Bariatric Surgery in Canada

Report

May 2014

Health System Performance

Canadian Institute for Health Information

Institut canadien d'information sur la santé

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Acknowledgements

CIHI would like to acknowledge and thank the many individuals who contributed to the development of this report. This report could not have been completed without the generous support and assistance of our expert advisory group:

- Nicolas Christou, MD, PhD, President, Weight Loss Surgery; Professor of Surgery, McGill University
- Diane T. Finegood, PhD, President and CEO, Michael Smith Foundation for Health Research; Professor, Department of Biomedical Physiology and Kinesiology, Simon Fraser University
- Yoni Freedhoff, MD, CCFP, Founder and Medical Director, Bariatric Medical Institute; Assistant Professor, University of Ottawa
- John Hagen, MD, FRCSC, Chief of Surgery and Surgical Director, Bariatric Surgery, Humber River Regional Hospital
- Michaela Sandhu, MSc, Lead, Bariatric Services Strategy, Provincial Programs Branch, Ontario Ministry of Health and Long-Term Care

Please note that the analyses and conclusions in the present document do not necessarily reflect those of the individuals or organizations mentioned above.

CIHI would also like to thank the Centre for Surgical Invention and Innovation for providing information on the Ontario Bariatric Registry. The production and analysis of this data was done by the Population Health Research Institute, and the project was supported by the Ministry of Health and Long-Term Care.

Appreciation goes to the CIHI staff involved from the core project team and the Classifications team, the client affairs managers and the supporting program areas who contributed to the development of this project. Core team members who contributed to this report include Jessica Burnett, Allie Chen, Dennis Christy, Alexey Dudevich, Josh Fagbemi, Cheryl Gula, Sharon Gushue, Kristen Hart, Sam Herold, Hong Ji, Derek Lefebvre, Michelle Martin-Rhee, Kathleen Morris, Geoff Paltser, Michelle Parker, Rob Ranger and Jeremy Veillard.

Executive Summary

Obesity is a major population health issue in Canada, affecting about one in five Canadian adults.[1] It increases both the risk of other chronic health conditions—such as type 2 diabetes, high blood pressure and sleep apnea—and the use of health resources.[2–6]

Many interventions can help individuals with obesity lose weight. These include lifestyle changes (diet modifications and increased physical activity), medical counselling and bariatric surgery. Evidence shows that bariatric surgery can be an effective tool for significant weight loss among people who have severe obesity, in turn leading to improvements in their health status and quality of life.[4, 7–9]

Improved access to bariatric surgery has been identified as a priority in several jurisdictions. This is due in part to concerns regarding the continuing rise in Canada's obesity rates and the public attention bariatric surgery has received in recent years. Using mainly administrative data from the Canadian Institute for Health Information (CIHI), this study examines the current state of bariatric surgery in Canada and describes several aspects of patients' hospital experiences and outcomes.

The study's main findings are the following:

1. **In 2012–2013, about 6,000 bariatric surgeries were performed in Canadian hospitals.** This represents an almost four-fold increase over six years, due largely to increased capacity for bariatric surgery in Ontario.
2. **The typical bariatric surgery patient is a woman in her 40s who has obesity and other conditions such as diabetes, hypertension or sleep disorders.** These characteristics have remained relatively consistent since 2006–2007.
3. **Overall, 5% of bariatric surgery patients experienced complications during their hospitalization for the surgery, and 6% were readmitted to hospital within 30 days of discharge.** This study shows that complication and readmission rates have declined over time and are comparable to rates reported in other countries. As well, the readmission rate is similar to that for surgical patients overall in Canada (6.5%).
4. **Short-term increases in use of hospital care often follow bariatric surgery.** Some patients have a noticeable change in their pattern of health care utilization after bariatric surgery. In some cases, this represents readmissions or follow-up care directly related to their surgery. In others, it may represent deferred procedures, such as joint replacements or hernia repairs, which could not be provided to patients at their starting weights. While this study examined only pre- and post-surgery hospital care, other studies have found that the surgery can reduce health care use and costs in other areas, such as prescribed medication.[10, 11]

Introduction

Obesity has become a major population health issue facing governments in developed countries around the globe.[12] In Canada, it is estimated to affect one in five adults.[1] Many options are currently available to treat obesity, including lifestyle changes (such as diet modifications and increased physical activity), medical counselling and bariatric surgery. This study focuses on bariatric surgery provided in Canadian hospitals.

The term “bariatric surgery” is used to describe a number of elective surgical weight loss procedures. Bariatric surgery modifies the gastrointestinal tract and works by restricting either the amount of food that the stomach can take in or the amount of nutrients absorbed from the intestinal tract (malabsorption).

Research suggests that, for people with moderate to severe obesity, bariatric surgery is an effective tool for long-term weight loss.[4, 9] Studies have shown that up to 60% of excess weight can be lost, depending on factors such as the type of procedure done and the patient’s starting weight.[13, 14] For many patients with obesity, the surgery can lead to improvements beyond just weight loss, including resolved comorbidities (such as type 2 diabetes, hypertension and sleep apnea), improved reported quality of life and reduced overall mortality risk.[4, 8, 9]

Although bariatric surgery has been found to be among the most effective options for people with severe obesity, it is not without risk. Published post-surgical mortality rates have ranged from 0.1% to 2%.[15, 16] Patients can also potentially experience a wide range of problems after surgery, including bowel obstructions, ulcers, gallstones and excessive scar tissue formations. When gastric banding is performed, the band applied can leak, erode or slip, resulting in complications. For some patients, a second bariatric surgery, either to revise the first procedure or as a second step in the process, may also be required.[13]

It is important to underscore that this surgery is one of many weight loss interventions, and it is typically offered only after other efforts have failed. Like any weight loss treatment, patients must understand that a significant lifelong commitment to a change in lifestyle is needed for long-term success, including changes in diet and physical activity. Some have also cautioned that bariatric surgery is still relatively new and that more, larger and longer-term studies are still needed to evaluate maintenance of weight loss and changes in quality of life.

Obesity in Canada: The Issue

Statistics Canada data shows that approximately one in five Canadian adults (18% of women and 19% of men) age 18 and older meet the criteria for obesity based on self-reported body mass index (BMI).[1] This is an increase from nearly 1 in 16 (6.2%) Canadian adults age 18 and older in 1985.[2] With men tending to overestimate their heights and women tending to underestimate their weights,[17] estimates based on actual body measurements suggest that the current rate of obesity among Canadian adults is likely closer to one in four (24.1%) adults age 18 to 79.[18]

Rising obesity rates have been observed around the globe (in countries such as the United States, England, Scotland, Australia and Sweden[19–23]) and are projected to continue to rise until at least 2020.[24] Overweight and obesity are also becoming challenges in developing countries, with estimates showing nearly a quadrupling between 1980 and 2012 in the number of people who are overweight or obese in the Middle East, Latin America and North Africa.[25]

The health consequences of obesity are well-documented and include increased risk of high blood pressure, type 2 diabetes, high cholesterol, arthritis, some cancers, sleep apnea and depression.[2–6, 26] Moreover, evidence suggests that people with severe obesity have a greater risk of premature mortality than those in the normal-weight and overweight ranges. An estimated 1 in 10 premature deaths among Canadian adults age 20 to 64 is directly attributable to obesity.[26] Obesity has also been associated with increased risk of depression, anxiety and low self-esteem.[27]

In addition to the physiological and psychological impact that obesity can have, social stigmatization and discrimination commonly occur, including barriers to job advancement and lower earnings relative to normal-weight individuals.[12] The financial impact of obesity is significant; estimated direct and indirect costs from 2000 to 2008 were between $4.6 billion and $7.1 billion annually.[2] Among many countries in the Organisation for Economic Co-operation and Development, it is reported that obesity is responsible for 1% to 3% of total health expenditures; this figure is even higher in the U.S., at 5% to 10%.[12]

Currently, Canadian clinical practice guidelines suggest bariatric surgery for adults who have had previous unsuccessful attempts at losing weight by lifestyle modification and who have

- A BMI of 40 kg/m^2 or higher (class III obesity); or
- A BMI of 35 kg/m^2 or higher (class II obesity) and obesity-related comorbidities.[26]

These guidelines are in line with recommendations used in other countries.[28–31] With preliminary evidence of positive results for those with less excess weight, some experts now suggest considering patients with BMIs of 30 kg/m^2 to 34.9 kg/m^2 (class I obesity) and type 2 diabetes for bariatric surgery.[28]

In addition to the eligibility criteria described above, guidelines also emphasize that prospective patients meet the following criteria:

- Have undergone preoperative testing and consultation;
- Be mentally and emotionally prepared for the surgery and understand its benefits and limitations;
- Have support systems in place; and
- Be committed to lifelong adherence to the required lifestyle changes and follow-up once the surgery has been completed.[32]

Given the recent attention to bariatric surgery and Canada's rising obesity rates, this study examines the current state of bariatric surgery in Canada by addressing the following questions:

1. What is the volume of bariatric surgery in Canada and how does it vary across provinces? How has this changed over the past six years?
2. What strategies are being implemented to improve access to bariatric surgery for qualifying patients in Canada?
3. What are the hospital costs of bariatric surgery?
4. Who is having bariatric surgery in Canada and what are the
   a. Complication and readmission rates?
   b. Effects on use of health care services after surgery?

