Results | The age and sex distribution of the LAGB population analyzed is provided in the Figure. During the 3 years after LAGB, the rate of revisional surgery was 18.9 events per 100 patients, comprising 11.4 intra-abdominal and 7.5 subcutaneous surgical procedures. The majority of revisional procedures were repeated or revisional LAGB procedures (8.3 events per 100 patients) and repairs or revisions of the LAGB reservoir (7.5 events per 100 patients). Conversions to another bariatric procedure (1.3 events per 100 patients) and LAGB reversals (1.9 events per 100 patients) were uncommon (Table).

Discussion | The present study found that almost 1 in 5 patients undergoing LAGB require some revisional surgery within 3 years. These results from our national cohort study are similar, albeit slightly higher, than the results from previous single-center (15.3% of patients)³ and multicenter cohort studies (17.5% of patients).²

There are 2 key strengths of our study. First, the data analyzed are observed health care utilization data maintained by the Australian government; therefore, the level of reliability is high, and the data set is complete (no loss to follow-up). Second, the entire population of Australians who received Medicare-subsidized LAGB was analyzed, thus providing results reflective of LAGB as delivered in a “real-world” setting.

Bariatric surgery is associated with dramatic weight loss and improvements in many clinical end points.² The benefits of surgery must be compared with the risk of adverse events, the need for reoperations, and the associated costs for each patient.

Catherine L. Keating, MPH
Jaithri Ananthapavan, MPH

Author Affiliations: Deakin Health Economics, Deakin University, Melbourne Burwood Campus, Burwood, Victoria, Australia.

Corresponding Author: Catherine L. Keating, MPH, Deakin Health Economics, Deakin University, Melbourne Burwood Campus, 221 Burwood Hwy, Burwood, Victoria, Australia 3125 (catherine.keating@deakin.edu.au).

Published Online: June 18, 2014.

Author Contributions: Ms Keating and Ananthapavan had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design: All authors.
Acquisition, analysis, or interpretation of data: All authors.
Drafting of the manuscript: All authors.
Critical revision of the manuscript for important intellectual content: Keating.
Statistical analysis: Keating.
Obtained funding: Keating.

Conflict of Interest Disclosures: Ms Keating has previously received an independent research grant from Allergan Australia. No other disclosures are reported.

Funding/Support: This project was funded by Deakin University.

Role of the Sponsor: The funding agency had no role in the design and conduct of the study; collection, management, analysis, or interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

Additional Contributions: We thank Medicare Australia for their assistance with the identification of the population analyzed in this study and for providing detailed medical data. We also thank Paul O’Brien, MD, FRACS, from the Centre for Obesity Research and Education, Monash University, Melbourne, Australia, for providing a critical review of the study from the perspective of a bariatric surgery expert. Dr O’Brien did not receive any compensation. Medicare Australia received an administrative fee to undertake the custom data extraction.


Avoiding Immortal Time Bias in the American College of Surgeons National Surgical Quality Improvement Program Readmission Measure

Readmission has become a key quality metric because it is a frequent and costly adverse event for patients.⁴ Medicare penalizes hospitals if they have excess numbers of readmissions for certain diagnoses, including some within surgery. The American College of Surgeons National Surgical Quality Improvement Program (NSQIP) began tracking readmission rates in 2011.²

While conducting research on readmission after surgery, we noted a problem with the NSQIP’s definition of readmission.³ The NSQIP only counts readmissions during the 30 days following surgery, consistent with the interval they use for all postoperative outcomes. However, the standard period for readmission used by Medicare and others is 30 days after hospital discharge. This discrepancy creates an immortal time bias—patients cannot be readmitted before hospital discharge and are therefore “immortal” for this outcome until they leave the hospital.⁴ Including immortal time when calculat-
The National Surgical Quality Improvement Program (NSQIP) method (30-day postoperative readmission) undercounts true 30-day postdischarge readmission. This effect worsens with longer lengths of stay and is statistically significant at 25 days or longer (P = .012, determined by use of the Fisher exact test).

ing readmission rates leads to a bias between the measured value and the true value for readmission rates. Logically, 30-day postoperative readmission should systematically undercount 30-day postdischarge readmission. In addition, this bias should worsen for a longer length of stay. In our previous NSQIP analysis, we noted that readmission rates increased with longer lengths of stay, peaked at 13 days, and decreased thereafter. We hypothesized that readmission rates would increase continuously with longer lengths of stay if this immortal time bias were not present. Here we report data supporting this hypothesis and demonstrate how to avoid this bias.

Methods | We examined patients who had a colorectal resection at Johns Hopkins Hospital in Baltimore, Maryland, between 2009 and 2011, survived to hospital discharge, and were captured by the NSQIP. Dates of admission, discharge, and readmission were obtained from the NSQIP, medical record review, and administrative data, as previously described. The NSQIP 30-day postoperative readmission rate was compared with the standard 30-day postdischarge readmission rate obtained from medical record review. A Kaplan-Meier method to estimate the true 30-day postdischarge readmission rate using only data collected by the NSQIP was then evaluated. Our study was approved by the Johns Hopkins Hospital institutional review board. Consent was waived owing to the retrospective nature of the analysis. Patients were not compensated.

