



# HHS Public Access

Author manuscript

*Surg Laparosc Endosc Percutan Tech.* Author manuscript; available in PMC 2017 February 01.

Published in final edited form as:

*Surg Laparosc Endosc Percutan Tech.* 2016 February ; 26(1): 38–43. doi:10.1097/SLE.0000000000000219.

## One Year Surgical Outcomes and Costs For Medicaid vs. non-Medicaid Patients Undergoing Laparoscopic Roux-en-Y Gastric Bypass: A Single Center Study

Ellie Y. Chen, BA<sup>1</sup>, Benjamin T. Fox, BS<sup>1</sup>, Andrew Suzo, BS<sup>2</sup>, Jacob A. Greenberg, MD EdM<sup>1</sup>, Guilherme M. Campos, MD PhD<sup>1</sup>, Michael J. Garren, MD<sup>1</sup>, and Luke M Funk, MD MPH<sup>1</sup>

<sup>1</sup>Department of Surgery, University of Wisconsin School of Medicine and Public Health, Madison, WI

<sup>2</sup>Department of Surgery, The Ohio State University Wexner Medical Center, Columbus, OH

### Abstract

**Purpose**—To compare one-year outcomes and costs between severely obese Medicaid and non-Medicaid patients who underwent laparoscopic Roux-en-Y gastric bypass surgery.

**Methods**—Single institution, retrospective review comparing 33 Medicaid patients to 99 randomly selected non-Medicaid patients (1:3 case-control). 90-day and one-year outcomes were extracted from the electronic health record. Costs were obtained from the UW information technology division. Bivariate analyses were used to compare study variables.

**Results**—Emergency department visits (48.2% vs. 27.4%;  $p=0.06$ ) and readmissions (37.0% vs. 14.7%;  $p=0.01$ ) were more common for Medicaid patients. Medicaid patients had less excess body weight loss (50.7% vs. 65.6%;  $p=0.001$ ) but similar comorbidity resolution and complication rates. One-year median costs were similar between Medicaid and non-Medicaid patients (\$21,160 vs. \$24,215;  $p=0.92$ ).

**Conclusion**—One-year comorbidity resolution, complications and costs following laparoscopic Roux-en-Y gastric bypass were similar between Medicaid and non-Medicaid patients. Focusing on reducing ED presentations and readmissions would be a high impact area for future quality improvement initiatives.

### Keywords

laparoscopic Roux-en-Y gastric bypass; surgical outcomes; Medicaid patients

---

Corresponding author: Luke M. Funk, MD, MPH, Assistant Professor of Surgery, University of Wisconsin School of Medicine and Public Health, Department of Surgery, 600 Highland Avenue, H4/728 Clinical Science Center, Madison, WI 53792-7375, Office phone number: (608) 263-1036, Home phone number: (617) 671-8869, Fax: (608) 252-0942, funk@surgery.wisc.edu.

Author Contributions: E.C. contributed via design and drafting of the work. E.C. and A.S. participated in the design of the work and critical revisions. J.A.G., G.M.C., and M.J.G. participated in the data interpretation and revisions. L.M.F. participated in all phases of the study. All co-authors approved the version to be published and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Conflict of Interest Disclosure Statement: Drs. Greenberg, Campos, Garren and Funk have no conflicts of interest. Ms. Chen, Mr. Fox and Mr. Suzo have no conflicts of interest.

## Introduction

With passage of the Affordable Care Act in 2010, Medicaid was extended to cover individuals and families with household income up to 138% of the federal poverty line.<sup>1</sup> As of July 2014, 7 million Americans had been added to Medicaid payrolls.<sup>2</sup> More than 90% of the states that have expanded Medicaid include at least some coverage of bariatric surgery.<sup>3</sup> Given that morbid obesity affects nearly 7% of the U.S. adult population and is more common among poorer adults, knowledge regarding the outcomes and costs for Medicaid patients who undergo bariatric surgery will be important.<sup>4,5</sup>