The Fine Print: Data Sources, Case Selection and Study Limitations

Data Sources, Period and Case Selection

This study uses 2006–2007 to 2012–2013 data from CIHI's Discharge Abstract Database, Hospital Morbidity Database and National Ambulatory Care Reporting System, and 2006–2007 to 2009–2010 data from the Alberta Ambulatory Care Reporting System. The study period was chosen to allow for complete coverage of comparable data across different versions of the International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Canada (ICD-10-CA). This study period also allows for pre- and post-surgery analysis of health care use.

Bariatric surgery was identified using Canadian Classification of Health Intervention (CCI) codes, with accompanying codes indicating obesity from ICD-10-CA, specifically discharges with a diagnosis of obesity as E66.^, regardless of diagnosis type, and an accompanying non-abandoned procedure classified as 1.NF.78.^^ (repair by decreasing size, stomach).

Additional information on cohort selection and study methodology is available upon request.

Study Limitations

The following information should be considered when understanding and interpreting the study's findings.

Data Availability

Some data was not available for inclusion in the study, including the following:

- Procedures carried out in stand-alone private clinics;
- Procedures performed out of country;
- Patients' BMIs; and
- Services received outside of the hospital (such as referrals or post-surgical follow-ups in primary care settings).

(cont'd on next page)

Cautions on Interpreting Results

Bariatric surgery patients in private clinics may differ from those in hospitals. As such, caution is required when generalizing the results from this study as representing all bariatric surgery patients or when comparing patient populations across provinces.

The data may underestimate obesity-related comorbidities among bariatric surgery patients, particularly when patients are admitted solely for a scheduled surgery with no plans to treat any underlying conditions.

Current State of Bariatric Surgery in Canada: Volumes, Access, Costs and Patient Profiles

Using hospital data, this section of the report provides information on the number of bariatric surgeries performed in hospitals, their associated hospital costs and the characteristics of the patients. This section also highlights challenges with access and important differences—over time and across jurisdictions—in the types of bariatric surgery and approaches most commonly carried out.

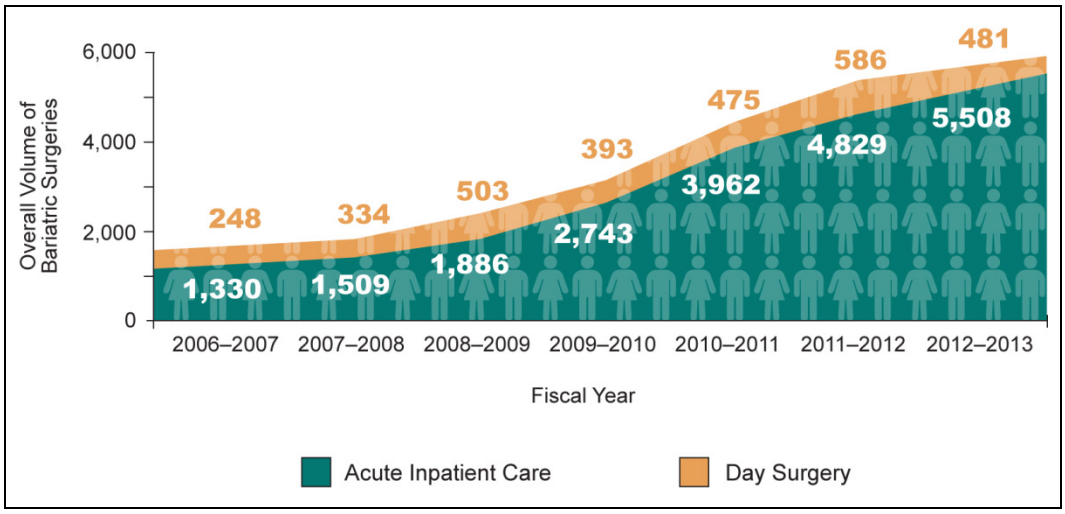
Bariatric Surgery: Volumes

Nearly 6,000 bariatric surgeries were carried out in Canadian hospitals in 2012–2013, almost four times the number performed in 2006–2007. Over the same period, the number of hospitals performing the procedures also grew, from 34 to 46. An estimated 1,000 additional procedures were performed in private clinics across Canada in 2012.[i] Experts suggest that some Canadians may pay privately for bariatric surgery in other countries; however, comprehensive data is not currently available on how many patients might be pursuing this option.

Figure 1 depicts the growth in bariatric surgery performed in Canadian hospitals each year from 2006–2007 to 2012–2013, in both day surgery and inpatient settings.

i. Compiled by CIHI through correspondence with private clinics.

Figure 1: Volume of Bariatric Surgeries Performed in Canadian Hospitals, 2006–2007 to 2012–2013



Note

Not all bariatric surgeries performed in hospitals are covered by jurisdictional health care plans.

Sources

Discharge Abstract Database, Hospital Morbidity Database and National Ambulatory Care Reporting System, 2006–2007 to 2012–2013, Canadian Institute for Health Information; Alberta Ambulatory Care Reporting System, 2006–2007 to 2009–2010, Alberta Health Services.

In 2012–2013, most procedures took place in Ontario (2,846) and Quebec (1,988). The remaining provinces had smaller volumes (detailed data by province is provided in Appendix A).

Ontario had some of the biggest growth among the provinces during the study period and now accounts for almost half (48%) of all hospital procedures done in Canada, up from 19%. From 2006–2007 to 2012–2013, procedures increased in the province by almost 10 times, from 297 to 2,846.

Other countries have also experienced growth in bariatric surgery volumes. In Australia, the number of procedures increased from approximately 500 in 1998–1999 to almost 17,000 in 2007–2008.[33] England, France and Sweden have also experienced increases in bariatric surgery in recent years.[34–36] In contrast, an initial rise in bariatric surgery rates in the U.S. from the early 2000s levelled off by 2008.[37]

A number of factors may influence bariatric surgery volumes over time, including the following:

