ASSESSING THE HYSTEROSCOPY NEEDS OF NORTHERN QUEBEC: A RETROSPECTIVE COHORT STUDY

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This project fulfills the Master of Global Surgical Care (MGSC) requirements for SURG 560 at the UBC Branch for Global Surgical Care (BGSC).
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Acknowledgement

We would like to acknowledge the patients who endure significant delays and challenges in accessing appropriate medical care by virtue of the remote and harsh living conditions in Nunavik, as well as the health-care workers dedicated to travelling and providing care in these regions.
**Introduction**

Although the World Health Organization (WHO) has affirmed the universal right of timely and safe access to health services\(^1\), achieving this goal in reality evidently proves to be more challenging for certain communities. Notable impediments can be related to many factors including financial, infrastructural, or logistical issues, among others, in addition to patient-level barriers in seeking care such as mistrust or fear\(^2\). Northern Quebec is home to over thirteen thousand indigenous people living predominantly in 14 villages spread over the two coasts of the province, Hudson Bay and Ungava Bay\(^3\),\(^4\). This area, bounded by the 55\(^{th}\) parallel to the south and the Hudson strait to the North, comprises a land mass larger than that of the state of California and is known as Nunavik\(^5\),\(^6\). Health services to the area have been largely overseen by the Nunavik Regional Board of Health and Social Services (NRBHSS) since the signing of the James Bay and Northern Quebec Agreement (JBNQA) in 1975\(^7\).

Under the purview of the JBNQA and NRBHSS, health services are concentrated in two main hospitals on either coast, established in Puvirnituq (Hudson Bay) and Kuujjuaq (Ungava Bay). Periodic specialist care is scheduled in both centres, with regularly occurring non-overlapping trips from a variety of different specialties such as ophthalmology, otorhinolaryngology, and obstetrics gynecology, slated every 2-3 months. Unfortunately, due to the extreme weather situations, trips have frequently been delayed or cancelled – further hindering access to care. As well, limited resources and support in Nunavik results in many patients requiring transfer to tertiary-care centers (typically Montreal) for a variety of reasons including emergency care, specialist follow up, or medical/surgical interventions. These patient transfers are expensive, with numerous associated costs (flight, transport and lodging, meals) and stressors to the patient such as loneliness, unfamiliarity with the environment, and lack of social/familial support. Presence of an escort is often encouraged and budgeted for, resulting in a doubling of transfer costs for patients.
Hysteroscopy is a low-risk, minimally-invasive modality which is used to both assess and treat intra-uterine pathologies such as polyps, uterine fibroids, uterine septa, intra-cavitary adhesions, as well as abnormal uterine bleeding. Using local anesthesia injected in the cervix, with or without systemic sedation, allows for the vast majority of hysteroscopic procedures to be carried out safely and tolerably. With hysteroscopy, many uterine pathologies can be diagnosed and simultaneously treated, all in an outpatient setting. Transferring patients to a different city far from their primary place of residence for hysteroscopy is an expensive and potentially avoidable endeavour. With some investment in basic instruments (such as a fluid management system, functional hysteroscopes, and operative add-ons), hysteroscopy could be provided locally in the North, when gynecologists visit for their regularly scheduled trips. As mentioned, gynecologists regularly visit Nunavik for medical trips lasting approximately one week (occurring every 2-3 months on average in Puvirnituq), such that there would frequently be skilled providers available locally if the equipment and setup were made available. Establishing a central hysteroscopy suite in Puvirnituq to service the 14 villages of Nunavik may be preferable for patients, rather than travelling much further from remote Northern villages to Montreal, as well as potentially having the added benefit of being cost-effective.

