The cost of bariatric medical tourism on the Canadian healthcare system

Caroline E. Sheppard, B.Sc.¹,², Erica L. W. Lester, M.D.², Shahzeer Karmali, M.D., F.R.C.S.C.¹,², Christopher J. de Gara, M.B., M.S., F.R.C.S. (Ed, Eng, C), F.A.C.S., F.F.St.Ed.²,*, Daniel W. Birch, M.Sc., M.D., F.R.C.S.C.¹,²

¹Centre for the Advancement of Minimally Invasive Surgery, Room No. 502 CSC, 10240 Kingsway Avenue, Royal Alexandra Hospital, Edmonton, Alberta T5H 3V9, Canada; ²University of Alberta, 2-590 Edmonton Clinic Health Academy, 11405-87 Avenue NW, Edmonton, Alberta T6G 1C9, Canada

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Abstract

BACKGROUND: Medical tourists are defined as individuals who intentionally travel from their home province/country to receive medical care. Minimal literature exists on the cost of postoperative care and complications for medical tourists. The costs associated with these patients were reviewed.

METHODS: Between February 2009 and June 2013, 62 patients were determined to be medical tourists. Patients were included if their initial surgery was performed between January 2003 and June 2013. A chart review was performed to identify intervention costs sustained upon their return.

RESULTS: Conservatively, the costs of length of stay (n = 657, $1,433,673.00), operative procedures (n = 110, $148,924.30), investigations (n = 700, $214,499.06), blood work (n = 357, $19,656.90), and health professionals’ time (n = 76, $17,414.87) were summated to the total cost of $1.8 million CAD.

CONCLUSIONS: The absolute denominator of patients who go abroad for bariatric surgery is unknown. Despite this, a substantial cost is incurred because of medical tourism. Future investigations will analyze the cost effectiveness of bariatric surgery conducted abroad compared with local treatment.

Medical tourism is defined as an individual intentionally traveling from their home province or country to receive medical care. This phenomenon has become relevant to the evolving field of bariatric surgery, as obese patients seek this evidence-based approach for weight loss. Long wait times are thought to be the predominant reason for patients traveling abroad, particularly when private clinics promote swift wait times, equivalent care, and affordable prices.¹,² Overall cost burden of these procedures is both personal and public. On average, a patient is said to pay $16,000 for a gastric band in private Canadian facilities.³ However, there are many controversial ethical and medical issues associated with medical tourism, such as queue jumping, language barriers for care, and risks of travelling after major abdominal surgery.⁴,⁵ Although the number of patients who become medical tourists in Canada is unknown (and untracked),⁶ some fraction of these patients do seek...
follow-up upon returning home, either for routine care or because of negative sequelae of their surgical intervention. In addition, Alberta Health and Wellness does reimburse for select procedures for medical tourism upon returning to Canada. Evidently, there is an inherent public cost to this care, which presently is poorly explored in the literature.

Within the jurisdiction of Alberta Health Services, these patients present to the Royal Alexandra Hospital (RAH) for treatment. This is a 678-bed hospital, which conducts 9,000 to 10,000 surgical procedures each year. The Royal Alexandra is home to the bariatrics team and Weight Wise clinic: a multidisciplinary clinic where patients are assessed before surgery by nursing, medicine, dietetics, psychology, and surgery, and are followed closely thereafter. The wait time to enter this program is approximately 3 months and 8 to 9 months for surgery. On average, it takes 12 months to receive surgery upon entering the program, 3 months of which are to aid the patient through lifestyle changes and prepare for surgery. Presently, this program has a capacity to conduct 250 bariatric surgeries per annum. Medical tourists presenting to this clinic not only occupy the limited space in the program, but also often require complex revision surgery and high-level care that detract resources from the long waitlist of eligible surgical candidates.

**Methods**

Charts were reviewed based on initial contact with our institution from February 2009 to June 2013. There is no tracking system or code for bariatric medical tourism patients; therefore patients selected for this review were based on recall from the bariatric surgeons at our institution. To reduce the bias, all revision clinic and gastrointestinal stented patient charts were reviewed to identify medical tourists. The Human Research Ethics Board approved this study.

Patients were included in this study if they received bariatric surgery either outside of Alberta or Canada. Patients who had their bariatric surgery in a province or country they originally lived in and moved to Alberta afterward were excluded from this study, because this population would capture patients who went through the appropriate healthcare channels for surgery and not medical tourism. Patients were included regardless of their eligibility for bariatric surgery, as initially determined by the 1991 National Institute of Health accepted criteria. Patients were excluded if their initial surgery was earlier than 2003 or if the surgery was a vertical-banded gastroplasty (VBG). We wanted to capture a more recent surgical group and funding already exists to revise VBGs. The charts were reviewed for age at postoperative intervention, sex, preoperative body mass index (BMI), date, location and type of initial surgery, postoperative BMI at intervention (in Alberta), date and reason for intervention, type of initial contact for intervention, days in hospital (including intensive care unit [ICU]), type of revision surgery, operating room time, types of investigative procedures performed, and amount of blood work required.