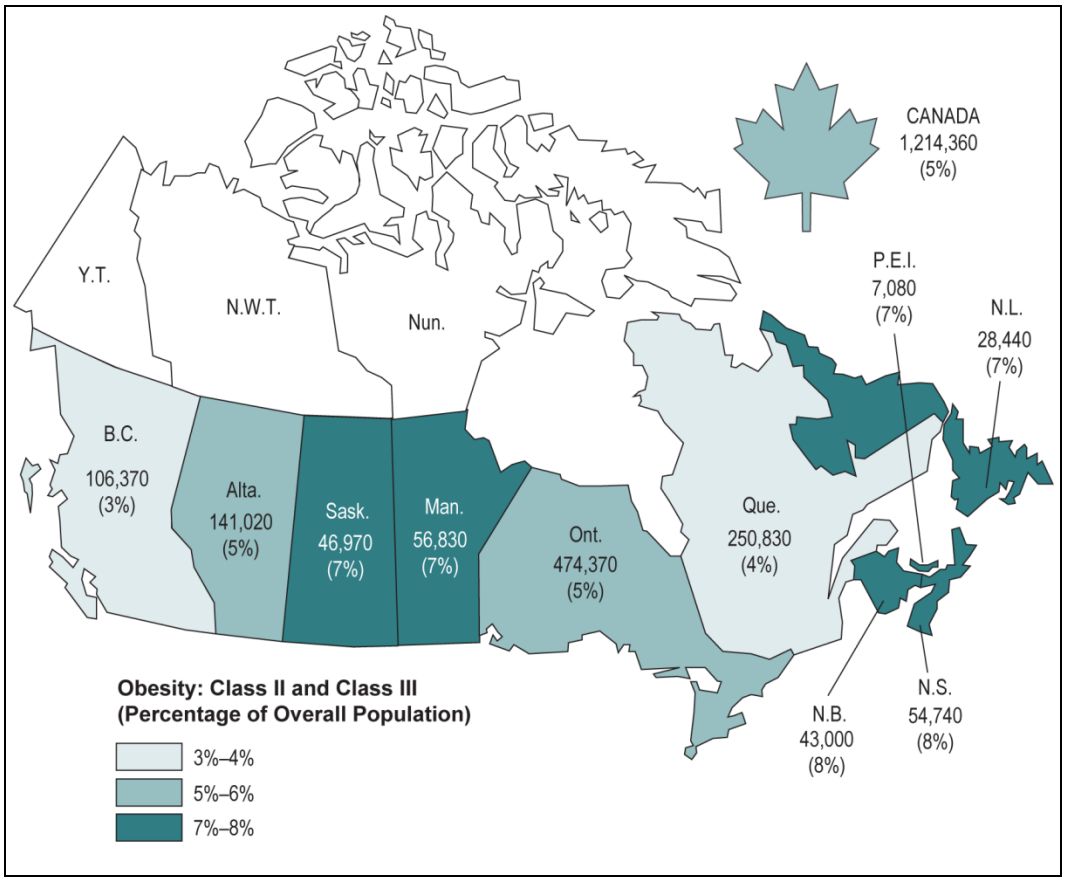
- Increased coverage by provincial health care plans can remove a financial barrier to accessing the surgery and lead to increased interest in the surgery.
- Increases in the number of hospitals or clinics that offer the procedure may result in more access.
- Advances in surgical techniques, local surgical expertise and individual practice patterns among treating physicians could lead to more patients being treated.[36, 37]

In addition, any future expansion in practice guidelines to include those with less excess weight may lead to more people being eligible for the surgery.

Bariatric Surgery: Issues With Access

Despite recent increases in funding in some jurisdictions, access to bariatric surgery remains a challenge in Canada. According to data from Statistics Canada, more than 1.2 million Canadian adults age 18 to 79 are estimated to have class II (more than 830,000 people) and class III (more than 370,000 people) obesity, based on self-reported data. Figure 2 provides obesity estimates by province. Approximately two out of every three (67%) Canadians with class II obesity also reported having one or more related comorbidities (such as diabetes and high blood pressure), potentially meeting the eligibility criteria for bariatric surgery.

Figure 2: Canadian Population With Class II and Class III Obesity by Province, 2007 to 2010



Note
Based on self-reported data of Canadian adults age 18 to 79.
Source
Canadian Community Health Survey, 2007 to 2010, Statistics Canada.

Expanding the guidelines for the surgery to potentially include those with less excess weight, such as individuals with class I obesity, may result in significantly more people being eligible for the surgery. An additional 3.1 million Canadians age 18 to 79 are estimated to have class I obesity, and three out of five also reported having one or more related comorbidities.

Lengthy wait times have been reported for publicly covered bariatric surgery in some jurisdictions.[38, 39] Each year, some Canadians choose to pay out of pocket for surgery in private clinics, either within or outside of Canada. From a doctor's referral for surgery to the date of surgery, wait times can be as short as a few months in some jurisdictions to as long as several years in others. Experts have suggested a number of contributing factors, including a limited number of surgeons specializing in bariatric techniques, restricted operating room capacity, a lack of postoperative beds, limited funding and a lack of prioritization when it comes to these types of procedures.[40] In addition, as bariatric surgery is an elective procedure often performed in only a few specialized hospitals, some patients incur substantial out-of-pocket costs for travel and accommodation.

In response, several provinces have moved forward with strategies to help improve access. These include making efforts to increase bariatric surgery capacity and expertise, supporting recommendations on the need for agreed-upon funding criteria for surgery and post-surgical procedures (such as skin reductions) and establishing wait time targets.

Improving Access to Bariatric Surgery

In recent years, several jurisdictions have made commitments to increase access to bariatric surgery and have put programs in place to assist qualifying patients through the process. Examples of the largest programs in Canada are given below.

In 2009, Ontario established a bariatric treatment program that includes the **Ontario Bariatric Network** and four centres of excellence across the province, as well as regional assessment and treatment centres. The number of procedures performed in the province has more than tripled since 2009.

Quebec's bariatric program is also provided through centres of excellence across the province. In 2005, the Agence d'évaluation des technologies et des modes d'intervention en santé recommended that Quebec significantly increase its capacity for bariatric surgery. The province has more than doubled the number of procedures done since then.

Other provinces have also made important investments in offering bariatric surgery:

- In **Alberta**, adult bariatric surgery is offered through a weight management program that consists of interdisciplinary care teams within hospital-based adult bariatric speciality clinics. In 2012–2013, additional procedures were funded as part of a one-time initiative to help reduce the waiting list.
- In 2010, **Manitoba Health** started a pilot program to assess bariatric surgery services in the province. The program is reported to have offered more than 120 procedures by 2012, with a goal of performing 200 procedures a year going forward.
- As of 2012, more than 500 **Saskatchewan** residents had accessed the province's Bariatric Surgical Program since it opened in 2009. The program has the capacity to take in 100 to 125 new clients a year and provides a number of services within a multidisciplinary outpatient clinic.

Bariatric Surgery: The Costs

The estimated financial impact of obesity on the health care system can be significant. Previously published studies have shown that bariatric surgery can be a cost-effective treatment for obesity when compared with other options.[14, 41] The cost of bariatric surgery includes many components, such as preoperative assessment and care, the surgery episode itself, and postoperative and follow-up care. Some costs, such as for travel to the hospital where surgery is performed or excess skin removal after weight loss, are typically paid for out of pocket by patients. In all, the total estimated cost can range from $14,000 to $24,000 for one surgery.[42, 43]

To further understand which portion of these costs is paid for primarily by the public purse,[ii] this study used CIHI's Case Mix Group+ (CMG+) methodology to estimate the hospital[iii] component of the surgery in 2012–2013. The total hospital cost for nearly 6,000 bariatric surgeries performed in 2012–2013 was approximately $48 million (excluding physician compensation).

