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Immersive Place-Based Attachments in Rural Australia: An Overview of an Allied Health Program and Its Outcomes

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Abstract: This paper describes a rural immersive attachment program for allied health students at an Australian University Department of Rural Health and its workforce outcomes. A mixed methods longitudinal cohort study, with data collected via end-of-placement and post-graduation surveys. Over 13 years, 311 allied health 'year-long' immersive rural attachments, as well as short-term placements, were supported. Pre- and post-placement rural practice intention ratings were paired (from 572 end of placement surveys) for 553 (96.7%) students. Students from metropolitan (49.4%, $n = 273$, $p < 0.001$), and rural origin (50.6%, $n = 280$, $p < 0.001$) showed a significant increase in rural practice intention. At 1 year post-graduation, 40.3% ($n = 145$) of graduates had worked in a rural or remote location in Australia, 39.9% at 3 years ($n = 87$) and 36.5% ($n = 42$) at 5 years. Longer-term rural attachments were found to be associated with rural practice location, independent of rural background. Those who had undertaken a longer rural attachment (≥18-weeks) were twice as likely to be working in a rural or remote area than those <18 weeks at 1 year (OR 2.018 95% CI 1.204–3.382) and 2.7 times as likely at 3 years (OR 2.727, 95% CI (1.325–5.614). Supporting students to undertake rural immersive attachments appears to be associated with greater rural practice intention and later rural practice.

Keywords: allied health; placements; rural; workforce; work integrated learning

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Citation: Brown, L.J.; Wakely, L.; Little, A.; Heaney, S.; Cooper, E.; Wakely, K.; May, J.; Burrows, J.M. Immersive Place-Based Attachments in Rural Australia: An Overview of an Allied Health Program and Its Outcomes. *Educ. Sci.* **2023**, *13*, 2. https://doi.org/10.3390/educsci13010002

Academic Editor: Kylie Mansfield

Received: 15 November 2022
Revised: 12 December 2022
Accepted: 16 December 2022
Published: 20 December 2022

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1. Introduction

Tertiary preparation of allied health professionals includes a focus on work integrated learning, also known as professional practice placements, usually undertaken within a range of health care and community settings [1]. Placement type, duration and timing is mandated by professional associations or accreditation bodies, the requirements of which vary between health professions [2] and countries. These 'real-life' opportunities aim to develop skills and competency [3] in clinical, therapeutic and community-based practice and may influence the future career trajectories of health care students. This influence on career plans may extend to their practice area (e.g., generalist, specialist) [4], workplace type (e.g., public hospital or private sector) [5] and location of their practice (e.g., metropolitan, rural or remote) [6,7].

Given the health workforce maldistribution and resulting service gaps in rural and remote areas, many countries have tried to influence the post-graduate location of future healthcare professionals with a range of strategies. Initiatives have typically focused on an increased exposure to rural contexts through placements [3], as well as extended training and incentive programs designed to improve rural return [8]. In Australia, the Commonwealth Department of Health has funded programs to support rural health workforce development since the 1990s through the formation of University Departments of Rural Health (UDRHs) and Rural Clinical Schools (RCSs) based in regional, rural and remote areas of Australia. These programs support the training and placements for health professional students in non-metropolitan areas of Australia [9].

The term 'rural immersion' has been used to describe tertiary programs where students live and undertake their clinical training in rural areas over sustained periods [10]. These programs have been largely focused on medical students in the United States [11], Canada [12] and Australia [10]. Rural immersion attachments (i.e., a full year of a medical program) have been a long-standing option for medical students through the RCS program in Australia [10,13], but are not typically an option for allied health professions. In Australia, allied health degree programs are usually delivered at metropolitan or regional universities, where students complete 3 or 4 years of tertiary study. Hence, the option for extended training at a rural location allows for a unique opportunity for students to live, work and practice in an underserviced rural area.

Placement length or tertiary study undertaken in a rural location has been associated with increased return to practice after graduation, with several studies providing evidence of a possible exposure-response effect in medical graduates [14–16]. In Australia, medical programs with a rural immersion component have been shown to have positive correlations between rural training and rural practice (from post-graduate year up to 10 years post-qualification) [14]. This effect was found to be further increased when combined with rural origin and longer duration of rural immersion [10]. In UDRH programs for allied health and nursing, the literature shows similar outcomes [17–21]. However, the literature exploring allied health workforce outcomes is less developed and largely focused on short-term placements (typically 2–12 weeks) [18–20]. Furthermore, the large diversity of allied health professions and the combining of data with nursing outcomes [19,20,22] makes it difficult to provide this evidence conclusively.

