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Effect of medical student preference on rural clinical school experience and rural career intentions

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LW and JMc have direct leadership responsibilities for medical student education programs in Australian rural clinical schools. Their students participate in the FRAME exit survey.

Criteria for inclusion in the authors'/contributions' list

LW and DD developed the study design and the data collection process, LW drafted the initial version of the manuscript. AS and JMc analysed the data and presented initial results to the group. DP, JMc, RS, AS and LW contributed to data interpretation and critical revision and all authors approved the final version of the paper.

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The effect of medical student preference on rural clinical school experience and rural career intentions.

Abstract

Background:

The key parameter for Rural Clinical Schools (RCSs) is to provide at least 1 year of clinical training in rural areas for 25% of Australian Commonwealth supported medical students with the intent to influence future rural medical workforce outcomes. The objective of this study is to describe the association between a medical student's selection preference and their RCS experience and rural career intent.

Methods:

Medical students completing a RCS placement in 2012 and 2013 were encouraged to complete a survey regarding their experience and future career intent. Data were analysed to compare medical students for whom the RCS was their first choice with students who described the RCS as other than their first preference.

Results:

Students for whom RCS was their first choice (724/1092) were significantly more likely to be female, come from a rural background and be from an undergraduate programme. These students reported more positive experiences of all aspects of the RCS programme (costs, access, support and networks, safety) and were 2.36 times more likely to report intentions to practice in a non-metropolitan area [OR 2.36 (95%CI 1.82-3.06), $p<0.001$]. This was true for students of rural [OR = 3.11 (95% CI 1.93-5.02), $p<0.001$] and metropolitan backgrounds [OR = 2.07 (95% CI 1.48-2.89), $p<0.001$]. More students in the first choice group (68.8%) intended to practice in a regional area (not a capital or major city), significantly higher than the 48.4% of participants in the other preference group [$X^2(1)= 42.79$, $p<0.001$].

Conclusions:

122 The decision to choose a RCS placement is a marker of rural career intention and a positive rural

123 training experience for students of both rural and metropolitan backgrounds. It may be important to

124 identify other preference students and their specific social support needs to ensure a positive

125 perception of a future rural career.

126

127 ## Introduction

128 In Australia, Rural Clinical Schools (RCSs) provide at least one year of clinical training in rural areas
129 for 25% of Australian Commonwealth supported medical students. The intent is to strengthen future
130 rural medical workforce. There is considerable evidence in the literature demonstrating the positive
131 impact on rural medical workforce recruitment of meaningful exposure to rural areas during medical
132 school.[1] Some of this literature also suggests that voluntary rural placement positively impacts health
133 professional students' feelings towards rural practice [2-4].

134

135 At the time of this study, there are three common selection processes used to allocate medical students
136 to rural clinical schools. Firstly, a number of medical schools have admission options where
137 candidates apply for an RCS-linked medical school position[5]. Secondly, other medical schools invite
138 medical students to apply to the RCS in a competitive process, sometime after they have been
139 accepted into medicine. Finally, many medical schools run an allocation process for RCS and urban
140 clinical placements based on student preference, taking into account special circumstances and
141 placement numbers. These three selection processes can all result in students gaining either their first
142 choice or another preference for clinical training. The objective of this study is to describe the
143 association between a medical student's selection preference and their RCS experience and career
144 intent.

145

146 ## Methods

147 Since 2007, the Federation of Rural Australian Medical Educators (FRAME) has collected data from
148 medical students who have recently completed a full academic year at a rural clinical school (RCS) in
149 Australia about their experience and future career intent [6]. Note that the Australian Standard
150 Geographical Classification RA2-5 was used as the definition of rural, excluding metropolitan
151 centres. Research Ethics was granted by Flinders University Social and Behavioural Research Ethics
152 Committee (project 4098). Medical students from 19 RCS were invited to complete the questionnaire

153 during a period from four weeks prior to completion of their RCS placement to 12 weeks after
154 completion of their placement. Individual medical schools nominated whether to invite students by
155 email to participate in an online version of the questionnaire or to have administrative staff at the RCS
156 distribute paper-based questionnaires.

