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Title	Remote psychiatry outreach clinics in Manitoba: an economic cost analysis
Authors	Janine N. Reid MD, Karen D. Ethans, Brian Chun-Fai Chan PhD
Reviewer 1	Dr. Cheryl Barnabe
Institution	University of Calgary, Calgary, Alta.
General comments (author response in bold)	<p>This paper provides an economic analysis of direct system and indirect patient costs of providing psychiatry care within conventional clinics in the urban setting, compared to decentralizing the care and providing it via an outreach model. As the authors state in the introduction and interpretation sections, this consideration is vital given the complex needs of patients requiring psychiatry care to maintain function and social roles, yet with numerous challenges for these patients introduced by where these services are typically accessed.</p> <p>26. I did find the third paragraph of the introduction slightly unclear. The first sentence sounds as a statement that should be supported by a reference, but could also be a leading statement for the rest of the paragraph in which case I don't believe the references are unique to the 'rural psychiatry population' but rather any rural population requiring different forms of specialty care. See page 3 Introduction paragraph 3 for clarification and reference. Please see point 15 above for further explanation of the context of the psychiatry physical examination and interventional treatments.</p> <p>27. Methods - The estimates clearly depend on the selection of included costs, and their estimates. Where to 'draw the line' becomes important. I wonder if portable equipment (ie the EMG and ultrasounds) need to be included in this cost as 'start up' costs. This portable equipment exists within the Winnipeg psychiatry clinics and was not a start-up cost for this clinic model. The cost for use was considered equivalent for both clinic models. See page 5 Methods paragraph 5 iii for added description "Costs for clinic space, portable equipment, transcription services, medications, clinic supplies, referrals, and investigations were excluded as they would be medically necessary and assumed to be equivalent in both locations."</p> <p>28. There were indirect costs calculated for patients' travel time, but not for the physicians' travel time which should be included, as well as staff time spent organizing travel and accommodations for the physicians. The attending physicians involved felt that the daily stipend provided for the attending physician for this clinic model includes compensation for the travel time opportunity cost. As the resident only receives a yearly salary and was not additionally compensated we chose to add that opportunity cost. Staff time organizing outreach clinics was included as "General administration". See page 5 Methods paragraph 5 ii for this description.</p> <p>29. Cost estimates could be expanded to estimate the cost of no-shows (ie time/cost not compensated) based on rates occurring during these outreach clinics and when booked for patients from these communities in the urban centre. Interesting consideration, and unfortunately we do not have formal data available for either clinic model for a no-show rate. This, and other outcomes data would be an interesting future area of investigation. From our informal</p>

experience with these clinic models over approximately 3.5 years now, there are occasional no-shows in community however the rate of urban centre no-shows from these communities seems to be higher (including factors such as weather preventing travel). If this impression is correct, inclusion of a factor for clinic efficiency would likely improve costs savings related to outreach services.

30. The volume of patients estimated is based on 6 outreach clinic models that were conducted, representing a mix of new consultations and follow-up visits. For this type of specialty practice, follow-up patients accrue rapidly and displace new patient appointment scheduling. Could this mix of visit types be varied in the model too?

The scope of this study was to report with the data that we had based on the clinic run time in these two locations. This would be an excellent opportunity for further scenario analysis, and likely would need to pull from a larger sample size, understanding of the patient population distribution, and care needs for travel. Our experience with these clinics is that some of our patients, including spinal cord injury for example, are ongoing follow-ups that are not accumulating because these are known patients previously served in Winnipeg and the incidence of SCI is fairly low. The more common new consults of musculoskeletal or electrodiagnostic questions may have 0-1 follow-up appointments required and can be time-limited interactions. Our chronic pain consults are treated more in a consulting capacity where direction is able to be given to the primary care physicians and ongoing follow-up is with primary care rather than the physiatry clinic. Because of the heterogeneity of the physiatry patient populations (some of which are more single serve medicine) it would be interesting to see over time what the balance is here.

31. I also wonder about the role of outreach clinics increasing costs - related to increased referrals and services simply from increasing access to care - which should be included in the model, or at least discussed in the interpretation section. Increasing access and service to meet patient needs is a quality care goal, but still ultimately incurs additional costs.

See page 7 Interpretation paragraph 3 for the edited sentence “however data on effectiveness can further inform implications on health system costs, including increased costs from further referral and health care use.” with references 17, 35. The basis of this study was with the assumption that services provided in this setting would be equivalent, and referrals, investigations, and medical interventions would be similar between both models. However as discussed, the improvement in access to patients who otherwise would not receive care is an important consideration. This additional analysis likely requires a much expanded data collection and analysis of health outcomes of patients served, to understand both the positive and negative implications to costs (for example wound management in community preventing admissions for sepsis, however generating a referral for a CT scan and increased home care services).