**Aim and Objectives**

Hysteroscopy, as a low-risk and multipurpose platform, can greatly expand access to basic gynecological care for the remote Northern population of Quebec for a range of procedures; however a thorough understanding of the needs and current costs of hysteroscopy are warranted to inform future planning. The purpose of this project is to quantify the hysteroscopic needs of the 14 Indigenous villages of Northern Quebec in order to evaluate whether investing in local capacity building merits further consideration. Evaluating the current costs and delivery framework of hysteroscopy and comparing to the costs of providing the same care at a local referral hospital (Puvirnituq) with specialist visits every 2-3 months will assist in determining the feasibility as well as the need for local access to hysteroscopy.
Methods

Search Strategy
At a single tertiary-care academic centre, the McGill University Health Centre (Royal Victoria Hospital), we performed a retrospective chart review from January 2016 to January 2021. All hysteroscopic procedures performed either electively or emergently were identified for patients whose primary residence originates from the 14 villages in the Nunavik region. These villages include the following: Akulivik, Aupaluk, Inukjuak, Ivujivik, Kangiqsualujjuaq, Kangiqsujuaq, Kangirsuk, Kuujjuaq, Kuujjuarapik, Puvirnituq, Quaqtaq, Salluit, Tasiujaq, and Umiujaq. This search was carried out using the electronic operative database of the institution with criteria set for procedure codes and limitations set on place of residence by address and postal code. Hysteroscopic procedures that were included in the search were diagnostic hysterectomy, myomectomy, septoplasty, endometrial polypectomy, intrauterine device (IUD) retrieval, and endometrial ablation. Ethics approval was waived by the institutional Research Ethics Board, given the study was deemed to be primarily quality improvement, and no patient identifiers would be released through the electronic search (see Appendix A).

Primary Outcome
The primary outcome of the study was a quantitative assessment of the annual case load for hysteroscopy for patients from this region, averaged over a five-year period.

Secondary Outcome
Secondary outcomes included indications for hysteroscopy, type of procedure performed (both specific hysteroscopic surgery as well as the nature of the procedure, meaning elective vs. emergent), as well as an approximation of cost per case based on three key expenses: travel costs, daily expenses relating to meals, lodging, and local travel, and lastly presence of a patient escort. These three variables were chosen as they represent in essence all the associated costs of transporting a patient from Nunavik to Montreal in order to undergo an intervention. Costs related to the intervention directly (such as consumable equipment and OR time) were excluded, as they are unchanged whether the procedure is done locally in Nunavik or in Montreal.
Analysis

Descriptive analyses were performed for the averaged annual case load for hysteroscopy as well as the qualitative secondary outcomes mentioned previously. Cost estimates were obtained after contacting logistical support staff who assist in the planning of medical trips for this population. Direct costs related to accessing the procedure in a tertiary referral center in Montreal were acquired (transportation, accommodation, and meals). These were compared to estimates of costs of patients transferring to a local referral hospital in Puvirnituq, in order to understand cost differences between transferring patients locally in Nunavik to transferring patients to Montreal. Procedural costs related to disposable equipment, OR time, and other surgical expenses were not included in the analysis, as they are fixed costs that would be equivalent in either setting, either in Montreal or in Puvirnituq.

Results

Over the course of 5 years from January 1st 2016 to January 1st 2021, including 10 months of the COVID-19 pandemic, a total of 22 hysteroscopic procedures were performed for patients from Nunavik, all of which were elective in nature except for one. The most common procedure performed was diagnostic hysteroscopy (n = 12), followed by hysteroscopic endometrial ablation (n = 6), retrieval of intrauterine device (n = 3), and polypectomy (n = 1). Accounting for reduced surgical volume during COVID-19, there were approximately 4 – 5 patient transfers that occurred annually for hysteroscopy over this 5 year period.

Indications for hysteroscopy varied widely, however the three most common indications were endometrial or cervical polyp (n = 10), abnormal uterine bleeding (n = 5) and retained IUD (n = 3). Cost estimates which were obtained from logistical specialists who arrange transportation and lodging for patients from Nunavik for medical trips were collected. The average price per round trip flight per patient varies from $3,500-$4,000 CDN. Daily food allowance, lodging, and local transport tally to approximately $500 CDN per day. Prior to the COVID-19 pandemic, the average length of stay for patients awaiting surgical intervention was 3-5 days in Montreal, however since the added complexity of
travel during the pandemic, the average length has increased to 5-7 days currently. Lastly, the majority of patients travel with an escort, effectively doubling associated expenses. In summation, a 5-day trip costs approximately $13,000 CDN for a patient with their escort.

