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**eTable 1.** First stage of instrumental variable analysis

**eTable 2.** Results of a sensitivity analysis in which the instrumental variable is utilization of sleeve gastrectomy in the 2 years prior to treatment

This supplemental material has been provided by the authors to give readers additional information about their work.
### eTable 1. First stage of instrumental variable analysis.

|                                | β     | 95% CI          | SE    | Z-Stat | P    |
|--------------------------------|-------|-----------------|-------|--------|------|
| Prior-Year Sleeve Gastrectomy Use | 3.919 | 3.433, 4.405    | 0.248 | 15.8   | <.001|
| Age                            | 0.004 | 0.001, 0.009    | 0.002 | 2.51   | 0.012|
| Female                         | -0.090| -0.135, -0.045  | 0.023 | -3.9   | <.001|
| Race/Ethnicity (ref: White)    |       |                 |       |        |      |
| Black                          | 0.189 | 0.100, 0.279    | 0.046 | 4.15   | <.001|
| Other                          | 0.075 | -0.033, 0.182   | 0.055 | 1.36   | 0.174|
| Year of Surgery (ref: 2012)    |       |                 |       |        |      |
| 2013                           | 2.638 | 2.235, 3.042    | 0.206 | 12.81  | <.001|
| 2014                           | 1.352 | 0.970, 1.734    | 0.195 | 6.94   | <.001|
| 2015                           | 0.879 | 0.458, 1.300    | 0.215 | 4.09   | <.001|
| 2016                           | 0.812 | 0.376, 1.248    | 0.223 | 3.65   | <.001|
| 2017                           | 0.768 | 0.318, 1.217    | 0.230 | 3.34   | 0.001|
| Comorbidities                  |       |                 |       |        |      |
| Congestive heart failure       | 0.107 | -0.011, 0.225   | 0.060 | 1.77   | 0.076|
| Valvular disease               | 0.091 | -0.152, 0.334   | 0.124 | 0.73   | 0.463|
| Pulmonary circulation disease  | -0.124| -0.354, 0.105   | 0.117 | -1.06  | 0.290|
| Peripheral vascular disease    | 0.001 | -0.185, 0.186   | 0.095 | 0.01   | 0.994|
| Hypertension                   | -0.116| -0.200, -0.032  | 0.043 | -2.71  | 0.007|
| Paralysis                      | 0.315 | -0.068, 0.698   | 0.195 | 1.61   | 0.107|
| Other neurological disorders   | 0.090 | -0.070, 0.250   | 0.082 | 1.10   | 0.271|
| Chronic pulmonary disease      | -0.073| -0.120, -0.026  | 0.024 | -3.03  | 0.002|
| Diabetes without chronic complications | -0.334 | -0.403, -0.264 | 0.035 | -9.45 | <.001 |
| Diabetes with chronic complications | -0.58  | -0.702, -0.459 | 0.062 | -9.40  | <.001 |
| Hypothyroidism                 | 0.045 | -0.026, 0.115   | 0.036 | 1.24   | 0.213|
| Renal failure                  | 0.361 | 0.232, 0.490    | 0.066 | 5.49   | <.001|
| Liver disease                  | -0.146| -0.383, 0.088   | 0.120 | -1.22  | 0.222|
| Acquired immune deficiency syndrome | -0.022 | -0.911, 0.866 | 0.454 | -0.05 | 0.962 |
| Lymphoma                      | 0.093 | -0.627, 0.812   | 0.367 | 0.25   | 0.801|
| Solid tumor w/out metastasis   | -0.222| -0.698, 0.253   | 0.757 | -0.91  | 0.360|
| Rheumatoid arthritis           | 0.272 | 0.142, 0.403    | 0.243 | 4.09   | <.001|
| Coagulopathy                   | 0.120 | -0.118, 0.359   | 0.066 | 0.99   | 0.323|
| Weight loss                    | -0.611| 0.003, 0.295    | 0.122 | -2.64  | 0.046|
| Fluid and electrolyte disorders | -0.080 | -0.198, 0.036 | 0.059 | -1.35  | 0.178|
| Chronic blood loss anemia      | -0.513| -1.141, 0.113   | 0.32  | -1.6   | 0.109|
| Deficiency Anemias             | -0.025| -0.188, 0.138   | 0.083 | -0.30  | 0.763|
| Psychoses                      | -0.210| -0.337, -0.082  | 0.065 | -3.23  | 0.001|
| Depression                     | -0.097| -0.177, -0.016  | 0.041 | -2.36  | 0.018|

**Supplemental Table 1 Legend:** Results of a logistic regression with outcome being undergoing sleeve gastrectomy. Prior-year sleeve gastrectomy use is the instrumental variable.
**eTable 2.** Results of a Sensitivity Analysis in Which the Instrumental Variable Is Utilization of Sleeve Gastrectomy in the 2 Years Prior to Treatment

|                        | Instrumental Variables Analysis | Difference (95% CI) |
|------------------------|----------------------------------|---------------------|
|                        | Sleeve                          | Bypass              |
| Mortality              | 0.88 (0.76-0.98)                 | 1.85 (1.52-2.18)    | -0.97 (-1.36, -0.58) |
| Complications          | 11.19 (10.52-11.85)              | 14.67 (13.48-15.86) | -3.48 (-5.18, -1.78) |
| ED Utilization         | 48.42 (46.92-49.92)              | 53.53 (52.34-54.72) | -5.11 (-7.50, -2.71) |
| Hospitalization        | 22.97 (21.93-24.03)              | 27.08 (25.65-28.51) | -4.10 (-6.20, -2.01) |
| Reintervention         | 8.60 (7.95-9.24)                 | 12.37 (11.40-13.35) | -3.78 (-5.24, -2.31) |
| Revision               | 0.45 (0.29-0.60)                 | 0.49 (0.31-0.67)    | -0.04 (-0.36, 0.27)  |

**Supplemental Table 2 Legend:** The instrumental variables analysis was a 2-stage residual inclusion estimation method wherein the first stage was a multivariable logistic regression model to estimate the likelihood of undergoing sleeve gastrectomy (covariates: sleeve gastrectomy rate in the 2 years prior to treatment (the instrumental variable), age, sex, race and ethnicity, comorbidities, and year of surgery) and the second stage was a multivariable logistic regression model to estimate the absolute risk difference for each outcome (covariates: treatment, age, sex, race and ethnicity, comorbidities, year of surgery, and residuals from the first-stage regression model).