ORIGINAL ARTICLE

University of British Columbia rural training graduates: Trained for rural, did rural gain?

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Abstract

Introduction: The University of British Columbia (UBC) implemented a Rural Training programme in 1982 to prepare rural generalist physicians. Our study is a cumulative evaluation to assess efficacy with regard to recruitment and retention of physicians to rural practice.

Methods: Comparative evaluation, Cox regression analysis and Kaplan–Meier survival graphs of information from a database containing annual practice location information from resident physician participants in the rural training programmes at UBC from 1982 to 2020 were compared with a database of urban-trained UBC residents from 2005 to 2020. Length of practice and duration in rural communities as defined by the BC Rural Subsidiary Agreement was determined, as well as trends over time and by site of undergraduate training. Outcomes of recruitment using the Rational Risk Taker (RRT) assessment were compared to the outcomes when it was not implemented.

Results: Kaplan–Meier survival graphs showed consistent trends that rural programmes increased the likelihood of doctors staying in rural communities, with almost half of all rural-trained doctors staying around 10 years initially, and nearly a third remaining in rural communities for 20-30 years. The RRT may increase the retention rate in rural communities for rurally trained doctors. Cox regression analysis determined that training urban was associated with a much higher likelihood of rurally recruited doctors not staying in rural communities (likelihood ratio of 14.18 P = 0.003, positive coefficient 0.57).

Conclusion: The UBC rural training programme successfully increases the long-term retention rate for doctors who practise in rural communities. The RRT and other approaches it utilises may be useful in other jurisdictions to increase retention of rural doctors. Further long-term and ongoing analysis are warranted.

Keywords: Doctors, post-graduate training, retention, rural

Résumé

Introduction: L'Université de la Colombie-Britannique a mis sur pied, en 1982, un programme de formation rurale visant à préparer des médecins généralistes à la pratique en région. Notre étude propose une évaluation cumulative de ce programme afin d'en mesurer l'efficacité en matière de recrutement et de rétention des médecins en milieu rural.

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Méthodes: Nous avons réalisé une évaluation comparative à l'aide d'une analyse de régression de Cox et de courbes de survie de Kaplan-Meier. Les données provenaient d'une base recensant, année par année, le lieu de pratique des médecins ayant participé aux programmes de formation rurale de l'UBC entre 1982 et 2020. Ces données ont été comparées à celles d'un groupe de médecins formés en contexte urbain à l'UBC entre 2005 et 2020. Nous avons mesuré la durée de pratique et le temps passé en communauté rurale, selon la définition retenue dans le BC Rural Subsidiary Agreement, de même que les tendances dans le temps et selon le site de formation prédoctorale. Les résultats en matière de recrutement ont aussi été comparés selon l'utilisation, ou non, de l'outil d'évaluation Rational Risk Taker (RRT).

Résultats: Les courbes de survie de Kaplan-Meier montrent de façon constante que les programmes de formation rurale augmentent la probabilité pour les médecins de demeurer en milieu rural. Au départ, près de la moitié des médecins formés en contexte rural y sont restés environ 10 ans, et près du tiers ont poursuivi leur pratique en région pendant 20 à 30 ans. L'outil RRT pourrait également contribuer à améliorer la rétention des médecins formés en milieu rural. L'analyse de régression de Cox a montré qu'une formation urbaine était associée à une probabilité beaucoup plus élevée de quitter la pratique en milieu rural chez les médecins recrutés pour ces communautés (rapport de vraisemblance de 14,18; P = 0,003; coefficient positif de 0,57).

Conclusion: Le programme de formation rurale de l'UBC contribue de façon significative à améliorer la rétention à long terme des médecins qui exercent en région rurale. Le RRT, ainsi que d'autres approches qui l'accompagnent, pourraient être utiles dans d'autres contextes afin de renforcer la rétention des médecins en milieu rural. Des analyses à plus long terme et un suivi continu demeurent toutefois nécessaires.