Bariatric Surgery: The Patients

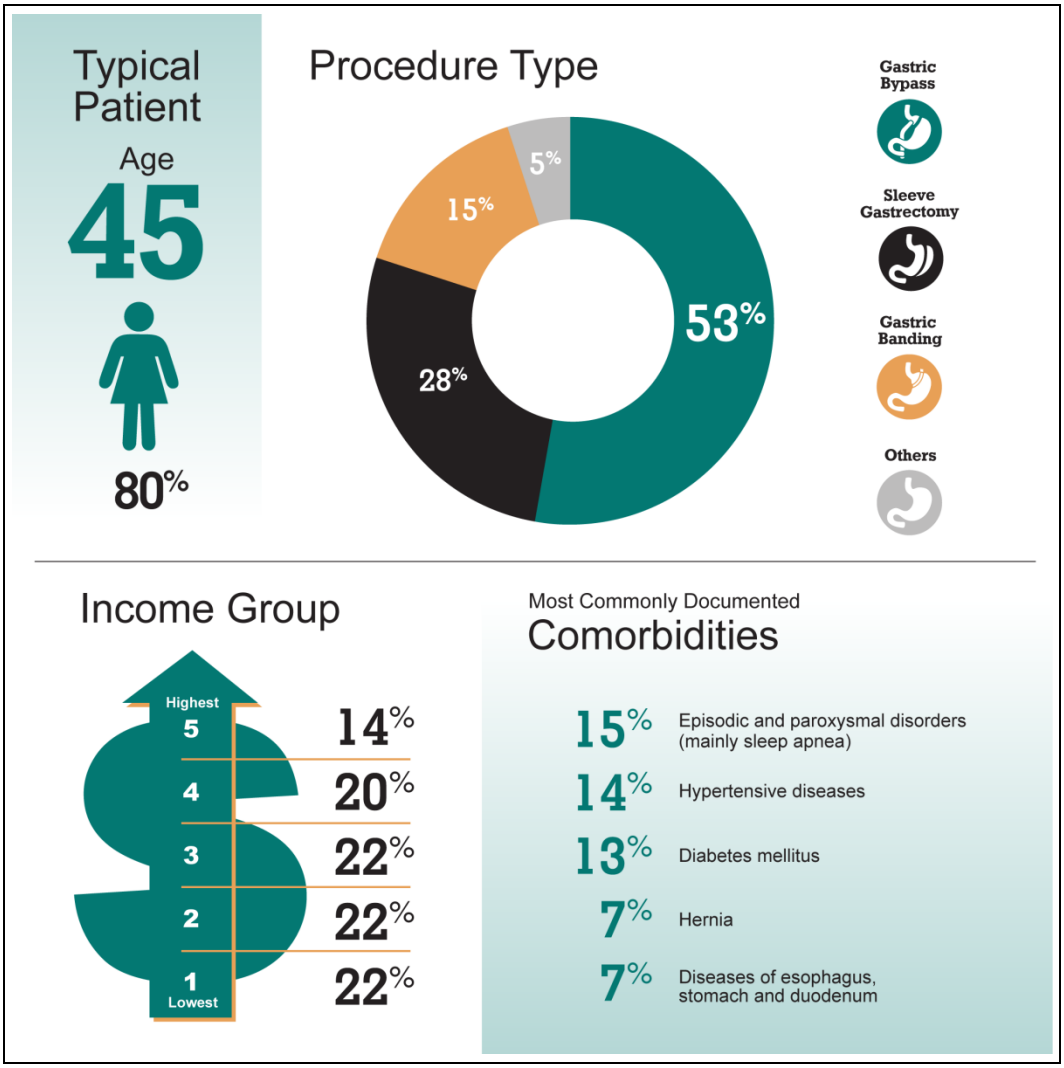
While there have been significant changes in bariatric surgery volumes in recent years, patient characteristics have remained relatively consistent. In 2012–2013, 80% of hospital bariatric surgery patients were women, reflecting the higher percentage of women among Canadians with class II (52%) and class III (60%) obesity. There was some variation across provinces in the proportion of women who had surgery, from 72% in Quebec to 95% in Nova Scotia. The average age of patients was 45, ranging from 43 in Manitoba to 47 in British Columbia. As well, the age distribution shows that almost 6 out of 10 (56%) patients were age 30 to 49. This ranged from 43% in British Columbia to 75% in Prince Edward Island.

It is unclear whether these provincial variations in age and sex reflect true differences in populations with obesity or differences in policies in those provinces. For example, the bariatric pilot project in Manitoba was initially limited to female patients.[44]

Figure 3 provides information on the characteristics of bariatric surgery patients in Canada. Additional information on provincial differences is available in Appendix B.

ii. Not all bariatric surgery procedures performed in hospitals are covered by public health care plans.
iii. CMG+ hospital costs exclude costs such as physician compensation and building service equipment.

Figure 3: Characteristics of Bariatric Surgery Patients, 2012–2013



Notes

Percentages may not add to 100 due to rounding.

The data may underestimate obesity-related comorbidities among bariatric patients, particularly when patients are admitted solely for a scheduled surgery with no plans to treat any underlying conditions.

Sources

Discharge Abstract Database, Hospital Morbidity Database and National Ambulatory Care Reporting System, 2012–2013, Canadian Institute for Health Information.

The most common obesity-related comorbidities documented among bariatric patients in this study were episodic and paroxysmal disorders such as sleep apnea (15%); hypertension (14%); and type 2 diabetes (13%). This is similar to other studies that have shown sleep apnea, hypertension and type 2 diabetes as common comorbid conditions among Canadians with obesity.[2, 3, 6]

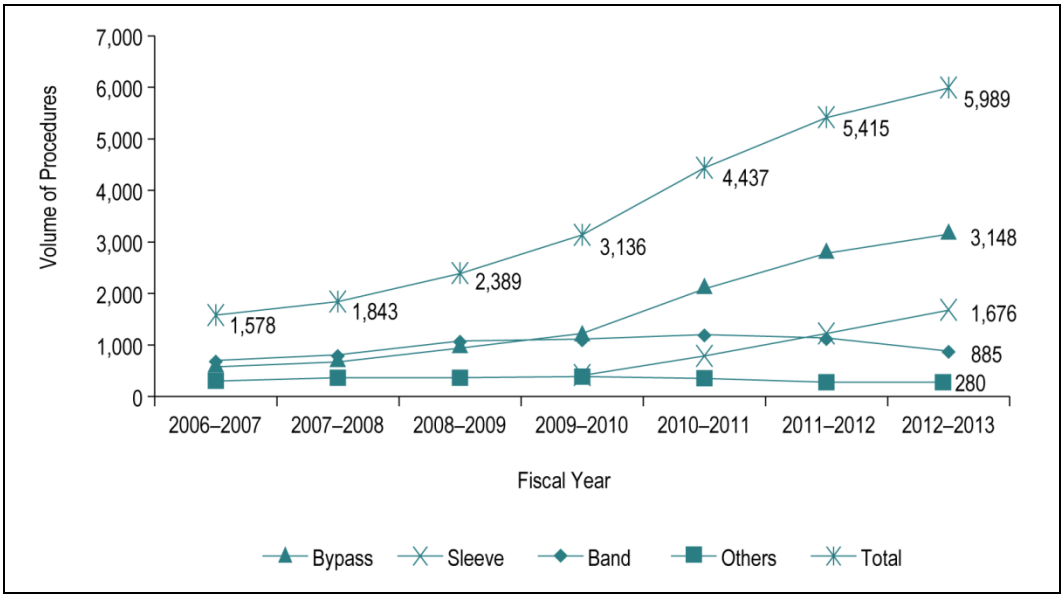
Three out of every four bariatric surgery patients (78%) in this study were from an urban area—as are 80% of Canadians with obesity and 80% of Canadians overall—with some variation by province. In addition, patients were more likely to live in lower-income neighbourhoods. Specifically, there were more patients in the lowest income quintile (22%) than the highest (14%). This is consistent with findings from studies that show overall associations between poverty and obesity.[35, 45]

Variation in Bariatric Surgical Procedures

In 2012–2013, gastric bypass was the most commonly performed bariatric surgery in Canadian hospitals (53%), followed by sleeve gastrectomy (28%) and gastric banding (15%). Between 2006–2007 and 2009–2010, gastric banding and gastric bypass were the most common procedures. However, gastric bypass and sleeve procedures have increased sharply since 2009–2010, while the overall number of other procedures (such as biliopancreatic diversion) has declined.

Figure 4 provides more detailed information on the changes in the types of bariatric surgery performed in Canadian hospitals each year from 2006–2007 to 2012–2013. Appendix C provides more detailed information for each province.

Figure 4: Changes in Volume of Different Types of Bariatric Procedures Performed in Canadian Hospitals, 2006–2007 to 2012–2013



Notes

Band refers to gastric banding; Bypass refers to gastric bypass; Sleeve refers to sleeve gastrectomy.
New codes were introduced in CCI Version 2009 to identify sleeve gastrectomy.
Not all bariatric surgeries performed in hospitals are covered by jurisdictional health care plans.

Sources

Discharge Abstract Database, Hospital Morbidity Database and National Ambulatory Care Reporting System, 2006–2007 to 2012–2013, Canadian Institute for Health Information; Alberta Ambulatory Care Reporting System, 2006–2007 to 2009–2010, Alberta Health Services.

