Variation in the Geographic Distribution of Physiotherapy Student Clinical Placements in Rural Saskatchewan

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ABSTRACT

Purpose: Rural and remote Saskatchewan has a shortage of physiotherapists. Positive student experiences in rural and remote communities may influence whether graduates choose to work in these settings. The intention of the first full-time, 4-week clinical placement (CP) in the Master of Physical Therapy programme at the University of Saskatchewan is to provide clinical experiences in rural settings outside Saskatoon and Regina. This study examines the geographic distribution of and yearly variation in these CPs to determine whether this stated intent is being realized. **Method:** We analyzed the locations of physiotherapy student CPs from 2008 to 2016 using geospatial mapping. **Results:** Spatial patterning using mapping identified variability in the number of rural placements in geographical regions in Saskatchewan over a 9-year period. An average of 75% of CP experiences occurred in rural locations outside the two major cities in Saskatchewan between 2008 and 2016 (ranging from 58% in 2015 to 84% in 2009). **Conclusions:** The goal of providing all University of Saskatchewan physiotherapy students with a rural experience for their first CP is not being met. Securing more CPs in rural settings may have a positive impact on recruitment of physiotherapists to these communities.

Key Words: education; health services accessibility; rural health.

RÉSUMÉ

Objectif : on observe une pénurie de physiothérapeutes dans les régions rurales et éloignées de la Saskatchewan. Les expériences positives des étudiants en milieu rural ou éloigné peuvent influencer sur leur choix d'y travailler à la fin de leurs études. Le premier stage clinique (SC) de quatre semaines à temps plein à la maîtrise en physiothérapie de l'université de la Saskatchewan vise à offrir des expériences cliniques en milieu rural à l'extérieur de Saskatoon et de Regina. La présente étude porte sur la répartition géographique et les variations annuelles de ces SC pour déterminer si cette intention exprimée se réalise. **Méthodologie :** les auteurs ont analysé les lieux où les étudiants en physiothérapie ont fait leur SC entre 2008 et 2016 au moyen d'une cartographie géospatiale. **Résultats :** la modélisation spatiale par cartographie a contribué à établir la variabilité du nombre de stages en milieu rural dans les régions géographiques de la Saskatchewan sur une période de neuf ans. En moyenne, 75 % des expériences de SC se sont produites dans des milieux ruraux situés hors des deux grandes villes de la Saskatchewan entre 2008 et 2016 (entre 58 % en 2015 et 84 % en 2009). **Conclusions :** l'objectif d'offrir une expérience en milieu rural à tous les étudiants en physiothérapie de l'université de la Saskatchewan lors de leur premier SC n'est pas respecté. L'obtention d'un plus grand nombre de SC en milieu rural pourrait avoir un effet positif sur le recrutement de physiothérapeutes dans ces localités.

Recruiting and retaining health care providers in rural areas is a continuous challenge for health system planners, decision makers, and health care professional training programmes. People living in rural and remote parts of Canada have poorer health, shorter life expectancy, and higher rates of disability than urban dwellers,^{1,2} and rural residents may have reduced access to health care services, including physiotherapy.³⁻⁷ Physiotherapy services, like many other primary health care services in

Canada, are poorly distributed in rural areas, particularly compared with population health needs.^{6,8} For example, 36% of Saskatchewan's population lives in a rural area, whereas only 11% of the province's physiotherapists indicate a primary employment location in a rural or remote community; however, physiotherapists who travel to provide services at secondary or other rural locations are not necessarily represented in prior research examining rural physiotherapy service delivery.⁸

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Clinical placements (CPs) are a critical component of health science training programmes. They have a direct bearing on students' ability to integrate theory into practice, work effectively, function in a variety of roles and diverse practice settings, and, ultimately, help students confront many of the challenges and issues related to patient care.⁹ Several recent studies of the CPs of physiotherapy and other health professional students have observed that, when they are carried out in rural and remote locations, they are associated with a greater likelihood of the students practicing in a rural or remote community after they graduate.^{10–18} For example, Boehm and colleagues¹⁷ and Johnston and colleagues¹⁸ reported that recruiting students to, and retaining them in, a regional and remote workforce was significantly related to their rural and remote educational experiences. A systematic review conducted in 2016 also determined that rural exposure strategies had a positive effect on dental students' and graduates' intention to practice in a rural area.¹⁹ A separate challenge, however, is identifying suitable health care centres with qualified professionals willing to supervise students for CPs in rural and remote settings.

