

<b>Article details: 2018-0205</b>	
<b>Title:</b> Regional Campuses Matter: A Retropective Longitudinal Cohort Study	
<b>Authors:</b> Chris Y. Lovato PhD, Helen C.H. Hsu MSc, Joanna Bates MDCM, Oscar Casiro MD, Angela Towle PhD, David Snadden MCISc MD	
<b>Reviewer comments</b>	<b>Author response</b>
<b>Reviewer 1:</b> Thomas Lecraoix; University of Western Ontario, Southwestern Ontario Medical Education Network	
1. While I have an interest in whether regional medical campuses promote rural practice, I am also extremely curious to find out the effect on promotion of regional generalist specialties, perhaps this could be her next study!	Done, noted in limitations.
<b>Reviewer 2:</b> Steve Slade	
1. I think there's an incorrect reference to Table 3 on page 8. The sentence should read, " Findings from multiple logistics regression on rural family practice (Table 4) indicate students...."	Done
2. Among the limitations, the authors may want to mention that the study does not look at location of post-MD training. If you do your undergrad and postgrad at a regional campus, how much more/less likely are you to go into rural practice? Does RMC post-MD training have a greater/lesser impact on practice location choice than undergrad RMC education?  Also, there is a potential bias consideration related to discipline choice and RMC post-MD training. In general, I think RMCs offer a narrower range of post-MD training disciplines compared to main campuses. Thus, if your primary motivation is to do post-MD training at a rural campus you may be more likely to choose family medicine simply because of the relatively limited number of discipline choices you have, regardless of whether or not you did your undergrad at a RMC	It has been noted in the limitations section that we didn't include post MD-training just residency speciality.  To clarify the point regarding RMC training, we have added a sentence to the section setting that states, "All students, regardless of training site, are required to complete the same clinical rotations.
3. In the limitations section the authors make the very important observation that some of their sample was still in post-MD training at the time of doing their analysis (39% or 352/904). It's not clear if these trainees were excluded from the analysis entirely or if they were included for parts of it. For instance, was it possible to use current trainee information to determine their PGME discipline choice, but not their eventual practice location? Either way, it seems certain that the findings could change in a future analysis that contains complete data for the entire original sample.	See Figure 1 for this detail regarding the study sample. Students in post-MD training were not included in the sample.
<b>Reviewer 3:</b> Lawrence Loh; University of Toronto, Dalla Lana School of Public Health	
1. The use of the term "prospective longitudinal cohort study" to describe this study is confusing to me, particularly in reviewing the data extraction as described on page 5. It is not clear to me that this is administrative data from a faculty database (i.e. sex, age, postal code from address from info at admission) that was repurposed into a cohort after the fact along with the outcome of interest - which would be more retrospective - versus an actual "cohort" created between 2004-2007 where students, when admitted, were specifically asked for these details at the time of admission and advised as to the study purpose for why this data was being collected, and then followed through to the outcome of interest (in this case, family medicine and rural practice.) This is explained by a great	Done