The literature regarding surgery outcomes for Medicaid patients is mixed. Some studies have found that Medicaid patients do worse postoperatively when compared to non-Medicaid patients. This includes higher complication rates such as surgical site infection, emergency department visits, and length of stay.<sup>6,7</sup> Studies of patients with severe obesity have shown that Medicaid and non-Medicaid patients who undergo bariatric surgery have similar surgical outcomes such as lengths of stay and anastomotic complications.<sup>8,9</sup> Although differences in bariatric surgery costs between Medicaid patients and non-Medicaid patients have not been studied, findings in other specialties have varied. For example, Medicaid patients undergoing coronary artery bypass grafting had higher costs and longer lengths of stay,<sup>10</sup> while Medicaid patients undergoing spinal cord surgery generated lower costs compared to non-Medicaid patients.<sup>11</sup>

The primary purpose of this study was to analyze the 90-day and one-year outcomes of Medicaid patients with severe obesity who underwent laparoscopic Roux en-Y gastric bypass surgery and compare them to non-Medicaid patients. Additionally, we sought to compare charges and costs between these two cohorts. Based on our findings from a similarly designed retrospective review,<sup>12</sup> we hypothesized that Medicaid patients would have higher rates of emergency department visits at 90 days and less overall weight loss but similar rates of comorbidity resolution and costs after one year.

## Materials and Methods

### Study population

All patients with severe obesity who underwent bariatric surgery at the University of Wisconsin Hospital and Clinics (UWHC) from January 1, 2010 to June 1, 2013 were identified from the UW Bariatric Surgery Database, which is a prospectively maintained database. 288 patients met these inclusion criteria. Patients who underwent adjustable gastric banding or sleeve or patients who underwent revisional bariatric surgery were excluded, leaving us with 223 patients who underwent a primary laparoscopic Roux-en-Y gastric bypass. Of these patients, 33 Medicaid patients and 190 were non-Medicaid patients. All non-Medicaid patients were insured, either via Medicare or commercial insurance plans. To generate a 3:1 case-control ratio, 99 non-Medicaid patients were randomly chosen from the remaining 190 patients using a random number generator within SAS 9.3 (Cary, NC).

Three surgeons performed all of the Roux-en-Y gastric bypasses that were included in the dataset. All operations were laparoscopic and involved a stapled jejunojejunostomy

(common channel created and enterotomy closed with endo-GIA stapler or suture) and a stapled, antecolic, antegastric gastrojejunostomy (GJ). The GJ was performed via either transabdominal or transoral passage of a 25-mm EEA stapler. The mesenteric defect of the jejunojunostomy was closed with a running, nonabsorbable suture while closure of Peterson's defect was variable. Roux limb length was 100 to 150 cm for all patients.

### Data source and study variables

A detailed chart review using electronic health record data (Epic; Verona, WI) was performed for each patient. Patient characteristics including gender, age, and race were recorded. The presence of six obesity-related comorbidities – hypertension, hyperlipidemia, obstructive sleep apnea, coronary artery disease, gastroesophageal reflux disease (GERD), and type 2 diabetes - was identified by reviewing all available notes from the bariatric surgeon, referring physician notes, and the preoperative anesthesiology evaluation. Patient preoperative weights and heights were obtained from the last visit with the operating surgeon before surgery.

### 90-day outcomes

All provider notes that were available in the electronic health record were reviewed to determine length of stay, readmission, reoperation, emergency department (ED) visits, intensive care unit (ICU) admission, or death. For surgical complications, definitions established by the National Surgical Quality Improvement Program (NSQIP) were applied.<sup>13</sup> These included deep vein thrombosis, pulmonary embolism, myocardial infarction, cerebrovascular accident, acute renal failure, wound infection, pneumonia, and urinary tract infection. An anastomotic leak was identified if it was seen on computed tomography (CT) (extravasation of enteric contrast) or during reoperation. Postoperative hemorrhage was identified if the patient required a blood transfusion postoperatively. Anastomotic strictures, dilations, and marginal ulcers were identified through direct review of endoscopy reports. A stricture was defined as any gastrojejunostomy less than 10mm in diameter (a standard gastroscope could not be passed). Intra-abdominal abscesses were identified through abdominal CT, exploratory laparoscopy, or laparotomy. Every wound complication was reviewed to characterize the timing and how each was managed. Every ED visit within 90 days of surgery was also examined to characterize the reason for the visit and subsequent management.

