Author Contributions: Ms Goldsack had full access to all of the data in the study and takes 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: Goldsack.

Critical revision of the manuscript for important intellectual content: Sonnad.

Statistical analysis: Sonnad.

Administrative, technical, or material support: Goldsack.

Study supervision: Sonnad.

Conflict of Interest Disclosures: None reported.


Reviseral Surgery After Laparoscopic Adjustable Gastric Banding in a National Australian Cohort

A recent systematic review reported wide-ranging long-term revision or reversal rates after laparoscopic adjustable gastric banding (LAGB) of between 8% and 60%. The marked variability is likely due to different definitions of revisional surgery, different follow-up durations, and the different “eras” of the surgical cohorts. The studies reviewed provided little detail regarding the types of revisional procedures performed. Two recent studies have significantly advanced evidence in this area. The Longitudinal Assessment of Bariatric Surgery (LAGB) of Australia’s government tax-funded insurance program (known as Medicare) between July 1, 2005, and June 30, 2006, was identified (N = 6037). Identification was based on utilization of Medicare Benefits Schedule item (ie, billing code) 30511 (gastric reduction or gastroplasty for morbid obesity), which is primarily used for LAGB.

Medical utilization data from the date of LAGB until 3.5 years after surgery was retrieved for each patient from an administrative database maintained by Medicare. Medicare funds approximately 3800 medical services. Selected predefined items directly related to bariatric surgery, as specified in the Table, were analyzed. For privacy reasons, deidentified, aggregate data on medical utilization were provided to the research team by Medicare. The earliest and latest dates for data capture were July 1, 2005, and December 30, 2009, respectively.

Observed frequencies over 3.5 years were converted to 3-year rates for each revisional surgery item. The Medicare item relating to LAGB reversal (item 30514) is used when the initial gastric banding procedure is repeated (item 30511) when a conversion to another bariatric procedure is undertaken (items 30512 and 30518). Therefore, gastric banding reversals performed in association with other procedures were excluded from the data to remove the risk of double counting.

### Table. Data on Revisional Procedures

<table>
<thead>
<tr>
<th>Summary Description</th>
<th>Medicare Item</th>
<th>No. of Observed Events Over 3.5 Years (N = 6037)*</th>
<th>Events per 100 Persons Over 3.5 Years</th>
<th>Events per 100 Persons Over 3 Years#</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repeated or revisional LAGB</td>
<td>Gastric reduction or gastroplasty for morbid obesity, by any method</td>
<td>30511</td>
<td>583</td>
<td>9.7</td>
</tr>
<tr>
<td>Conversion to gastric bypass</td>
<td>Gastric bypass for morbid obesity, by any method, including anastomosis</td>
<td>30512</td>
<td>40</td>
<td>0.7</td>
</tr>
<tr>
<td>Conversion to gastrectomy</td>
<td>Partial gastrectomy</td>
<td>30518</td>
<td>46</td>
<td>0.8</td>
</tr>
<tr>
<td>LAGB reversal</td>
<td>Surgical reversal for morbid obesity, by any method</td>
<td>30514</td>
<td>131</td>
<td>2.2</td>
</tr>
<tr>
<td>Subtotal of intra-abdominal surgical procedures</td>
<td></td>
<td>800</td>
<td>13.3</td>
<td>11.4</td>
</tr>
<tr>
<td>Port repair of replacement</td>
<td>Repair, revision, or replacement of long-term implanted reservoir associated with the adjustable gastric band</td>
<td>31441</td>
<td>528</td>
<td>8.7</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1328</td>
<td>22.0</td>
<td>18.9</td>
</tr>
</tbody>
</table>

Abbreviation: LAGB, laparoscopic adjustable gastric banding.

*The 3.5-year time horizon was the maximum available at the time of data request from Medicare Australia.

#Data are presented over 3 years to enable comparison with 2 recent studies reporting LAGB revisional surgery rates.
The source for the data is Medicare Australia. Identification was based on utilization of Medicare Benefits Schedule item 30511 (gastric reduction or gastroplasty for morbid obesity, by any method), which is primarily used for laparoscopic adjustable gastric banding in Australia.1

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)1 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.

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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.3 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-