A summation was performed of the cost of initial contact for intervention, hospital stay, revision surgery, investigative procedures, and blood work. The costs for an initial visit were determined by the average cost for an emergency room visit including all health professional personnel ($287.00, n = 1) and/or the average cost of a visit to the interdisciplinary team at the weight wise clinic ($495.86, n = 9) or revision clinic ($218.18, n = 4). The cost for hospital stay is based on an average cost for 24 hours in hospital ($1,483.00) and ICU ($3,178.00). The cost of revision surgery is the sum of the specific billing of each patient’s case from the RAH operating room and the average billing amount for each procedure from the bariatric surgeon. Investigative procedure costs were provided by the diagnostic imaging department ($21.54–$683.00), gastroenterology department ($197.60–$2,185.19), pathology department ($415.68), and Alberta Health Services materials management Website. Procedure costs also included the interpretation fees and staff time. Blood work costs were divided into general hospital blood workup ($47.60), bariatric team workup ($141.15), and transfusion costs ($46.50–$419.00). Dollar amounts were provided by laboratory services and hematology.

The cost the patient paid for their initial surgery was approximated by the available Canadian bariatric surgery costs literature and an average of quotes from private out-of-country clinics.

All costs were based on the most conservative costs available. Not all costs were taken into account, such as the cost of anesthesiology billing or clerk work. Emergent U.S. operative procedures that would be insured by the Canadian healthcare system were based on Canadian costs and not United States dollars. Stent placement was not considered an investigative procedure and was included in operative procedures.

The RAH is a public Canadian university-affiliated academic tertiary care institution.

Patients were stratified into 4 categories based on the level of intervention required, which was agreed upon by the surgical team A, B, C, or D.

**Category A** No surgery required. Patients who have been referred to the RAH Weight Wise revision clinic have had blood work before being referred, required band fills, or have not followed up with the clinic.

**Category B** No surgery required. Patients who needed to have minor investigative procedures done for complications, such as gastroscopy and diagnostic imaging. Interventions such as stent placement and hospital stay for malnutrition and dehydration included.

**Category C** Patients who required a definitive minor surgery, such as a band removal, had diagnostic
Table 1: Summation of postoperative care costs separated by category of complication severity

<table>
<thead>
<tr>
<th>Patient type</th>
<th>Initial visit (n = 76)</th>
<th>Hospital stay (n = 657)</th>
<th>Surgery (n = 110)</th>
<th>Investigative procedures (n = 700)</th>
<th>Blood work (n = 357)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (n = 24)</td>
<td>$4,601.60</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$7,158.51</td>
<td>$3,059.35</td>
<td>$14,819.46</td>
</tr>
<tr>
<td>B (n = 10)</td>
<td>$2,807.26</td>
<td>$48,939.00</td>
<td>$6,944.12</td>
<td>$12,455.60</td>
<td>$1,514.95</td>
<td>$66,752.07</td>
</tr>
<tr>
<td>C (n = 15)</td>
<td>$3,275.26</td>
<td>$59,320.00</td>
<td>$48,052.58</td>
<td>$12,445.60</td>
<td>$1,514.95</td>
<td>$124,608.39</td>
</tr>
<tr>
<td>D (n = 13)</td>
<td>$6,730.75</td>
<td>$1,325,414.00</td>
<td>$93,927.60</td>
<td>$187,921.46</td>
<td>$13,994.40</td>
<td>$1,627,988.21</td>
</tr>
<tr>
<td>Total (n = 62)</td>
<td>$17,414.87</td>
<td>$1,433,673.00</td>
<td>$148,924.30</td>
<td>$214,499.06</td>
<td>$19,656.90</td>
<td>$1,834,168.13</td>
</tr>
</tbody>
</table>

The patients in each category were similar in age and sex (P > .6 and P > .5, Table 2). BMI decreased from the initial surgery to the time of intervention (A: P < .05, n = 5; B: P > .2, n = 5; C: P = .05, n = 6; D: P > .3, n = 3); however, this could be attributed to patients requiring intervention because of malnutrition. There was no significant difference between groups for preop or post BMI (P > .1 and P > .2). However, only a third of preop BMI was captured from the chart review making it difficult to avoid skewed data. The total time spent in the operating room for all categories was 5,008 minutes, with a median of 113 minutes (average: 217.76 ± 425.86 minutes, range: 55–2,134 minutes).

The cost to each patient for their initial surgery was an approximated amount of $11,084.75 ± $6,538.61.

