Rural and Remote Health
MEDLINE listed
Impact factor 0.878
The International Electronic Journal of Rural and Remote Health Research, Education, Practice and Policy
ISSN 1445-6354

ORIGINAL RESEARCH

Regional universities and rural clinical schools contribute to rural medical workforce, a cohort study of 2002 to 2013 graduates

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Submitted: *28 July 2014;* ***Revised:*** *30 March 2015;* ***Accepted:*** *7 May 2015;* ***Published:*** *6 August 2015*

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Rural and Remote Health **15: 3219. (Online) 2015**

Available: http://www.rrh.org.au

ABSTRACT

Introduction: Rural clinical schools and regionally based medical schools have a major role in expanding the rural medical workforce. The aim of this cohort study was to compare location of practice of graduates from the University of Tasmania School of Medicine's clinical schools based in the larger cities of Hobart and Launceston (UTAS SoM), with those graduates who spent at least 1 year at the University of Tasmania School of Medicine's Rural Clinical School based in the smaller regional city of Burnie (UTAS RCS) in Australia. Specifically, the aim was to quantify the proportion who worked in an Australian regional or remote location, or in the regional cities and smaller towns within Tasmania.

Methods: The 2014 locations of practice of all graduates from the UTAS SoM and UTAS RCS between 2002 and 2013 were determined using the postcode listed in the Australian Health Practitioners Authority database. These postcodes were mapped against the Australian Bureau of Statistics Australian Standard Geographic Classification – Remoteness Areas (ASGC-RA) and the 2011 Census population data for Tasmania to define Modified Monash Model classifications.

Results: The study tracked 974 UTAS SoM graduates; 202 (21%) spent at least 1 year at the Rural Clinical School (UTAS RCS graduates). Students who had spent a year at the UTAS RCS were five times more likely to be working in RA3 to RA5 than those who hadn't spent a clinical year there (28% vs 7%, $\chi^2(1)=59.5$, $p<0.0001$) (odds ratio (OR) 4.9, 95% confidence interval (CI) 3.2–7.6). Using the Modified Monash Model, it was found that UTAS RCS graduates were nine times more likely (OR 9.0, 95%CI 4.7–17.2) to be working in the regional cities and smaller towns of Tasmania.

Rural-and-Remote-Health
The International Electronic Journal of Rural and Remote Health Research, Education Practice and Policy

Conclusions: This study adds to the growing evidence that training medical students in rural areas delivers graduates that work rurally. The additional year spent in a rural area, even when their medical school is in a regional city, significantly affects their workplace choices over the first 3 years post-graduation.

Key words: Australia, medical education, Modified Monash Model, specialist training, Tasmania.

Introduction

Many rural and remote regions of Australia struggle to attract and retain medical staff[1]. Rural clinical schools were established by the Australian Government in 2002 and were funded as part of a long-term strategy to expand the rural medical workforce. There is growing evidence that regional medical schools and Australian rural clinical schools are increasing the numbers of doctors working regionally and rurally[2-5].

Tasmania, an island state, has poorer health outcomes and fewer doctors than other states, and the smaller outer regional, remote and very remote towns have patients with the worst health[6]. These towns have lower socioeconomic status, higher Aboriginality, are under-represented in post-school education statistics, and have reduced access to health services[6,7]. Attracting and retaining medical staff to these communities remains a major challenge. The north-west coast of Tasmania, the home of the University of Tasmania School of Medicine's Rural Clinical School (UTAS RCS), has fewer general practitioners (GPs) than remote areas of Australia. In 2014 there were 118 GPs working in north-western Tasmania[8], which has a population of 110 000[9]. In 2011 there were 227.8 GPs per 100 000 persons in major cities in Australia, twice that of remote areas (113.0 per 100 000 persons)[10]. Like many rural Australian areas, health services in north-western Tasmania remain heavily dependent on locum staff and overseas-trained doctors[11,12].

All of Tasmania is considered regional or remote under the Australian Standard Geographic Classification – Remoteness Areas (ASGC-RA), including the capital city, Hobart, which is RA2[13]. The Modified Monash Model[12,14], a newer classification of regional and remote areas, is able to better differentiate the major cities of Hobart and Launceston, which are category 2 (RA2 or 3, with populations over 50 000), from the remaining regional cities and small towns, which are categories 3–7.