The University of Saskatchewan (U of S) is 1 of 15 universities in Canada offering a professional Master of Physical Therapy (MPT) degree (or equivalent) at the entry-to-practice level. Clinical Practice Two (CPII) is a month-long CP that is one of six full-time CPs embedded in our programme. The goal of CPII is for MPT students to obtain clinical experience in "rural, regional, and remote Saskatchewan centres outside of Regina or Saskatoon."²⁰ Having CPs in rural locations is an integral part of fulfilling the MPT programme's commitment to addressing the physiotherapy workforce requirements of the rural and remote communities across Saskatchewan. In addition, because it is the sole post-secondary programme for physiotherapists in a geographically large province, it has an institutional mandate to distribute the resources involved in training physiotherapists throughout the province.

The purpose of this study was to examine the geographic (spatial) distribution of and yearly variation in CPs for physiotherapy students in rural, regional, and remote Saskatchewan centres outside the cities of Regina and Saskatoon. These findings will help to identify and target potential health care centres (and clinical preceptors) that have historically not supervised physiotherapy students and have the potential to increase CP capacity in rural locations.

METHODS

In this descriptive study, we used geospatial mapping techniques to examine the distribution of and yearly variation in CPs for physiotherapy students at the U of S. Given the intent of CPII, our goal is to place all 40 students from the first-year MPT cohort in CPs outside

the two metropolitan areas of Saskatoon and Regina. Each year, we canvass clinical sites in rural, regional, and remote communities in an attempt to secure a CPII placement for each student in his or her first CP; we then confirm the placement schedule on the basis of the rural placement capacity for that year. Students who cannot be placed in a rural setting for CPII are placed in one of the two major urban centres.

We collected information about the CPII placement schedule and a list of health care facilities and centres that have accepted CPII students from the U of S MPT Clinical Education Unit. First, we captured a set of geographic coordinates for all health care facilities and centres using different spatial data sources, such as Statistics Canada's geographic layers (e.g., census subdivision, municipality), Google Maps, and so forth. We then aggregated the CPII data at the community or census subdivision level to obtain yearly placement counts, and we then assigned these aggregated data to the community locations for mapping purposes. We applied a geospatial mapping technique to visualize the spatial distribution of CPII data by year and created a bar graph to plot 9 years worth of data (2008–2016) at the community level using ArcGIS Desktop software (version 10.5.1; ESRI, Redlands, CA). The CPII data for Saskatoon and Regina were not included in the mapping.

We used the metropolitan influence zone (MIZ) classification layer to distinguish among urban and four types of rural community. We prepared the MIZ classifications for statistical analysis purposes and assigned them to census subdivisions (CSDs) outside urban centers after considering the percentage of the CSDs' resident employed labour force who commuted to work in the cores of urban census metropolitan areas or census agglomerations. The following MIZ classifications were used: strong MIZ, at least 30% commuters; moderate MIZ, at least 5% commuters but less than 30%; weak MIZ, more than 0% commuters but less than 5%; and no MIZ, none of the CSD's residents commuted.²¹ We incorporated the Saskatchewan Health Region boundary layer into the mapping as a background layer. The U of S's Research Ethics Board deemed this project to be programme evaluation and thus exempted it from ethical review.

RESULTS

The results obtained from the geospatial analysis and mapping are presented in Figure 1. Figure 1 shows the yearly variation in CPII data at the community level, overlaid with the geographical groupings of a 2011 census layer for Saskatchewan based on the MIZ classification. In total, 353 CPs occurred in Saskatchewan during the 9 years from 2008 to 2016, with an average of 40 placements per year, and 75.0% of these placements occurred in rural areas outside Regina and Saskatoon (see Figure 2 and Table 1). Of the 262 CPII placements that occurred outside Regina and Saskatoon ($n = 94$ placements), 168

Figure 1 Results of geospatial analysis and mapping.

Figure 2 Yearly comparison of MPT CPlI by area (rural and urban areas).