Results | We identified 708 patients, whose characteristics were described previously. Of these 708 patients, 134 (18.9%) were readmitted within 30 days after hospital discharge, but only 114 (16.1%) were readmitted within 30 days after surgery. Therefore, the NSQIP method had a sensitivity of 85% for 30-day postdischarge readmission in this population. This undercounting worsened with longer lengths of stay and was statistically significant at 25 days (P = .01, determined by use of the Fisher exact test) (Figure).

The NSQIP began reporting the day of readmission in 2012. This information can be used to overcome the immortal time bias. Truncating our data at 30 days after surgery as if it were from the NSQIP, we estimated the 30-day postdischarge readmission rate using Kaplan-Meier methods. This resulted in an estimated readmission rate of 17.2% (95% CI, 14.5%-20.3%), which included the true value of 18.9%.

Conclusions | The NSQIP systematically undercounts 30-day postdischarge readmissions, and this bias worsens with longer lengths of stay. The Medicare Hospital Readmissions Reduction Program enforces larger and more widespread financial penalties than any other quality measure of any type, and it is expanding into surgery. The NSQIP and other programs like it, which are designed to help hospitals improve quality, should “teach to the test” and adopt the 30-day postdischarge readmission definition. Until this occurs, research on readmission using NSQIP data should use Kaplan-Meier methods to avoid underestimating readmission rates.

Donald J. Lucas, MD, MPH
Elliott R. Haut, MD
Elizabeth M. Hechenbleikner, MD
Elizabeth C. Wick, MD
Timothy M. Pawlik, MD, MPH, PhD

Author Affiliations: Department of Surgery, Walter Reed National Military Medical Center, Bethesda, Maryland (Lucas); Department of Surgery, Johns Hopkins Hospital, Baltimore, Maryland (Haut, Wick, Pawlik); Department of Surgery, Georgetown University Hospital, Washington, DC (Hechenbleikner).

Corresponding Author: Timothy M. Pawlik, MD, MPH, PhD, Department of Surgery, Johns Hopkins Hospital, 600 N Wolfe St, Blalock 688, Baltimore, MD 21287 (tpawlik1@jhmi.edu).

Published Online: July 2, 2014.

Conflict of Interest Disclosures: Dr Haut receives royalties from Lippincott Williams & Wilkins for a book he coauthored (Avoiding Common ICU Errors). He has received honoraria for various speaking engagements regarding clinical and quality and safety topics and has given expert witness testimony in various medical malpractice cases. No other disclosures are reported.

Disclaimer: The views expressed in this article are those of the authors and do not represent the official policy of the US Navy, the Department of Defense, or the US government.

Additional Information: Dr Haut is the primary investigator of the Mentored Clinician Scientist Development Award K08 IK08HS017952-01 from the Agency for Healthcare Research and Quality entitled “Does Screening Variability Make DVT an Unreliable Quality Measure of Trauma Care?” Dr Haut is the primary investigator of a contract with The Patient-Centered Outcomes Research Institute entitled “Preventing Venous Thromboembolism: Empowering Patients and Enabling Patient-Centered Care via Health Information Technology.”

Downloaded From: jamasurgery.com on 10/16/2018
Areas of Overlap

To the Editor We write to alert readers that there are areas of overlap between 2 articles that we published, one in the Archives of Surgery1 and the other in the Journal of Pediatric Surgery.2 Both of these studies used the US National Trauma Data Bank and similar methods of analysis. However, our study in the Archives of Surgery focused on adult patients, whereas our study in the Journal of Pediatric Surgery focused on pediatric patients, and therefore different nonoverlapping subsets of the data bank were used for each study. Given the different analyses and target audiences, we decided to submit them to separate journals. In our Archives of Surgery article,1 we should have included a reference to the previously published article in the Journal of Pediatric Surgery,2 which was accepted and published first. In addition, we should have recognized that the descriptions in the Results and Comment sections of both articles needed to be clearly nonduplicative. We apologize for these important errors.

Heather Rosen, MD, MPH
Fady Saleh, MD, MPH
Stuart R. Lipsitz, ScD
Selwyn O. Rogers Jr, MD, MPH
Atul A. Gawande, MD, MPH

Author Affiliations: Vanderbilt University Medical Center, Nashville, Tennessee (Rosen); Department of Surgery, University of Toronto, Toronto, Ontario, Canada (Saleh); Department of Surgery, Brigham and Women’s Hospital, Boston, Massachusetts (Lipsitz, Gawande); Department of Surgery, Temple University, Philadelphia, Pennsylvania (Rogers).

Corresponding Author: Heather Rosen, MD, MPH, Vanderbilt University Medical Center, 1211 Medical Center Dr, Nashville, TN 37232 (heather.rosen@vanderbilt.edu).


Conflict of Interest Disclosures: None reported.
