2,3] Alan Bruce Chater,[3] Bahram Sangelaji,[3] Srinivas Kondalsamy-Chennakesavan[2]

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[1]Rural Clinical School, Faculty of Medicine, The University of Queensland, Rockhampton, Queensland, Australia
[2]Rural Clinical School, The University of Queensland Faculty of Medicine, Toowoomba, Queensland, Australia
[3]Mayne Academy of Rural and Remote Medicine, The University of Queensland Faculty of Medicine, Theodore, Queensland, Australia

Correspondence to
Alan Bruce Chater;
a.chater@uq.edu.au

ABSTRACT

Objectives To investigate the effects of extended short-term medical training placements in small rural and remote communities on postgraduate work location.

Design and setting Cohort study of medical graduates of The University of Queensland, Australia.

Participants Graduating medical students from 2012 to 2021 who undertook a minimum of 6 weeks training in a small rural or remote location. Some participants additionally undertook either or both an extended short-term (12-week) placement in a small rural or remote location and a long-term (1 or 2 years) placement in a large regional centre.

Primary outcome measure Work location was collected from the Australian Health Practitioner Regulation Agency in 2022, classified as either rural, regional or metropolitan and measured in association with rural placement type(s).

Results From 2806 eligible graduates, those participating in extended small rural placements (n=106, 3.8%) were associated with practising rurally or regionally postgraduation (42.5% vs 19.9%; OR: 2.2, 95% CI: 1.1 to 4.6), for both those of rural origin (50% vs 30%; OR: 4.9, 95% CI: 2.6 to 9.2) or metropolitan origin (36% vs 17%; OR: 2.8, 95% CI: 1.7 to 4.8). Those undertaking both an extended small rural placement and 2 years regional training were most likely to be practising in a rural or regional location (61% vs 16%; OR: 8.6, 95% CI: 4.5 to 16.3). Extended small rural placements were associated with practising in smaller rural or remote locations in later years (15% vs 6%, OR: 2.7, 95% CI: 1.3 to 5.3).

Conclusion This work location outcome evidence supports investment in rural medical training that is both located in smaller rural and remote settings and enables extended exposure with rural generalists. The evaluated 12-week programme positively related to rural workforce outcomes when applied alone. Outcomes greatly strengthened when the 12-week programme was combined with a 2-year regional centre training programme, compared with either alone. These effects were independent of rural origin.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ The cohort study utilised linked administrative data sets to evaluate all participants of an extended short-term small rural training programme.
⇒ The primary outcome measure evaluated was postgraduate workforce location and the impact of extended shorter-term training in small rural or remote communities.
⇒ Graduates could also complete long-term training in large regional centres, enabling unique evidence of the value of different training type combinations.
⇒ Apart from rural origin, this study's design was not able to adjust for other measures of pre-existing rural interest likely to be present among participants of the 1–2-year regional or extended short-term small rural training.
⇒ Work location outcomes were cross-sectional and observed up to 10 years postgraduation, thus measuring actual workforce outcomes rather than just intent, but still may not reflect graduate's longer-term outcomes.

INTRODUCTION

The maldistribution of the medical workforce globally across regional and remote locations remains a significant concern that impacts the health and well-being needs of underserviced populations.[1] These workforce issues are most acutely experienced by smaller rural and remote communities, where recruitment and retention are generally poorer.[1] Training medical students within regional and rural environments has been a key and expanding intervention over the last 25 years that has been shown to be significantly associated with an increased likelihood of pursuing a rural medical career.[2–5] Rural medical training programmes provide students with an immersive understanding of the local rural community context, giving them hands-on clinical experience and providing improved targeted knowledge and skills relevant to a rural environment.[2 6 7] Enabling sufficient opportunities to experience rural medicine and clinical practice during a doctor's period of training is fundamental to providing them with both

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the best rural training experience and also increasing their likelihood of pursuing a rural medical career, particularly for experiences in community settings and/or in more rural locations.[5 8 9]