This shift in common procedures is not unique to Canada and has been observed in other countries, including England, France, Germany and the U.S.[35, 36, 46, 47] It may be related to research suggesting that gastric bypass results in better outcomes, including more weight loss, compared with other procedures (particularly banding procedures).[48] However, recent research also suggests that sleeve gastrectomy can result in outcomes similar to those of gastric bypass.[49]

Declining rates of biliopancreatic diversions could be due to a number of factors, including its more technically complex nature, a smaller number of surgeons who are skilled in the technique, the duration of the procedure relative to other forms of bariatric surgery and the increased risk it carries. Biliopancreatic diversion is also intended for a higher-risk subgroup of patients with obesity and thus has a higher baseline risk.[50] Experts believe the declining rate of gastric banding is due to higher reported failure rates and need for reversals and revisions with such techniques.[51, 52]

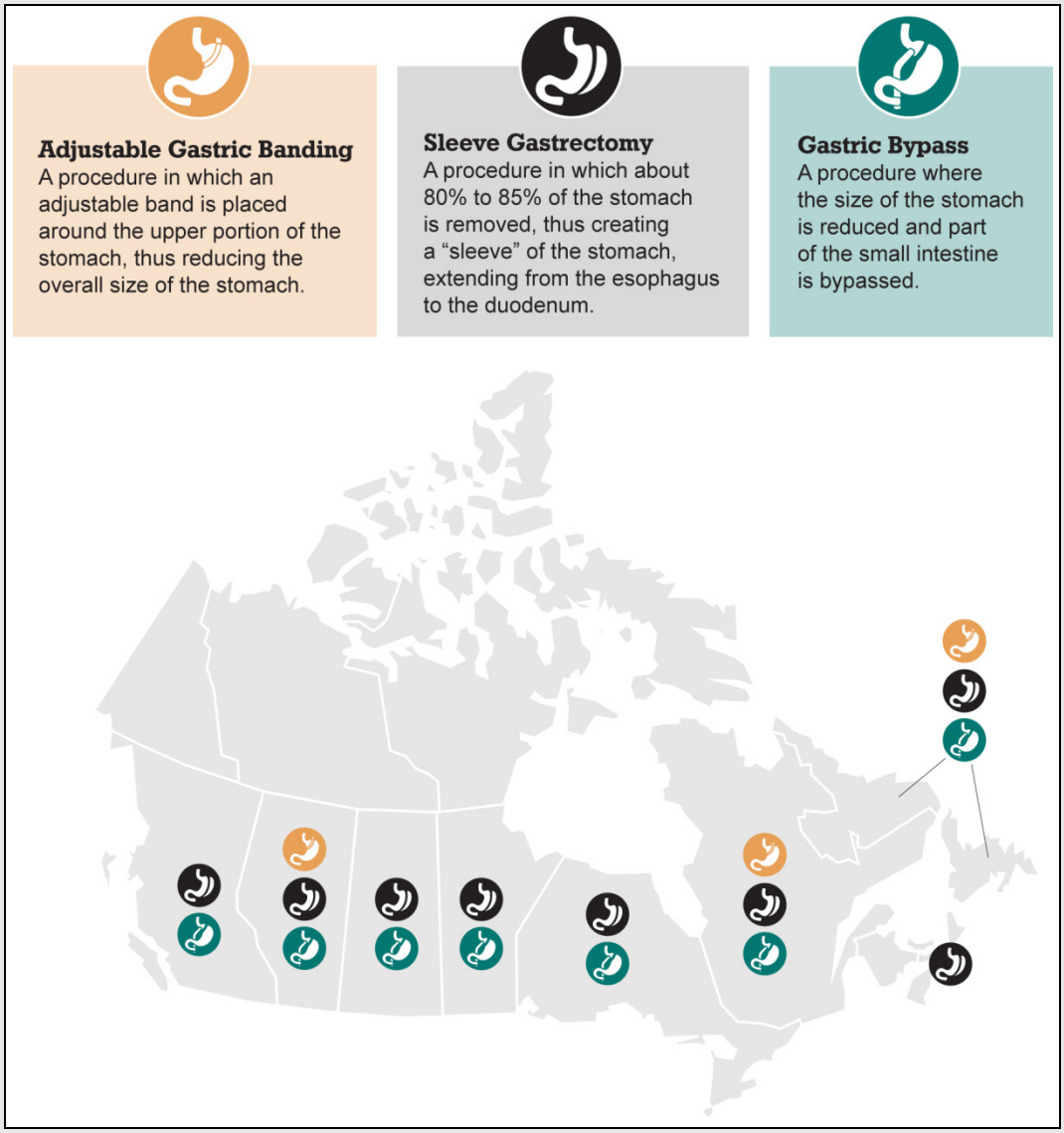
In addition to the shift over time toward gastric bypass, there are provincial variations in the types of procedures performed. For example, in 2012–2013, gastric bypass was the main procedure (88%) in Ontario, while sleeve gastrectomy was most common in Newfoundland and Labrador (98%) and Nova Scotia (92%). (Details are provided in Appendix C.)

The variation in types of procedures carried out across provinces may reflect differences in the underlying conditions and starting weights of patients from different jurisdictions, government policy (such as coverage for band procedures), patient preference or practice patterns among individual physicians.

Bariatric Procedures Covered Through Jurisdictional Health Care Plans

The three main types of bariatric surgery that are commonly performed in Canada are gastric bypass, sleeve gastrectomy and adjustable gastric banding. However, there are differences among jurisdictions in terms of which procedures are covered by public health care plans.

Figure 5: Variation in Common Types of Bariatric Surgery Covered Through Jurisdictional Health Care Plans, 2012–2013



Notes

Prince Edward Island covers sleeve gastrectomy and gastric bypass out of province.

New Brunswick covers all three types of surgery, but not all are performed in the province.

Yukon and the Northwest Territories cover bariatric surgery, usually on a case-by-case basis; patients are referred to an affiliated province.

Nunavut does not cover bariatric surgery.

Source

Compiled by the Canadian Institute for Health Information.

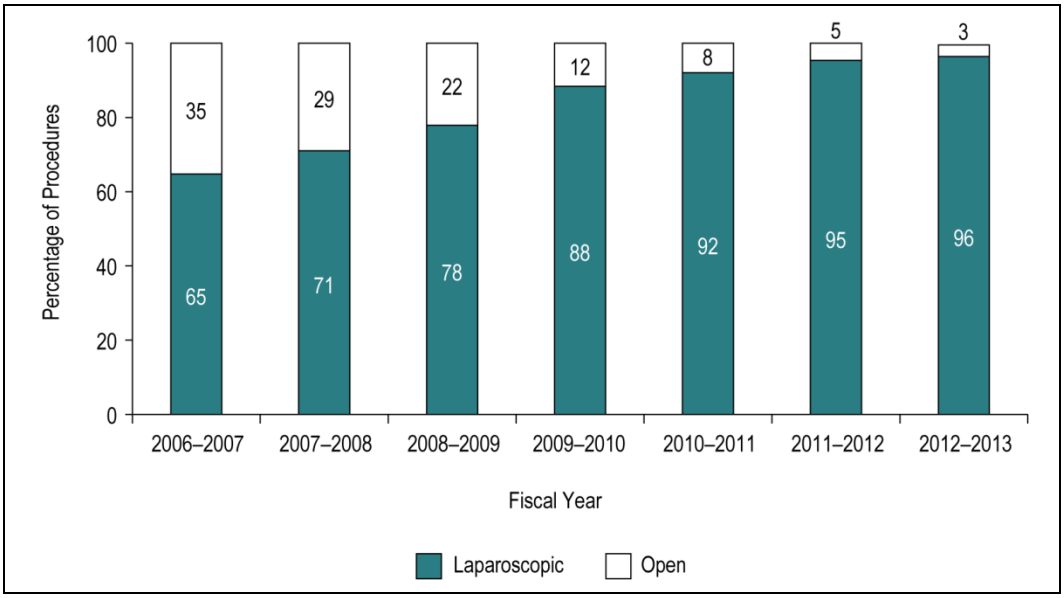
Variation in Surgical Approach

Advances in surgical instruments and methodologies have enabled the use of minimally invasive techniques in bariatric surgery. Research has shown that minimally invasive surgeries can allow for shorter recovery periods, shorter in-hospital lengths of stay and lower rates of morbidity and mortality, whereas open bariatric procedures have higher rates of complications and infection.[53]

Figure 6 depicts an increasing use of laparoscopic bariatric surgery in Canada. In 2006–2007, nearly 7 out of 10 (65%) bariatric surgeries were laparoscopic. By 2012–2013, 96% of all bariatric surgeries performed in hospital were laparoscopic.

In 2012–2013, the average length of stay for inpatient bariatric surgery was three days, down from four days in 2006–2007. This decline likely reflects, at least in part, the shift away from open procedures.