MPT = Master of Physical Therapy; CPlI = Clinical Placement Two.

occurred in 10 municipalities classified as strong MIZ, 20 in 7 municipalities classified as moderate MIZ, 70 in 15 municipalities classified as weak MIZ, and 1 municipality classified as no MIZ. Three CPlI placements occurred in the areas outside Saskatchewan. Figure 2 shows the number (and percentage) of placements over the 9-year period that occurred in rural, regional, and remote areas outside Regina and Saskatoon.

We found that an average 75.0% of CPlI placements occurred in rural, regional, and remote settings outside Regina and Saskatoon between 2008 and 2016, ranging from 57.5% (23) in 2015 to 84.2% (34) in 2009. During these 9 years, CPlI placements occurred in 33 communities and 52 health care facilities and centres outside Regina and Saskatoon (Figure 1)—4 in Swift Current and 3 each in Moose Jaw, North Battleford, Prince Albert, Weyburn, and Estevan. CPlI occurred just once in 9 communities and only twice in 6 communities.

DISCUSSION

Providing rural and remote placement opportunities for physiotherapy students may increase the likelihood that the students will consider employment in a rural or remote location after graduation or contribute to other models of care that improve access to underserved rural communities. The intent of CPlI, in particular, is to provide students with a CP opportunity outside Saskatoon and Regina, if possible. In Saskatchewan, Saskatoon and Regina are the only metropolitan centres with populations larger than 100,000 (246,376 and 215,106, respectively, in 2016). For the purposes of our programme, smaller urban centres such as Yorkton (population 16,041 in 2016) and Weyburn (population 10,870 in 2016) are considered rural.

Table 1 Summary of MPT CPlI Placements by Health Region

Health region	CP count by geographic area		
	Rural	Urban	Overall
Saskatoon	15	50	65
Prairie North	52	—	52
Regina Qu'Appelle	7	44	51
Cypress	44	—	44
Sunrise	29	—	29
Sun Country	29	—	29
Five Hills	27	—	27
Prince Albert Parkland	23	—	23
Kelsey Trail	16	—	16
Heartland	13	—	13
Keewatin Yatthé	4	—	4
Other	3	—	3
Total (overall)	262	94	356

MPT = Master of Physical Therapy; CPlI = Clinical Placement Two.

Many factors may have influenced the variability in rural placements for physiotherapy students during 2008–2016. The distribution of registered physiotherapists practicing in Saskatchewan is a key consideration when examining student placements because they are the professionals who serve as preceptors, thereby making CPs possible. There is an apparent mismatch between where physiotherapists work and population distribution and needs, and this mismatch is greater in certain health regions in Saskatchewan.^{8,22} Heartland Health Region, for example, has fewer than 2.0 physiotherapists per 10,000 population, whereas Saskatoon Health Region has more than three times that number.⁸ The low proportion of registered physiotherapists in the Heartland Health Region is mirrored in the low number of CPs secured in this region over the 9-year period. An increased number of physiotherapists working in rural and remote Saskatchewan will likely lead to more CP opportunities for students in these regions.

Successfully recruiting and retaining physiotherapists is one way to improve access to physiotherapy services in underserved rural and remote areas, and providing more CP opportunities in rural and remote communities may have a positive effect on the recruitment of new physical therapy graduates to these settings. Winn, Chisholm, and Hummelbrunner (2014) conducted a survey of rehabilitation professionals living and working in northern Ontario to assess the factors linked to recruitment and retention, and they identified the fact that both rural or remote educational experiences and rural or remote origin were important recruitment factors.¹⁵ Similar results have been found in other disciplines. For example, a study investigating factors that may affect the recruitment and retention of physicians in rural communities reported that, besides physician characteristics,

“training environment and a rural training curriculum are important factors”^{23(p.12)} related to attracting physicians to rural practice locations. According to a recent systematic review using meta-analysis to assess the impact of strategies on the intention of dental students and graduates to practice in rural areas, both the recruitment of dental students from rural backgrounds and clinical rotations in rural areas appeared to be effective strategies for tackling the shortage and uneven distribution of dentists in rural areas.¹⁹

Our findings should be considered in light of the following limitations. First, we did not analyze CPs that occurred outside of CPII. In the MPT programme, students complete six full-time placements (a total of 29 weeks) during the programme; thus, those students who do not secure a rural placement in CPII may secure one later in the programme. This means that although the number of rural placements in CPII may be decreasing overall, students may have the opportunity to complete one in a subsequent CP. In addition, examining only the primary location of CPII may not have captured models of care in which physiotherapists (and students) travel to provide services to rural and remote communities.