The availability of programmes that provide medical students the best opportunities to appreciate, absorb and adapt clinical practice within a rural environment is thus fundamental for an optimal rural clinical learning experience. You cannot be what you cannot see. Globally, studies have shown that longer-term rural placements (most commonly 1 or 2 years) increase the chances of them practising rurally.[9–11] Other evidence suggests that setting matters too, with models like longitudinal integrated clerkships (LICs) increasingly common in rural training, providing interwoven and continuous learning experiences often across a variety of clinical settings and contexts.[12 13] Contributing influencing factors include students' openness to pursue a rural medical career particularly because of their personality,[14] willingness to support underserviced communities,[6] having a pre-existing interest in rural medicine[15] or having a rural background.[11] The attraction of rural training is further evident from one Canadian study, which found that almost half of rural doctors wished they previously had more training within rural-focused programmes.[16] As a method of training, rural immersion provides students the opportunity to learn under the supervision of local doctors, observing and shadowing them in their daily and weekly routine, preferably across a range of both hospital-based and primary care services, as well as residing within the regional or rural community itself. These rural medical training experiences provide an understanding of rural communities, their people and clinical practice.[2] Few studies have considered whether the size and isolation of training sites is important[6 11] and what duration is required to have a meaningful effect in smaller and remoter communities where the workforce deficiencies are most acute.[3 17]

From around 1993, most Australian medical schools have supported national initiatives that aim to fulfil the healthcare needs of rural populations by preparing a rural health workforce that is trained within and for local rural communities. Beginning with the Rural Undergraduate Support and Coordination (RUSC) programme and expanding through Rural Clinical Schools (RCSs) from 2000, university commitments have included all students completing at least 4 weeks training in a rural community, 25% completing at least 12 months clinical training rurally in a locally coordinated site and around 25% of selected students being of rural origin.[18 19] In 2016, the programme became the Rural Health Multidisciplinary Training (RHMT), through which 21 universities operate 19 RCSs to support rural training for medical students.[20] One key change with RHMT was a reduction of the minimum 4 weeks rural training from 100% to 50% of the medical student cohort.[18]

The University of Queensland's (UQ) programme has maintained at least 6 weeks rural training for all domestic students throughout. The placement is the Rural and Remote Medicine (RRM) term, a compulsory short-term clinical placement programme as part of the Year 3 Comprehensive Clinical Practice semester of the 4-year Doctor of Medicine programme (>98% annual participation). Year 3 is normally the first time students are provided an opportunity to undertake a clinical placement. The RRM term is evenly spread across the year and consists of a 6–8-week term placement (plus 1 rural-based preparation week) in a smaller rural or remote community that is mostly serviced by rural generalists with learning in a hospital or general practice, or a combination of both. Connected to UQ's RRM term is an optional (elective) longer placement experience known as the Extended Placement Programme (EPP) which affords students the opportunity to spend an additional 6–8 weeks at the same small rural or remote site. This provides further experience of continuity of practice in a rural community, thus enhancing patient and learner-centeredness. Students are required to apply for a position in the EPP and are selected based on their interests in rural practice. The EPP provides an integrated learning opportunity to complete their RRM and general practice terms concurrently, with extended clinical exposure, utilising a rural generalist training approach.[21 22] In addition, the EPP provides students with enough time to become embedded within the local community, thereby enhancing their rural experience, both professionally and non-professionally. These placements are promoted in concert with UQ student's rural health club (TROHPIQ). In addition to these shorter-term small rural placements, UQ provides 1 or 2 years of longer-term training (in year 3 and/or year 4 of the MD programme) to about 25%–30% of domestic medical students in one of four large regional centres, characterised with having significant specialist services.

Determining the benefit of these additional (henceforth 'extended') 6–8-week terms in smaller rural and remote locations, in comparison to the existing dominant immersions of 1 or 2 year programmes in regional centres, is imperative to identify methods of optimal rural medical training programmes to address the pressing workforce development needs, particularly in smaller rural communities. Identified predictors that influence students' decision to pursue rural practice include having a rural background or having a partner with rural background,[11] gender[23] and a preference for general practice.[23 24] This study aims to explore the value of UQ's EPP (total 12–16 weeks in small rural communities), in comparison to their standard 6–8-week RRM programme and 1 or 2 years of longer-term training in large regional centres. It also investigates contributing factors that influence a student's pursuit of a rural medical career.