Mots-clés: Rétention des médecins, programmes de formation rurale, médecins formés en milieu rural, programme de formation rurale de l'UBC

INTRODUCTION

The recruitment and retention of rural physicians in British Columbia (BC), throughout Canada and globally,[1] continues to be a significant challenge. In order to address the need for rural Physicians in BC the Department of Family Practice University of BC (UBC) initiated the Rural Training Programme in 1982.[2] This unique programme was at the forefront of community-based, rural training in Canada.[3] It also recognised the need for diverse, comprehensive training experiences that are now enshrined in the principles of generalist rural medicine as outlined in the 2014 Cairns Consensus (Australia), specifically a rural generalist who provides primary and emergency care to the community.[4]

Although the programme has grown and undergone several evaluations over the years, a cumulative longitudinal evaluation was needed to provide an in-depth assessment of trends of recruitment and, critically retention. These data are essential for building strategies for rural healthcare planning.[5]

Why a longitudinal evaluation now? The average physician completing training in their 30s, has a career of 35–40 years, and retires around age 70, with some gender differences.[6] Data have been collected on students in the rural graduate programme from 1982 onwards and maintained in a database with practice data updated annually. This data will now allow for a picture of the life cycle of graduates trained with a rural focus, as well as giving a snapshot of other mid and early career physicians, as compared to their urban-trained colleagues.

There have been limited longitudinal studies on our topic, mostly American[7,8] and Australian[9] with a few in the Canadian context.[10,11] None were identified that intentionally began to explore this question from the perspective of the entire career life of the clinician as ours does. Like many other aspects of healthcare, consistent, high-quality longitudinal care for rural populations won't happen without constant, deliberate effort and the policies to support and promote it.[12] Fragmentation eroding local services is an enduring threat and studies like ours are needed to address and better understand ways to mitigate and address rural health issues.

METHODS

UBC's family medicine training programmes have grown over the years, but have generally provided three main streams – rural, urban and urban with an international medical graduate (IMG) focus. While the number of locations and

residency training programmes varied annually, the curriculum was consistent in content (1982–2016). Rural residency programmes would be based out of larger rural or smaller urban centres and have a significant number of their clinical rotations in rural communities.

UBC's 2-year Family Practice Post-graduate rural training curriculum was based on a 1st year (R1) focused on urban/regional rotations required for later licensure in BC. The 2nd year (R2) curriculum was rural based with 10 blocks rural/2 blocks elective and 1 block UBC based academic time. Block duration ranged from 4 to 16 weeks and could be individualised. All rural training sites were defined by those presently outlined as Rural Subsidiary Agreement Communities (RSAC) in BC.[13] RSAC is an agreement between the provincial government and the Doctors of BC whereby rural communities are defined according to agreed upon criteria, which has been refined over the years. RSAC are grouped into 4 tiers largely based on remoteness and services provided. In the four classifications, A through D, A is the most remote and isolated, D represents the larger rural communities. Residents would rotate through these communities for their rural rotations.

Physicians who completed a family medicine residency at UBC were identified as either those who completed a rural residency between 1982 and 2020 and those who completed an urban residency between 2005 and 2020. The urban residents were used as a comparison group. These UBC databases contained information on medical school location and graduation year and, gender, residency programme location and year of graduation from residency. It did not contain information on the background of the residents, in particular, whether or not they came from rural communities, which has been suggested as a possible contributor to rural retention. The evaluation included stratifying rural or urban residency trained as well as by where physicians obtained their MD from, UBC or other. We also did a stratification on retention outcomes based on 5-year aggregate groups to evaluate if there were differences that were specific to various time periods.

Details on physician practice status and location were determined for each year, extracted from publicly available registration directories including the BC College of Physicians and Surgeons (except 2004, which was not produced) and other Canadian and American public registry sources. Data on retirement and death were also sourced from these records, when and where available. Data on physicians who lived in an urban environment but who may have worked rurally or done rural locums were not available. The location of practice was categorised as rural if the community was identified as such by the BC Rural Practice Subsidiary Agreement as of 2020.

Analysis

This information was formatted into an Excel spreadsheet to facilitate analysis and future evaluations. Simple descriptive statistical techniques were applied to each dataset. Stratified trend analysis was applied based on the location of original medical training, in Canada (Canadian Medical Graduates [CMGs]) or outside of Canada (IMGs). Additional statistical consultation resulted in calculations that included survival analysis for rural versus urban-trained physicians, by year of graduation, CMG versus IMG status and gender. Survival analysis graphs were performed and interpreted on these parameters. As well, Cox regression models were done on rural versus urban to answer the question of whether rural training matters to retention of physicians in rural communities. Many physicians were noted to have more than one episode of rural practice and the relevance of this was also analysed using Cox regression techniques.