### One-year outcomes

The follow-up period was defined as the interval between the bariatric operation and the clinic visit closest to one-year postoperatively. If there was no visit within three months of the one-year follow-up date, the data were considered missing. Ideal body weight was obtained from Metropolitan Life Insurance Company Height and Weight tables.<sup>14</sup> Percent excess body weight loss was defined as:  $(\text{Preoperative weight} - \text{Follow-up weight}) / (\text{Preoperative weight} - \text{ideal body weight}) \times 100$ . Postoperatively, comorbidities were considered to be resolved if a bariatric surgery program note or referring provider note specifically stated that a comorbidity was resolved. Additionally, resolution of type 2 diabetes was confirmed if patients who were previously taking diabetes medications stopped after surgery. If a hemoglobin A1c result was available, a reading of 6.4% or below was

needed to confirm resolution. Obstructive sleep apnea was considered resolved if the patient had a negative sleep study. Stoppage of anti-secretory medications (H2 blockers, PPIs) indicated resolution of GERD. Hyperlipidemia and hypertension were considered to be resolved if the patients were no longer taking their respective medications or their lipids or blood pressures normalized.

### Charges and Costs

One-year facility charges and costs were obtained from the UW information technology division. Both charges and costs were categorized as inpatient, outpatient, ED, and total charges or costs. Professional fees were not included in our analysis.

### Statistical Analysis

Patient demographics, 90-day surgical outcomes, one-year outcomes, and costs were analyzed for all 132 patients included in the cohort. Fisher's exact tests were used to compare categorical variables between Medicaid and non-Medicaid patients. Student's t tests were used to compare the means, and Wilcoxon rank sum tests were used for the comparison of the medians of continuous variables (length of stay, follow-up interval). P values were two-sided and considered significant if they were <0.05. SAS version 9.3 (SAS Institute, Cary, NC) was used for all analyses. The study protocol was approved by the Health Sciences Institutional Review Board of the University of Wofurgical isconsin.

## Results

### Patient Characteristics

Medicaid and non-Medicaid patients who underwent laparoscopic Roux-en-Y gastric bypass surgery at our institution had similar preoperative body mass indices (BMI 49.6 vs 47.1;  $p=0.09$ ) (Table 1). There were no differences in gender or race. Medicaid patients were significantly younger than non-Medicaid patients (mean age: 39.0 vs 48.7;  $p<0.001$ ). There were no statistically significant differences in the preoperative prevalence of hypertension, obstructive sleep apnea, gastroesophageal reflux, type 2 diabetes, or coronary artery disease between the two groups. Fewer Medicaid patients had preoperative hyperlipidemia (24.2% vs 50.5%;  $p=0.01$ ).

### 90-Day Outcomes

Medicaid and non-Medicaid patients had similar lengths of stay (2.2 vs 2.3;  $p=1.00$ ) and ICU admission rates (0 vs 5.3%;  $p=0.58$ ) (Table 2). The overall complication rate was similar between the two groups (33.3% vs 30.3%;  $p=0.83$ ). Medicaid and non-Medicaid patients also had similar rates of wound complications (14.8% vs 17.9%;  $p=1.00$ ), anastomotic leak (0 vs 2.1%;  $P=1.00$ ), postoperative hemorrhage (11.5% vs 12.6%;  $p=1.00$ ), marginal ulcer (11.5% vs 4.3%;  $p=0.18$ ), strictures requiring dilations (21.7% vs 13.0%;  $p=0.33$ ), intra-abdominal abscess (3.9% vs 1.1%;  $p=0.39$ ), and reoperations (3.0% vs 4.0%;  $p=1.00$ ). The incidence of other complications, such as urinary tract infection, is characterized in the Appendix.