Results

The total costs incurred by 62 medical tourists were $1,834,168.13 CAD. The majority of this cost was because of the cost of hospital stay (inpatient = 407, ICU = 250, $1,433,673.00). The procedure most often seen was gastric band (57%, n = 37) and more patients fell into category A than any other category (n = 24; Table 1). Gastric bands represented the majority (71%) of initial surgeries in category A, whereas the costly categories were more populated with sleeve gastrectomies (25% B and 71% D) and laparoscopic Roux-en-Y gastric bypasses (LRYGBs) (42% B). However, gastric band removal was the most costly component of category C (93%).

Category D Patients who required major or multiple surgeries had diagnostic imaging, gastroscopy or transfusions, or hospital stay ≥7 days or ICU stay.

Statistical analysis for age, preop BMI, and postop BMI was performed using a 1-way analysis of variance and sex using a chi-square analysis by STATA 10.0 statistical software (StataCorp LP, College Station, TX).

Table 2: Demographics of medical tourists separated by category of complication severity provided as average and standard deviation

<table>
<thead>
<tr>
<th>Category</th>
<th>Age (years)</th>
<th>Sex</th>
<th>Preop BMI (kg/m²)</th>
<th>Postop BMI (kg/m²)</th>
<th>Time until intervention (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (n = 24)</td>
<td>44.25 ± 11.00</td>
<td>M = 5</td>
<td>64.36 ± 19.04</td>
<td>42.38 ± 10.68</td>
<td>3.23 ± 2.13</td>
</tr>
<tr>
<td>B (n = 10)</td>
<td>43.10 ± 8.37</td>
<td>M = 2</td>
<td>47.78 ± 11.92</td>
<td>38.67 ± 13.24</td>
<td>2.39 ± 2.14</td>
</tr>
<tr>
<td>C (n = 15)</td>
<td>43.87 ± 10.90</td>
<td>M = 1</td>
<td>45.40 ± 5.30</td>
<td>35.59 ± 8.09</td>
<td>2.81 ± 2.63</td>
</tr>
<tr>
<td>D (n = 13)</td>
<td>48.38 ± 12.63</td>
<td>M = 1</td>
<td>44.85 ± 12.70</td>
<td>32.72 ± 9.49</td>
<td>0.85 ± 1.08</td>
</tr>
<tr>
<td>Total (n = 62)</td>
<td>44.58 ± 10.94</td>
<td>M = 9</td>
<td>50.77 ± 14.55</td>
<td>37.59 ± 10.78</td>
<td>2.48 ± 2.24</td>
</tr>
</tbody>
</table>

BMI = body mass index; F = female; M = male; Postop BMI = BMI upon access to healthcare intervention; Preop BMI = BMI before initial bariatric surgery.

Conclusions and limitations

The medical tourists presenting postbariatric surgery exhibited a broad range of initial surgery types and necessary further interventions. While many elected to seek intervention from the Weight Wise clinic, others required emergency nonelective procedures to rectify their complications. A large cost is associated with this care; however, this is deemed to be a conservative calculation. The costs derived in this study are limited by the paucity of data concerning the number of medical tourists reimbursed by Alberta Health Services for their procedure abroad. As well, it is difficult to elicit an exact cost for each patient, as the costs found are averages and estimates provided by each department. In addition, these are considered to be one-time costs related to managing early complications and do not capture potential ongoing costs to the patient and imaging or gastroscopy or hospital stay <7 days.
Alberta Health Services. This study is not based on each patient’s individual billing codes, as this information is not attainable within the current system.

In 2009, our institution performed a similar review of 10 medical tourists who presented to the RAH with complications and found that the combined cost of these patients to the healthcare system was $162,791.00 CAD.\(^{11}\) As bariatric surgery increases in necessity, as expected the costs of returning medical tourists will also increase. In addition, laparoscopic-adjustable gastric band (LAGB) is the most travelled procedure in this population, perhaps because only 2 provinces insure AGB: Alberta and New Brunswick.\(^2\) In Alberta, government health claims may also be made for out-of-province and out-of-country bariatric surgery. Although the number of these claims is not available at this time, the amount reimbursed to patients is based on each procedure. Claims include surgeon, anesthesiology, assistant surgeon, laboratory and operating room costs. A LRYGB, LAGB removal, and laparoscopic sleeve gastrectomy (gastric partitioning) are reimbursed at $2,670.73, $248.08, and $1,290.36, respectively, in CAD. Surgeon and anesthesiology are set figures, while assistant surgeon, laboratory, and operating room costs are variable on the site of the surgery. For all bariatric procedures, the province of Ontario totaled $50.6 million in expenditures for out-of-country spending from 2008 to 2009.\(^6\)

Furthermore, this study does not delve into the realm of economics and future work could extrapolate further on this larger scale issue. A known cost is associated with obesity and with a patient remaining obese; each possible primary bariatric surgery that is not conducted because of resources being utilized by a medical tourist’s bariatric complication can be considered a savings loss to the system as a whole. Currently, bariatric surgery is considered to be a cost-effective option for the treatment of obesity.\(^12\) With regards to completeness of data collection, the total denominator of patients remains unknown as medical tourism is not regulated or tracked in Canada.