Students enrolled in the UTAS School of Medicine (SoM) undergraduate medical program all spend their first 3 years in Hobart. Thereafter, students can choose to spend their two clinical years in one of three clinical schools: in Hobart, in Launceston or at the rural clinical school based on the north-western coast of Tasmania.

This study sought to assess the proportion of UTAS RCS graduates currently working in rural areas in Australia compared to those UTAS SoM graduates that did not spend a year studying at the UTAS RCS. These early outcomes are compared to published university and rural medical school outcomes. In addition, the study sought to determine the proportions of UTAS SoM and UTAS RCS graduates working in the regional cities and smaller towns in Tasmania, categories 3–7 of the Modified Monash Model.

Methods

The cohort study consisted of all graduates of the UTAS SoM between 2002 and 2013. Graduates who had graduated since 2002 were searched for on the Australian Health Practitioner Register (AHPRA) database. The AHPRA database records the graduate's name and postcode where they currently work. Graduates' 2014 primary place of work postcodes were used to identify remoteness classifications from the

postcode search function on the DoctorConnect website http://www.doctorconnect.gov.au/internet/otd/Publishing.nsf/Content/locator), where RA1 – major cities; RA2 – inner regional; RA3 – outer regional; RA4 – remote; and RA5 – very remote. Remoteness classifications were investigated in two ways: RA2–5 and RA3–RA5. Tasmanian population data for the Tasmanian postcodes were obtained from the Australian Bureau of Statistics. This allowed remoteness areas to be differentiated according to the Modified Monash Model for graduates working within Tasmania. Only Tasmanian regions are used in this study as the model still requires external validation in each state[14].

Data were entered into an Excel spreadsheet then imported into the Statistical Package for the Social Sciences v21 (IBM; http://www.spss.com) for analysis. Frequencies were run to describe the data, with percentages calculated for categorical data, means with standard deviations calculated for normally distributed scale data, and medians and interquartile ranges (IQR) calculated for non-parametric data. Pearson's χ^2 and Fisher's exact tests were used to investigate differences in categorical variables between students who had spent at least a year at UTAS RCS and UTAS SoM graduates who only attended the other clinical schools. All tests were two-sided and $p<0.05$ significance level was used for all tests. Odds ratios (OR) with 95% confidence intervals (CI) were calculated for significant χ^2 results.

Ethics approval

Ethics approval was gained from the Social Sciences Research Committee (Tasmania) network, references H12949 and H13913.

Results

There were 974 graduates of UTAS SoM from 2002 to 2013, 202 (21%) of whom spent one or two clinical years at UTAS RCS. Median age at graduation was 24 years (IQR 23–26, range 22–59) for both the UTAS RCS and UTAS SoM graduates, and 508 (51%) graduates were women.

In 2014 a total of 105 (11%) of graduates were unable to be traced through the AHPRA database. AGSC remoteness classifications were available for the remaining 869 graduates. Figure 1 shows the number of UTAS medical graduates working in RA1 and RA3–5 areas by year of graduation. A larger proportion of UTAS RCS students were working in an AGSC RA2–5 area compared to UTAS SoM students (57% vs 49%, $\chi^2(1)=4.3$, $p=0.038$; OR 1.4, 95%CI 1.0–2.0) (Table 1). After restricting the rural category to RA3–5 (outer regional, rural or remote), the difference was considerably greater (28% vs 7%, $\chi^2(1)=59.5$, $p<0.0001$; OR 4.9, 95%CI 3.2–7.6). Female graduates were not more likely than men to be working in an RA3–5 area (53% vs 47%, $\chi^2(1)=0.2$, $p=0.58$).

There were 328 graduates working in Tasmania, with no difference between the schools for the proportion of graduates working in the state (37% vs 38%, $\chi^2(1)=0.1$, $p=0.76$). Twenty five of the 30 graduates working in north-western Tasmania, where the UTAS RCS is hosted, were UTAS RCS graduates. These graduates were predominantly (66%) working in the two postcodes where the two main regional hospitals are situated.

Among the 541 graduates working interstate (mainland Australia), 26 RCS graduates were working in RA3–5 areas, compared to 30 SoM graduates (22% vs 7%, $\chi^2(1)=0.2$, $p<0.0001$; OR 8.9, 95%CI 4.7–17.2). Among the 328 graduates working in Tasmania, 22% were working in RA3–5 areas compared to 7% of SoM graduates ($\chi^2(1)=22.7$, $p<0.0001$; OR 3.8, 95%CI 2.1–6.6).