Wound complications presented most commonly one week postoperatively. 100% of wound infections in Medicaid patients healed with initial medical management or incision and drainage (I & D). Similarly, 94.4% of non-Medicaid patient wounds healed with antibiotics or one I & D procedure. One patient healed after a second I&D. There were no deaths in either cohort at 90 days.

### ED Visits and Readmissions

ED visits for Medicaid patients were nearly twice as common as non-Medicaid patients although the difference was not statistically significant (48.2% vs. 27.4%;  $p=0.06$ ). The etiology of these ED presentations and their subsequent management are highlighted in Table 3. More than half (54.2%) of Medicaid patients presented with non-specific symptoms that improved without a specific intervention while only 34.8% of non-Medicaid patients presented similarly. More than 80% of ED presentations were non-wound related in both cohorts. 50% of Medicaid patients were admitted from the ED while nearly 70% of non-Medicaid patients were admitted to the hospital. Medicaid patients had significantly higher readmission rates (37.0% vs 14.7%;  $p=0.01$ ).

### One-Year Outcomes

The median number of months for follow-up for the Medicaid and non-Medicaid patients was 12.3 and 13.5, respectively ( $p=0.24$ ) (Table 4). Medicaid patients had a similar rate of follow-up at 1 year as non-Medicaid patients (63.6% vs 70.7%;  $p=0.52$ ). Medicaid patients lost significantly less excess body weight than the non-Medicaid patients (50.7% vs 65.6%;  $p=0.001$ ). However, the two groups had similar rates of comorbidity resolution: diabetes (76.9% vs 63.3%;  $p=0.49$ ), hyperlipidemia (40.0% vs 30.6%;  $p=0.64$ ), hypertension (60.0% vs 47.8%;  $p=0.55$ ), and gastroesophageal reflux (36.4% vs 62.2%;  $p=0.17$ ). One-year complication rates were similar between the two groups for marginal ulcer (21.7% vs. 8.8%;  $p=0.14$ ) and anastomotic stricture (21.7% vs. 13.0%;  $p=0.33$ ). The rate of surgical revisions was similar between the two groups (8.3% vs 8.8%;  $p=1.00$ ). There were no deaths within one year in either group.

### Charges and Costs

Inpatient, outpatient, ED, and total charges and costs for Medicaid and non-Medicaid patients are presented in Table 5. There were no statistically significant differences in any cost or charge category. The mean cost or charge for Medicaid patients was lower for seven of the eight cost/charge categories. Despite higher ED utilization, ED charges were also similar for Medicaid patients compared to non-Medicaid patients (\$8,681 vs. \$8,434;  $p=0.91$ ).

### Discussion

Our findings suggest that one-year comorbidity resolution, complications and overall costs are similar between Medicaid and non-Medicaid patients, while excess body weight loss is lower for Medicaid patients. Medicaid patients were nearly twice as likely to present to the ED within 90 days of surgery. Of those, half were admitted to the hospital compared to

nearly 70% of non-Medicaid patients who were seen in the ED. Laparoscopic Roux-en-Y gastric bypass surgery was safe for both cohorts with no deaths over a one-year period.

This study adds to the growing body of literature suggesting that Medicaid patients have similar rates of complications and comorbidity resolution after undergoing bariatric surgery compared to non-Medicaid patients. In a recently published single institution retrospective review, Funk and colleagues found similar outcomes with no significant differences in lengths of stay, medical complications, anastomotic leaks, or reoperations between Medicaid and non-Medicaid patients. Rates of diabetes, hyperlipidemia, hypertension and GERD resolution were also similar between non-Medicaid and Medicaid patients.<sup>8</sup> Likewise, Jensen-Otsu and colleagues performed a single institution retrospective review and found no difference in lengths of stay or anastomotic complications between Medicaid and non-Medicaid bariatric surgery patients.<sup>9</sup> Further, Alexander et al. reported that although the Medicaid patients presented with more comorbidities, the proportion of patients who resolved their comorbidities was similar between Medicaid (75%) and Commercial (74.1%) groups.<sup>15</sup>

Approximately one-third of patients in both cohorts developed complications within 90 days of surgery, which is higher than previous reports.<sup>16</sup> However, nearly half were minor wound complications. More than 95% of those wound complications healed with either antibiotics alone or incision and drainage. None required a reoperation.