Figure 6: Trend in Open and Laparoscopic Bariatric Surgeries, 2006–2007 to 2012–2013



Note

Percentages for 2012–2013 do not add to 100 because a few surgeries were performed using other approaches.

Sources

Discharge Abstract Database, Hospital Morbidity Database and National Ambulatory Care Reporting System, 2006–2007 to 2012–2013, Canadian Institute for Health Information; Alberta Ambulatory Care Reporting System, 2006–2007 to 2009–2010, Alberta Health Services.

Hospital Care for Bariatric Surgery Patients

The following section provides information on complications and readmissions after bariatric surgery. As with all surgical procedures, there are risks associated with bariatric surgery. The risks that bariatric surgery patients face can be influenced by the complexity of their health status.[54] This section also highlights differences in the patterns of hospital use for bariatric patients before and after their surgery.

Complications

In 2012–2013, approximately 5.3% of bariatric surgery patients experienced a complication during their hospitalization, a decrease from 8.2% in 2009–2010.[iv] In this study, complications were defined as specific conditions that arose during the hospitalization for the surgery. The most common complications were bleeding; puncture and laceration; infection; and mechanical complications of inserted devices as a result of displacement, leakage or perforation.[v]

Similar to findings from previous studies, complication rates were higher for patients who underwent gastric bypass than adjustable gastric banding.[14, 55] The difference in complication rates may in part be explained by differences in surgical technique; it likely also reflects underlying differences in patient characteristics. In addition, patients with pre-existing digestive diseases and those whose surgery was a revision of a previous procedure also had higher complication rates than other patients.

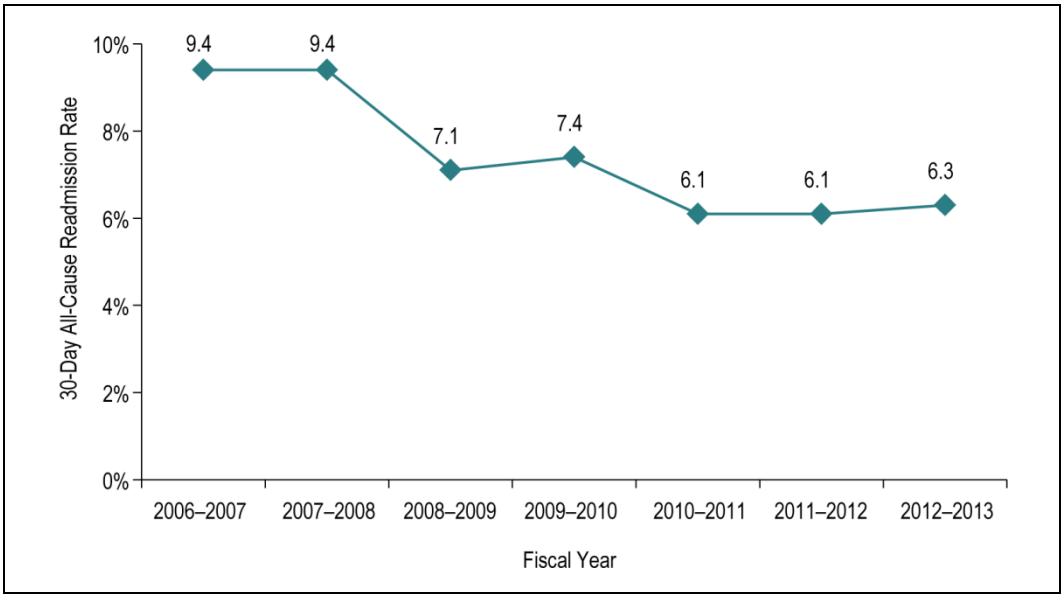
Readmissions

In Canada, unplanned readmissions to acute care within 30 days of bariatric surgery have decreased from 9.4% in 2006–2007 to 6.3% in 2012–2013 (see Figure 7). This is similar to the readmission rate for all surgical patients in Canada (6.5%)[56] and to bariatric readmission rates in other countries. Specifically, a British study showed that 8% of bariatric patients experienced an unplanned readmission to hospital within 28 days,[35] and a U.S. study reported an overall 30-day readmission rate of 6.5% following bariatric surgery.[57]

iv. The year ICD-10-CA Version 2009 was introduced. Comparable complications analysis is not available using previous versions of the classification.

v. For the detailed methodology, technical notes are available upon request.

Figure 7: Rate of Unplanned Readmissions to Acute Inpatient Care Within 30 Days of Bariatric Surgery, 2006–2007 to 2012–2013



Note

Index date is the date of hospital discharge following bariatric surgery.

Sources

Discharge Abstract Database, Hospital Morbidity Database and National Ambulatory Care Reporting System, 2006–2007 to 2012–2013, Canadian Institute for Health Information; Alberta Ambulatory Care Reporting System, 2006–2007 to 2009–2010, Alberta Health Services.

Bariatric surgery patients who experienced complications had a higher readmission rate following their surgery. This suggests that surgical complications are an important consideration in readmissions. In 2012–2013, 14% of bariatric surgery patients who experienced in-hospital complications were readmitted to hospital within 30 days. In comparison, only 6% of patients who did not experience a complication were readmitted.

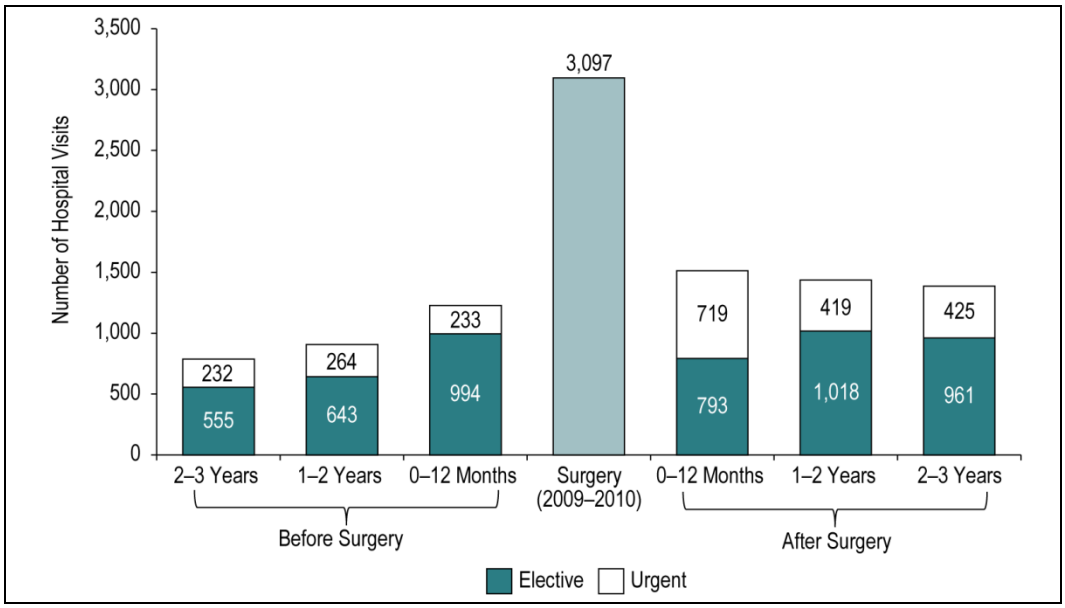
The declines in both in-hospital complication and readmission rates suggest that reducing in-hospital complication rates can potentially reduce the likelihood of readmission following bariatric surgery.

Changes in Health Care Utilization

The effect of bariatric surgery on patients' future health care use is complex. One expected result is for overall health status to improve when a significant amount of excess weight is lost. However, losing a significant amount of weight may also make patients eligible for procedures not previously available to them. For example, an Alberta study found that the number of hospital visits was greater in the two years after surgery than in the two years before surgery.[58] Other countries such as Sweden and the U.S. have reported similar increases.[11, 59]

This study examined changes in hospital utilization, and results show that hospital care for bariatric surgery patients across Canada increased after their surgery. The 3,097 patients who had bariatric surgery in 2009–2010 were hospitalized more frequently in the three years after surgery than in the three years before surgery: the number of hospital visits increased from 2,921 to 4,335 overall (see Figure 8). To determine this, we identified patients who had bariatric surgery in 2009–2010 and then examined their use of hospital-based services for three years before and three years after their surgery. Of the 3,097 patients identified, 35% visited the hospital prior to and following their surgery, 26% had no visits prior to but at least one visit after their surgery and 17% visited the hospital before their surgery but not after. One out of five patients (21%) had no hospital visits over the six years other than the bariatric surgery itself.