<p>graphic in Wikipedia here, and based on what I see I am assuming (since it was "extracted" rather than "collected") that this is a retrospective study since data on both the initial contributing factors and the outcomes of interest were all collected after the fact.</p> <p><a href="https://en.wikipedia.org/wiki/Prospective_cohort_study#/media/File:ExplainingCaseControlSJW-en.svg">https://en.wikipedia.org/wiki/Prospective_cohort_study#/media/File:ExplainingCaseControlSJW-en.svg</a></p>	
<p>2. While the name prospective / retrospective may seem semantic, it relates to the second concern I have with this paper in that not all variables are accounted for in the model. Specifically, one wonders about other factors such as socioeconomic status and financial considerations (i.e. debt), marital status, ethnic background, ever rural (as opposed to just rural background based on an entry postcode, e.g. someone who had grown up 16 years in the countryside but lived in Vancouver for four years during undergrad), that in a true prospective study might have been collected in order to build a model.</p>	<p>See our response to previous comment (Editor #2).</p>
<p>3. Another more important factor not explained or considered here: location of residency vs. location of medical school. I presume the RMC exposure relates to medical school. If it relates to both, how was this addressed in the model? How would location of residency have factored into these models as well?</p>	<p>See our response to previous comment (Reviewer 2-Comment 2)</p>
<p>4. Finally, also related to this, and I am happy to take response from the authors on this if it comes back for revision, but I believe the exclusion of Main Campus as a potential covariate in the logistic regression presents challenges in the interpretation that has been offered because essentially you are comparing the two regional campuses but not comparing them against data and outcomes related to Main Campus as the exposure. This makes it difficult to say with certainty that RMC attendance is associated with the outcomes of interest, because it's really just the RMCs that are included in the model as opposed to including the Main Campus for comparison.</p>	<p>The campus variable has three categories: Main Campus, IMP-RMC and NMP-RMC. Main Campus is defined as the reference category in the logistic regression model, therefore, each RMC is separately compared to the Main Campus in the model.</p>
<p>5. There is also a question of the heterogeneity of outcomes on the rural model. Worth noting that the year 2015 gets mentioned in the results, but there is no clarity from the methods or background as to why this timeframe was selected (I presume 10 years after the opening of the RMCs?) and also demonstrates the heterogeneity of the outcomes that were included i.e. some were full time MDs and some were trainees in Canada, who were included, and then others were outside of Canada or lost to follow-up, who were presumably not included. Were trainees included or excluded? If they were included, then presumably those at RMCs would be categorized as "rural" settings (or even "urban" settings as identified in the limitations around Prince George in the paper) so that would skew the results somewhat.</p>	<p>For 10-year justification see response to Editor's Comment #11 and page 5 of manuscript.</p> <p>See Figure 1 flow chart that clarifies who is included and excluded from the analysis.</p>
<p>6. This gets to Table 3 which seems to have an n of 309. It's not clear to me who these 309 folks are. I presume they are some mix of full physicians and trainees that trained at the RMCs and Main Campus since taken together the NMP-RMC and IMP-RMC add up to around 133 alone on the basis of practicing docs with no campus breakdown related to trainees.</p>	<p>See Figure 1 flow chart that clarifies who is included and excluded from the analysis.</p>
<p>7. I would be remiss if I did not point out another limitation which should be added which is the idea that this captures a point in time alone and not outcomes over a career (which is something that could be captured through a true prospective cohort where follow-up is conducted at regular intervals!) So, it may very well come to pass that those who are freshly new in practice are just sticking around in rural settings before moving, or data may not have been updated in time. The authors get at this somewhat on page 10 talking about how national databases don't capture sessional practice or locum before long-term, but could expand to talk about how this isn't also capturing people at 5-10-15-20 years out of training in general.</p>	<p>We have added a section to the limitations (page 10) that acknowledges this limitation and the need for additional research.</p>
<p>8. Page 8 - Suggest phrasing as "The main campus is located at UBC in Vancouver, whose metropolitan area population of 2.4 million is the largest in the province." City of Vancouver itself proper is closer to 600k, so you want to be</p>	<p>Done</p>

clear delineating metro vs. city proper populations.	
9. Page 5 lines 47-56 would benefit from specifying exactly which outcome data and covariate data was extracted here from the get go rather than having to figure it out from the results and tables, and also some clarity (e.g. how was rural background figured out? Was it based on address of application? Postcode of application?)	Done. See description of outcome measures and explanatory variables on page 6. For comment on rural background see our response to Editor Comment #13.
10. Page 6 lines 46-50; page 7 41-46, and page 11 9-14: I had to go back to my stats textbook to put my finger on this but I think the use of the t-test and the chi-squared test needs to be more clearly stated. This test determines whether the proportions observed in the tables are due to chance or otherwise. So a "significant" test suggests that the proportions are NOT due to chance alone. However, it does not mean that the variables are "significant" i.e. significantly associated to the outcomes in question. It just means the observed differences are being driven by more than just chance. So I would suggest framing it as the differences observed between the groups were deemed to be not by chance alone and leave it at that.	Done
11. Page 10, 22-23 - family medicine is considered a specialty, so may want to consider rewording ("physicians of other specialties" or "non-family medicine physicians")	Done
12. Table 3 - Sex and Campus n=309 and rural background n=301, but footnote b says missing data is 16 so not clear that the numbers all line up here.	See Figure 1 flow chart that clarifies who is included and excluded from the analysis.
<b>Reviewer 4: Kieran Quinn; University of Toronto, Medicine</b>	
1. I believe the main interpretation of the findings could be expanded somewhat. The findings that people who originate from rural settings are more likely to pursue rural practice is important.  Hospital infrastructure in rural regions may be limited to offer more specialized services like specific surgical procedures, which may by itself influence a trainee's decision to pursue Family Medicine if they wish to practice in a rural setting.  The two (rural practice location and family medicine specialization) appear collinear. More importantly, the main interpretation seems to be that offering medical students of rural origin the ability to train in rural centers provides them the opportunity to pursue their interests in practicing in locations they were destined to prefer from the beginning.	The interpretation section discusses this point.  As noted in setting section all trainees rotated through the same clinical rotations
2. The main interpretation described above also leads to one of the main limitations of the study that was not discussed – that the study was unable to measure the reported preferences of medical students of future preferences for location of practice. The fact that students of rural origin are more likely to practice in rural regions underscores this point.	The fact that we did not include location preferences of medical students of future location of practice has been acknowledged as a limitation.
3. Finally, it is not clear how the authors classified the 352 students who were still in clinical training in their statistical model. In all likelihood, these students are pursuing specialization in fields other than family medicine. I imagine an analysis that classifies these students in such a way may blunt (if not eliminate entirely) the	See Figure 1 flow chart that clarifies who is included and excluded from the analysis.