In a study across two Australian universities (n = 1315 allied health and nursing students), those of rural origin (n = 289; 22%) were 4.5 times more likely to undertake a rural placement compared to metropolitan origin students, with a higher proportion undertaking multiple rural placements (56% rural origin vs. 14% metropolitan origin) and a higher mean number of rural placement days [23]. The same study tracked graduates (n = 1130; 49% allied health) after 1 year and linked rural placement data with workplace destinations using health practitioner registration data. Rural origin graduates had a 4.45 times higher odds ratio for a rural workplace location after 1 year. For those with >40 rural placement days (>8 weeks), the odds ratio was 4.54, compared to 1.93 for 20–40 days (4–8 weeks) [17]. This large cohort study supports the value of longer-term placements (>8 weeks) but does not specifically examine the workforce outcomes for those students with longer rural immersive attachments.

Given the overall evidence for longer rural placement experiences, a key recommendation from a recent UDRH evaluation [24] was to support longer rural placements in settings that reflect the employment opportunities in rural communities. This strategy being considered key to optimising rural return to practice after graduation [24] for those students of rural or metropolitan background. The rural immersive attachment program described in this paper is the first of its kind for allied health students in Australia [25]. It was first described as a pilot in 2009 [26] and this rural immersive attachment program has continued to evolve ever since. An in-depth description of the program is provided below.

Rural Immersive Attachment Program

The University of Newcastle Department of Rural Health (UONDRH) rural immersive attachment program was developed in 2003 when two allied health disciplines (occupational therapy and diagnostic radiography) trialed the concept of a 'year-long' rural attachment [26]. This trial was based at the rural location of Tamworth, located 3.5 h from the metropolitan area of Newcastle (location of the central university campus), New South Wales Australia. Initial numbers of students were small with a range of external factors (e.g., student commitments in metropolitan areas, access to part-time work and coursework requirements) contributing to the limited development of the model beyond a handful of students in the early years of the program. The rural immersive attachment program developed through ongoing engagement with central university campus academic staff

across relevant faculties and schools. From 2009 onwards, additional health disciplines of nuclear medicine, nutrition and dietetics, physiotherapy and radiation therapy were established in the program. Initial rural sites included Tamworth and Taree and, from 2017 onwards, the additional rural sites of Port Macquarie and Coffs Harbour were included.

Rural immersive attachments have varied from 'semester-long' to 'year-long' attachments. The term 'year-long' was used to indicate the intention of the program, which was for students to undertake their full academic year (typically ~26 weeks) or semester (typically ~13–18 weeks) in a rural location. This rural immersive attachment program has been implemented in varied ways across disciplines; however, a minimum expectation has been for students to complete their required placement weeks, plus their core coursework for a 'true' rural immersion experience. For example, final year physiotherapy students undertake four blocks of 5-week placements based in a range of physiotherapy services (public or private), complete two 10-unit core courses as well as their Honours and/or elective coursework. In some disciplines, students are able commit to the rural immersion attachment program for a shorter timeframe in the form of a semester-long attachment. For example, in the case of Speech Pathology, semester-long options were established between 2012–2016 and during this time supported students to undertake a semester-long rural immersion attachment.

Placement blocks are typically completed at the main rural immersion site and/or another supported rural placement site (e.g., Armidale, Inverell or Moree). Some discipline programs require students return to the metropolitan campus for some practical or compulsory components such as pre-placement preparation, coursework lecture blocks, particular types of placements or end-of-year reflections. Where possible, coursework and practical assessments are undertaken in the one rural location. Figure A1 (see Appendix A) provides a summary of the typical structure of a 'year-long' immersive attachment program by allied health discipline. Given the ultimate purpose of the program was to encourage students towards working rurally, the program was focused primarily on students in their final year of study.

Students are provided subsided accommodation at the rural site and are accommodated with other health students; these include medicine students undertaking a rural year in the RCS program (Taree and Tamworth locations) and nursing and allied health students on short-term placements. Students are supported by locally based academics who facilitate or support the delivery of student coursework, source and support local rural placements and develop and maintain community and stakeholder engagement. If students are undertaking a research project as part of an Honours program, this can be supported by rural-based UONDRH academics. Throughout the immersive rural attachments, students are invited to attend a range of interprofessional learning, discipline-specific practical tutorials, community engagement activities and social events [27].

Ongoing promotion of the rural immersive attachment program is undertaken through UONDRH academic staff presenting guest lectures about rural and specialist practice areas and/or other online engagement through social media and distance education platforms. In the early years of their program (years 1–3), students can participate in 'rural tasters' (e.g., short visits for rural engagement and skill development opportunities for 3rd year nutrition and dietetics students) and experiential placements (e.g., simulation-based placements for 2nd year physiotherapy students) to increase their exposure to rural locations prior to the immersion options offered in their final year. Students can apply for the rural immersion attachment program through a selection process that considers their level of interest and motivation to undertake a rural immersion program. Students are able to nominate up to four rural location preferences; they are then offered a place where available and are expected to relocate to their allocated rural location for the program duration.