There is limited published data comparing costs for Medicaid and non-Medicaid patients who undergo bariatric surgery. With respect to cardiac surgery, investigators have reported that Medicaid patients have higher costs due to higher complication rates and longer lengths of stay after coronary artery bypass grafting.<sup>10</sup> We found no evidence to suggest that Medicaid patients were more costly than non-Medicaid patients in an outpatient, inpatient or emergency department setting following bariatric surgery. Huang and colleagues came to a similar conclusion when evaluating patients undergoing spinal cord stimulation surgery. Medicaid patients had higher healthcare utilization rates, measured by longer length of stay, more use of prescription medications, and higher rates of subsequent ED visits. However, Medicaid patients had similar complication rates compared to commercially insured patients and had incurred significantly lower overall costs.<sup>11</sup> The authors hypothesized that this might be due to higher billing rates for commercially insured patients in an effort to compensate for low reimbursement for Medicaid patients. Given that facility charges and costs are not impacted by insurance status, this should not have impacted our findings. Rather, despite having a lower ED utilization rate overall, the non-Medicaid cohort had several patients with complications who accrued high charges and costs. This offset the potential for lower costs that might have otherwise been associated with a lower ED utilization and readmission rate.

Though Medicaid programs cover bariatric surgery to some degree in 45 states, there are various restrictions in place for unclear reasons. For example, in the state of Wisconsin, criteria for Medicaid coverage include having body mass index over 35 with at least one “high risk, life-limiting” comorbidity which is “unresponsive to appropriate treatment”.<sup>17</sup> The reasoning behind these criteria, which are more stringent than those established by

Medicare and hence most commercial insurers, is unclear. Numerous studies have concluded that bariatric surgery is one of the most cost-effective treatments that surgeons can offer patients.<sup>18</sup> Our study offers additional evidence suggesting that concerns about poor outcomes or higher costs for Medicaid patients may not be justified.

Medicaid patients in our study were readmitted more than twice as frequently as non-Medicaid patients during the first 90 days after surgery. Medicaid patients also utilized the ED twice as much as non-Medicaid patients. This difference was not statistically significant likely due to sample size limitations, but we believe this finding represents a real trend. Other investigators have found a similar relationship between socioeconomic status and postoperative resource utilization following bariatric surgery. In a study of nearly 5 million all-payer claims in Florida, Fuller and colleagues concluded that Medicaid enrollees had a readmission rate that was 25% higher than non-Medicaid patients.<sup>19</sup> Likewise, Dallal and colleagues reported that Medicaid status independently predicted 60-day readmission rates.<sup>20</sup> Kellogg et al. found that unemployed, disabled, or retired patients were more likely to be readmitted or evaluated in the ED after bariatric surgery.<sup>21</sup>

The majority of Medicaid patient presentations to the ED were not wound-related as one might have expected given that this was by far the most complication. Rather, more than 80% of presentations were non-wound related. Medicaid patients were 20% more likely to present to the ED with vague symptoms and 20% more likely to be discharged from the ED compared to non-Medicaid patients. Similarly, Hong and colleagues found that patients with publicly-funded health insurance were more likely to be admitted after bariatric surgery due to malaise.<sup>22</sup> Potentially avoidable ED visits and readmissions represent a critical area where a targeted quality improvement program could significantly improve outcomes. Thus, we strongly support the first national quality improvement project for the Metabolic and Bariatric Surgery Quality Improvement Program (MBSQIP). With a goal of reducing 30-day readmissions through the “DROP” program (Decreasing Readmissions through Opportunities Provided), as was achieved in a single institution study using a similar quality improvement program,<sup>23</sup> investigators will work with multi-disciplinary teams to improve patient education and discharge planning for patients who undergo bariatric surgery. We believe that targeting high readmission risk patients, such Medicaid patients, will further maximize its impact.