The Modified Monash Model was applied to the Tasmanian context only. This excluded 531 students who were working interstate in 2014. Among the remaining 328 students, 30 RCS and 21 SoM graduates were working in Modified Monash Model categories 3–5 areas (44% vs 8%, $\chi^2(1)=53.3$, $p<0.0001$; OR 8.9, 95%CI 4.7–17.2) (Table 2). The UTAS RCS supplied 109 graduates per 100 000 people to Modified Monash Model category 2 areas in Tasmania and 16 per 100 000 graduates to category 3 areas in Tasmania (Table 3).

Table 1: Graduates of the University of Tasmania School of Medicine (2002–2013) practice locality in Australia, 2014, using Australian Standard Geographic Classification – Remoteness Areas

ASCG remoteness classification	Rural Clinical School graduates, *n*=185† (%)	School of Medicine graduates, *n*=684† (%)	*p* value
RA1 – major city	79 (42.7)	351 (51.3)	Not able to calculate due to small expected cell frequencies
RA2 – inner regional	55 (29.7)	284 (41.7)	
RA3 – outer regional	48 (25.9)	45 (6.6)	
RA4 – remote	3 (1.6)	1 (0.1)	
RA5 – very remote	0 (–)	3 (0.4)	
Working in RA2–5 (regional, rural or remote)	106 (57.3)	333 (48.7)	0.038
Working in RA3–5 (outer regional, rural or remote)	51 (27.6)	49 (7.2)	<0.0001

† Percentages exclude 105 students (17 Rural Clinical School and 88 School of Medicine) with unknown current work location
ASCG, Australian Standard Geographic Classification. RA, remoteness area

Table 2: Supply of medical graduates to Tasmania using Modified Monash Model

Modified Monash Model† Tasmania category	Rural Clinical School graduates, *n*=68† (%)	School of Medicine Graduates, *n*=260† (%)	*p* value
Category 2 (RA2–3 with population >50 000)	38 (55.9)	239 (91.9)	Not able to calculate due to small expected cell frequencies
Category 3 (RA2–3, population 15 001–50 000)	17 (25.0)	8 (3.1)	
Category 4 (RA2–3, population 5000–15 000)	11 (16.2)	5 (1.9)	
Category 5 (RA2–3, population <5000)	2 (2.9)	8 (3.1)	

†Excludes 105 students with unknown current address and 541 students not residing in Tasmania
RA, remoteness area

Table 3: Supply of medical graduates to Tasmania, per 100 000 people, using Modified Monash Model

Modified Monash Model† Tasmania category	Population	Total graduates (% UTAS RCS)	Graduates/ 100 000 people
Category 2 (RA2–3, population >50 000)	255 205	277 (13.7)	108.5
Category 3 (RA2–3, population 15 001–50 000)	159 255	25 (68)	15.7
Category 4 (RA2–3, population 5000–15 000)	139 130	16 (68.8)	11.5
Category 5 (RA2–3, population <5000)	101 132	10 (20)	9.9
Categories 6 and 7 (RA4–5)	5378	0	0

†Excludes 105 students with unknown current address and 541 students not residing in Tasmania
RA, remoteness area. RCS, Rural Clinical School. UTAS, University of Tasmania