2. Materials and Methods

2.1. Study Design

This paper describes data from the rural immersion attachment program for allied health students and presents data from a mixed methods student follow-up study for short-term placements and long-term allied health student attachments [21,25].

2.1.1. Rural Immersion Attachment Program Data

Allied health student numbers for those participating in a rural immersion attachment program (year-long and semester-long attachments) were recorded from 2009 onwards. Allied health academic staffing levels for all UONDRH sites supporting the rural immersion attachment program were reported, as of the 20 October 2022. Rural immersion attachment students completed a minimum of 18 weeks in a rural site, inclusive of required placement weeks and coursework. Students undertaking short-term placement blocks, typically completed placements between 2- and 12-week durations. Some disciplines completed multiple placements blocks in 1 year (e.g., dietetics students complete three placements in their final year: a 4-week, a 5-week and 10-week placement block, typically at varied locations), some of which may have been completed in one or multiple rural locations across the year. Those students undertaking multiple rural placements in the one location in the same year (i.e., multiple short placements only) were not included in the rural immersive attachment data; however, those students undertaking multiple placement blocks in one rural site were considered to be taking a longer rural placement (i.e., if cumulatively placements these were 18 weeks or longer). In previous data analysis, we have used groupings of short-term (<8 weeks), medium term (8–18 weeks or long-term >18 weeks) [25]. For the purpose of this paper, the 'rural placement/attachment weeks' have been dichotomised to a rural immersion length of <18 weeks or $\geq$18 weeks.

2.1.2. Student Follow Up Study Data

The overall methods for this study have been reported elsewhere [21,25] and a brief overview is provided for research processes specific to this paper. Ethics approval was granted by the University of Newcastle Human Research Ethics Committee H-2011-0027.

2.2. Setting and Participants

Settings for recruitment included the UONDRH rural immersive attachment locations of Tamworth, Taree, Port Macquarie and Coffs Harbour and short-term placement sites of Armidale, Inverell and Moree in New South Wales, Australia. All sites are classified as 'large rural towns' (MM-3) or 'small rural towns' (MM-4) [28] by the Modified Monash Model remoteness classification (refer to Appendix A, Figure A2). In order to classify workplace outcomes in terms of rurality, both the Modified Monash Model and Australian Statistical Geography Standard—Remoteness Area (ASGS-RA) [29] have been used. In previous publications [21,25], we used ASGS-RA to classify remoteness, in this current paper, in order to compare, we have used this classification, along with the Modified Monash Model, which is increasingly being used to measure rurality. In this analysis, the following groupings have been used: ASGS-RA—RA 1 (metropolitan) and RA 2–5 (combined rural-remote); and Modified Monash (MM) classification MM 1–2 (combined metropolitan-regional) and MM 3–7 (combined rural-remote). MM2 was combined with MM1 so that 'rural return' for workplace locations was matched to MM3–MM5, as per the location classifications for UONDRH sites.

2.2.1. Recruitment and Sampling

Allied health students enrolled in degree programs at the University of Newcastle who participated in UONDRH supported rural placements of at least 2-week duration between May 2011 and December 2021 were invited to participate in the study. Eligible students from the disciplines of diagnostic radiography, nuclear medicine, nutrition and dietetics, occupational therapy, physiotherapy, radiation therapy and speech pathology

were informed of the study and invited to participate. Study details were provided during their orientation to the UONDRH, either by the administrative staff member delivering the orientation or by a research assistant. Interested students were then able to consent to participate in one or more aspects of the follow-up study.

2.2.2. Data Collection

Data reported in this paper were obtained from end of placement (EOP) surveys and graduate follow-up (FUP) surveys at 1, 3 and 5 years post-graduation. These surveys have been described in detail elsewhere [21,25,27].

Rural practice intention was measured on a 5-point Likert scale (1 = strongly agree to 5 = strongly disagree) in response to two statements in the EOP survey. Statement one: "Prior to this placement I was considering living and working in a regional, rural or remote location following graduation". Statement two: "This placement has made me reconsider my future and I am now considering living and working in a regional, rural or remote location following my graduation". Rural background at end of placement was based on the student self-reporting to have previously lived in a rural area for at least 2 year.

Key data collected in FUP surveys reported on in this paper include: rural background, employment details in the preceding year and location of practice by postcode. A 'rural background' at these follow-up time points was defined overall as the participant having spent time living in a rural area. A self-report question—'Which of the following best describes where you grew up?'—was used to identify the rurality of background (with options for metropolitan, rural or remote). Refer to Supplementary File S1 for a copy of the Allied Health graduate FUP survey (Year 1).