Second, we accounted only for the geographic location of a placement; we did not evaluate whether the placement was a positive experience. We do know, however, from physiotherapy student feedback collected after every CP over many years that students' experiences are, in general, overwhelmingly positive. Having a positive experience in a rural or remote community is a motivator to seek employment in this setting.^{10,24,25}

CONCLUSION

The goal of giving all University of Saskatchewan physiotherapy students a rural experience for their first CP is not being met. Securing more CPs in rural settings may have a positive impact on recruitment of physiotherapists to these communities. Further research is needed to explore the factors involved in Saskatchewan physiotherapists' decision making regarding their career choices. In addition to having a rural CP, other factors may include demographic characteristics, financial incentive programmes for relocation, access to support and mentorship, and other various market and labour drivers. Effectively addressing the shortage and uneven distribution of physiotherapists in rural and remote communities in Saskatchewan will require provincial policymakers and health system managers to take a comprehensive approach, one that must be supported by both the provincial professional and regulatory bodies and the physiotherapy educational programme at the University of Saskatchewan. This study may serve as a template for examining student placement training opportunities in other parts of Canada or beyond with similar workforce distribution challenges.

KEY MESSAGES

What is already known on this topic

The distribution of physiotherapists in rural and remote communities relative to urban settings is inequitable. Inconsistent and inadequate rural student placement opportunities have also been noted in other health care professions in Canada and elsewhere in the world. Having a positive clinical placement (CP) experience in a rural or remote setting is associated with a greater likelihood of choosing to work in such a community.

What this study adds

In a programme in which the first full-time CP is intended to take place in a rural setting, the number of CPs secured in rural settings has varied over the years and has not been evenly distributed across Saskatchewan. These findings support the need to increase opportunities for physiotherapy students in rural and remote settings, and doing this may ultimately increase recruitment of MPT graduates to underserved communities.

REFERENCES

1. Mitton C, Dionne F, Masucci L, et al. Innovations in health service organization and delivery in northern rural and remote regions: a review of the literature. *Int J Circumpolar Health*. 2011;70(5):460–72. <https://doi.org/10.3402/ijch.v70i5.17859>. Medline:22030009
2. Romanow RJ. Building on values: the future of health care in Canada [Internet]. Saskatoon: Commission on the Future of Health Care in Canada; 2002 [cited 2015 Aug 5]. Available from: <http://publications.gc.ca/collections/Collection/CP32-85-2002E.pdf>.
3. Landry MD, Ricketts TC, Fraher E, et al. Physical therapy health human resource ratios: a comparative analysis of the United States and Canada. *Phys Ther*. 2009;89(2):149–61. <https://doi.org/10.2522/ptj.20080075>. Medline:19131399
4. Wilson RD, Lewis SA, Murray PK. Trends in the rehabilitation therapist workforce in underserved areas: 1980–2000. *J Rural Health*. 2009;25(1):26–32. <https://doi.org/10.1111/j.1748-0361.2009.00195.x>. Medline:19166558
5. Gupta N, Castillo-Laborde C, Landry MD. Health-related rehabilitation services: assessing the global supply of and need for human resources. *BMC Health Serv Res*. 2011;11(1):276. <https://doi.org/10.1186/1472-6963-11-276>. Medline:22004560
6. Roots RK, Li LC. Recruitment and retention of occupational therapists and physiotherapists in rural regions: a meta-synthesis. *BMC Health Serv Res*. 2013;13(1):59. <https://doi.org/10.1186/1472-6963-13-59>. Medline:23402304
7. Laurent S. Rural Canada—access to health care. Ottawa: Parliamentary Research Branch (Economics Division);2002.
8. Bath B, Gabrush J, Fritzler R, et al. Mapping the physiotherapy profession in Saskatchewan: examining rural versus urban practice patterns. *Physiother Can*. 2015;67(3):221–31. <https://doi.org/10.3138/ptc.2014-53>. Medline:26839448
9. Norman KE, Booth R, Chisholm B, et al. Physiotherapists and physiotherapy student placements across regions in Ontario: a descriptive comparison. *Physiother Can*. 2013;65(1):64–73. <https://doi.org/10.3138/ptc.2011-63>. Medline:24381384
10. Roberts C, Daly M, Kumar K, et al. A longitudinal integrated placement and medical students' intentions to practise rurally. *Med Educ*. 2012;46(2):179–91. <https://doi.org/10.1111/j.1365-2923.2011.04102.x>. Medline:22239332
11. Shires L, Allen P, Cheek C, et al. Regional universities and rural clinical schools contribute to rural medical workforce, a cohort