As the realm of globalization and medical tourism continues to evolve, further investigations will be necessary to aid not only in the understanding of this phenomenon, but in the regulation and overall financial implications. Future studies may elicit the overall cost effectiveness of bariatric surgery procedures performed in Alberta, including follow-up and complications, versus abroad. As well, the overall cost repercussions of caring for complicated medical tourists in lieu of conducting primary bariatric surgery need to be explored.

**References**


**Discussion**

_Eugene Cho, M.D._: The authors present a follow up paper to their 2009 study calculating the cost to the Canadian health care system of 10 patients who presented to their institution with complications of bariatric surgery performed outside of their province. In this paper, the cost of 62 such patients over a 4 year period is estimated. The denominator of the total number of patients who had bariatric procedures performed outside of the province is not known.

Their conclusions are that those 62 patients cost an aggregate $1.8 million Canadian over the study period. These figures as based on estimates such as the cost of a day in the hospital being $1,483 and in an intensive care bed $3,178, which at first glance appear to be hospital chargemaster numbers rather than true costs to the hospital when compared to similar costs in the United States. Basing any estimate of costs on hospital chargemaster figures is chancy as best, as the way these numbers are calculated has come under some recent scrutiny in the US, but it is reasonable to assume that the true cost to the hospital is somewhat less than those numbers.

Likewise, the cost of bariatric surgery and its complications need to be looked at in some perspective, and in the case of the Canadian health care system this is even more important. The authors correctly point out that without knowing the denominator of patients who seek treatment through medical tourism, the true costs or potentially cost savings are unknown.

One reason this is important is that it is even possible that the complication rate of patients undergoing bariatric surgery via medical tourism may actually be lower than that for patients at the authors’ home institution. Keep in mind that it is certainly possible that some of the patients who
left Canada for surgery may just have gone across the border to accredited centers of excellence for bariatric surgery in the United States or to international Joint Commission accredited hospitals overseas. If so, then patients undergoing surgery elsewhere might even represent a net cost savings to the system. Without the denominator, this is impossible to determine.

Because this is the Canadian system, we must also factor in the cost control limits set by the Canadian government. The yearly cap of 250 bariatric procedures for the authors’ institution is almost certainly an artificial limit set by the government rather than an actual capacity issue at the hospital. The authors speculate that some or all of the Canadians who resort to medical tourism do so because of the long waiting lists created by these artificial limits. Those patients who wait, and suffer admissions to the hospital for problems related to obesity such as diabetes, hypertension, joint problems, etc. who seek bariatric surgery elsewhere have a certain cost associated with their care while sitting on the waiting list, and this cost should also be considered in relation to the total number of patients who have medical tourism bariatric surgery but do not require further intervention postoperatively.

The Province of Alberta, according to the authors, subsidizes part of the expense of bariatric surgery done elsewhere, which strongly implies that the Province considers it cheaper to do so than to allow more bariatric procedures to be done at home. Whatever part of that cost which comes out of the pocket of the patients and is not subsidized is also a net savings for the system and the government. Bariatric surgery is not the only procedure where long waiting lists result in medical tourism, orthopedic operations also generate medical tourism, and for every patient who pays out of pocket for a hip replacement, that is money saved by the Canadian system.

So while I congratulate the authors on their initiative and on the work they have done, and while this paper is certainly eye opening as it is, I would challenge them to expand on the work they have already done by adding these additional pieces of data to their database and analysis.

1. Estimate the denominator, or the total number of people who leave Alberta for medical tourism bariatric surgery. One way to do this would be to engage primary care providers in the province, who may know exactly which of their patients have undergone bariatric surgery, and where. Since the provincial government has agreed to subsidize such patients, it seems likely that they would have a database of patients who have applied for such subsidies, and this would be another way to estimate the denominator. Once the denominator is known, then complication rates and their costs can be meaningfully examined.

2. Obtain true hospital costs, not chargemaster charges, for items such as hospital days. It should not be necessary to drill down to the level of itemized costs, the average overall cost of each patient’s hospital stays and outpatient encounters should be enough for the purpose of comparison.

3. Include in the paper the complication rates and costs associated with bariatric surgery where the primary operation was done at the authors’ home institution.

4. Determine the average cost per year to the Canadian system for patients who are waiting for bariatric surgery due to care for their bariatric related comorbid conditions.

This is a worthwhile and though provoking manuscript as is, but with those 4 additions, depending on the data found and conclusions generated, could be a very powerful, landmark paper that could potentially profoundly impact Canadian and other governmental policies for decades to come.