32. There is no mention of ethics (whether approved or not, or given a waiver by the institutional and community/hospital ethics boards).

	<p>See page 6 Methods Ethics Statement.</p> <p>33. Table 2 has multiple asterisks in it, but no descriptions of what these signify. See top of table 2, asterisk indicates the source of data where no public citation available.</p> <p>In the interpretation, I am very supportive of the authors' insightful comments to include environmental impacts in future work.</p>
Reviewer 2	Dr. R. Jaakkimainen
Institution	Institute for Clinical Evaluative Sciences Central; Sunnybrook Health Sciences Centre, Toronto, Ont.
General comments (author response in bold)	<p>This is an interesting cost-minimization analysis for a group of patients accessing physiatry services in Manitoba comparing the costs of them attending outreach clinics versus cost of them attending a clinic in a conventional urban setting. This is an important study as there is not a lot of literature about care provided to people living with disabilities, especially in rural and remote settings.</p> <p>My comments are more for clarification and are mostly suggestions.</p> <p>34. I would suggest moving the paragraph in the methods about conducting the cost minimization analysis to the end of the introduction. See Introduction paragraph 3 for the revised sentence "...we conducted a cost minimization analysis comparing their societal costs with the estimated costs of seeing the same patients in conventional urban physiatry outpatient clinics". The detailed explanation of how the cost minimization analysis is constructed is more typically found in the Methods section. Perhaps the headings added within the Methods section makes this more clear.</p> <p>35. The introduction mentions outreach programs improve access and care compared to telehealth. Are there references for this? See page 3 Introduction paragraph 3. Please see point 15 above for the detailed context of the physiatry physical examination and interventional treatment</p> <p>36. The rest of the paragraph compares outreach programs being better compared to conventional programs across a number of disease conditions. While the justification for the development of the outreach physiatry program is well described, with a strong community engagement, is there any data (even pilot data) indicating it provides equivalent care. For example, outside of new consultations, could follow up visits be done virtually? There is some emerging data for rehabilitation via telemedicine, however none currently within the physiatry scope to comment on regular comprehensive follow-up of conditions. Telehealth is used within the Manitoba physiatry context however there is no data on health outcomes for this intervention. Notably, telehealth is unable to provide injection management which is a common physiatric intervention for pain and spasticity and prominent reason for outpatient follow-up for neurorehab patients, or electrodiagnostic testing which is a common physiatry outpatient consult. Much of the emerging data is primarily descriptive, with some preliminary data showing utility for telehealth for wound care in spinal cord injury in "What's happening now! Telehealth management of spinal</p>

cord injury/disorders”, DOI: 10.1179/2045772311Y.0000000003. The Stroke AHA guidelines commented on allied health and nursing follow-up but not physiatry in A Review of the Evidence for the Use of Telemedicine Within Stroke Systems of Care <https://doi.org/10.1161/STROKEAHA.109.192360>. Chronic pain patient satisfaction surveys for telemedicine were generally positive including when comparing to perceived in-person care in Development and Patient Satisfaction of a New Telemedicine Service for Pain Management at Massachusetts General Hospital to the Island of Martha’s Vineyard <https://doi.org/10.1093/pm/pnw069>.

37. Could some description be provided on the group of patients who were in the outreach clinic? Table 1 provides details about volumes. But are interventions provided for all visits or specialized investigations? Are the health conditions similar or different?

See page 4 Methods paragraph 3 for sentences added for general description of patient population “The patient populations seen in outreach represent a generalist physiatry practice and included spinal cord injury, traumatic brain injury, cerebral palsy, amputee, musculoskeletal, chronic pain, neuromuscular and electrodiagnostic medicine. Initial and follow-up assessment of common rehabilitation complications included spasticity, mobility, neurogenic bowel and bladder, chronic pain, chronic wounds, and entrapment neuropathy. Required in-person interventions included botulinum toxin, segmental neuromyotherapy, and electrodiagnostics.” We do not have the data documented about interventional treatments or investigations but from experience I believe it is about half the patients on average. The health conditions represent a generalist physiatry practice including musculoskeletal and neurologic rehab, with overarching similarities of symptom management including pain, spasticity, mobility, wounds, bowel and bladder.

38. The details about costing are well described. However, it may be easier if the direct and indirect costs for the outreach program were group together and separated from the conventional urban setting costs.

The methods were laid out in a format to highlight the categories of costs and help understand how they break down into the key figures.