METHODS

Study design

We conducted a cohort study of UQ's graduating medical students, analysing their practice location data

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available from the Australian Health Practitioner Regulation Agency (AHPRA).[25] The main outcome analysed was their primary place of clinical practice. The Modified Monash Model (MMM)[26] classification was used to categorise each location into metropolitan (MMM-1) or rural and regional (MMM 2–7), as well as individually large regional (MMM-2 only) and smaller rural (MMM 3–7). For context, MMM-2 locations have a population of greater than 50 000 but not otherwise considered 'metropolitan' and MMM 3–5 locations have a population size under 50 000, 15 000 and 5000, respectively. MMM 6–7 locations ('remote' areas) are predominantly identified by their geographical isolation from metropolitan and other larger rural communities. Over 95% of EPPs were in MMM 4–7 locations.

Doctors in Queensland cannot usually establish in smaller rural locations in postgraduate year (PGY) 1–3 because they are doing internship and other preparatory skills training in non-GP specialist-led larger regional settings.[27] For testing the effect of the interventions into 'smaller rural' areas, graduates were separated into PGY 1–3 and PGY 4–10.

Patient and public involvement

This study focused on locational outcomes of graduating medical students; it did not involve patients or the general public in the design, conduct or reporting of this research.

Participants and placement type

Work location (AHPRA outcome) data were extracted in April 2022, for all medical students who graduated following participation in at least one of the rural placements and/or training options offered at an RCS and graduated between 2012 and 2021. Students whose only rural training participation was the 6-week RRM placement (available only to domestic-enrolled) were used as the control group, with the few graduates that had not undertaken an RRM placement excluded from this study. Key demographics of graduates were their gender and whether they were classified as rural origin, the latter defined at enrolment by the university against the RHMT's definition at that time.[28] The primary optional training experience of interest was whether students undertook an EPP. In addition, students could have undertaken 1–2 whole-years training in a regional centre (called 'regional training placement'), which was categorised as 0, 1 or 2 years regional training. Thus, for this study, there were six possible combinations of rural training across both EPP and regional training.

Data analysis and statistical methods

Descriptive analysis was used to report frequencies of placement and/or training participation rates, with group comparisons using a two-sided Fisher's exact test. Multiple logistic regression models were used to determine associations between graduate practice locations and rural or regional training experiences after adjusting for rural origin, gender and regional training. Stata SE V.15.1 for Windows was used for all analysis, with $p<0.05$ used to indicate significance for all comparisons.

RESULTS

Participant characteristics

From 2806 eligible students who participated in the RRM programme from 2011 and graduated by 2021, 106 students (3.8%) participated in the EPP and were observed working in Australia. Of these, 45 (42.5%) were practising in a regional, rural or remote location (MMM-2–7) and 61 in metropolitan (MMM-1) locations. An additional six EPP participants were excluded, with three identified as working overseas and the work status of three could not be determined.

Participation in rural or regional training placements

Table 1 compares students who participated in the EPP and those who did not, based on their gender, rural origin and attendance at a regional training placement (during year 3, when RRM and EPP occur). Participants of the EPP were significantly more likely to be regional training

Table 1 Extended Placement Programme participant characteristics

Group	Non-EPP	EPP	P value
Year 3 at a regional training placement			
Yes	711 (26.3%)	58 (54.7%)	<0.001
No	1989 (73.7%)	48 (45.3%)	
Gender			
Female	1066 (39.5%)	53 (50.5%)	0.026
Male	1633 (60.5%)	52 (49.5%)	
Rural origin			
Yes	617 (22.9%)	40 (38.5%)	0.001
No	2081 (77.1%)	64 (61.5%)	

EPP, Extended Placement Programme.