For appropriate comparison, local flights in Nunavik (from different villages to Puvirnituq, the main regional referral hospital) cost approximately $400 CDN, and daily allowances for lodging, meals, and local transit average $100 CDN in Puvirnituq. Lastly, trips between villages in Nunavik are either same day visits (due to the frequency of local flights) or last one night, and as such are rarely completed with a patient escort given the brevity. The following table compares associated costs of undergoing hysteroscopy in Montreal versus Puvirnituq. Since the costs of the actual surgical procedure (consumables, operative costs) are unchanged in either setting, they have been omitted from the calculations.

<table>
<thead>
<tr>
<th></th>
<th>Montreal</th>
<th>Puvirnituq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flight</td>
<td>$3,500 - $4,000</td>
<td>$400</td>
</tr>
<tr>
<td>Meal, lodging, local transport</td>
<td>$500 per day</td>
<td>$100 per day</td>
</tr>
<tr>
<td>Length of stay</td>
<td>5-7 days</td>
<td>0-1 days</td>
</tr>
<tr>
<td>Total cost:*</td>
<td>$6,000 - $15,000</td>
<td>$500 - $1,000</td>
</tr>
</tbody>
</table>

*Upper limit reflects highest estimated cost and inclusion of a patient escort

Based on the data, cost savings associated with performing the procedure locally range from $5,500 to $14,000 per patient per procedure. Benefits not financially quantified through local provision of surgical care include increased patient comfort (remaining close to home and support system), improved access through decreased wait-times, as well as less exposure to COVID-19 dense areas such as Montreal.

**Discussion**

In this retrospective study, we sought to determine the volume of hysteroscopic procedures performed for a population spanning 14 remote northern Quebec villages whose primary residents are of Indigenous background. Approximately 4 – 5 patients annually are transferred to Montreal for this procedure, resulting in travel and associated expenses amounting to $13,000 CDN per patient per 5-day trip. The most common intervention
performed was diagnostic hysteroscopy and the most common indication for hysteroscopy was endometrial or cervical polyp.

This retrospective review is the first attempt to quantify and qualify the use of this diagnostic and therapeutic modality for this patient population. However, there are numerous limitations to the data gathered. For instance, gynecologists assessing patients in the North may be less likely to suggest or offer such a minor procedure, given the major costs and commitments involved, and may rather manage with either local pharmacological alternatives or suggest a larger, more definitive surgery such as a hysterectomy. Resorting to alternative options to hysteroscopy may be occurring unintentionally, and may represent an unfair disadvantage to the patients of remote Northern Quebec. The reduced access to hysteroscopy in the North may serve as a major deterrent to gynecologists working in Nunavik from offering this valuable, low-risk, and effective treatment option. It may be felt as not worthwhile to spend thousands of dollars and a week’s worth of time simply to undergo hysteroscopy when the same time and transportation costs could be used towards a major intervention like a hysterectomy, thus unfairly skewing both counselling and management options for this demographic of women. This may potentially result in underestimation of the number of women who may in fact be eligible and very well treated with hysteroscopy as well as those who would choose this procedure over equivalent alternatives. Furthermore, with the COVID-19 pandemic, non-emergent procedures, specialist trips to Northern Quebec, as well as patient willingness to travel were all reduced and may represent another factor to consider in potentially underestimating the most current case volume.

Establishing a hysteroscopy suite in a key Northern referral center such as Puvirnituq offers significant advantages such as increased accessibility, decreased travel time, distance, and expense, as well as the benefit of patients being close to home and their support network. The local hospital in Puvirnituq already has the physical operating room space to accommodate hysteroscopy, as well as a sterilization core and biomedical department. These spaces are already being used for other procedures by obstetricians/gynecologists (such as tuba ligation/salpingectomy, oophorectomy, mid-urethral sling placement, and cervical conization), as well as other specialists too who
perform endoscopy and other minor procedures. As there are already gynecologists routinely travelling to Nunavik every two months, the availability of a hysteroscopy suite would enable them to offer this procedure on a regular basis. The providers are already in place and trained, however the equipment and consumables are not. There are other considerations however, such as managing patient transport from other villages to Puvirnituq and ensuring there is sufficient lodging in local transit homes to accommodate an influx of patients awaiting procedures. A more accurate assessment of the volume to be served would help in planning resource allocation and priorities for capacity building.