39. Interestingly in Table 1 there were fewer follow up visits than new consultations? Is this similar across other years? There was a mention that continuity of care is a benefit to physiatry patients and I would expect more follow up visits.

Our experience with these clinics is that some of our patients, including spinal cord injury for example, are ongoing follow-ups that are not accumulating because these are known patients previously served in Winnipeg and the incidence of SCI is fairly low. The more common new consults of musculoskeletal or electrodiagnostic questions may have 0-1 follow-up appointments required and can be time-limited interactions. Our chronic pain consults are treated more in a consulting capacity where direction is given to the primary care physicians and ongoing follow-up is optional with primary care or the physiatry clinic. Because of the heterogeneity of the physiatry patient populations (some of which are more

	<p>single serve medicine) it would be interesting to see over time what the balance is here.</p> <p>40. The discussion is very good. I would comment on a potential mixed care approach. Maybe some outreach and virtual clinics would be an option since the majority of costs and inconvenience are related to travel. See page 7 Interpretation paragraph 2 for additional comment on integration with telehealth “Including other outreach physiatry services in Canada would help generalize incremental costs estimates across various settings and with telehealth integration.”</p>
Reviewer 3	Dr. Grace Li
Institution	University of British Columbia, Vancouver, BC
General comments (author response in bold)	<p>Great work on a topic, not well studied to date by others.</p> <p>41. it would be helpful to note the days or hours spent in clinic vs. proportion of travel time, as this will affect the portion of travel costs greatly. ie. would the outreach team be able to stay for more days to improve efficiency of the travel costs? See page 4 Methods paragraph 1 and 2 for added sentences “Clinics utilized flights for access, with approximate two-way travel time to St. Theresa Point of 7 hours, and to Churchill 5 hours.” and “. The physiatrist team of 1 attending physician and 1 resident physician provided one-day clinics of approximately of 6-8 hours duration...”; page 7 Interpretation paragraph 3 commenting on future research directions including different clinic models. The outreach team in this case could certainly stay for more days to maximize value, including outreach to multiple geographically nearby communities connected by boat or winter road travel. As a pilot-type project the single day clinics formed a basis for a needs assessment for this type of physiatry outreach.</p> <p>42. it would be helpful to note that some patients, especially the more mobile ones, really value their medical appts to urban centers, as they are able to either purchase necessities, or visit with loved ones. this is difficult to capture in a purely economic assessment. See page 7 Interpretation paragraph 3 for the included sentence “Investigation of process measures should be patient-centred and include access, utilization, and satisfaction.”. Agreed that the next steps of assessment of an outreach clinic service include process measures such as patient satisfaction. This as you’ve pointed out can go both for or against an outreach model.</p> <p>43. also, often when patients are travelling to urban centers, they are able to pair together other appts (ie. orthotist, urology, ophtho, imaging), and so it would be helpful to indicate if they were still needing to travel outside of their community for other medical appts The widespread experience of the physiatrists in Winnipeg, all of whom serve northern/remote patients, is that coordination of either multiple visits, or additional needed follow-up care rarely occurs in the same visit to Winnipeg and requires an additional visit at a later date. This was demonstrated at several points by patients served by this clinic where they</p>

informed us of a recent visit to Winnipeg for endocrinology or cardiology follow-up for example. The data for this are not available currently however it is a significant area of discussion within the faculty of medicine concerning effective care provision for northern/remote patients. Significant exceptions to care coordination for Winnipeg appointments include for pediatric patients and for patients from the Kivalliq region of Nunavut whom have dedicated care coordinators. Neither of these patient populations were significantly represented within these outreach clinics (low uptake of pediatric physiatry in Manitoba, outreach locations not more accessible by Nunavut patients than Winnipeg).

44. it would be interesting if you could've included a direct comparator of travel costs or number of urban clinic visits for those chronic patients you converted to outreach, to show value

Interesting thought to compare an individual use of the system. In general the unit cost should be fairly representative of the value per visit, multiplied by 3 visits per year for the average spasticity patient, or 1 per year for spinal cord general follow-up for example. With the diversity of rehab populations served by these clinics it would be difficult to generalize a chronic follow-up patient use per year.