Our study has several limitations. Due to the difficulty in obtaining bariatric surgery coverage for our Medicaid patients, only 11 Medicaid patients underwent laparoscopic Roux-en-Y gastric bypass annually during the study period. Thus, some of the similarities in outcomes between the two cohorts may have been due to type II error. To address this, we performed bivariate analyses to examine whether differences in patient demographics (gender or age) contributed to lower overall complication rates for the non-Medicaid group. There were no differences in the average age of those who experienced a complication versus those who did not (44.4 vs. 47.1 years old;  $p=0.21$ ). Females had a higher complication rate although this difference was not statistically significant (34.2% vs. 16.7%;  $p=0.14$ ). Thus, it is unlikely that adjusting for these cohort differences would have worsened outcomes for Medicaid patients.

Further, since data were collected from the electronic health record, it is possible that we missed ED presentations and readmissions to other hospitals. The costs that were analyzed were only facility costs. Thus, we could not calculate the total impact that bariatric surgery at our institution had on the Medicaid program. We suspect, however, that the professional fees would have been similar between the two cohorts given the similarities in facility costs.

In conclusion, Medicaid and non-Medicaid patients experienced similar one-year rates of complications, comorbidity resolution and costs following laparoscopic gastric bypass surgery at our institution. These findings offer further evidence that Medicaid patients can achieve good outcomes after bariatric surgery. Medicaid programs that are considering bariatric surgery coverage can expect to have similar costs as non-Medicaid programs. Given the higher ED utilization rates and readmissions by Medicaid patients, quality improvement programs should target these areas to improve quality of care.

## Acknowledgments

Source of Funding: No extramural funding was used to support this project.

## Appendix

Medical complications within 90 days

	Non-Medicaid	Medicaid	P value
Urinary tract infection	9	2	1.00
Pneumonia	2	1	0.52
Acute Renal Insufficiency	1	0	1.00
Deep Vein Thrombosis	0	0	n/a
Pulmonary Embolism	0	0	n/a
Myocardial Infarction	0	0	n/a
Cerebrovascular Accident	0	0	n/a

## References

1. Carmen, D-W.; Proctor, B.; Smith, J. Income, Poverty, and Health Insurance Coverage in the United States: 2010. U.S. CENSUS BUREAU; 2011. <http://www.census.gov/prod/2011pubs/p60-239.pdf>:
2. McCarthy M. State opposition to Medicaid expansion will leave five million poor Americans without health cover, report says. *BMJ*. 2013; 347:f6305–f6305. [PubMed: 24136798]
3. Lee JS, Sheer JL, Lopez N, Rosenbaum S. Coverage of obesity treatment: a state-by-state analysis of Medicaid and state insurance laws. *Public health reports*. Jul-Aug;2010 125(4):596–604. [PubMed: 20597460]
4. Ogden C, Carroll M, Kit B, Flegal K. Prevalence of Obesity in the United States, 2009-2010. *NCHS Data Brief*. 2012; 82
5. Sturm R, Hattori A. Morbid obesity rate continue to rise rapidly in the US. *International Journal of Obesity*. 2013; (37):889–891. [PubMed: 22986681]
6. Carbonell A, Lincourt A, Matthews B, Kercher K, Sing R, Heniford B. National study of the effect of patient and hospital characteristics on bariatricsurgery outcomes. *The American Journal of Surgery*. 2005; 71(4):308–314.
7. Dallal R, Datta T, Braitman L. Medicare and Medicaid status predicts prolonged length of stay after bariatric surgery. *Surgery of Obesity Related Diseases*. 2007; 3(6):592–596.