Another important consideration would be the initial costs for reusable equipment and the running cost of consumables, which must be distinguished. There are numerous providers of hysteroscopic equipment on the market as well as a range of products for various needs. In order to establish a hysteroscopic suite with the capabilities of offering a wide and reasonable range of procedures, equipment for both diagnostic and therapeutic hysteroscopy would be required. Hysteroscopic equipment by one supplier of women’s health equipment, Hologic Inc (Massachusetts, USA), can be purchased at the following approximate price-points:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost per unit</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluent ® fluid management system</td>
<td>$30,000 CDN</td>
<td>1</td>
</tr>
<tr>
<td>Omniscope ®</td>
<td>$10,000 CDN</td>
<td>1</td>
</tr>
</tbody>
</table>

Total costs for creating a hysteroscopy suite are elevated due to the initial investment in reusable technology, such as the fluid management system. All costs for consumables however are identical, whether the procedure is performed locally in Puvirnituq or in Montreal. Consumables include items such as irrigation fluid, tubing, resection tools and ablative tools. An upfront large-scale purchase of approximately $40,000 CDN would be required to establish a productive hysteroscopy suite. As evidenced earlier, providing hysteroscopy locally produces cost savings of $5,500 - $14,000 per single patient, meaning that establishing a hysteroscopy suite becomes cost-neutral after 3 – 7 patients, or after only one and a half years of use, considering the lower and upper limits of the savings estimates. Once again, it is important to highlight that the number of patients
undergoing hysteroscopy is likely underestimated, given that the known costs and logistical difficulties may bias medical counselling for patients in Nunavik. It remains to be seen whether local access would then translate to higher rates of hysteroscopy use, once the financial deterrent and coordination challenges are removed, and whether this in turn may result in reduced rates of other interventions such as hysterectomy.

**Conclusion**

Using the best available data based on historic use and conservative estimates, there appears to be both sufficient clinical need as well as cost incentives to investigate the establishment of an outpatient hysteroscopy suite in the North to serve Northern remote communities of Quebec.

**Recommendations**

Despite the upfront one-time investment in the necessary reusable materials for hysteroscopy and the generally low number of procedures performed, cost-savings are still achieved after only 3 – 7 procedures are completed, suggesting the financial feasibility of establishing a hysteroscopy suite in Puvirnituq. Future studies should focus on changes in patient counselling or volume of hysteroscopy as a function of improved accessibility and simplified logistics for patients in Nunavik, if and when a full scale hysteroscopy suite is opened in Puvirnituq to service this region.
Reference List


Appendix A

December 28, 2021

Dr. Andrew Zakhari
Minimally Invasive Gynecologic Surgery
McGill University Health Centre

RE: Exemption from Research Ethics Board (REB) review

Dear Dr. Zakhari:

On November 24, 2021 you requested that the Research Ethics Board of the McGill University Health Centre (MUHC REB) assess whether your project called “Utilization of hysteroscopy by Northern Quebec” requires ethics review and approval. The project is essentially a review of operative statistics and booking patterns.

The following requires ethics review and approval by an REB before the research commences:

- Research involving living human participants;
- Research involving human biological materials, as well as human embryos, fetuses, fetal tissue, reproductive materials and stem cells. This applies to materials derived from living and deceased individuals.

For the purpose of defining the ethics review requirement, “research” is defined as: “an undertaking intended to extend knowledge through a disciplined inquiry and/or systematic investigation. The term “disciplinary inquiry” refers to an inquiry that is conducted with the expectation that the method, results, and conclusions will be able to withstand the scrutiny of the relevant research community.”

As a member of the MUHC REB, I have reviewed your proposal and have determined that the project does not require any further REB review.

As a reminder, prior to initiating this project, you may need to seek additional approvals, including from the Director of Professional Services (DPS) if required by Article 19.2 of the Loi sur les services de santé et des services sociaux (LSSS).

If you have any further questions, please do not hesitate to contact me.

Renaud Boulangier MSc
Co-Chair
REB Co-Chair
Centre for Applied Ethics
Quality, Evaluation, Performance and Ethics