45. with the new push towards digital health strategies, it is becoming increasingly important to justify why in-person visits are necessary (vs. remote/assisted assessments with a PT/ OT/ local NP or physician) and strategies towards teaching local physicians to assist with management strategies for improving sustainability of the clinic (ie. to empower local clinicians)

Certainly integrated strategies of access and community skill building would be excellent. In the case of many northern Manitoba communities the access to physiotherapy is minimal or nonexistent, however does happen to exist within both of the selected communities. An integrated approach was discussed with the local practitioners however currently there was limited interest or ability to coordinate timing or management strategies. There is no OT in one community, and twice yearly OT in the other. The physicians and community health nurse for one community have been responsive for uptake of transferrable skills and management, for example with chronic pain management, however the other community, and most northern communities in Manitoba, have transient physician services which makes communication and coordination extremely difficult. Without further funding available for consistent health care provider presence in these communities it will continue to be difficult to build capacity. It will be interesting to see data coming out of the rapid shift to telerehab over the coming months or years. However, the interventional nature of physiatry management including electrodiagnostics, toxin injection, etc. unfortunately would not be amenable to delegation or telehealth strategies.

46. it would be good to explicitly mention whether the purpose of having a resident attend is for the purposes of manpower, teaching, rural physician recruitment, or that an extra set of hands was required; as the costs for the resident, while small, are included in the calculation

See page 4 Methods paragraph 2 for the added sentence "Resident inclusion

	in the clinic models is standard for Ongomiizwin Health Services and multipurpose for service provision, education, and rural recruitment.”. Resident attendance is commonplace within the organization’s specialist outreach programs for all of the above purposes.
Reviewer 4	Ms. Andrea Coronado
Institution	Western University, London, Ont.
General comments (author response in bold)	<p>"An economic cost minimization analysis of remote physiatry outreach clinics in Manitoba" is an interesting study on the relevant topic of providing care closer to home for patients living in rural and remote communities. In the study, the authors compare the costs of outreach physiatry clinics (in Churchill and St. Theresa) and conventional clinics (Winnipeg), from a societal perspective. They report physiatry outreach clinics represent only 21% of the estimated costs of providing conventional care (in urban centers). The below recommended revisions may help readers understand results and study implications more clearly,</p> <p>47. Study design: The authors chose a cost-minimization analysis as the economic evaluation method. A clear rationale for this is not provided. Consider including a clear explanation in the methods section. See page 4 Methods paragraph 4 with a sentence added stating that “This study design is appropriate for comparing the cost of health care treatment alternatives with similar health outcomes.” References 16-17 were added to the end of this statement.</p> <p>48. It is mentioned in the introduction that visiting specialist outreach patient clinics is comparable to conventional care. However, references provided 15-16 (systematic reviews) are over 15 years old. Is there a reason why these were chosen despite being so outdated? Please note these references are now 16-17. The literature in this area is minimal and these were the most recent and most relevant studies available through the literature search, that address health outcomes of rural specialist outreach. Most studies concerning rural specialist outreach are descriptive alone, or occasionally include cost analysis. There are some further studies of a similar vintage concerning psychiatry outreach that are primarily economic analysis and include outcome data as part of this, however they employed an intensive and interdisciplinary team approach and this was considered less comparable to the model used in the current manuscript.</p> <p>49. Demographics: In the introduction, authors mention the relevance of providing care closer to home, especially for Indigenous patients living in rural/remote areas. It would be helpful to include a description of the demographics in Churchill and St Theresa, so readers who are not very familiar with the region can make the connection. Moreover, wondering if any general demographics of the 31 patients can be provided at all, although I would imagine the small sample size may preclude from doing so. See page 3 Methods paragraph 1 for revised sentence “...remote northern communities of St. Theresa Point (Oji-Cree First Nation, population approx. 3,300) and Churchill (rural municipality, population approx. 900), Manitoba.” Thank you for highlighting this. Unfortunately this study does not have adequate data to comment on demographics. Additionally, it is difficult to</p>

comment directly on providing services to Indigenous people in Canada due to strict ethics, in particular in Manitoba requiring direct oversight and input from the Assembly of Manitoba Chiefs which this study did not obtain.

50. Study limitations: A one-way sensitivity analysis was conducted. Recommend to include the limitations around an analysis like this, which considers parameters one at a time, and what you have done in your study to address such limitations.

See page 8 Interpretation Limitations for added sentences “One-way analyses are intended to identify which specific model inputs are the most sensitive when varied, however does not indicate the likelihood of which value is correct, potential non-linearity of values, or interactions. In our analysis there were only two highly sensitive inputs, flight cost and indirect cost of travel time, and these variables are not expected to interact.”

51. Conclusion: In the interpretation, the authors write " The total costs of outreach clinics were \$33,135, representing 21% of estimated conventional clinic costs of \$158,344". Given the uncertainty in some relevant cost parameters (e.g. travel/transportation costs), it would be better to include a range, instead of providing a single cost estimate.

See page 8 Conclusion paragraph with a sentence added providing a range based on the most sensitive direct cost. “The costs savings of outreach services ranged from \$105,523 to \$133,913 when varying flight cost as the most sensitive direct cost.”