157

158 Responses to the 2012 and 2013 versions of the questionnaire (available
159 at http://www.ausframe.org/index.php/2012-06-15-05-28-07/national-rcs-project-secure-data-linkage
160) have been analysed herein, comparing responses from students whose preference to attend a RCS
161 was their top choice with students for whom it was not their first choice (other preference group).
162 SPSS (Version 22, SPSS Inc., Chicago, USA) was used to calculate descriptive statistics and
163 determine differences between groups. Due to small numbers in some categories of preferred location
164 of future practice, small rural community and remote areas were coded as one cohort.

165

166 Missing data were excluded from analysis on a variable by variable basis. Categorical responses were
167 analysed using Pearson's Chi Square test and continuous variables were analysed using Student's T-
168 test with a significant p-value <0.05. Wilcoxon signed ranks tests were used for questions relating to
169 views (ordinal data) prior to and following attendance at a Rural Clinical School. The odds ratio (OR)
170 for future practice in a metropolitan vs non-metropolitan area (RA2-5), as influenced by whether
171 attendance at a RCS was a student's first choice, was determined via binary logistic regression.

172

173 Results

174 There were 440 and 652 responses to the 2012 and 2013 FRAME questionnaires respectively (1092
175 participants). Survey response rates were 72% of the students invited to participate in 2012 and 88%
176 of this cohort in 2013. Students from Monash University, the University of Wollongong and the
177 University of Melbourne made up 20.9, 12.8 and 10% of responses, respectively. Overall, students

178 from Victoria and New South Wales contributed almost three quarters of responses (73.4%). The

179 majority of rural clinical schools engaged in the study (Table 1).

180

181 Table 1: Response proportions for all Rural Clinical Schools

University Rural Clinical School by State	Number of responses (%)			School response rates
	2012	2013	All	
AUSTRAIAN CAPITAL TERRITORY				
Australian National University	5 (1.1)	20 (3.1)	25 (2.3)	57%
SOUTH AUSTRALIA				
Flinders University (Flinders University RCS)	27 (6.1)	31 (4.8)	58 (5.3)	*73%
Flinders University (NT Rural Clinical School)	-	5 (0.8)	5 (0.5)	
University of Adelaide	-	35 (5.4)	35 (3.2)	85%
VICTORIA				
Deakin University	-	-	-	-
Monash University (Undergraduate)	54 (12.3)	60 (9.2)	114 (10.4)	*96%
Monash University (Graduate)	63 (14.3)	52 (8.0)	115 (10.5)	
University of Melbourne (Undergraduate)	36 (8.2)	20 (3.1)	56 (5.1)	*94%
University of Melbourne (Graduate)	9 (2.0)	44 (6.7)	53 (4.9)	
NEW SOUTH WALES				
University of Newcastle	32 (7.3)	30 (4.6)	62 (5.7)	88%
University of New England	20 (4.5)	20 (3.1)	40 (3.7)	70%
University of New South Wales	11 (2.5)	63 (9.1)	74 (6.8)	58%
University of Notre Dame (Sydney)	11 (2.5)	23 (3.5)	34 (3.1)	54%
University of Sydney	17 (3.9)	55 (8.4)	72 (6.6)	58%
University of Western Sydney	18 (4.1)	24 (3.7)	42 (3.8)	80%
University of Wollongong	71 (16.1)	69 (10.6)	140 (12.8)	92%
WESTERN AUSTRALIA				
University of Western Australia (Undergraduate)	2 (0.5)	41 (6.3)	43 (3.9)	*47%
University of Western Australia (Graduate)	3 (0.7)	15 (2.3)	18 (1.6)	
University of Notre Dame (Fremantle)	2 (0.5)	23 (3.5)	25 (2.3)	52%
TASMANIA				
University of Tasmania	57 (13.0)	22 (3.4)	79 (7.2)	90%
No affiliation	2 (0.5)	-	2 (0.2)	-
Total	440 (100.0)	652 (100.0)	1092 (100)	

182 **Response rates are calculated at a university level as the authors did not collect the potential numbers of*
183 *students in each school subgroup.*

184

185 Overall, 724 of 1,092 students across Australia who attended the RCS chose their placement as their

186 first choice, indicating that for 33.7% (n=368) of participants their RCS placement was a preference

187 other than first choice (Table 2).