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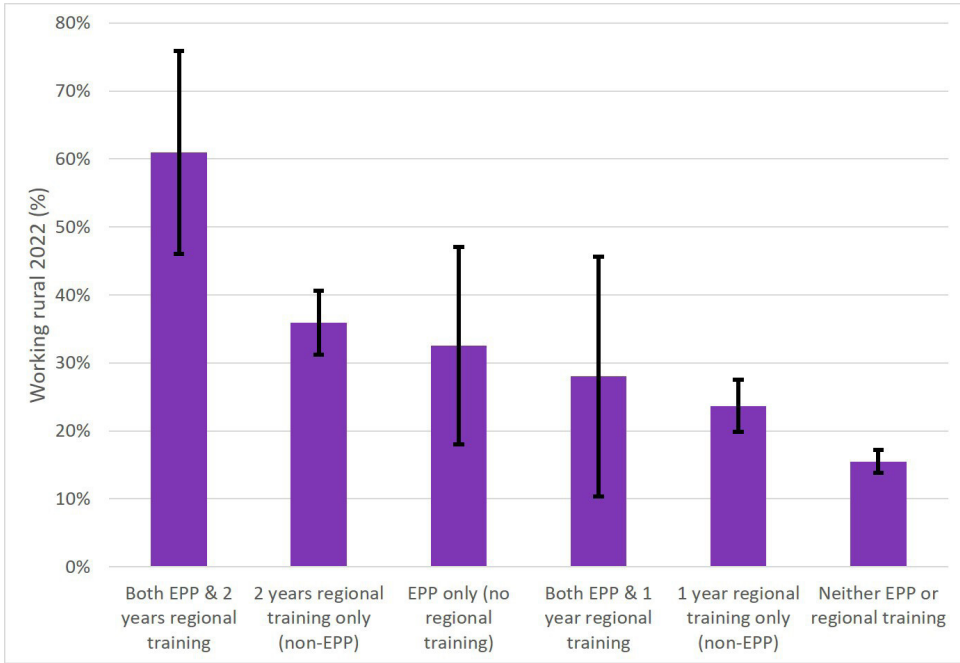

Figure 1 Extended Placement Programme participants (%) working rurally in 2022. EPP, Extended Placement Programme.

students during their placement, female and from a rural origin.

Influence of small rural placement programme duration on practising rural or regional after graduation

The combined effects of participation in EPP and regional training placements are illustrated in figure 1. Those who participated in both the EPP, and a 2-year regional training placement experienced the highest rates of later working in a rural or regional location (61.0%, 95% CI: 46.1% to 75.9%). Those who undertook an EPP only were more likely to practise in a rural or regional location (32.5%, 95% CI: 18.0% to 47.0%) in comparison to those who took a 1-year regional training placement combined with or without an EPP (ranging from 23.7% to 28.0%). This was slightly below the rate of working rural or regional among those who participated in a 2-year regional training placement (35.9%) without EPP. Those with only the control group (6–8-week RRM term and no regional training placement training) experience saw 15.5% practising in a rural or regional location.

When compared with only the baseline 6–8-week rural placement experience, the effect of participating in the EPP was significantly associated with practising in a rural or regional work location after graduation, both independently (OR: 2.2, 95% CI: 1.1 to 4.6) and combined with a 2-year regional training placement (OR: 8.6, 95% CI: 4.5 to 16.3), though significance was not reached when combined with a 1-year regional training placement (OR: 2.3, 95% CI: 0.9 to 5.5) (table 2). The EPP was also significantly associated with practising rurally or regionally, irrespective of students having a rural origin background (OR: 4.9, 95% CI: 2.6 to 9.2) or a metropolitan origin background (OR: 2.8, 95% CI: 1.7 to 4.8), with the latter being higher than the odds for rural origin participants without EPP (OR: 2.1, 95% CI: 1.7 to 2.5). EPP was also associated with an increased odds of practising in a rural or regional location for both genders, though only females remained significant in the multivariable model.

The EPP's association with future place of practice in metropolitan (MMM1), regional (MMM2) or smaller rural areas (MMM 3–7)

The distribution of practising medical graduates based on rurality is described for those who undertook an EPP during their degree and those who did not in figure 2. In the early junior doctor years (PGY 1–3), there is little chance to work in smaller rural locations irrespective of EPP participation (5% vs 2%). Those who participated in an EPP have a higher frequency of doing their intern and junior doctors' years regionally (MMM-2) (43% vs 20%, OR: 3.0: 95% CI: 1.6 to 5.7). In later years (PGY4-10), where practising in smaller rural communities is more available, those who undertook the EPP have a higher frequency of practising in regional centres (24% vs 13%) and importantly in smaller rural or remote locations too (15% vs 6%, OR: 2.7, 95% CI 1.3 to 5.3).