2.2.3. Data Analysis

Data about rural immersion program students and UONDRH site staffing were tabulated to provide a summary of data relevant to the 'year-long' and 'semester long' student allocations in the rural immersion attachment program. Data collected via EOP and FUP surveys were analysed using IBM SPSS Statistics release 28.0.0.0 (2021). Paired *t*-tests (two-sided) were performed on EOP survey rural practice intention scores. For each FUP survey year, Chi-square tests were performed on the practice location, cross-tabulated against rural attachment length. Binomial logistic regression was performed to examine the effect of extended placement on rural practice location by controlling for rural background. Interaction between extended placement and rural background was also included in the analysis. Odds ratios (OR) for rural practice locations were calculated together with 95% confidence intervals (CI). In all tests, p values of 0.05 considered significant.

3. Results

3.1. Academic Staffing and Year-Long Student Attachment Data

Table 1 provides data about academic staffing across rural sites of the UONDRH, where allied health academic staff and facilities are based. A total of 10.7 FTE allied health academic staff were employed as of 20 October 2022. The rural immersive attachment placement program has supported 311 year-long and 22 semester-long students across four health degree programs over 10 years; refer to Table 2 for further details.

3.2. Data from End of Placement Surveys

Between May 2011–December 2021, 1231 eligible students were invited to participate in the EOP survey and 1045 consented (84.9% consent rate). At least one EOP evaluation was received from 572 participants (response rate 55%). Where multiple EOP surveys were completed, the first evaluation for each participant was used in our analysis. Valid responses were obtained for 553 evaluations.

The majority of study participants undertook placements/attachment of less than 18 weeks (75.7%, n = 419), almost half of which reported to be of a rural background

(i.e., having spent at least 1 year living in a rural area) (46.5%, n = 195). This compared to 63.4% (n = 85) reporting rural background in the group who had undertaken placements $\geq$ 18 weeks. There were significant changes in rural practice intention following rural placement/attachment for students with both metropolitan (49.4%, n = 273, $p < 0.001$) and rural backgrounds (50.6%, n = 280, $p < 0.001$). When placement/attachment length was considered, only changes in pre- and post-scores for students from a rural background undertaking placements of 18 weeks or longer were not significant; however, these students had the lowest mean 'pre-' rural practice intention scores of 1.81 (SD 1.018), which indicated a greater rural practice intention prior to placement. Table 3 summarises data related to rural practice intention.

Table 1. Allied health academic staffing at key UONDRH sites as of October 2022.

Location	Allied Health Disciplines	Full-Time Equivalents
Locations with rural immersion attachment program		
Coffs Harbour [a]	Diagnostic Radiography Dietetics Occupational Therapy Physiotherapy Speech Pathology	3.2
Tamworth [a]	Diagnostic Radiography Dietetics Occupational Therapy Physiotherapy Speech Pathology [c]	4.3
Taree [a,b]	Allied Health (Physiotherapy) [d] (Speech Pathology) [d]	0.8
Port Macquarie [a]	Dietetics Occupational Therapy Physiotherapy Radiation Therapy Speech Pathology	3.2
Locations with short-term placements and academic support		
Armidale	Dietetics Physiotherapy Speech Pathology	1.2
Inverell	Allied Health (Physiotherapy) [d]	0.4
Moree	Allied Health (Dietetics) [d]	0.4
Total		10.7

[a] Sites with 'year-long' attachments; [b] site has supported some 'year-long' attachments across physiotherapy and medical radiation sciences, with varied staffing levels 2009–2022; [c] Speech Pathology students participated in a short trial of 'semester-long' placements at this site, [d] These 'allied health' roles are currently filled by the listed discipline and have been developed between 2021–2022 to support students across diverse disciplines in smaller rural sites.

Table 2. UONDRH Rural Immersion Attachment Program for Allied Health 'Year-Long' and 'Semester-Long' Students across four sites 2009–2021 [a,d].

Year	Dietetics	Physiotherapy	Occupational Therapy	Medical Radiation Science [b]	Totals (Year-Long)
2009	2	-	-	5	7
2010	4	1	-	4	9
2011	6	3	-	3	12

Table 2. *Cont.*

Year	Dietetics	Physiotherapy	Occupational Therapy	Medical Radiation Science [b]	Totals (Year-Long)
2012	2	1	-	4	7
2013	3	3, 1 semester long	-	13	19
2014	5	9	-	15	29
2015	3	6	-	5	14
2016	6	7	6	8	27
2017	8, 3 semester long	10	4	6	28
2018	11, 1 semester long	7, 3 semester long	7	4	29
2019	7, 3 semester long	22	7	5	41
2020 [c]	8, 1 semester long	26, 1 semester long	3	2	39
2021	13, 4 semester long	21	9	11, 5 semester long	54
Totals	78 12 semester long	116 5 semester long	32	85 5 semester long	311 22 semester long

[a] Includes sites of Tamworth and Taree (2009–2021). The additional sites of Port Macquarie and Coffs Harbour offered the 'year-long' option from 2017. [b] Medical radiation sciences is the overarching grouping for the professions of diagnostic radiography, radiation therapy and nuclear medicine. [c] 'Year-long' placement numbers were impacted by the COVID-19 pandemic in 2020, as some students decided to return home or needed to relocate due to changes in placements, impacting the number able to complete an immersion experience in some disciplines. [d] An additional 46 Speech Pathology students undertook a semester-long attachment (2012–2016) and are not shown as the program is not currently offered.

