Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
The use of gastric bypass in the treatment of severe obesity was assessed.

Type of intervention
Secondary prevention of obesity-related diseases and the treatment of obesity itself.

Economic study type
Cost-utility analysis.

Study population
The target population comprised men and women aged 35 to 55 years with a body mass index (BMI) between 40 and 50 kg/m2. The analysis was limited to nonsmokers who did not have cardiovascular disease or major psychological disorders, and who had been unable to maintain a clinically meaningful weight loss despite several attempts at conservative measures (e.g. dieting, exercise, behaviour therapy, pharmacotherapy).

Setting
The setting was secondary care. A specific location was not identified due to the modelling nature of the study.

Dates to which data relate
The effectiveness data related to studies published between 1990 and 2000. The price year was 2001. The dates during which the resource use data were collected were not reported.

Source of effectiveness data
The effectiveness data were derived from a review and synthesis of completed studies, supplemented by expert opinion.

Modelling
The authors used a deterministic decision analysis model to estimate the costs and outcomes of gastric bypass.

Outcomes assessed in the review
The following outcomes were assessed:

- the rate of minor wound infection;
- the rate of major wound infection;
- the rate of deep vein thrombosis;
the rate of pulmonary embolism;
the rate of cholelithiasis;
the rate of incisional hernia;
the rate of abdominoplasty;
the rate of revisional surgery;
the rate of reversal surgery;
the rate of perioperative death; and
life expectancy.

Study designs and other criteria for inclusion in the review
The authors did not indicate whether they undertook a systematic review for any of the parameters. In addition, no inclusion criteria were reported. However, the authors chose studies with large samples and one study in particular had 14 years of follow-up. Where information was available from no other source, the authors used a randomised clinical trial.

Sources searched to identify primary studies
Not reported.

Criteria used to ensure the validity of primary studies
No criteria were reported. However, the authors used studies with excellent follow-up rates where possible.

Methods used to judge relevance and validity, and for extracting data
Not reported.

Number of primary studies included
Four primary studies were used in the review.

Methods of combining primary studies
Not relevant.

Investigation of differences between primary studies
Not reported.

Results of the review
The rate of minor wound infection was 8.7.

The rate of major wound infection was 3.0.

The rate of deep vein thrombosis was 2.6.

The rate of pulmonary embolism was 1.0.
The rate of cholelithiasis was 11.4.
The rate of incisional hernia was 24.0.
The rate of abdominoplasty 39.0.
The rate of revisional surgery was 2.8.
The rate of reversal surgery was 2.
The rate of perioperative death was 1.5.

Life expectancy for gastric bypass in individuals with a BMI of 40 was 23.00 for men and 24.63 for women.
Life expectancy for no treatment in individuals with a BMI of 40 was 22.97 for men and 24.72 for women.
Life expectancy for gastric bypass in individuals with a BMI of 50 was 22.83 for men and 24.46 for women.
Life expectancy for no treatment in individuals with a BMI of 50 was 22.52 for men and 24.46 for women.

Methods used to derive estimates of effectiveness
The authors used discussions with experts to supplement their effectiveness outcomes.

Estimates of effectiveness and key assumptions
It was unclear which effectiveness estimates were supplemented by discussions with experts.

Measure of benefits used in the economic analysis
The summary measure of health benefit was the quality-adjusted life-years (QALYs). The utility weights were estimated from published sources (see Other Publications of Related Interest). The authors assumed that the time spent in a hospital was a state worse than death and reduced the QALYs by 200% for this period. They also assumed that the time spent recovering decreased quality of life by half. The lifetime benefits were discounted at a rate of 3%.

Direct costs
The cost analysis appears to have included only the health service costs. However, the areas costed were not described in detail. The health service costs were for initial surgery, the treatment of complications, follow-up care and the treatment of obesity-related diseases. Adjustments for inflation were made using the Consumer Price Index for All Urban Consumers. Expected lifetime medical costs were obtained from the literature. Other costs of nationally representative hospital charges were obtained from a published source. Medication costs were obtained from wholesale prices and follow-up visit costs were obtained from a local source. The authors accounted for differences between the costs and reimbursement rates. The costs were discounted at a rate of 3%. The unit costs and the quantities were not reported separately. The price year was 2001.

Statistical analysis of costs
The costs were treated deterministically.

