Supplementary Online Content

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This supplementary material has been provided by the authors to give readers additional information about their work.
eTable 1. Percentage of Excess Weight Loss After Bariatric Surgery and Lifestyle Intervention

| Year | Base-Case | Range        | Base-Case | Range        | Base-Case | Range        |
|------|-----------|--------------|-----------|--------------|-----------|--------------|
| 0    | 0.00%     | 0– 0.00%     | 0.00%     | 0– 0.00%     | 0.00%     | 0– 0.00%     |
| 1    | -72.32%   | -64.60%– -80.04% | -69.70%   | -41.09%– -98.32% | -28.14%   | -27.50%– -28.78% |
| 2    | -71.02%   | -70.84%– -71.44% | -68.45%   | -68.27%– -68.85% | -20.77%   | -20.08%– -21.45% |
| 3    | -66.08%   | -65.33%– -67.15% | -63.68%   | -62.96%– -64.72% | -16.27%   | -15.58%– -16.95% |
| 4    | -63.74%   | -62.91%– -64.51% | -61.43%   | -60.63%– -62.17% | -14.60%   | -13.93%– -15.26% |
| 5    | -61.33%   | -60.29%– -62.30% | -59.11%   | -58.10%– -60.05% | -13.28%   | -12.59%– -13.96% |
| 6    | -58.92%   | -57.67%– -60.10% | -56.79%   | -55.58%– -57.92% | -13.90%   | -13.24%– -14.56% |
| 7    | -56.84%   | -55.52%– -58.15% | -54.78%   | -53.51%– -56.04% | -13.29%   | -12.60%– -13.97% |
| 8    | -54.76%   | -53.37%– -56.19% | -52.78%   | -51.43%– -54.16% | -15.59%   | -14.95%– -16.23% |
| 9    | -53.59%   | -51.95%– -55.18% | -51.65%   | -50.07%– -53.19% | -15.59%   | -14.95%– -16.23% |
| 10   | -52.42%   | -50.54%– -54.18% | -50.52%   | -48.71%– -52.21% | -15.59%   | -14.95%– -16.23% |
| 11   | -53.80%   | -50.92%– -56.52% | -51.85%   | -49.08%– -54.47% | -15.59%   | -14.95%– -16.23% |
| 12   | -55.18%   | -51.30%– -58.86% | -53.18%   | -49.44%– -56.73% | -15.59%   | -14.95%– -16.23% |
| 13   | -56.56%   | -51.67%– -61.21% | -54.51%   | -49.80%– -58.99% | -15.59%   | -14.95%– -16.23% |
| 14   | -57.93%   | -52.05%– -63.55% | -55.84%   | -50.16%– -61.25% | -15.59%   | -14.95%– -16.23% |
| 15   | -59.31%   | -52.43%– -65.89% | -57.16%   | -50.53%– -63.51% | -15.59%   | -14.95%– -16.23% |
| 16   | -59.05%   | -51.43%– -66.30% | -56.91%   | -49.57%– -63.90% | -15.59%   | -14.95%– -16.23% |
| 17   | -58.79%   | -50.44%– -66.70% | -56.66%   | -48.61%– -64.28% | -15.59%   | -14.95%– -16.23% |
| 18   | -58.53%   | -49.44%– -67.10% | -56.41%   | -47.65%– -64.67% | -15.59%   | -14.95%– -16.23% |
| 19   | -58.27%   | -48.45%– -67.51% | -56.16%   | -46.69%– -65.06% | -15.59%   | -14.95%– -16.23% |
| 20   | -58.01%   | -47.45%– -67.91% | -55.91%   | -45.73%– -65.45% | -15.59%   | -14.95%– -16.23% |

Negative values indicate weight loss, whereas positive values indicate weight gain. Ranges were used in one-way sensitivity analysis. β distributions were used for all weight loss values in probabilistic sensitivity analysis.

For patients who underwent laparoscopic Roux-en-Y gastric bypass (GB) or laparoscopic sleeve gastrectomy (SG), the weight loss one year after surgery was based on a recent meta-analysis. In subsequent years, maintenance of weight loss after bariatric surgery was based on data from the Swedish Obese Subjects (SOS) study. Weight loss in the intensive lifestyle intervention (ILI) strategy was derived from the Look AHEAD (Action for Health in Diabetes) trial. After year 8, body mass index (BMI) remained stable in the ILI strategy. In the usual care strategy, patients remained at their initial BMI throughout their lifetime.

GB, laparoscopic Roux-en-Y gastric bypass; SG, laparoscopic sleeve gastrectomy; ILI, intensive lifestyle intervention
eTable 2. Health-Related Quality-of-Life Utilities of the United States Population

| Age Group | Male  | Female |
|-----------|-------|--------|
| 20–29     | 0.928 | 0.913  |
| 30–39     | 0.918 | 0.893  |
| 40–49     | 0.887 | 0.863  |
| 50–59     | 0.861 | 0.837  |
| 60–69     | 0.840 | 0.811  |
| 70–79     | 0.802 | 0.771  |
| 80–89     | 0.782 | 0.724  |

The age/sex-specific utilities in eTable 2 were used to adjust the quality-of-life values assigned during each year to patients in the model. These utilities were multiplied with the liver disease utility (i.e., the utility for compensated cirrhosis, decompensated cirrhosis, hepatocellular carcinoma, or post-transplant health states) and the weight-related utility to determine each patient’s overall utility during each year of the simulation. Source: Hanmer et al.4
eFigure 1. One-Way Sensitivity Analysis for SG in Severe Obesity

eFigure 1 shows the results of one-way sensitivity analyses performed for SG (versus usual care) in patients with severe obesity. One-way sensitivity analysis involves adjusting the value of one model parameter at a time in order to assess the impact on study outcomes. This figure includes the ten parameters that led to the largest effect on ICER values when modified. The numbers on either side of the bars indicate the extreme parameter values that led to the resulting ICER shown in the figure. This figure is centered around the base-case ICER of $6,563/QALY. High and low parameter values can be found in Table 1 and eTable 1.