Table 3. Rural practice intention pre- and post-placement by placement/attachment length and rural background using paired *t*-tests (n = 553).

Placement/Attachment Length	Rural Background [a]	n =	Rural Practice Intention [b] Mean Rating (SD)		p
			Pre	Post	
Less than 18 weeks	None or less than 1 year	224	3.02 (1.114)	2.20 (0.908)	<0.001
	1 year or more	195	2.10 (1.001)	1.87 (0.797)	<0.001
18 weeks or longer	None or less than 1 year	49	2.53 (1.043)	1.73 (0.785)	<0.001
	1 year or more	85	1.81 (1.018)	1.72 (0.854)	0.251

[a] Rural background was classified as living in a rural area for 1 year or more prior to rural placement/attachment. [b] Rural practice intention response given to a 5-point Likert scale (1 = strongly agree to 5 = strongly disagree); hence, a lower score represents a greater rural practice intention. Lower scores indicate greater rural practice intention.

3.3. Longitudinal Follow-Up Study Data from Graduate Follow-Up Surveys at 1, 3 and 5 Years

Students who were eligible for the study and had graduated by December 2020 were invited to participate in the Graduate FUP Surveys. Of the 1058 eligible students, 875 agreed to participate in the FUP surveys (consent rate = 82.7%). By December 2021, FUP surveys had been emailed to 875 participants at 1 year, 585 participants at 3 years and 380 participants at 5 years post-graduation. Response rates for the surveys were 49.0% (n = 429), 45.0% (n = 263) and 40.1% (n = 155) respectively.

Table 4 details the number of graduates who worked in their health profession in the year preceding each of each FUP survey. Of those who reported having been employed within their health profession within Australia at some point within the past year, 40.3% had worked in a rural or remote location (RA2-5) at 1 year (n = 145), 39.9% at 3 years (n = 87) and 36.5% (n = 42) at 5 years.

At the 1-year follow-up, 21% of the participants who agreed to take part in the FUP survey were longer rural attachment students and 37% of responders were (>18-week placements), almost twice the response rate. At the 3-year follow-up, the proportions from the longer rural attachments were 27% agreed and 30% responders, and, at the 5-year follow-up, it was 26% agreed and 27% responders.

Proportions of graduates practicing at rural (MM 3–7) or metropolitan (MM 1–2) locations in each follow-up year are shown in Figure 1. Significant associations were found between longer placements/attachments (18 weeks or longer) and rural practice locations for each year (year 1 $X^2 = 9.187$, $p = 0.002$; year 3, $X^2 = 11.272$, $p < 0.001$; year 5, $X^2 = 9.144$, $p = 0.002$).

Table 4. Employment locations of study participants in allied health profession at 1, 3 and 5 years post-graduation.

Year [a]	Employment Location					Australian-Based Location by Remoteness Classification	
	Employed in Australia	Employed Overseas	Not Employed in Health Profession	Invalid or No Answer	Total	Rural RA 2–5; MM 3–7 *n* = (%)	Metro RA 1; MM 1–2 *n* = (%)
1	360	0	34	35	429	145 (40.3); 109 (30.3)	215 (59.7); 251 (69.7)
3	218	10	21	14	263	87 (39.9); 61 (28.0)	131 (60.1); 157 (72.0%)
5	115	7	25	8	155	42 (36.5); 29 (25.2)	73 (63.5); 86 (74.8)

[a] Number of years post-graduation; Abbreviations: ASGS-RA (Australian Standard Geography Standard-Remoteness Area)—RA 1 (metropolitan), RA 2–5 (combined rural-remote); MM—Modified Monash classification MM 1–2 (combined metropolitan-regional) and MM 3–7 (combined rural-remote).