The improved distribution into smaller rural or remote locations of those participants who did a longer regional experience with only the usual shorter 6-week rural experience was also significant when compared with a short rural experience only, but not as strong (9% vs 6%, OR: 1.6, 95% CI: 1.1 to 2.3). The combination of undertaking an EPP with longer regional training experience also saw the highest proportion working in smaller rural or remote locations (18%), compared with EPP alone (11%), regional training alone (8%) or neither (6%). Within those undertaking regional training (1–2years), also undertaking an EPP was significantly associated with smaller rural practice

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Table 2 Multivariate model analysing Extended Placement Programme participation and associations with practising in a rural location after graduating

EPP	Subgroup	Total	Practising rurally or regionally N (%)	Univariate OR (95% CI)	Multivariate OR (95% CI)
Combined EPP and regional training placement					
No	Nil	1830	283 (15.5%)	Ref	Ref
Yes	Nil	40	13 (32.5%)	2.2 (1.1 to 4.6)*	2.0 (0.98 to 4.1)
No	1 year	472	112 (23.7%)	1.7 (1.3 to 2.2)**	1.7 (1.3 to 2.2)**
Yes	1 year	25	7 (28.0%)	2.3 (0.9 to 5.5)	2.4 (0.98 to 5.9)
No	2 years	398	143 (35.9%)	3.1 (2.4 to 3.9)**	2.8 (2.2 to 3.6)**
Yes	2 years	41	25 (61.0%)	8.6 (4.5 to 16.3)**	7.3 (3.8 to 14.0)**
Combined EPP and rural origin					
No	Metropolitan origin	2081	353 (17.0%)	Ref	Ref
Yes	Metropolitan origin	64	23 (35.9%)	2.8 (1.7 to 4.8)**	2.2 (1.3 to 3.8)**
No	Rural origin	617	183 (29.7%)	2.1 (1.7 to 2.5)**	1.8 (1.5 to 2.3)**
Yes	Rural origin	40	20 (50.0%)	4.9 (2.6 to 9.2)**	3.4 (1.8 to 6.6)**
Combined EPP and gender					
No	Male	1633	328 (20.1%)	Ref	Ref
Yes	Male	52	20 (38.5%)	2.4 (1.3 to 4.2)**	1.8 (0.98 to 3.3)
No	Female	1066	209 (19.6%)	0.97 (0.8 to 1.2)	0.96 (0.8 to 1.2)
Yes	Female	53	25 (47.2%)	3.4 (2.0 to 6.0)**	2.3 (1.3 to 4.1)**

*P<0.05, **p<0.01.
The model was adjusted for regional training, gender and rural origin.
EPP, Extended Placement Programme.

(OR: 2.5, 95% CI: 1.1 to 5.8). Although slightly over half of students who undertook an EPP still practised in a metropolitan (MMM-1) location, participation in an EPP shows both increased rural and regional supply and improved distribution in smaller rural areas in comparison to those who did not participate in the EPP.