ICER, incremental cost-effectiveness ratio; QALY, quality-adjusted life year; HR, hazard ratio; BMI, body mass index; Prob., probability; DC, decompensated cirrhosis; CC, compensated cirrhosis; SG, laparoscopic sleeve gastrectomy; HCC, hepatocellular carcinoma
eFigure 2. One-Way Sensitivity Analysis for SG in Moderate Obesity

eFigure 2 shows the results of one-way sensitivity analyses performed for SG (versus usual care) in patients with moderate obesity. One-way sensitivity analysis involves adjusting the value of one model parameter at a time in order to assess the impact on study outcomes. This figure includes the ten parameters that led to the largest effect on ICER values when modified. The numbers on either side of the bars indicate the extreme parameter values that led to the resulting ICER shown in the figure. This figure is centered around the base-case ICER of $10,274/QALY. High and low parameter values can be found in Table 1 and eTable 1.

ICER, incremental cost-effectiveness ratio; QALY, quality-adjusted life year; HR, hazard ratio; BMI, body mass index; Prob., probability; DC, decompensated cirrhosis; SG, laparoscopic sleeve gastrectomy; CC, compensated cirrhosis; HCC, hepatocellular carcinoma
eFigure 3. One-Way Sensitivity Analysis for SG in Mild Obesity

EFigure 3 shows the results of one-way sensitivity analyses performed for SG (versus usual care) in patients with mild obesity. One-way sensitivity analysis involves adjusting the value of one model parameter at a time in order to assess the impact on study outcomes. This figure includes the ten parameters that led to the largest effect on ICER values when modified. The numbers on either side of the bars indicate the extreme parameter values that led to the resulting ICER shown in the figure. This figure is centered around the base-case ICER of $18,716/QALY. High and low parameter values can be found in Table 1 and eTable 1.

ICER, incremental cost-effectiveness ratio; QALY, quality-adjusted life year; BMI, body mass index; SG, laparoscopic sleeve gastrectomy; Prob., probability; CC, compensated cirrhosis; DC, decompensated cirrhosis; HCC, hepatocellular carcinoma
eFigure 4 shows the results of one-way sensitivity analyses performed for SG (versus usual care) in patients with overweight. One-way sensitivity analysis involves adjusting the value of one model parameter at a time in order to assess the impact on study outcomes. This figure includes the ten parameters that led to the largest effect on ICER values when modified. The numbers on either side of the bars indicate the extreme parameter values that led to the resulting ICER shown in the figure. This figure is centered around the base-case ICER of $66,119/QALY. High and low parameter values can be found in Table 1 and eTable 1.

ICER, incremental cost-effectiveness ratio; QALY, quality-adjusted life year; Prob., probability; CC, compensated cirrhosis; DC, decompensated cirrhosis; HCC, hepatocellular carcinoma; HR, hazard ratio; BMI, body mass index; SG, laparoscopic sleeve gastrectomy; Util, utility
Probabilistic sensitivity analysis was performed for patients with severe obesity (i.e., BMI>40). The model was run using second-order sampling for 10,000 iterations; the percent of these times that a treatment strategy was cost-effective, at varying willingness-to-pay thresholds, is shown in this figure.

ILI, intensive lifestyle intervention; SG, laparoscopic sleeve gastrectomy; GB, laparoscopic Roux-en-Y gastric bypass; QALY, quality-adjusted life year
Probabilistic sensitivity analysis was performed for patients with moderate obesity (i.e., BMI 35 – 40). The model was run using second-order sampling for 10,000 iterations; the percent of these times that a treatment strategy was cost-effective, at varying willingness-to-pay thresholds, is shown in this figure.

ILI, intensive lifestyle intervention; SG, laparoscopic sleeve gastrectomy; GB, laparoscopic Roux-en-Y gastric bypass; QALY, quality-adjusted life year
Probabilistic sensitivity analysis was performed for patients with mild obesity (i.e., BMI 30 – 35). The model was run using second-order sampling for 10,000 iterations; the percent of these times that a treatment strategy was cost-effective, at varying willingness-to-pay thresholds, is shown in this figure.

ILI, intensive lifestyle intervention; SG, laparoscopic sleeve gastrectomy; GB, laparoscopic Roux-en-Y gastric bypass; QALY, quality-adjusted life year
Probabilistic sensitivity analysis was performed for patients with overweight (i.e., BMI 25 – 30). The model was run using second-order sampling for 10,000 iterations; the percent of these times that a treatment strategy was cost-effective, at varying willingness-to-pay thresholds, is shown in this figure.

ILI, intensive lifestyle intervention; SG, laparoscopic sleeve gastrectomy; GB, laparoscopic Roux-en-Y gastric bypass; QALY, quality-adjusted life year
eReferences

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