

Original article

# American Society for Metabolic and Bariatric Surgery estimation of metabolic and bariatric procedures performed in the United States in 2016

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## Abstract

**Background:** Bariatric surgery, despite being the most successful long-lasting treatment for morbid obesity, remains underused as only approximately 1% of all patients who qualify for surgery actually undergo surgery. To determine if patients in need are receiving appropriate therapy, the American Society for Metabolic and Bariatric Surgery created a Numbers Taskforce to specify annual rate of use for obesity treatment interventions.

**Objectives:** The objective of this study was to determine metabolic and bariatric procedure trends since 2011 and to provide the best estimate of the number of procedures performed in the United States in 2016.

**Setting:** United States.

**Methods:** We reviewed data from the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program, National Surgical Quality Improvement Program, Bariatric Outcomes Longitudinal Database, and Nationwide Inpatient Sample. In addition, data from industry and outpatient centers were used to estimate outpatient center activity. Data from 2016 were compared with the previous 5 years of data.

**Results:** Compared with 2015, the total number of metabolic and bariatric procedures performed in 2016 increased from approximately 196,000 to 216,000. The sleeve gastrectomy trend is increasing, and it continues to be the most common procedure. The gastric bypass and gastric band trends continued to decrease as seen in previous years. The percentage of revision procedures and biliopancreatic diversion with duodenal switch procedures increased slightly. Finally, intragastric balloons placement emerged as a significant contributor to the cumulative total number of procedures performed.

**Conclusions:** There is increasing use of metabolic and bariatric procedures performed in the United States from 2011 to 2016, with a nearly 10% increase noted from 2015 to 2016. (Surg Obes Relat Dis 2018;14:259–263.) © 2018 American Society for Metabolic and Bariatric Surgery. All rights reserved.

## Keywords:

Bariatric surgery; Procedure trends; Bariatric surgery procedure trends; Numbers task force; Estimated numbers; 2016

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The obesity rate has alarmingly increased over the past 5 decades, from 13.4% in 1962 to 36.4% in 2014. Currently, over 98.7 million U.S. residents are affected. Medical costs for treatment of co-morbidities associated

with obesity, ranging from diabetes to Alzheimer’s disease, has become quite substantial as well. In 2014, the direct medical expenses associated with treating obesity and its co-morbidities accounted for 14.3% of U.S. healthcare spending, and the indirect costs related to obesity due to loss of employee output were estimated to exceed \$988 billion. When adding the indirect costs of obesity, the overall economic impact is calculated to be \$1.42 trillion, which is equivalent to 8.2% of the U.S. gross domestic product in 2014 and over twice what is spent on national defense [1].

Bariatric surgery, as the only successful and durable long-term treatment for obesity, remains underused in treating the obesity epidemic in the United States and surgery is used as a treatment option by approximately 1% of all patients who qualify as candidates for metabolic and bariatric surgery [2,3]. To determine if patients in need are receiving appropriate therapy, the American Society for Metabolic and Bariatric Surgery (ASMBS) created a Numbers Taskforce to specify annual rate of utilization for obesity treatment interventions.

Here, the ASMBS Numbers Taskforce is reporting the 2016 estimate of the number of metabolic and bariatric surgery procedures performed in the United States. This report provides the best approximation using the methodology described in the following.

**Methods**

A comprehensive review of the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP) database was completed, which included 100% of the primary and revisional metabolic and bariatric procedures performed within metabolic and bariatric surgery centers that are accredited by MBSAQIP.

In addition, a comprehensive review of the National Surgical Quality Improvement Program (NSQIP) database was also performed, which included 100% of the primary and revisional metabolic and bariatric procedures performed within non-MBSAQIP-accredited metabolic and bariatric surgery centers. A major limitation of using data from NSQIP is that participating centers are only required to report at least 20% of surgical cases, which includes metabolic and bariatric procedures. Underreporting at these centers is expected; however, some centers may report up to 100% of all metabolic and bariatric surgery procedures.

A review of other national registries was also undertaken, including the Bariatric Outcomes Longitudinal Database (BOLD) and Nationwide Inpatient Sample (NIS). A limitation of using the NIS database is that it does not record outpatient metabolic and bariatric procedures or track patients longitudinally.

To capture outpatient procedures performed at centers that do not submit data to MBSAQIP, NSQIP, or BOLD, device companies were surveyed to obtain the total number

of gastric bands and intragastric balloons sold in 2016; however, estimates were made to deduct devices purchased but not used. Large outpatient centers performing stapling procedures, mainly laparoscopic sleeve gastrectomies, were also queried to help account for outpatient procedures performed outside of MBSAQIP.

MBSAQIP and BOLD data were considered accredited centers for purposes of this assessment. Data from NIS and NSQIP were used to estimate nonaccredited inpatient center activity. Data from industry and outpatient centers were used to estimate outpatient center activity. A 5% reduction in the overall number was applied to account for devices purchased, but not used, in keeping with supply chain industry standards.

When considering procedures performed, primary procedure categories were sleeve gastrectomy, Roux-en-Y gastric bypass, gastric banding, biliopancreatic diversion with duodenal switch, and gastric balloons. Revisions and conversions included procedures in which primary procedures were previously performed and included gastric band removals. The “Other” procedure category included, but was not limited to, gastric plication, single-anastomosis gastric bypass, vertical-banded gastroplasty, endoscopic therapies (not including gastric balloons), unlisted procedures, and other investigational procedures.

**Results**

Compared with 2015, the total number of bariatric procedures performed in 2016 increased from approximately 196,000 to 216,000. The overall estimated number of metabolic and bariatric procedures for 2016, as well as the trend and percentage breakdown from 2011 to 2016, is listed in Fig 1 and Tables 1 and 2 [3,4].

The sleeve gastrectomy continues to be the most common procedure, comprising 58.1% of all procedures in 2016. An 18.8% increase was noted from 2015 (105,448 to 125,318), but even more striking was the observed growth trend of > 346% since 2011.

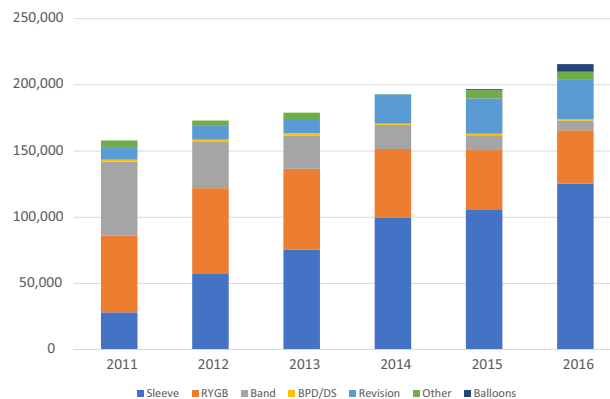


Fig 1. Metabolic and bariatric surgery procedure trend, 2011–2016. RYGB = Roux-en-Y gastric bypass; BPD/DS = biliopancreatic diversion with duodenal switch.

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