Ethics

This evaluation was granted exemption from the ethics review board.

RESULTS

Eight-hundred and forty-eight physicians who completed a family medicine residency at UBC were identified. Of that group, 315 completed a rural residency (between 1982 and 2020) and 533 completed an urban residency (between 2005 and 2020). Twenty-point one percent were IMGs. Seventeen of the rural-trained doctors (315; 5.4%) were IMGs. However, only 2 of these 17 ended up practising in a rural community, and only 1 has stayed rural. There were 553 (28.9%) IMGs in the

urban stream (553). They included 124 doctors in the St. Paul's urban IMG training programme that had a rural return-of-service agreement for its graduates. If these are excluded, the proportion of IMG trainees in the urban programmes (7.3%) is comparable to that found in the rural stream, but only one of these doctors went into rural practice.

Only 5 of the physicians in the rural stream were identified as having retired (1.6%), and none in the urban stream, making it difficult to draw any conclusions about retirement in these groups. There were however 10 lost to follow up and 2 temporarily inactive and 3 deceased in the rural-trained group. In the urban-trained group, 4 were lost to follow up as of 2020, 6 were noted as temporarily inactive and 1 had died. The medical careers of those who had retired spanned from 25 to 31 years in length, with an average of 28.4 years. All 5 spent most of their career in rural communities, although one was in rural Alberta, not BC.

During the analysis, it was noted that there was an unexpected pattern of initial recruitment to rural practice for several years, then time in urban practice and a return to rural practice for many doctors. These multi-changes were considerably more notable in the rural-trained cohort than the urban control group (20% vs. 4.3%). The rural multi-movers did spend 77.8% of their total practice years in rural, despite moving more than once. This complicated the analysis and will need to be further explored in future evaluations; for the purposes of this assessment, the initial period of rural practice and subsequent leaving was used for the determination of survival analysis (Kaplan–Meier graphs). For the statistical cumulative analyses, the total years spent in rural was determined and applied.

Analysis included a cumulative total of 4004 years of practice in BC for the urban-trained physicians (244 years practiced out of province) and 3896 years of cumulative practice in BC for rural-trained doctors (456 years out of province). Of these years, rural-trained doctors spent 45.2% of them in rural communities, whereas urban-trained doctors went on to spend only 12.4% of their career years in a rural community.

Table 1 presents the breakdown of rural career years by stream and RSAC category. Urban-trained doctors who do go into rural practice are more likely than their rural-trained colleagues to practise in less isolated rural posts as designated by category A and B.

Cox regression analysis determined that training urban was associated with a much higher likelihood of rurally recruited doctors not staying in rural communities (likelihood ratio of 14.18 P = 0.003, positive coefficient 0.57). As shown in Figure 1, a Kaplan–Meier survival graph of the two training streams shows divergence in retention rates for rural versus urban-trained physicians, starting about year 3. This showed a consistent pattern of urban physicians leaving rural communities at greater rates than their rural-trained colleagues. This difference started at year 3 with 64% of rural-trained graduates staying in rural communities versus their urban-trained colleagues at 53%. This pattern persisted, reaching a peak discrepancy at year 11 with 44% of rural-trained doctors staying in rural communities versus 31% of urban-trained physicians.

There were no notable differences between rural retention irrespective of the year in which the physician started residency [Figure 2]. However, a sub-analysis of those physicians who were recruited to rural-training programmes during the years that the Rational Risk Taker (RRT) Assessment was used tended to stay in rural communities at a higher rate than those recruited without this tool [Figure 3].

Analysis of all rural residency trainees demonstrated a tendency for UBC graduates to stay in rural communities at a greater rate than their non-UBC trained colleagues [Figure 4]. This was even more notable when sub-analysis was performed of UBC rural trainees with a persistent pattern of rural trainees staying in rural communities at much higher rates than their urban counterparts after year 5. However, those doctors who stay longer than 25 years in a rural community are likely to continue to stay at equal rates, regardless of what medical school they graduated from [Figure 5].

Doctors who obtained their MD at a medical school other than UBC, but who trained in a UBC rural programme, who then went into rural practice, are more likely to stay than those who received their MD training elsewhere. For urban-trained doctors this pattern is reversed: Doctors who choose rural, but who did not study at UBC for their undergraduate medical degree,

are more likely to stay in rural practice than their UBC urban-trained colleagues, from about 4 years onwards, despite coming from an urban-focused training scheme [Figure 6].