Figure 8: Hospital Visits by All Patients Who Underwent Bariatric Surgery in 2009–2010



Notes

Index date is the date of hospital discharge following bariatric surgery.
Visits include admissions to acute inpatient care or day surgery only.
Excludes records with insufficient information for data linkage.

Sources

Discharge Abstract Database, Hospital Morbidity Database and National Ambulatory Care Reporting System, 2006–2007 to 2012–2013, Canadian Institute for Health Information; Alberta Ambulatory Care Reporting System, 2006–2007 to 2009–2010, Alberta Health Services.

In the year immediately preceding bariatric surgery, diagnostic examinations and investigations were the leading reasons for visits (likely performed in preparation for the surgery) and were responsible for increases in overall visits compared with the previous two years. Among these, the most commonly identified procedures were biopsy of the stomach (66%) and biopsy and inspection of the small intestine (15%).

In the year immediately after bariatric surgery, complications of medical and surgical care were the leading reasons for visits (16%). Some patients were readmitted to hospital to treat complications or to receive follow-up care after their surgery. In the three years after surgery, procedures related to weight loss were more common. For example, 137 removals of excess skin were performed during that time, compared with 7 in the three years preceding surgery. Data also suggests that some procedures were likely deferred until after weight loss and recovery from surgery. For example, compared with the three years before bariatric surgery, the number of knee and hip replacements increased by 139% and 275%, respectively, in the three years after surgery. Similarly, therapeutic interventions on the muscles of the chest and abdomen (including hernia repair) grew by 298% in the three years following surgery.

The duration of the study's pre- and post-surgery period is important for interpretation of the findings. Use of hospital care increased in the three years after surgery. However, given a longer time period, utilization could continue to increase, stabilize or go back to pre-surgery levels (or below). Further, the scope of the current study includes only hospital care. Use of services in other areas, such as primary care and prescription drugs, are also important pieces in understanding overall health care use. For example, some studies have found that bariatric surgery can reduce the use and cost of prescribed medication.[10, 11]

Bariatric Surgery Outcomes: Weight Loss, Quality of Life and Mental Health

As with other options for weight loss, patients undergoing bariatric surgery seek long-term improvements in their health and quality of life. Individual results can vary based on factors such as starting weight or BMI, adherence to post-surgical diet plans and the specific procedure carried out.[60] Previous studies have found that patients can lose up to 60% of excess weight within a short period after surgery.[13, 14] In addition to weight loss in and of itself, a number of pre-existing comorbidities may also resolve or show improvement. For example, compared with those who get conventional medical treatment, bariatric surgery patients have better control over their type 2 diabetes and show reduced blood glucose levels up to two years post-surgery.[61, 62] Hypertension and hyperlipidemia are also improved in a significant proportion of patients three years after surgery.[63]

Since 2010, the Ontario Bariatric Registry has been collecting data on consenting patients who have had publicly funded bariatric surgery in the province. The collection of data used in this registry is supported by the Ministry of Health and Long-Term Care. Data from patients in the registry shows significant improvements in BMI (from an average starting BMI of 48.6 kg/m^2 to 32.2 kg/m^2 a year after surgery). At one year after surgery, these patients had lost an average of 64.1% of excess weight, mostly during the first six months. The registry data also shows improvements in patients' medical conditions. For example, the percentage of patients with type 2 diabetes decreased from 33% to 15% between their first assessment and an assessment six months after surgery.[64] There were similar decreases in hypertension (48% to 23%), hyperlipidemia (35% to 14%), musculoskeletal pain (75% to 37%) and gastroesophageal reflux disease (48% to 18%). Future studies with longer periods of patient follow-up will be of benefit in assessing long-term outcomes.

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Beyond physical conditions, people with obesity also report poorer quality of life than people of average weight. In fact, poor quality of life appears to be one of the factors influencing people's decisions to seek surgical treatment for severe obesity.[65] Previous studies have found that several quality of life measures—including depression and anxiety—improve after surgery.[66–68] The Ontario Bariatric Registry also found improvements in measures of quality of life at one year post-surgery, measured by a patient-completed quality of life questionnaire (EuroQol 5D-5L). For example, the percentage of patients who reported having problems with their mobility decreased from 68% to 19%. There were similar decreases in problems with self-care (29% to 3%), usual activities (66% to 15%), discomfort (88% to 43%) and anxiety/depression (53% to 31%).[64]

The benefits to quality of life can be seen quickly, sometimes within the first few weeks following surgery.[69] And it appears that these improvements are sustained, with surveys conducted after more than a decade continuing to show the improvement.[70] However, there remains a small but significant number of patients who experience unanticipated psychological challenges following their surgery. This may be related to disappointment in the amount of weight lost or anxiety about changes in body size and shape. Psychological evaluation before surgery, in addition to support and long-term mental health follow-up after surgery, can help identify those at risk for experiencing such challenges.

Conclusion

Obesity continues to be a significant population health issue across Canada. Many options can help with weight loss, including lifestyle changes (such as diet modifications and increased physical activity), medical counselling and medication. Another option is bariatric surgery. The surgery can be an effective intervention for achieving significant weight loss and improved quality of life for people with severe obesity. In recent years, several provincial governments have expanded capacity for bariatric surgery for qualifying individuals. Some jurisdictions—most notably Ontario—are also changing the organization and delivery of these procedures to help improve access. For example, centralized intake and streamlined provision of publicly covered surgery into centres of excellence have been introduced.

This study describes the current state of bariatric surgery in Canada and provides information on who is having the procedures in hospitals. Overall, surgical volumes increased over six years (from 1,578 in 2006–2007 to 5,989 in 2012–2013) and complication and readmission rates declined. CIHI's data shows annual hospital costs of approximately $48 million to provide nearly 6,000 surgical procedures (not including preoperative assessments and care or postoperative and follow-up care). Missing from these figures are procedures performed out of country or paid for out of pocket in private facilities, estimated to be approximately 1,000 in 2012.

The profile of patients undergoing bariatric surgery remained the same over the study period: women in their mid-40s with obesity and other comorbid conditions such as type 2 diabetes or hypertension. Current Canadian clinical practice guidelines restrict eligibility to people with either class III obesity or class II obesity with a related comorbid condition. Some experts have suggested that the patient selection criteria governing who qualifies for publicly covered bariatric surgery could be relaxed, as the procedure has become safer and outcomes research more available.

There is evidence that the outcomes of bariatric surgery go beyond the physical effects of obesity. Data from the Ontario Bariatric Registry shows that in addition to significant weight loss and resolution of comorbidities such as diabetes and hypertension, patients report that their quality of life improves socially and emotionally as a result of weight loss through bariatric surgery, at least in the short term. Future research on longer-term impacts will show if such improvements are sustained.

The current study also found an increase in the frequency of hospitalizations for patients in the three years after their surgery, compared with the three years before. In some cases, this represents readmissions and follow-up care directly related to the surgery. In others, patients received care such as joint replacements and hernia repairs that likely could not be provided at their starting weight. While this study examined only hospital care for bariatric surgery patients, other studies show that bariatric surgery can reduce health care use and costs in other areas, such as prescribed medication.

Much progress has been made in recent years to improve access to bariatric surgery in Canada, as evidenced by the significant increase in surgical volumes. However, there remains a great deal of variation across provinces in the specific procedures provided to patients and in how long patients wait to receive their surgery. Many factors—such as patients' underlying health conditions and starting weights—influence who receives which procedures. More research is required to consider the impacts of government policy (such as coverage for band procedures), patient preference and physician practice patterns in ongoing efforts to improve access to and outcomes of publicly covered bariatric procedures.