8. Funk L, Suzo A, Mikami D, Needleman B. Two-Year Outcomes for Medicaid Patients Undergoing Laparoscopic Roux-en-Y Gastric Bypass: a Case-Control Study. *Obesity Surgery*. 2014; 24(10): 1679–1685. [PubMed: 24668544]
9. Jensen-Otsu E, Ward E, Mitchell B, et al. The Effect of Medicaid Status on Weight Loss, Hospital Length of Stay, and 30-Day Readmission After Laparoscopic Roux-en-Y Gastric Bypass Surgery. *Obesity Surgery*. 2014
10. LaPar D, Stukenborg G, Guyer R, et al. Primary payer status is associated with mortality and resource utilization for coronary artery bypass grafting. *Circulation*. 2012; 126:132–139.
11. Huang K, Hazzard M, Babu R, et al. Insurance disparities in the outcomes of spinal cord stimulation surgery. *Neuromodulation*. 2013; 16(5):428–434. [PubMed: 23647668]
12. Funk LM, Suzo A, Mikami DJ, Needleman BJ. Two-Year Outcomes for Medicaid Patients Undergoing Laparoscopic Roux-en-Y Gastric Bypass: a Case-Control Study. *Obesity surgery*. Mar 26.2014
13. [November 28th, 2014] ACS NSQIP Data User Guide. 2012. [http://site.acsnsqip.org/wp-content/uploads/2013/10/ACSNSQIP.PUF\\_UserGuide.2012.pdf](http://site.acsnsqip.org/wp-content/uploads/2013/10/ACSNSQIP.PUF_UserGuide.2012.pdf)
14. 1983 Metropolitan height and weight tables. *Statist Bull Metropolitan Life Insurance Co*. 1984;64–62. 69.
15. Alexander J, Goodman H, Martin Hawver L, James L. The Impact of Medicaid Status on Outcome After Gastric Bypass. *Obesity Surgery*. 2008; 18(10):1241–1245. [PubMed: 18618206]
16. Campos G, Ciovica R, Rogers S, Posselt A, Vittinghoff E, J P, T M. Spectrum and risk factors of complications after gastric bypass. *Archives of Surgery*. 2007; 142(10):969–975. [PubMed: 17938311]
17. [10/13/2014] Changes to Bariatric Surgery Prior Authorization Guidelines 2011. 2014. <https://www.forwardhealth.wi.gov/kw/pdf/2011-44.pdf>
18. Wang B, Furnback W. Modelling the long-term outcomes of bariatric surgery: A review of cost-effectiveness studies. *Best Practice & Research Clinical Gastroenterology*. 2013; 27(6):987–995. [PubMed: 24182616]
19. Fuller R, Atkinson G, McCullough E, H JS. Hospital Readmission Rates The Impacts of Age, Payer, and Mental Health Diagnoses. *The Journal of Ambulatory Care Management*. 2013; 36(2): 147–155. [PubMed: 23448921]
20. Dallal R, Bailey L, Guenther L, Curley C, Sergi F. Comparative analysis of short-term outcomes after bariatric surgery between two disparate populations. *Surgery for Obesity and Related Diseases*. 2008; 4(2):110–114. [PubMed: 17532268]
21. Kellogg T, Swan T, Leslie D, Buchwald H, Ikramuddin S. Patterns of readmission and reoperation within 90 days after Roux-en-Y gastric bypass. *Surgery of Obesity Related Diseases*. 2009; 5(4): 416–423.
22. Hong B, Stanley E, Reinhardt S, Panther K, Garren M, Gould J. Factors associated with readmission after laparoscopic gastric bypass surgery. *Surgery for Obesity and Related Diseases*. 2012; 8:691–695. [PubMed: 21978746]
23. Morton J. The first metabolic and bariatric surgery accreditation and quality improvement program quality initiative: decreasing readmissions through opportunities provided. *Surgery of Obesity Related Diseases*. 2014; 10(3):377–378.