Indirect Costs
The indirect costs were not estimated. They might have been relevant if the weight loss attempts resulted in changes in economic productivity.
Currency
US dollars ($).

Sensitivity analysis
The authors carried out one-way sensitivity analyses for the percentage weight loss, reimbursement rates, mortality and the discount rate. One- and two-way analyses for residual effects of weight loss were also performed.

Estimated benefits used in the economic analysis
The results presented here are for the age 35 sub-group.

The quality-adjusted life expectancy for gastric bypass in individuals with a BMI of 40 was 19.56 for men and 19.82 for women.

The quality-adjusted life expectancy for no treatment in individuals with a BMI of 40 was 18.51 for men and 18.21 for women.

The quality-adjusted life expectancy for gastric bypass in individuals with a BMI of 50 was 18.87 for men and 18.88 for women.

The quality-adjusted life expectancy for no treatment in individuals with a BMI of 50 was 16.83 for men and 16.03 for women.

Cost results
The total costs for gastric bypass in individuals with a BMI of 40 were $68,600 for men and $59,000 for women.

The total costs for no treatment in individuals with a BMI of 40 were $38,500 for men and $35,300 for women.

The total cost for gastric bypass in individuals with a BMI of 50 were $75,000 for men and $64,800 for women.

The total costs for no treatment in individuals with a BMI of 50 were $53,200 for men and $48,500 for women.

Synthesis of costs and benefits
The costs per life-year for gastric bypass in individuals with a BMI of 40 were $844,700 for men. The corresponding costs for women were not reported since the cost-effectiveness ratio was negative (greater costs and less effectiveness).

The costs per QALY for gastric bypass in individuals with a BMI of 40 were $28,600 for men and $14,700 for women.

The costs per life-year for gastric bypass in individuals with a BMI of 50 were $70,300 for men and $9,130,000 for women.

Some sensitivity analyses caused the cost-effectiveness to increase substantially whilst others did not. The cost-effectiveness estimates among women and younger, more obese men were more robust to parameter variation.

Authors' conclusions
Bypass was not cost-saving from the perspective of the payer. However, the cost-effectiveness ratios compared favourably with those of other accepted interventions and appear to have been robust to parameter variation.
Gastric bypass was compared with no treatment. This allowed the actual benefit of gastric bypass to be observed. In addition, no treatment may well represent current practice in some settings.

**Validity of estimate of measure of effectiveness**
The authors did not state that a systematic review of the literature was carried out. Due to the modelling nature of the study, the authors appear to have selected references that provided information relevant to the model and that showed signs of representing good-quality studies (long follow-up, randomised controlled trials). The data from the primary studies were not combined. The authors considered the impact of differences between the primary studies by carrying out various sensitivity analyses. However, there was no discussion of whether the estimates used were representative of the general literature.

**Validity of estimate of measure of benefit**
The QALY was used as the measure of benefit. The utility weights were estimated via a multivariate linear regression on a nationally representative sample of nonsmoking adults, stratified by gender. Further details of the sample were not provided. Details of the method used to obtain quality of life valuations were not reported.

**Validity of estimate of costs**
A payer perspective was adopted in the analysis, and the costs included appear to have reflected this perspective. The cost areas could have been described in more detail. The extent of absolute cost-differences between treatment and no treatment suggest that small omissions in cost may not have altered the principal conclusions. The inclusion of the indirect costs to the patients may even have reinforced the results presented, owing to potential increased productivity in the long term. The unit costs were not reported separately.

**Other issues**
The authors did not compare their own results and those of other published studies. However, they did discuss possible issues in generalising their results, suggesting that their findings may have been different if they had included patients with co-morbid conditions such as diabetes, heart disease and hypertension. Some limitations were highlighted. For example, the exclusion of obesity costs because of insufficient evidence. The authors acknowledged that productivity related costs were excluded as a result of the perspective adopted. The authors also acknowledged the possibility of selection and publication biases, which might have resulted from the use of published literature to inform their study, although they took steps to reduce such bias.

**Implications of the study**
The authors suggested that the decision to undergo surgery must be made on an individual basis. They alluded to studies with longer-term follow-up of laparoscopic forms of gastric bypass as a topic requiring more work in future.

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**Bibliographic details**

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**Other publications of related interest**

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