Men and women were equally likely to stay in rural communities for the first 8 years after UBC family practise residency training [Figure 7]. After that women were more likely to leave than men; after 13 years, the retention rate for men stabilised at around 44%. Women, however, continued to leave with a persistent downward trend up to 28 years. This pattern was persistent with sub-analysis of rural programme trainees [Figure 8].

DISCUSSION

Our study shows that the forward thinking and action of doctors at UBC in 1982 resulted in a programme that provides substantial long-term recruitment to rural practice, with nearly half of all rural trainees staying in a rural community initially for about 10 years, and a third staying between 20 and 30 years. Cox regression analysis supported this finding with a likelihood ratio for urban trainees leaving rural of 14.18 P = 0.003, positive coefficient 0.57. There is a unique bimodal pattern of retention for rural doctors, where they enter rural practice, stay for a number of years, leave and then return. This has not been well described in the literature and is worth further investigation.

Rural-trained doctors who graduated from UBC are more likely than their non-UBC colleagues to stay longer in rural communities, while non-UBC grads in post-graduate urban training programmes gravitated to more rural communities than their UBC medical student peers. Urban trainees, however, who chose rural practice were more likely to practise in less rural areas as compared to rural programme graduates, as defined by the Rural Subsidiary Agreement. According to the Canadian Medical Association data from 2001 to 2005, 8% of rural doctors were likely to move to urban cities and towns, versus 0.5% who moved from urban to rural. This could represent the bimodal pattern that was noted in this evaluation. It could be speculated that this

Table 1: Percentage of BC rural career years spent in rural subsidiary communities by category, with D representing the more isolated and remote communities, A is the larger rural communities as determined by rural subsidiary agreement communities

	A	B	C	D
Rural residency	32.7	15.8	49.5	20
Urban residency	52.5	20.9	25.4	1.2

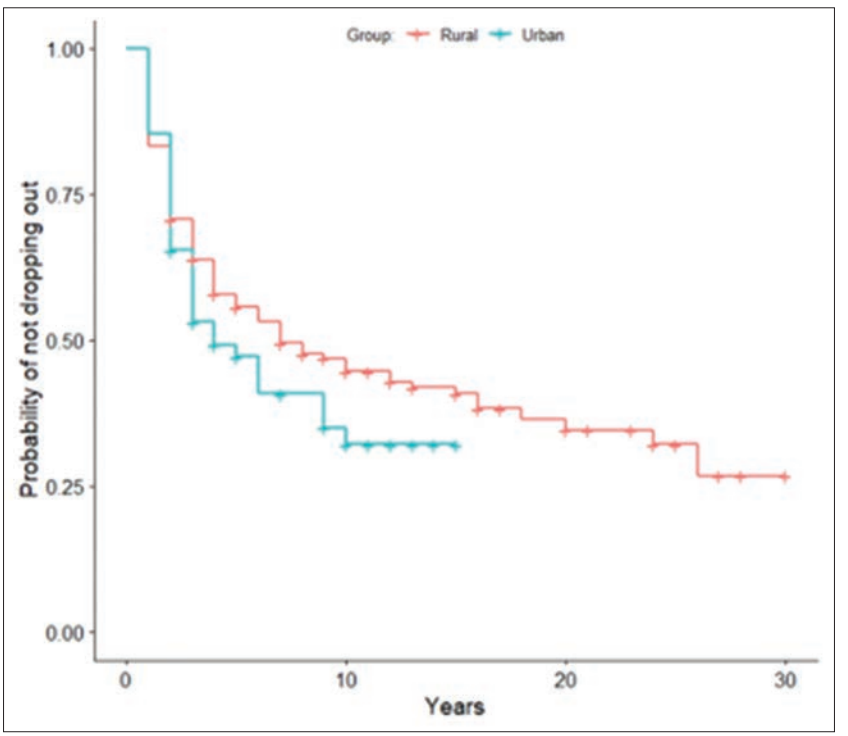


Figure 1: Rural versus urban University of British Columbia trained physicians and long term retention in rural communities.