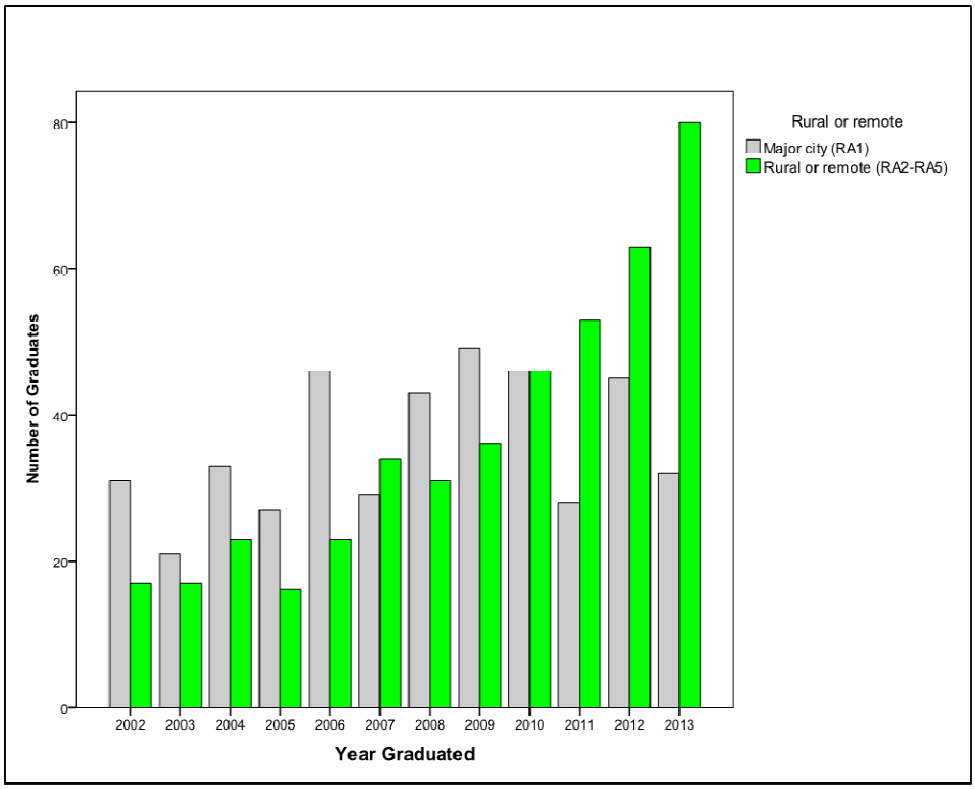

Figure 1: University of Tasmania School of Medicine (including Rural Clinical School) graduate locality in Australia, 2014, differentiated by remoteness areas 2–5.

Discussion

The UTAS School of Medicine in Tasmania supplies a significant proportion of graduates to the medical workforce in Tasmania. Tasmanian graduates appear more likely to work regionally and rurally than those graduates trained in capital cities on the mainland. Whereas over 49% of graduates in this study were working in RA2–5, 16% of graduates of a rural clinical school cited in a Western Australia study were working in RA2–5[3]; however, this reflects the classification of the Tasmanian capital (Hobart) as RA2 compared with RA1 state capitals on the mainland. The early placement data shows that the 49% working in RA2–5 is most comparable to the regional James Cook University in northern Queensland, where 60% of graduates worked in RA2–5[4].

When rurality was defined by ASGC RA3–5, graduates that spent at least a year at the UTAS RCS were significantly more likely to work in rural and remote areas (RA3–5) than those UTAS SoM graduates that did not attend the UTAS RCS (27% vs 7%).

The Modified Monash Model helped to illustrate the difference in supply of medical graduates to sparsely populated areas of Tasmania. While it is expected that more graduates would work in Hobart and Launceston, because the bigger hospitals are in these cities, regional hospitals are based in some of the smaller cities (ie Burnie and Devonport). The data does show that both proportionally and absolutely the UTAS RCS is supplying graduates to the smaller cities and towns of Tasmania.

The UTAS RCS started taking students as early as 2002 but had very limited numbers for the first 5 years whilst its infrastructure was being built. The UTAS RCS reached its training quota of 25% of all domestic students in 2009. Most of the UTAS graduates now working in north-western Tasmania are graduates of the UTAS RCS in their early postgraduate years (PGY1–3), reflecting the dates that the UTAS RCS took on larger cohorts of students.

While the data collected is a snapshot of workplaces of UTAS graduates it also demonstrates trend. Doctors in their early years of training are choosing to work in rural locations, but there is a drift back to urban areas, which is particularly evident after PGY3 (Fig1). One possible reason for the urban drift after PGY1–3 is that doctors currently need to move back to the cities to access specialist training. This effect might be reduced with expanded numbers of general practice places in rural and regional areas, allowing more general practitioners to train where they are needed most[15]. Continued development of regional postgraduate specialty programs is needed to allow graduates to continue their training in regional or rural areas[16].

Limitations

The UTAS RCS only started graduating significant numbers in the last 5 years. Doctors take at least another 10 years to finish training and to gain general practice and specialist posts, so these are early figures. Tracking postgraduate choices will continue through the AHPRA database to identify where graduates actually end up in established practice.

Conclusions

This study adds to the growing evidence that training medical students in rural areas delivers graduates that work rurally. The additional year spent in a rural area, even when their medical school is in a regional area, significantly affects their workplace choices over the first 3 years post-graduation. Rural areas that are underserviced need to train medical students locally, even if there is a regional university. The data showed that graduates that train as little as 4 hours away are unlikely to move to work to these areas. The data also confirms the urgent need to align postgraduate training to ensure that more training is undertaken regionally and remotely.

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