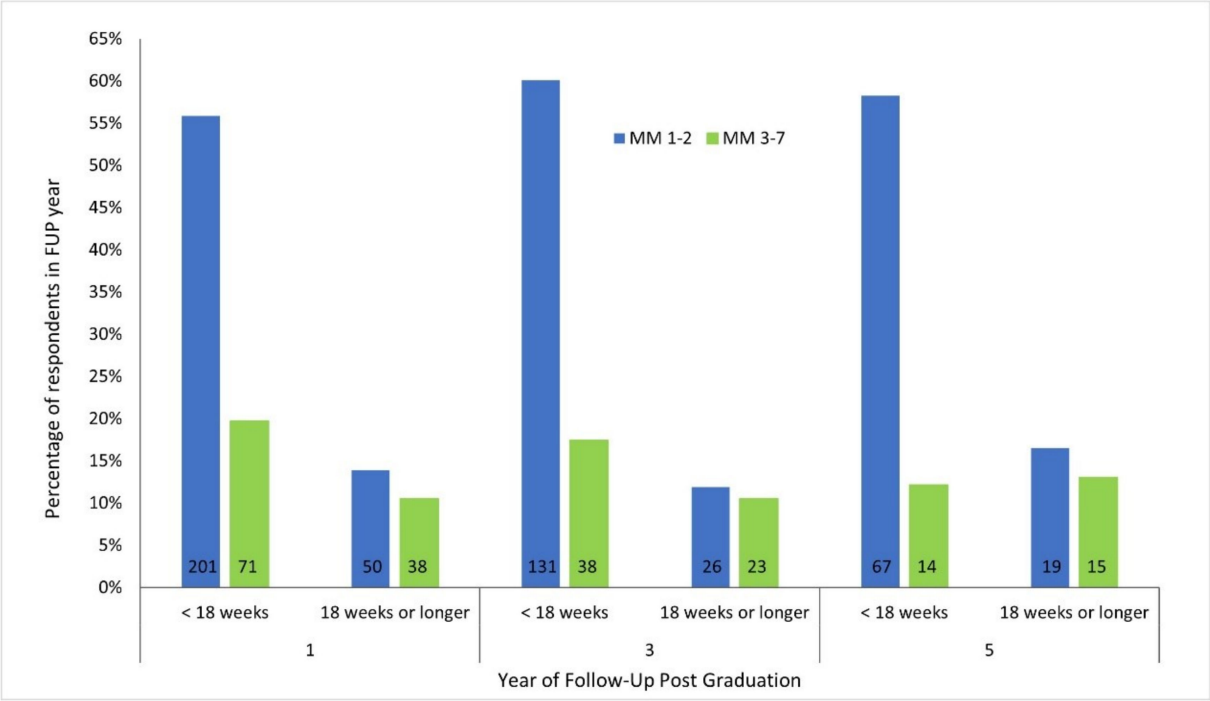


Figure 1. Proportions of graduates at rural, remote (MM 3–7) or metropolitan (MM 1–2) practice locations at each year post-graduation by placement length.

Binomial logistic regression of practice location at each follow-up year showed that longer rural placements/attachments were associated with rural practice location, independent of rural background (see Table 5). Those who had undertaken a longer rural attachment (classified as ≥18-weeks) were twice as likely to be working in a rural or remote area (MM 3–7) than those on shorter-term placements at the 1-year follow-up (OR 2.018, 95% CI 1.204–3.382) and over 2.7 times as likely at the 3-year follow-up (OR 2.727, 95% CI 1.325–5.614). At the 5-years follow-up ($n = 155$), an association with placement

length was not found to be significant. No significant interaction between placement length and rural background was found (data not shown). The association between rural background and rural practice location increased with time from 2.884 (95% CI 1.774–4.690) at 1 year to 5.734 (95%CI 1.770–15.580) at the 5-year follow-up.

Table 5. Binomial logistic regression of rural practice/attachment location (MM 3–7) at each follow-up year (1, 3 and 5) with rural background and placement/attachment of 18 weeks or longer as variables.

Year	*n* =	Variable	Nagelkerke R Square	Odds Ratio (95% CI)	*p*
1	360	Rural Background [b] Placement/Attachment of 18 weeks or longer	0.106	2.884 (1.774–4.690) 2.018 (1.204–3.382)	<0.001 0.008
3	218 [a]	Rural Background [b] Placement/Attachment of 18 weeks or longer	0.203	4.499 (2.219–9.125) 2.727 (1.325–5.614)	<0.001 0.006
5	115	Rural Background [b] Placement/Attachment of 18 weeks or longer	0.225	5.734 (1.770–15.580) 2.335 (0.902–6.042)	0.004 0.080

[a] Five cases of missing data (rural background) at Year 3; [b] Self-identified in Graduate Follow-up survey as being from a rural background.

4. Discussion

This paper describes an established program of immersive rural attachments for allied health students that allows them to immerse in a rural context beyond required placements weeks. This novel approach has been in development for 20 years, gaining momentum with increased uptake over the past 10 years. This current analysis of longitudinal data from a cohort of allied health students in this program provides evidence for longer-term attachments ($\geq$18 weeks) as a strong driver for rural return to practice. Longer-term rural attachments were found to predict rural practice location return at 1 and 3 years post-graduation, independent of a student's rural background. This finding is the first of its kind in relation to immersive rural attachments and allied health student workforce outcomes.