Appendix A: Changes in Volumes of Bariatric Surgery, by Province, 2006–2007 to 2012–2013

Province	Volume							Percentage Change From 2006–2007 to 2012–2013
	2006–2007	2007–2008	2008–2009	2009–2010	2010–2011	2011–2012	2012–2013	
N.L.	0	0	0	0	0	38	84	N/A
N.S.	1	6	28	59	61	51	62	6,100%
N.B.	48	70	108	127	152	164	135	181%
Que.	804	940	1,117	1,496	1,759	1,894	1,988	147%
Ont.	297	433	635	932	1,855	2,511	2,846	858%
Man.	0	0	0	0	41	89	104	N/A
Sask.	18	16	23	47	62	81	78	333%
Alta.	237	196	275	296	378	438	514	117%
B.C.	173	182	203	179	129	149	178	3%
Total	**1,578**	**1,843**	**2,389**	**3,136**	**4,437**	**5,415**	**5,989**	**280%**

Notes

N/A: Not applicable.

Volumes are based on the province of the facility.

Facilities in Prince Edward Island do not perform bariatric surgeries. Procedures for P.E.I. patients are performed out of province.

Not all bariatric surgeries performed in hospitals are covered by jurisdictional health care plans.

Sources

Discharge Abstract Database, Hospital Morbidity Database and National Ambulatory Care Reporting System, 2006–2007 to 2012–2013, Canadian Institute for Health Information; Alberta Ambulatory Care Reporting System, 2006–2007 to 2009–2010, Alberta Health Services.

Appendix B: Bariatric Surgery Patient Profile by Province of Residence, 2012–2013

Patient Characteristics	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Total
Number of Cases (% Day Surgery)	85 (0)	8 (0)	56 (0)	137 (19)	1,977 (21)	2,840 (1)	117 (0)	84 (0)	479 (2)	182 (2)	**5,982 (8)**
Female (%)	84	88	95	82	72	83	93	83	85	85	**80**
Age											
Mean	45	45	46	44	44	45	43	44	45	47	**45**
Median	43	44	47	43	44	45	43	44	45	49	**45**
Age Group (%)											
<30	1	0	2	9	11	8	8	7	7	7	**9**
30–39	27	25	20	21	27	23	24	27	23	16	**24**
40–49	41	50	34	40	29	32	44	40	36	27	**32**
50–59	18	13	39	21	25	27	21	20	27	37	**26**
60+	13	13	5	8	9	9	3	5	7	13	**9**
Inpatient LOS											
Mean	2	3	3	4	4	3	2	5	4	3	**3**
Median	2	3	2	2	3	2	2	3	2	2	**2**
Urban Residence (%)	67	63	61	48	74	84	72	69	80	91	**78**
Income Quintile (%)											
1—Low	20	13*	23	21	21	24	17	16	17	23	**22**
2	20	38*	38	23	22	22	25	18	19	25	**22**
3	15	0*	14	18	22	21	22	24	28	19	**22**
4	27	25*	14	21	21	19	20	26	20	16	**20**
5—High	18	25*	11	18	13	14	16	16	16	17	**14**
Within Province (%)	99	0	98	95	100	100	88	86	99	97	**99**
Procedure Type (%)											
Gastric Bypass	1	13	5	4	10	88	76	79	45	27	**53**
Sleeve Gastrectomy	96	88	93	58	40	10	22	20	42	67	**28**
Gastric Banding	1	0	0	36	37	1	2	1	13	4	**15**
Others	1	0	2	2	13	1	0	0	0	1	**5**

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Patient Characteristics	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Total
Most Commonly Documented Comorbidities (%)											
1	Diabetes mellitus (27)	N/A	Diabetes mellitus (20)	Diabetes mellitus (37)	Episodic and paroxysmal disorders (13)	Episodic and paroxysmal disorders (19)	Hypertensive diseases (30)	Diabetes mellitus (28)	Hypertensive diseases (15)	Diabetes mellitus (35)	Episodic and paroxysmal disorders (15)
2	Episodic and paroxysmal disorders (22)	N/A	Potential health hazards due to family/ personal history and conditions affecting health (20)	Hernia (24)	Hypertensive diseases (12)	Diabetes mellitus (17)	Episodic and paroxysmal disorders (22)	Hypertensive diseases (15)	Diabetes mellitus (13)	Episodic and paroxysmal disorders (22)	Hypertensive diseases (14)
3	Diseases of esophagus, stomach and duodenum (13)	N/A	Hypertensive diseases (16)	Episodic and paroxysmal disorders (4)	Diabetes mellitus (9)	Hypertensive diseases (16)	Diabetes mellitus (15)	Hernia (9)	Episodic and paroxysmal disorders (12)	Hypertensive diseases (19)	Diabetes mellitus (13)
4	Diseases of peritoneum (7)	N/A	Diseases of esophagus, stomach and duodenum (10)	Chronic lower respiratory diseases (3)	Metabolic disorders (7)	Diseases of esophagus, stomach and duodenum (7)	Hernia (10)	Disorders of other endocrine glands (6)	Diseases of esophagus, stomach and duodenum (10)	Diseases of peritoneum (8)	Hernia (7)
5	Hernia (6)	N/A	Episodic and paroxysmal disorders (6)	Diseases of liver (3)	Hernia (7)	Hernia (6)	Diseases of peritoneum (4)	Diseases of esophagus, stomach and duodenum (5)	Hernia (9)	Hernia (3)	Diseases of esophagus, stomach and duodenum (7)

Notes

* Please interpret with caution.

LOS: Length of stay.

N/A: Not applicable.

Volumes are based on the province the patient resides in.

Total includes patients from the territories.

The data may underestimate obesity-related comorbidities among bariatric patients, particularly when patients are admitted solely for a scheduled surgery with no plans to treat any underlying conditions.

Not all bariatric surgeries performed in hospitals are covered by jurisdictional health care plans.

Not all types of bariatric surgery are covered by provincial health care plans. Please see Figure 5 in the report.

Percentages may not add to 100 due to rounding.

Sources

Discharge Abstract Database, Hospital Morbidity Database and National Ambulatory Care Reporting System, 2012–2013, Canadian Institute for Health Information.

Appendix C: Bariatric Surgery Volumes by Type of Surgery, by Province, 2009–2010 to 2012–2013

Province	Gastric Bypass				Gastric Banding				Sleeve Gastrectomy				Others			
	2009–2010	2010–2011	2011–2012	2012–2013	2009–2010	2010–2011	2011–2012	2012–2013	2009–2010	2010–2011	2011–2012	2012–2013	2009–2010	2010–2011	2011–2012	2012–2013
N.L.	0	0	0	1	0	0	0	0	0	0	37	82	0	0	1	1
N.S.	2	3	6	4	0	0	1	0	57	58	44	57	0	0	0	1
N.B.	9	18	5	6	109	87	70	49	9	47	89	79	0	0	0	1
Que.	161	148	171	196	764	922	954	734	205	358	505	799	366	331	264	259
Ont.	820	1,658	2,217	2,516	53	46	36	30	50	133	250	286	9	18	8	14
Man.	0	18	64	83	0	0	0	1	0	23	25	20	0	0	0	0
Sask.	46	60	74	63	0	1	0	0	0	1	7	15	1	0	0	0
Alta.	131	144	172	234	93	77	62	63	64	153	203	215	8	4	1	2
B.C.	57	42	69	45	93	70	13	8	25	15	63	123	4	2	4	2
Total	**1,226**	**2,091**	**2,778**	**3,148**	**1,112**	**1,203**	**1,136**	**885**	**410**	**788**	**1,223**	**1,676**	**388**	**355**	**278**	**280**

Notes

Volumes are based on the province of the facility.

Facilities in Prince Edward Island do not perform bariatric surgeries. Procedures for P.E.I. patients are performed out of province.

Not all bariatric surgeries performed in hospitals are covered by jurisdictional health care plans.

Not all types of bariatric surgery are covered by provincial health care plans. Please see Figure 5 in the report.

Sources

Discharge Abstract Database, Hospital Morbidity Database and National Ambulatory Care Reporting System, 2009–2010 to 2012–2013, Canadian Institute for Health Information; Alberta Ambulatory Care Reporting System, 2009–2010, Alberta Health Services.

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Production of this document is made possible by financial contributions from Health Canada and provincial and territorial governments. The views expressed herein do not necessarily represent the views of Health Canada or any provincial or territorial government.

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ISBN 978-1-77109-276-0 (PDF)

How to cite this document:
Canadian Institute for Health Information. *Bariatric Surgery in Canada*. Ottawa, ON: CIHI; 2014.

Cette publication est aussi disponible en français sous le titre *Chirurgie bariatrique au Canada*.
ISBN 978-1-77109-277-7 (PDF)

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