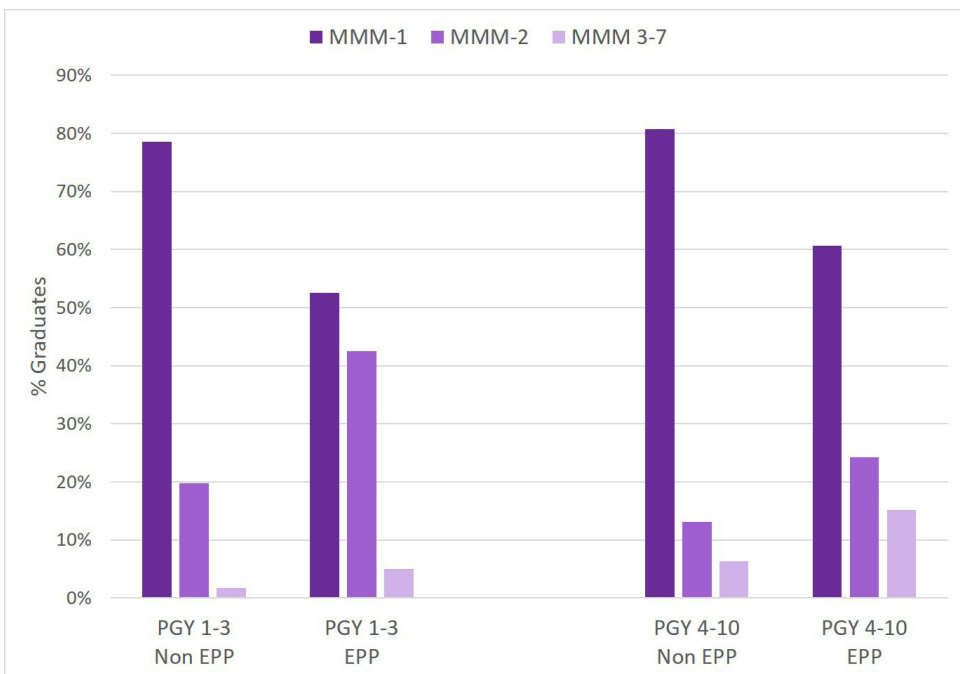

Figure 2 The effects of the Extended Placement Programme on postgraduate practice rurality. EPP, Extended Placement Programme; MMM, Modified Monash Model; PGY, postgraduate year.

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DISCUSSION

This study provides an in-depth appraisal of the value of extended short-term clinical training placement programmes in small rural settings, and how they influence a medical student's pursuit of a rural medical career. Strong evidence already exists for the benefits of 1–2 year long training through RCSs predominantly in larger communities with strong specialty coverage, in supporting students to choose rural practice postgraduation.[29] However, this study is arguably the first study that adds to the knowledge base, by highlighting the value and role of shorter term training immersions like the EPP in the rural generalist settings of smaller rural and remote communities in attracting future workforce to those communities. The study demonstrates that spending 1-year in a regional training placement without undertaking the EPP had the smallest proportion working rurally of this programme's five combinations of rural training, highlighting that year-long placements in large regional centres alone may not generate sufficient long-term rural aspirations.[11] Exploring the effects of EPP on these contributing factors, this study presents strong evidence for the importance of participation in extended short-term training of as little as 12 weeks in smaller rural and remote locations. The evidence is consistent with evidence emanating from other longer exposures in larger centre LICs.[12 13 30] Participation in the EPP is significantly associated with having a rural origin, being female and whole-year attendance at an RCS in the corresponding year, while other research demonstrates the impact of having a rural background on practising rurally,[11 15] continuing beyond three decades after graduation.[31 32] Notably, our study shows that participation in the EPP had a higher proportion working rurally than found with having a rural origin alone, with EPP participation associated with rural practice for both cohorts of metropolitan origin and rural origin.

The value of the EPP is further demonstrated by the distribution of their early career work location into smaller rural and remote communities. In the PGY 1–3 career establishment phase, apart from short-term intern placements, negligible rural training positions in Queensland occurs outside of the large regional hospitals. However, in PGY 4–10, rural training and practice is commonly available in smaller rural and remote (MMM 3–7) locations, and our data demonstrated that practice at this career consolidation phase is strongly associated with EPP participation. This study also demonstrated that MMM-2 practice in PGY 4–10 is associated with EPP participation. While our study does not include specialty, the PGY 4–10 results suggest that EPP participation is associated with higher uptake of general practice, given that both training and practising in small rural communities is mostly available in generalist practice.[31]

A strength of this study is its ability to compare different combinations of extended short-term, smaller rural exposure (EPP) and long-term, large regional training options. Participating in the EPP combined with the 2-year large regional placement produced the highest proportion who work rurally after graduation. Of interest, the EPP combined with a 1-year regional placement had a similar effect to those experiencing the EPP without either length regional training placement, which suggests that these may be attracting a different mix of student profiles. Other research highlights the additive effect of rural training duration, such as comparisons between 1-year and 2-year regional training placements showing the 2-year placement strongly increased uptake of rural practice.[9 33] However, our research supports evidence that it is not just duration, but that context/setting (aligned with rural generalists) and getting both regional and small rural immersion experiences can be more important factors regarding associations with improved future workforce distribution.[5 13]