In previous reporting of data from this longitudinal study of graduate workplace outcomes [21,25,27], we identified a positive shift in 'intention to work rurally' for students of both rural and metropolitan background post-placement, but this was only statistically significant for those from a metropolitan background ($n = 271$, $p \leq 0.001$) [27]. In this current analysis ($n = 553$), there were significant changes in rural practice intention following rural placement/attachments of less than 18 weeks for students from both metropolitan and rural backgrounds and for placement/attachments of 18 weeks or more for students from metropolitan backgrounds. Immersive rural placements may reinforce the 'rural intention' for rural background students as there was a positive shift in overall intention. The more noticeable shift in intention observed for metropolitan background students may be promising for rural 'conversion'; however, the longer-term benefits of this need to be examined. Outcomes of other UDRH programs have found short-term placements to have a positive influence on graduates' consideration of rural practice [20,22]; however, these have been reported as a percentage of graduates influenced more positively [22] or change in intention related to placement satisfaction [18]. Our current findings highlight the value of rural immersion placements/attachments on changing attitudes towards rural practice intention, particularly for those of metropolitan background and those on short to medium placements. Those of a rural background undertaking longer attachments were already positive towards rural practice, so a significant change was not observed.

In earlier published data [21], we found positive rates of rural practice return (52% at 1 year and 37.5% at 3 years post-graduation); however, in this previous analysis, the cohort numbers were small (n = 129, inclusive of 2012–2015 graduates). In the current analysis, rural return was 40.3% at 1 year, 39.6% at 3 years and 36.5% at 5 years, when using comparable ASGS-RA classifications. These rates of rural return (RA 2–5) are greater than those reported by other UDRH programs at 1 year (25%; RA 2–5) [22] or similar when using MM classification to match placement rurality (31.4%; MM 4–7) [20].

In our previous analysis, students from a rural or remote background were 2.35 times (95% CI 1.056–5.229) more likely to be located in a rural or remote workplace after 1 year than graduates from a metropolitan background [21]. However, in this current analysis we found that longer rural attachments were associated with rural practice location regardless of rural background. Those undertaking longer immersion attachments (18 weeks or longer) were twice as likely to be working rural or remote at 1 year and 2.7 times at 3 years, compared to those on short- or medium-term rural attachments. Previously, we found [21] that workplace location at 1 year did not appear to be associated with placement length and there was no observed association when controlling for background. Other UDRH programs have reported rural place of practice after graduation to be significantly associated with rural background (OR = 3.19) [19] (OR = 3.64) [20] and ≥10 weeks of placement (OR = 2.39) [20].

This study has reported on a growing number of graduates followed up at 1 year (n = 429) and 3 years (n = 263), with moderate response rates of 49% and 45%, respectively. Other allied health studies have comparable or poorer response rates (61% to 14.2%) [19,20] when following graduates up by survey. Allied heath students in the current study chose their rural immersion option and were able to preference short-term placement locations, although some short-term placement students may be allocated to a non-preferred placement site. Voluntary participation in rural placements has been shown to be linked to rural workforce return [22] and may be a factor not accounted for in the analysis. It should be noted that our cohort consisted of a disproportionate number of short-term immersion students, and longer attachment participants were almost twice as likely to respond at year 1. As already identified in previous publications [21], the students who consented to follow-up may be more inclined towards rural practice than those who did not consent. This response bias may also extend to those students who responded to the graduate FUP surveys; they may be those students who were more inclined towards rural practice. We are unable to compare workforce outcomes with those who did not consent to follow-up or undertake a rural placement. However, when previously compared with data from the Australian Graduate Survey (AGS), we found that only 23.7% of overall University of Newcastle graduates were working rural after 1 year [25]. The data from the AGS considered all students who graduated from the relevant health disciplines in the same timeframe. This indicated that the rural immersive program provided better rural return in the short- and medium-term when compared with the full student cohort.

5. Conclusions

Rural immersion options where students live, study and practice their profession allow for a more in-depth experience over an extended period of time and appear to be associated with rural practice return compared to short–medium length placement options regardless of rural background. This program warrants further examination to gain insights into the longer-term workforce outcomes.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/educsci13010002/s1, File S1: Allied Health Student Follow-up Study.