- study of 2002 to 2013 graduates. *Rural Remote Health*. 2015;15(3):3219. <https://www.rrh.org.au>. Medline:26245841
12. Walker J, DeWitt D, Pallant J, et al. Rural origin plus a rural clinical school placement is a significant predictor of medical students' intentions to practice rurally: a multi-university study. *Rural Remote Health*. 2012; 12:1908. Medline:22239835.
 13. Courtney M, Edwards H, Smith S, et al. The impact of rural clinical placement on student nurses' employment intentions. *Collegian*. 2002;9(1):12–8. [https://doi.org/10.1016/S1322-7696\(08\)60039-6](https://doi.org/10.1016/S1322-7696(08)60039-6). Medline:11893112
 14. McAllister L, McEwen E, Williams V, et al. Rural attachments for students in the health professions: are they worthwhile? *Aust J Rural Health*. 1998;6(4):194–201. <https://doi.org/10.1111/j.1440-1584.1998.tb00312.x>. Medline:9919076
 15. Winn CS, Chisholm BA, Hummelbrunner JA. Factors affecting recruitment and retention of rehabilitation professionals in Northern Ontario, Canada: a cross-sectional study. *Rural Remote Health*. 2014;14:2619. Medline:24717094
 16. Winn CS, Chisholm BA, Hummelbrunner JA, et al. Impact of the Northern Studies Stream and Rehabilitation Studies programs on recruitment and retention to rural and remote practice: 2002–2010. *Rural Remote Health*. 2015;15(2):3126. Medline:26163882.
 17. Boehm J, Cordier R, Thomas Y, et al. The first year experience of occupational therapy students at an Australian regional university: promoting student retention and developing a regional and remote workforce. *Aust J Rural Health*. 2017;25(1):22–7. <https://doi.org/10.1111/ajr.12252>. Medline:26684041
 18. Johnston C, Newstead C, Sanderson M, et al. The changing landscape of physiotherapy student clinical placements: an exploration of geographical distribution and student performance across settings. *Aust J Rural Health*. 2017;25(2):85–93. <https://doi.org/10.1111/ajr.12302>. Medline:27184770
 19. Suphanchaimat R, Cetthakrikul N, Dalliston A, et al. The impact of rural-exposure strategies on the intention of dental students and dental graduates to practice in rural areas: a systematic review and meta-analysis. *Adv Med Educ Pract*. 2016;7:623–33. <https://doi.org/10.2147/AMEP.S116699>. Medline:27822134
 20. School of Physical Therapy. Expectations of P.T. students: PTH 852.4—clinical practice 2 [Internet]. Saskatoon: College of Medicine, University of Saskatchewan; 2015 [cited 2015 Nov 19]. Available from: <https://medicine.usask.ca/documents/physical-therapy/ClinPrac2Expectations2015.pdf>.
 21. Statistics Canada. Census metropolitan influenced zone (MIZ) [Internet]. Ottawa: Statistics Canada; 2015 [cited 2017 June 3]. Available from: <http://www12.statcan.gc.ca/census-recensement/2011/ref/dict/geo010-eng.cfm>.
 22. McFadden B, Jones McGrath K, Lowe T, et al. Examining the supply of and demand for physiotherapy in Saskatchewan: the relationship between where physiotherapists work and population health need. *Physiother Can*. 2016;68(4):335–45. <https://doi.org/10.3138/ptc.2015-70>. Medline:27904233
 23. Bosco C, Oandasan I. Review of family medicine within rural and remote Canada: education, practice, and policy. Mississauga, ON: College of Family Physicians of Canada; 2016.
 24. Lea J, Cruickshank M, Paliadelis P, et al. The lure of the bush: do rural placements influence student nurses to seek employment in rural settings? *Collegian*. 2008;15(2):77–82. <https://doi.org/10.1016/j.colegn.2008.02.004>. Medline:18567479
 25. Roots R. The importance of clinical placements in emerging models of practice. *Physiother Practice*. 2016. 6:10–5.