Another important aspect of this study was that students participating in the 12-week EPP had self-selected through a competitive process including expressions of their future career interests, to immerse themselves for an extended duration in smaller rural communities during their training. This highlights the importance of targeted selection, thus supporting students who are keen and may envision practising rurally after graduation, irrespective of whether they are of rural origin. Evidence suggests that improving preference and acceptance of rural internship,[17] as well as future small rural practice uptake may occur with an expansion of training opportunities in smaller rural communities with a rural generalist context, such as the EPP.[34] Nevertheless, this may also lead to increased participation of students not primarily interested in rural careers, and thus possibly 'dilute' the impact of such placement programmes.

Rural training policy relating to building optimal rural workforce capacity is strongly focused on increased duration and increased supply of rural or regional placements. Evidence suggests that longer placements, such as those provided through large regional centres, accelerate the opportunity for students to amicably immerse themselves in the regional lifestyle and understand the medical skills and experience required for working in regional areas.[34 35] However, this study emphasises that a model consisting of extended short-term training in small rural locations, especially in combination to longer-term regional centre training opportunities, can greatly strengthen future decisions to practise rurally, and particularly in small rural centres after graduation. Supporting medical students through opportunities for longer durations of small rural placements may enable development of a more competent, personally and professionally well-intentioned and enhanced rural medical workforce to work in small rural towns.

Limitations

Like most evaluations of training programme interventions, allocation is not random and thus it can be more difficult to differentiate between the effect of the EPP 'intervention' and pre-existing interest in working and living in such locations. The relatively small counts

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of participants of the EPP are also acknowledged, thus widening the CIs of observed effect sizes. While this study has maximised participant counts by utilising administrative data sets across 10 years of observation, further accounting for covariates means that some cell counts were small.

CONCLUSION

This study provides new empirical evidence that participation in extended short-term training in smaller rural locations (EPP), both with and without other long-term regional centre training, was associated with higher proportions of students choosing to work rurally and regionally, including specifically as doctors in small rural centres. This evidence supports investment in rural medical training in smaller rural and remote settings and extended over 12 weeks or more, to help address unmet healthcare needs in those types of communities. The evaluated programme positively related to rural workforce outcomes when applied alone, but outcomes were greatly strengthened when in combination with 2-year large regional centre training. Importantly, its impact was significant for both rural origin and metropolitan origin participants and favours these programmes being offered to both. Recruiting rural doctors to smaller rural areas is reliant on providing both shorter training programmes and longer regional training programmes. Each of these is effective in encouraging enhanced long-term commitment to working rurally in smaller rural communities, but the strongest impact appears to be a combination of both. Despite the majority of time in the medical course involving exposures in metropolitan or large regional settings, it is notable that even relatively small increases in exposure in small rural communities have a positive effect on career location outcomes.

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Contributors MRM: conceptualisation, methodology, investigation, formal analysis, writing—review and editing, supervision, project administration. BFN: writing—review and editing, project administration. ABC: conceptualisation, methodology, investigation, writing—review and editing, supervision, project administration, guarantor. BS: methodology, investigation, writing—original draft. SK-C: conceptualisation, methodology, investigation, writing—review and editing, supervision, project administration.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting or dissemination plans of this research.

Patient consent for publication Not required.

Ethics approval This study involves human participants. The University of Queensland Human Research Ethics Committee approved the study (Clearance#:2022/HE000748). Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request. Data may be obtained from a third party and are not publicly available. The University of Queensland (UQ) Human Ethics Committee imposes restrictions on the data. Anonymised data are available to researchers who meet the conditions of the ethics approval and research governance policy that applies to this study via UQ eSpace. Requests for the data may be sent to the Director of Research, Rural Clinical School, UQ (rcsrc@uq.edu. au)

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ORCID iD

Bushra F Nasir http://orcid.org/0000-0002-8372-4877

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