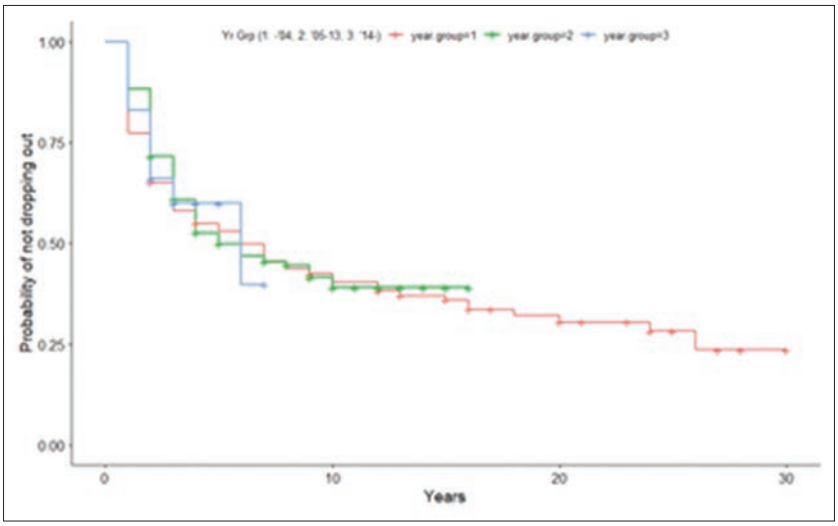


Figure 2: Rural retention by year of graduation (5-year aggregates) for all physicians trained in University of British Columbia rural and urban family practice residency programmes.

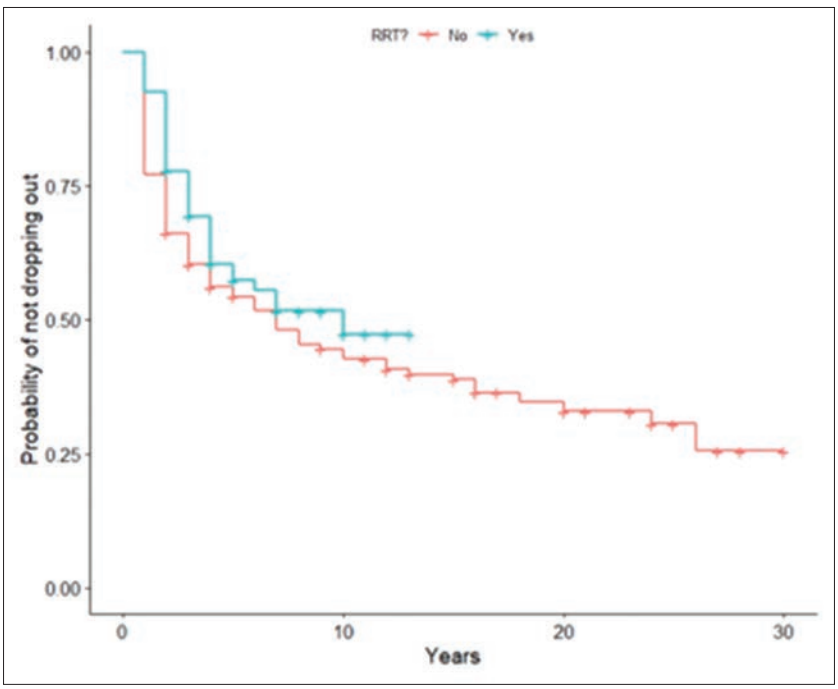


Figure 3: Rural retention of University of British Columbia rural physicians who were screened using the rational risk taker evaluation versus those who were not. RRT: Rational risk taker.

bimodal pattern may correlate with life events such as children's educational requirements, but further research is required. UBC rural training is generalist in nature, but details of whether the physicians who stay longer have a more general practice needs to be evaluated.

It is known that a number of factors influence an individual's decision to practise rurally.[14] Very little data are available on long-term retention, although some commentaries mention retention rates of up to 50% for 20 plus years.[15] However, the published data on programmes such as the Jefferson Medical College's Physician Shortage Area Programme find data of 32% rural retention for a 5–15-year career span (graduated from 1992 to 2002, practice location in 2007). An earlier study on graduates from 1982 to 1986 found a retention rate of 39% for a similar duration of practice.[16]

The use of the RRT assessment tool is one which was very forward thinking, and which has subsequently been supported by additional research.[17-19] There is a growing

body of evidence that rural doctors are more likely to have personalities that demonstrate 'low harm avoidance, high self-directedness and persistence',[20,21] which fits with the concepts of the RRT. This is the first known publication that demonstrates that an evaluation tool incorporating