Author Contributions: Conceptualisation, L.J.B. and J.M.B.; methodology, L.J.B.; formal analysis, J.M.; investigation, L.J.B.; data curation, J.M.; writing—original draft preparation, L.J.B., L.W. and J.M.; writing—review and editing, L.J.B., L.W., S.H., A.L., E.C., K.W., J.M. and J.M.B.; project administration, L.J.B. and J.M. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding. The Rural Health Multidisciplinary Training Program funded through the Australian Commonwealth Department of Health supports the allied health program described in this paper.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Human Research Ethics Committee of the University of Newcastle (protocol code H-2011-0027, approval date 6 April 2011).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data in this study are available on request from the corresponding author. The data are not publicly available due to the size of the database and privacy concerns.

Acknowledgments: All authors are employed under the Rural Health Multidisciplinary Training Program funded through the Australian Commonwealth Department of Health.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

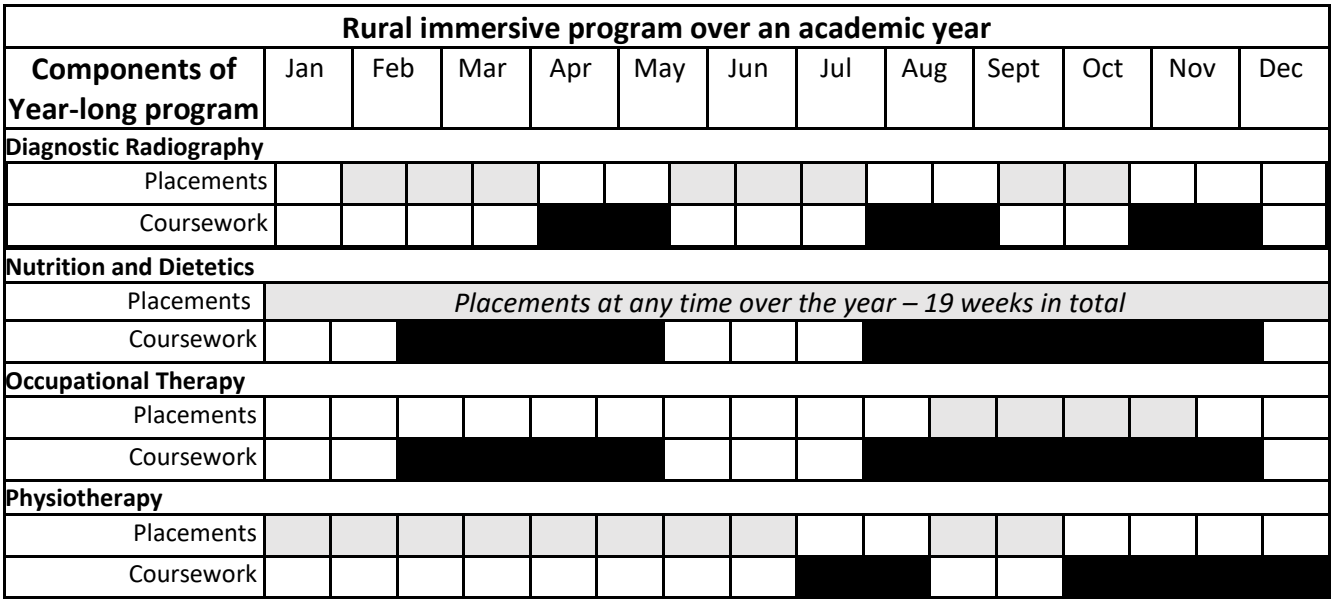


Figure A1. Year-Long Immersion Attachment Example Structure by Allied Health Discipline.

UONDRH Sites	Modified Monash	Australian Statistical Geography Standard Remoteness Area
N/A	MM1 metropolitan	ASGS-RA1
N/A	MM2 regional centres	ASGS-RA2 (inner regional) and RA-3 (outer regional) that are in or within 20 km of a town of over 50,000 residents
Tamworth Taree Port Macquarie Coffs Harbour	**MM3 large rural towns**	**ASGS-RA2 (inner regional) and ASGS-RA3 (outer regional) are not MM2 and are in or within a 15km drive of a town between 15,000 to 50,000 residents**
Moree Inverell Armidale	**MM4 medium rural towns**	**ASGS-RA2 (inner regional) and ASGS-RA3 (outer regional) that are not MM2 or MM3 and are in or within a 15 km drive of a town between 5000 to 15,000 residents**
Smaller placements sites	**MM5 small rural towns**	**All remaining ASGS-RA2 (inner regional) and RA3 (outer regional)**
N/A	MM6 remote communities	ASGS-RA4 (remote)
N/A	MM7 very remote communities	ASGS-RA5 (very remote)

Figure A2. Remoteness locations for UONDRH attachment/placement sites with reference to Modified Monash and ASGS-RA classifications. Adapted from original materials related to remoteness classifications [28,29]. Abbreviations: ASGS-RA—Australian Statistical Geography Standard—Remoteness Area MM—Modified Monash, N/A—not applicable.

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