<p>primary finding surrounding choice to pursue family practice, which, as the authors point out is what makes this study novel to begin with.</p>	
<p>4. Title: I felt that the title could be more informative of the study objective as per the STROBE guidelines – it was unclear if this was going to be an essay, review or original research study.</p>	<p>Changed the title of the paper to, “Regional Campuses Matter: A Retrospective Longitudinal Cohort Study”</p>
<p>5. Introduction: The rationale is very clear and well-articulated. I wonder still, is the mismatch in the proportion of physicians who practice in rural locations compared to the proportion of Canadians living there important? Perhaps a statistic comparing the number patients per physician in rural versus urban areas would help justify this point.</p>	<p>We report the overall physician/population ratio (CIHI, 2016), however, the rural/urban ratio is not available in the literature. Pong and Pitblado (2005) have argued that these simple ratios are misleading when applied to rural populations.</p> <p>Pong RW, Pitblado JR. Geographic Distribution of Physicians in Canada: Beyond How Many and Where. Statistics Canada (2005). <a href="https://secure.cihi.ca/fr/ee_products/Geographic_Distribution_of_Physicians_FINAL_e.pdf">https://secure.cihi.ca/fr/ee_products/Geographic_Distribution_of_Physicians_FINAL_e.pdf</a> Accessed May 16, 2019.</p>
<p>6. Methods: This may be the only genuine multivariate analysis that I’ve come across in a long time! Given that the prevalence of misuse of these terms is so high (Hidalgo et al Am J Public Health 2013), I was hoping to see a sentence or two on why this model was chosen.</p>	<p>This study used multivariable logistic regression analysis to observe the impact of the 3 independent variables on the binary outcome (rural vs urban family practice). We did not conduct a multivariate analysis.</p>
<p>7. Results: Are trainees of rural origin who train at urban centres less likely than their counterparts to practice family medicine or in a rural location? I would suggest a subgroup analysis stratifying students by their location of origin (rural versus urban) to help address this further.</p>	<p>We agree that this is an interesting sub-analysis. We plan to pursue the idea in a separate publication.</p>
<p>8. Results: Although not required, a flow diagram would greatly help readers to understand how many students entered medical school, how many were excluded from the study and at which site they trained. - Is there any contamination in the exposure groups? In other words, do students request to transfer to the main campus and does this actually happen?</p>	<p>See Figure 1 flow chart that clarifies who is included and excluded from the analysis.</p>
<p>9. Discussion: The confidence intervals on OR of likelihood to practice rural family medicine (Table 4) are very wide. I’m not sure the authors can state any magnitude of difference between the two regional campuses are present. Suggest highlighting</p>	<p>The wide confidence interval is likely due to the small sample size</p>

<p>it as a focus for future research on how best to deliver regional medical education.</p>	<p>in each regional medical campus. However the effect of campus location on practice outcome remains to be significant. Future research with larger sample size will need to be conducted to confirm the magnitude of difference seen in the two regional campuses. We have acknowledged this in the limitations</p>
<p>10. Tables/Figures: All Tables – the legends should allow the tables to stand alone and include information about the population, exposures and outcomes.</p>	<p>Done</p>
<p><b>Reviewer 5:</b> Riitta Partanen; University of Queensland, Rural Clinical School</p>	
<p>1. Overall, I thought this was a good paper, adding important information to the literature on regional medical training. Hope you are going to do a follow up paper on those in Specialist training and where they practice after fellowship.</p>	<p>Comment added to section on limitations (page 10).</p>