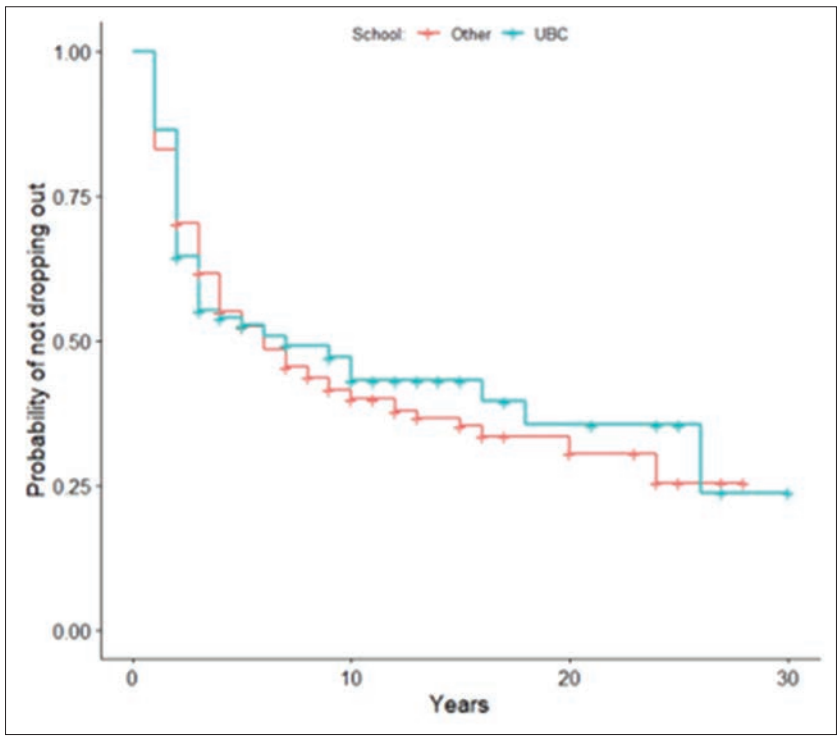


Figure 4: Rural retention for University of British Columbia (UBC) medical school graduates versus graduates from other schools for MD, rural and urban UBC residency training programmes. UBC: University of British Columbia.

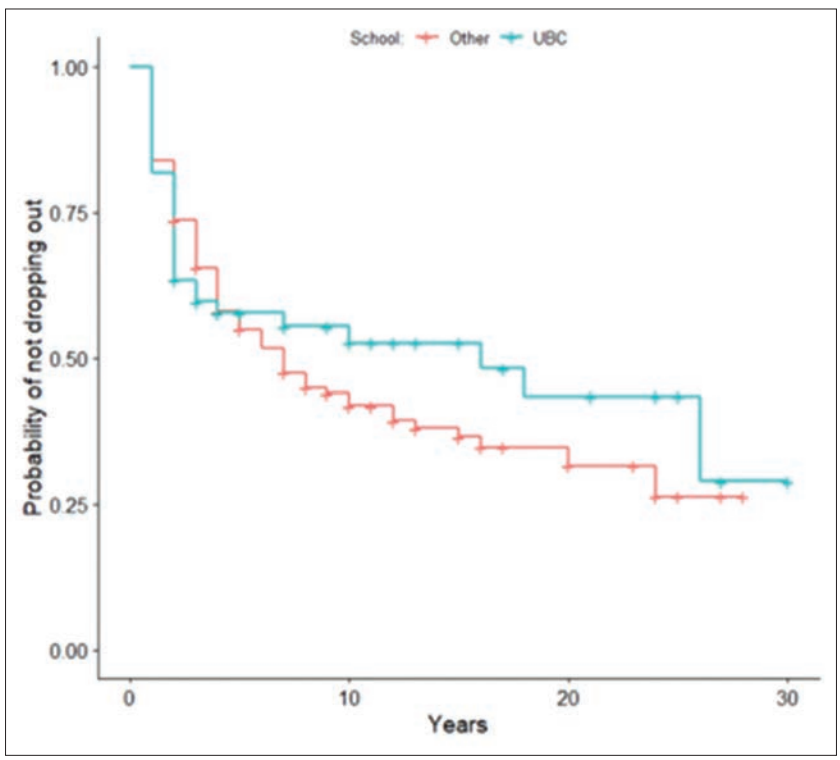


Figure 5: University of British Columbia MD undergraduates versus those receiving their MD elsewhere, rural residency programmes.

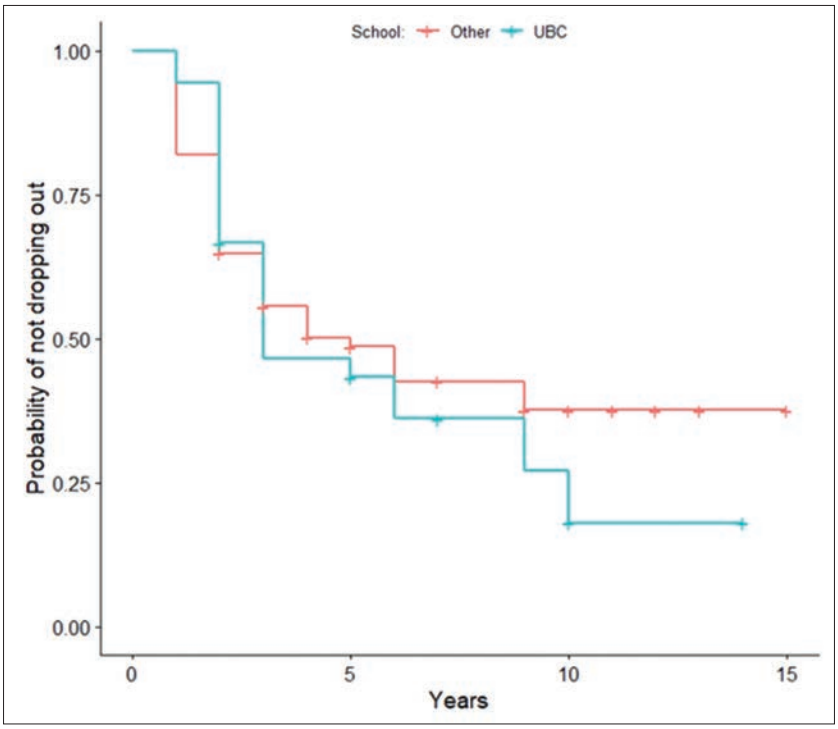


Figure 6: University of British Columbia MD undergraduates versus those receiving their MD elsewhere, urban residency programmes. UBC: University of British Columbia.

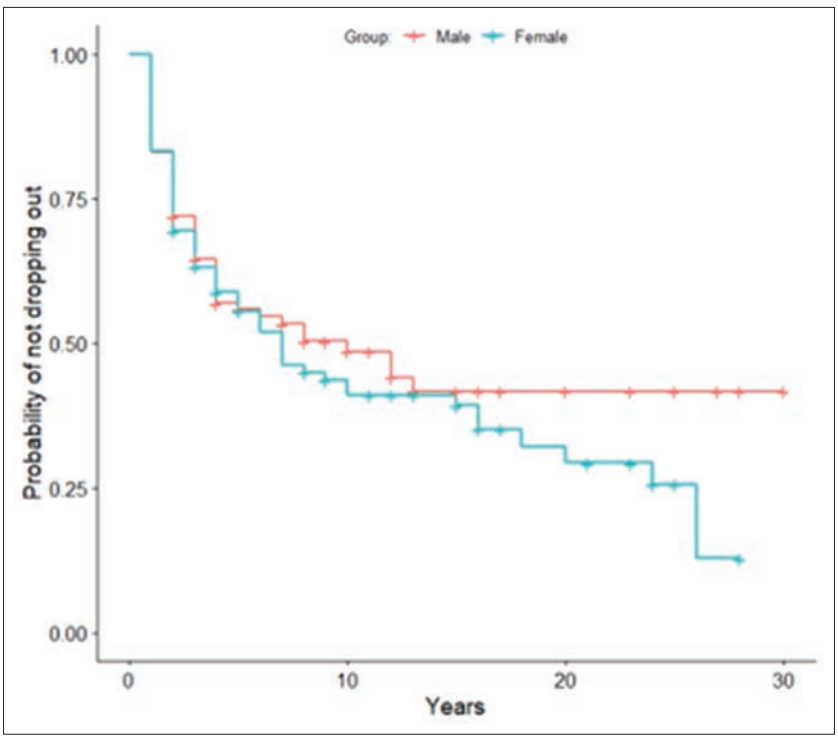


Figure 7: Rural retention in male versus female graduates of University of British Columbia rural and urban family practice residency programmes.

these concepts may improve rural retention. As such, further evaluation and exploration of the RRT instrument should be a priority.

Men were more likely than women to stay practising rurally for >20 years. Exploration of this, particularly considering the increase in

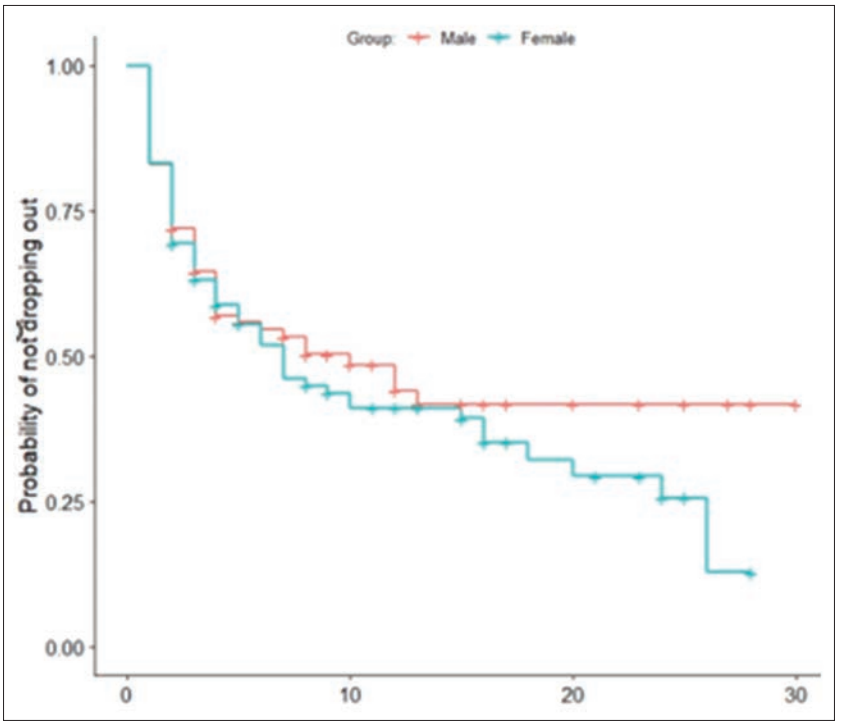


Figure 8: Rural retention in male versus female graduates of University of British Columbia rural family practice residency programmes.

female physicians over the years, is important.[22] It can be hypothesised that perhaps this is related to raising children or supporting aging parents.[23] Future studies will need to explore the bimodal pattern of long-term retention that was noted here and possibly include some qualitative interview evaluation of physicians in this category to better elucidate the reasons for this decision. This will allow for strategies to be developed to perhaps aid these doctors in staying in their rural communities.

Limitations

This study was limited in that many of the physicians in the database have not yet completed their careers, so this at best gives a snapshot in time of their decisions for practice location. It also reflects only one provincial jurisdiction and there may be other factors influencing retention that may not apply elsewhere. Doing ongoing analyses on a 5-year basis will allow for further clarification of the pattern of practice for these physicians, including long-term retention characteristics. Other challenges to this study include significant cultural and practice changes that may make it difficult to apply these findings to new groups of learners.

While acknowledging that numerous changes in society, culture and medicine have occurred over the timeframe, of our study, including the matching process (CaRMS), the applicability of our study's results to the present situation must be cautiously applied; it is important to try and identify factors that impact rural recruitment and retention through the career of physicians in various rural communities. This is necessary when evaluating the impact of rural training programmes on these trends.

CONCLUSION

It is known that there is still a great disparity in health access for rural populations.[24] Our study is unique in that it evaluates comparative populations of rural versus urban-trained physicians at the University of BC, with the evidence supporting the conclusion that the programmes are providing physicians to rural communities, many of whom stay for a considerable length of time.

Further exploration of the use of the RRT evaluation process as a potential tool to enhance the long-term retention of rural physicians is warranted as is the reason for the bimodal pattern of long-term physician retention. Both should be explored with some urgency. It may well provide insight that may allow policy to be developed to address concerns that result in the initial physician

migration from rural to urban. Our data should provide additional evidence to help support and develop rural retention policies.

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