188

189

190

191 Table 2: Reported preference to attend a RCS

	Number of participants	%
My last choice	37	3.4
Low on my list	37	3.4
My mid choice	117	10.7
High on my list	177	16.2
My first choice	724	66.3

192

193 Overall, 45.4% of participants had attended an Australian secondary/high school outside a capital city
194 or major urban centre. These participants attended an average of 5.1 years (+/- 1.6 SD) of high school
195 outside a capital city or major urban centre, with no significant difference in years of attendance
196 between first choice and other choice groups. . No difference was observed between the first choice
197 and other preference groups in age, bond status, and mean number of years of high school spent
198 outside a capital city (Table 3). Over 60% of RCS first choice participants were female compared to
199 54% of other preference students [$X^2(1)=4.31$, $p=0.038$]. Almost 56% of participants whose first
200 choice was a RCS were from universities with undergraduate entry into medicine compared with 38%
201 of other preference students [$X^2(1)=29.68$, $p<0.001$]. Rural origin students were more commonly
202 found in the first choice group [45% compared to 37%, $X^2(1)=6.69$, $p=0.010$].

203 Table 3: Demographic characteristics of participants

Characteristic	RCS first choice (n=724)	RCS other preference (n=368)	All (n=1092)	X^2, p-value (T, p-value)
Age [Mean (SE)]	25.7 (0.17)	26.2 (0.18)	25.9 (0.13)	1.69, p=0.090
Gender [frequency (%)]*				
Male	283 (39.4)	167 (46.0)	450 (41.6)	4.31, p=0.038
Female	435 (60.6)	196 (54.0)	631 (58.4)	
Bond status [frequency (%)] #				
Bonded	240 (33.3)	109 (29.9)	349 (32.1)	1.30, p=0.254
un-bonded	481 (66.7)	256 (70.1)	737(67.9)	
Self-identified background [frequency (%)]*				
Non-rural	393 (55.2)	226 (63.5)	619 (58.0)	6.69, p=0.010
Rural	319 (44.8)	130 (36.5)	449 (42.0)	
Years of high school outside a capital city [Mean (SE)]				
	2.43 (0.104)	2.41 (0.15)	2.42 (0.09)	-0.138, p=0.890
Entry [frequency (%)]**				
Undergraduate	404 (55.9)	141 (38.4)	545 (50.0)	29.68, p<0.001
Graduate	319 (44.1)	226 (61.6)	545 (50.0)	
Participated in longitudinal integrated clerkship [frequency (%)]				
Yes	361 (50.3)	194 (54.3)	555 (51.7)	1.52, p=0.217
No	356 (49.7)	163 (45.7)	519 (48.3)	

204 **p<0.05, **p<0.01*
205 *# Bonded medical students at the time this data was collected had received a place in medical school based on*
206 *the requirement that they work rurally after graduation for equivalent numbers of years as their medical course*
207

208 There were significant differences in which geographical area participants intended to practice upon
209 completion of their medical training [$X^2(3)=47.58$, $p<0.001$] (Table 4). Significantly fewer first
210 choice participants intended to practice in a capital or major city [31.2% vs 51.5 %, $X^2(1)=42.79$,
211 $p<0.001$]. More students in the first choice group (24.2%) intend to practice in a smaller town,
212 significantly higher than the 13.5% of participants in the other preference group [$X^2(1)=16.88$,
213 $p<0.001$]. In addition, more first choice participants reported intending to work in a small rural
214 community or remote area (8.7% compared with 4.4%) [$X^2(1)=6.66$, $p=0.010$].

215

216 Overall, first choice students were 2.36 times more likely to report intentions to practice in a non-
217 metropolitan area than other preference students [OR 2.36 (95%CI 1.82-3.06), $p<0.001$]. If only
218 students who reported having a metropolitan background are included in the analysis, first choice
219 participants were twice as likely to indicate future rural practice [OR = 2.07 (95% CI 1.48-2.89),
220 $p<0.001$] as students in the other choice group. First choice students with a reported rural background
221 were three times as likely to indicated future rural practice as rural background students in the other
222 preference group [OR = 3.11 (95% CI 1.93-5.02), $p<0.001$].

223

224 Students in the first choice group were more likely to agree with the statement (in 2013 survey only)
225 that their RCS medical experience increased their interest in pursuing a career in regional or rural
226 Australia [88.2% vs 75.7%, $X^2(1)=16.94$, $p<0.001$] and remote and very remote Australia [42.6 vs
227 30.8%, $X^2(1)=8.51$, $p=0.004$]. More first choice RCS students agreed with the statements that they
228 intend to do further medical training (PGY2, PGY3, PGY4 and PGY5) based in a non-metropolitan
229 area (RA2-5) ($t=-5.269$, $p<0.001$).

230

231

232

233 Table 4: Impact on career intentions

Location	Participants (%)			X^2, *p*-value
	First choice	Other preference	All	
Preferred geographical location for future practice (RCS)				
capital or major city**	222 (31.2)	187 (51.5)	409 (38.0)	42.79, p<0.001
inner regional city (25 000 - 100 000)	256 (36.0)	111 (30.6)	367 (34.1)	3.20, p=0.074
smaller town (10 000 - 24 999)**	172 (24.2)	49 (13.5)	221 (20.6)	16.88, p<0.001
small rural community or remote area*	62 (8.7)	16 (4.4)	78 (7.3)	6.66, p=0.010
My RCS medical experience has increased my interest in pursuing a career in (% agreed) (2013 only):				
General practice	277 (65.6)	137 (62.3)	414 (64.5)	0.72, p=0.397
A medical career in regional or rural Australia**	374 (88.2)	168 (75.7)	542 (83.9)	16.94, p<0.001
A medical career in remote and very remote Australia (RA4-5)**	180 (42.6)	68 (30.8)	248 (38.5)	8.51, p=0.004
I intend to do the following years of training based in a non-metropolitan areas RA 2-5 (% agree) (2013 only)				
Internship	213 (50.4)	79 (35.6)	292 (45.3)	12.82, p<0.001
Accredited PGY2 in specialty of preference	227 (53.7)	93 (42.3)	320 (49.8)	7.51, p=0.006
Accredited PGY3 in specialty of preference	227 (53.9)	88 (40.4)	315 (49.3)	10.55, p=0.001
Accredited PGY4 in specialty of preference	229 (54.1)	85 (38.6)	314 (48.8)	13.92, p<0.001
Accredited PGY5 in specialty of preference	222 (52.6)	85 (38.8)	307 (47.9)	10.99, p=0.001

234 **p<0.05, **p<0.01*

235

236 Table 4 indicates that RCS medical experience increased participants' interest in general practice
237 (65% of total cohort). Further exploration of future specialty plans found that overall preference for
238 general practice did not increase when compared to participants reported career preference before
239 commencing RCS. When asked about career preference on entry to a RCS significantly more first
240 choice participants chose general practice or rural medicine as their first preference [30.6 vs 19.8%,
241 $X^2(1)=13.70$, $p<0.001$] and significantly more other preference participants ranked sub-specialist as
242 their first choice [28.9 vs 20.5%, [$X^2(1)=9.20$, $p=0.0002$]. There was no significant change in these
243 preferences for either group when asked about career preference upon exit from their RCS.

244

245 More students in the first choice group would recommend the RCS experience to other medical
246 students than did other preference students [96.1% vs 86.7%, $X^2(1)=32.39$, $p<0.001$]. Significantly
247 more students in the first choice group reported that "Overall I felt well supported by my RCS"
248 [87.1% vs 69.9%, $X^2(1)=46.42$, $p<0.001$]. This was true for their experience of financial [66.1% vs

249 52.1%, $X^2(1)=19.83$, $p<0.001$], and academic [87.3% vs 76.9%, $X^2(1)= 18.85$, $p<0.001$] support, as

250 well as their sense of wellbeing [84.5% vs 66.5%, $X^2(1)=27.78$, $p<0.001$]. Significantly fewer first

251 choice students reported feeling academically isolated [25.3% vs 36.4%, $X^2(1)=14.22$, $p<0.001$]. The

252 greatest difference between the two groups related to whether they felt socially isolated [27.6% vs

253 48.0%, X2(1) = 26.61, $p<0.001$]

254

255 Table 5: Participant agreement with statements about their RCS experience

	Somewhat agree or strongly agree on 5-point Likert scale [frequency (%)]			
	First choice	Other preference	All	X^2, p-value
Would recommend the RCS experience to others**	692 (96.1)	314 (86.7)	1006 (93)	32.39, p<0.001
Overall I felt well supported by my RCS**	626 (87.1)	251 (69.9)	877 (81.4)	46.42, p<0.001
I felt well supported financially by my RCS**	475 (66.1)	188 (52.1)	663 (61.4)	19.83, p<0.001
I felt well supported academically by my RCS**	630 (87.3)	277 (76.9)	907 (83.8)	18.85, p<0.001
I felt academically isolated during my rural placement[a]**	183 (25.3)	131 (36.4)	314 (29.0)	14.22,p <0.001
I felt socially isolated during my RCS placement**	118 (27.6)	106 (48.0)	224 (34.6)	26.61, p<0.001
I have a rural based clinician as a mentor[a]*	257 (60.5)	110 (50.5)	367 (57.1)	5.90, p=0.015
I have a metro based clinician as a mentor[a]	76 (18.1)	39 (17.9)	115 (18.0)	0.003, p=0.960
My RCS informed me of health and counselling services that I could access for support if needed*	322 (44.8)	133 (37.1)	455 (42.3)	5.80, p=0.016
Overall, my RCS placement impacted positively on my wellbeing[a]**	360 (84.5)	147 (66.5)	507 (78.4)	27.78, p<0.001

256 **p<0.05, **p<0.01, [a] 2013 participants only*

257

258 Discussion

259 There were striking differences between the responses of first choice and other preference students on

260 the FRAME survey of student experience and work intention. Students whose first choice was to

261 enter RCS were consistently positive about their RCS experience; more so than their other preference

262 peers. First choice students reported being better supported financially and academically, feeling less

263 isolated during their rural year, and having their wellbeing more positively impacted than other

264 preference students. These findings are particularly significant because a previous study has shown

265 that health professional graduates' workforce outcomes are strongly related to their subjective course-

266 based experiences [4]. In this respect it may be important to be aware of the experiences of other
267 preference students in the RCS to ensure that negative experiences do not adversely impact on
268 decisions about rural practice.

269

270 Indeed the present study data confirms that first choice entrants were more likely than other
271 preference entrants to prefer a rural location for their subsequent practice. This first choice effect was
272 accentuated in their higher preference for small town, remote and very remote work. Previous studies
273 have identified that RCS graduates in general work more remotely [7-8]. Recognising that RCS student
274 interest in non-metropolitan work is reassuringly higher than their city-based peers[9], we propose that
275 first choice students may be responsible for this effect. The rural preference appears robust because
276 first choice, over other preference students, preferred rural locations for prevocational as well as
277 vocational training. Furthermore, these first choice students were more likely to opt for a vocational
278 choice – general practice - which is compatible with their preferred work location. The results
279 presented does not demonstrated that RCSs provide independent impact enough to change the career
280 preference of many students who commenced without interest in rural and remote careers or general
281 practice. However knowing that tertiary hospital experience is de-motivating to students who wish to
282 pursue both both rural and general practice, it is valuable to recognise the impact RCSs have on
283 cementing students' interests in rural and remote practice and in general practice.

284

285 The strength of these data lies in the consistent difference between first choice and other preference
286 responses throughout the survey. Although 66% of the sample was first choice, half of the remainder
287 put RCS as "high on the list" yet were consistently more negative about their experience and rural
288 career intentions. This demonstrates that there is something very important about students for whom
289 a RCS is their first choice. The distinction may be partly due to demographic factors, since there were
290 clear differences between the characteristics of first choice and other choice students. RCS students
291 who identified as rural background were more likely to have made the RCS their first choice. This

292 may be due to rural students' prior commitment to rural practice[9], to their different sense of place[10]
293 and our data on social isolation among non-first-preference students suggest that they may also be in a
294 better position than their urban peers to disengage from their metropolitan based social support
295 networks and re-establish networks in a rural area during the clinical years of their medical course [11].
296 On the other hand 55% of first choice students were from non-rural backgrounds and further analysis
297 of the data must be done to clarify this issue.

298

299 First choice students were also significantly also more likely to be female. The predilection of women
300 for entering RCS has been described previously [12]. FRAME survey data demonstrate that between
301 2009 and 2014 women consistently made up 58-59% of the cohort [13]. However, this is the first
302 demonstration that the gender difference in interest persists even amongst those who actually enter
303 RCSs, with men entering with lower preferences than women. The reasons for the association
304 between women and RCSs requires further exploration. One possibility is that female students are
305 attracted to the wealth of positive female role models who contribute as clinical academics in
306 Australian RCSs [14]. This finding may also demonstrate that rural practice lacks the rarefied medical
307 hierarchies traditionally found in tertiary hospital specialist training, which can override the capacity
308 for individuals to influence their way of practicing [15].

309

310 The principal limitation of this study is the possibility of a systematic bias where students' preferences
311 for RCS have been influenced by reliable reports of poor levels of support provided by specific RCSs.
312 For example, an RCS that provides less support may attract fewer first preference students, and the
313 students attending such a RCS would be less likely to report that they were well supported. As the
314 majority of RCSs are distributed across multiple sites, such a systematic error is unlikely. It is more
315 likely that other preference students require additional or alternate accommodation and social supports
316 and have wisely altered their preferences for clinical training locations accordingly [16].

317

318 It is unlikely that academic support would be systematically different between first choice and other
319 preference students, however the level of academic support was experienced differently between first
320 choice and other preference students. Other preference students are by definition not in their
321 preferred placement locations. It is noteworthy that the most marked difference between the first
322 choice and other preference groups is in students' reported levels of social isolation. It is possible that
323 confirmation bias may predetermine the anxiety of other preference students, increase their sense of
324 social isolation and create a subconscious case-building process leading to reporting more negative
325 perceptions of the support they receive from their RCS [17]. Even if the differences in reported
326 academic support were due to subjective differences in perception, we offer the first data to suggest
327 that it is important to identify other preference students and identify their specific social support
328 needs.

329

330 ## Conclusions

331 This is the first time that the workforce impact of RCS entrance preference has been reported.
332 Preference for RCS is a significant factor in predicting students' reported positive experience during
333 RCS training. The extent to which reported positive experience is related to objective differences in
334 support requirements or confirmational bias is yet to be explored.

335

336 The data also indicate that entrance preference could be a significant factor in students' subsequent
337 workforce choices. RCS can cement interest in rural practice in students who did not initially
338 preference rural clinical school attendance. First choice students were significantly more positive than
339 other preference students in expressing a rural career intention. This finding was the case for
340 prevocational as well as vocational training. This highlights the priority to ensure that, as far as
341 possible, first preference students are provided with the opportunity to participate in rural clinical
342 school training. It may also be of value to identify other preference students and their specific social
343 support needs, to proactively facilitate a more positive perception of a future rural career.

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