**Table 1**

Characteristics of Patients Undergoing Laparoscopic Roux-en-Y Gastric Bypass Surgery

	Non-Medicaid (n=99)	Medicaid (n=33)	P-Value
Preoperative body mass index (kg/m <sup>2</sup> )	47.1	49.6	0.09
Patient demographics			
Female gender (%)	78.8	90.9	0.19
Age (mean)	48.7	39.0	<b>&lt;0.001</b>
Non-white race (%)	12.1	12.1	1.00
Preoperative comorbidities (%)			
Hypertension	68.7	66.7	0.83
Obstructive sleep apnea	67.7	48.5	0.06
Gastroesophageal reflux	50.5	54.6	0.84
Hyperlipidemia	50.5	24.2	<b>0.01</b>
Type II Diabetes mellitus	40.4	54.6	0.16
Coronary artery disease	11.1	0	0.06

Bold values are p-value &lt;0.05

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

**Table 2**

90-day Outcomes for Patients Undergoing Laparoscopic Roux-en-Y Gastric Bypass Surgery

	Non-Medicaid (n=99)	Medicaid (n=33)	P Value
Length of stay (mean)	2.3	2.2	1.00
ICU admission (%)	5.3	0	0.58
90 day follow up rate (%)	96.0	78.8	<b>&lt;0.001</b>
90-day outcomes (%)			
Any complication	30.3	33.3	0.83
Wound complications	17.9	14.8	1.00
Anastomotic leak	2.1	0	1.00
Postoperative hemorrhage	12.6	11.5	1.00
Reoperation for bleeding	1.1	0	1.00
Marginal ulcer	4.3	11.5	0.18
Anastomotic stricture requiring dilations	13.0	21.7	0.52
Intra-abdominal abscess	1.1	3.9	0.39
Emergency Department visit	27.4	48.2	0.06
Readmission	14.7	37.0	<b>0.01</b>
Reoperation	4.0	3.0	1.00
Mortality	0	0	n/a

Bold values are p-value &lt;0.05

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

**Table 3**

## Etiology of ED Presentations and Subsequent Management

	Non- Medicaid (# of visits=46)	Medicaid (# of visits=24)
Interval from day of surgery to ED presentation (mean number of days)	25.4	23.5
Type of symptoms		
Nonspecific symptoms (i.e. fatigue), improved without intervention # cases (%)	16 (34.8%)	13 (54.2%)
Presentations requiring specific treatment # cases (%)	30 (65.2%)	11 (45.8%)
Wound status		
Wound related, # of cases (%)	7 (15.2%)	2 (8.3%)
Non-wound related, # of cases (%)	39 (84.8%)	22 (91.2%)
Disposition		
Discharged From ED, # of cases (%)	14 (30.4%)	12 (50.0%)
Admitted to the Hospital, # of cases (%)	32 (69.6%)	12 (50.0%)

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

**Table 4**

## One-year Surgical Outcomes for Patients Undergoing Laparoscopic Roux-en-Y Gastric Bypass Surgery

	Non-Medicaid (n=99)	Medicaid (n=33)	P Value
Follow-up interval (median no. of months)	13.5	12.3	0.24
Percent follow up at 1 year (%)	70.7	63.6	0.52
Percentage of excess body weight loss (%)	65.6	50.7	<b>0.001</b>
Change in body mass index (kg/m <sup>2</sup> )	-15.1	-13.8	0.31
Resolution of comorbidities (%)			
Type II Diabetes Mellitus	63.3	76.9	0.49
Hyperlipidemia	30.6	40.0	0.64
Hypertension	47.8	60.0	0.55
Gastroesophageal reflux	62.2	36.4	0.17
Marginal ulcer (%)	8.8	21.7	0.14
Anastomotic stricture requiring dilation (%)	13.0	21.7	0.33
Surgical revisions (%)	8.8	8.3	1.00
Mortality (%)	0	0	n/a

Bold values are p-value <0.05

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

**Table 5**

One Year Charges and Costs for Patients Undergoing Laparoscopic Roux-en-Y Gastric Bypass Surgery

	Non-Medicaid N=99	Medicaid N=33	P-Value
Charges (median, USD)			
Inpatient	49,801	42,522	0.63
Outpatient	9,715	6,826	0.13
ED	8,434	8,683	0.91
Total	59,795	51,190	0.83
Costs (median, USD)			
Inpatient	19,527	16,877	0.65
Outpatient	4,854	3,827	0.51
ED	2,300	2,149	0.95
Total	24,215	21,160	0.92

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript