



NATIONAL INSTITUTE FOR HEALTH AND WELFARE

# **Cost-utility of Bariatric Surgery in the Treatment for Severe Obesity in Finland**

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- Mäklin Suvi<sup>1</sup>, Malmivaara Antti<sup>1</sup>, Victorzon Mikael<sup>2</sup>, Koivukangas Vesa<sup>3</sup>, Mustajoki Pertti<sup>4</sup>, Linna Miika<sup>5</sup>, Sintonen Harri<sup>6</sup>

<sup>1</sup> Finohta, National Institute for Health and Welfare

<sup>2</sup> Vaasa Central Hospital

<sup>3</sup> Oulu University Hospital

<sup>4</sup> Duodecim

<sup>5</sup> CHES, National Institute for Health and Welfare

<sup>6</sup> Finohta & University of Helsinki



# Background and aims

- The number of bariatric surgical operations is low in Finland, but the demand is increasing rapidly
  - Hospital districts in Finland asked for HTA information on bariatric surgery
- Finnohta decided to do a full HTA report on the subject, according to the EUnetHTA Core Model
  - all 9 domains covered, including the domain *Costs and Economic evaluation*
- *Aim of this study* was to determine the cost-utility of bariatric surgery versus current standard treatment in Finland

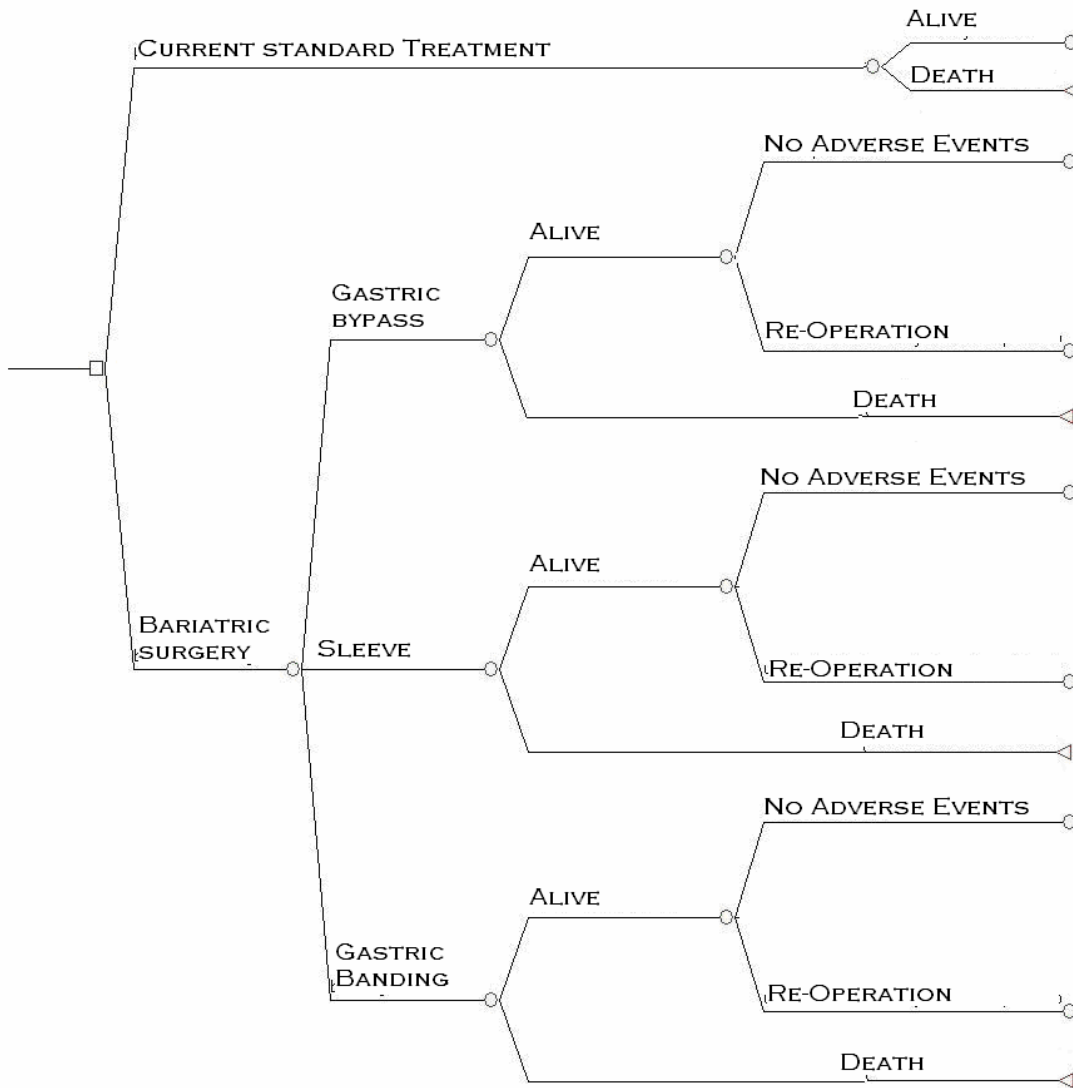


# Perspective and model

- Analysis was done
  - from health care providers' perspective
  - using a time horizon of ten years
- Within bariatric surgery 3 techniques currently used in Finland were included:
  - Gastric banding (GB)
  - Gastric bypass (GBP)
  - Sleeve gastrectomy (SG)
- The current standard treatment varies – not all severely obese people in Finland get active treatment
- Modelled in a Markov cycle tree
  - 1st year in a decision tree
  - Years 2-10 in a state transition model including four states

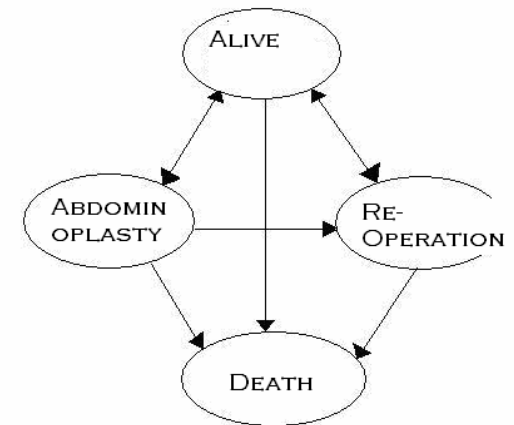


# The Markov Cycle Tree



www.markovmodeling.com

YEARS 2-10



# Baseline assumptions

- Mean age 43 years
- Body Mass Index (BMI) 47 kg/m<sup>2</sup>
- 35% male
- Prevalence of sleep apnoea 75%
- Prevalence of type 2 diabetes
  - 23% for GB
  - 55% for GBP and SG
- Baseline assumptions were based on patient data from two operating hospitals
- Type 2 Diabetes more prevalent among GBP and SG patients than among GB patients
  - > Also the controls were divided into two corresponding groups



# Data: Probabilities and effectiveness

- The full HTA report included a systematic review on effectiveness of bariatric surgery and the results were used in CUA
  - Data on survival, weight loss, and decreases in prevalence of diabetes or sleep apnoea were based on literature
- Pathway and transition probabilities were based on literature where available, otherwise expert opinion was used
- Data inputs for SG were assumed to be similar to GBP, as SG is a recent surgical technique and no long-term data on its effectiveness is available
- The controls were assumed to maintain the initial BMI (SOS-study, Sjöström et al.2007)



## Data: costs (1/2)

- Unit costs from the Hospital Discharge Registry
  - bariatric surgery
  - re-operations
  - abdominoplasty
  - follow-up costs for the first year after surgery
- Not actual cost data available on other health care resource use in either treatment group
  - health care resource use was modelled from a representative Finnish population data (Health2000) for all treatment arms
  - Age, sex, BMI and prevalence of type 2 diabetes and sleep apnoea were taken into account



## Data: Costs (2/2)

- Cost estimates for each year in each treatment arm was calculated by taking into account the effectiveness data, i.e. by taking into account the changes in patients' age, BMI (weight loss), and the differences in prevalences of type 2 diabetes and sleep apnoea
- All costs were valued in year 2006 EUR and discounted by 5%
- Indirect costs and medication costs excluded



# Data: QALYs

- Limited data available on the HRQoL before and after bariatric surgery, as well as comparative data for the control group
- Utilities were derived from the same population data as costs using similar methods
  - Age, sex, BMI and prevalence of type 2 diabetes and sleep apnoea were taken into account
  - Utilities were measured using 15D-instrument
- 15D is a generic, comprehensive instrument for measuring HRQoL and it produces a single index measure on a 0-1 scale
- QALYs were also discounted at 5%



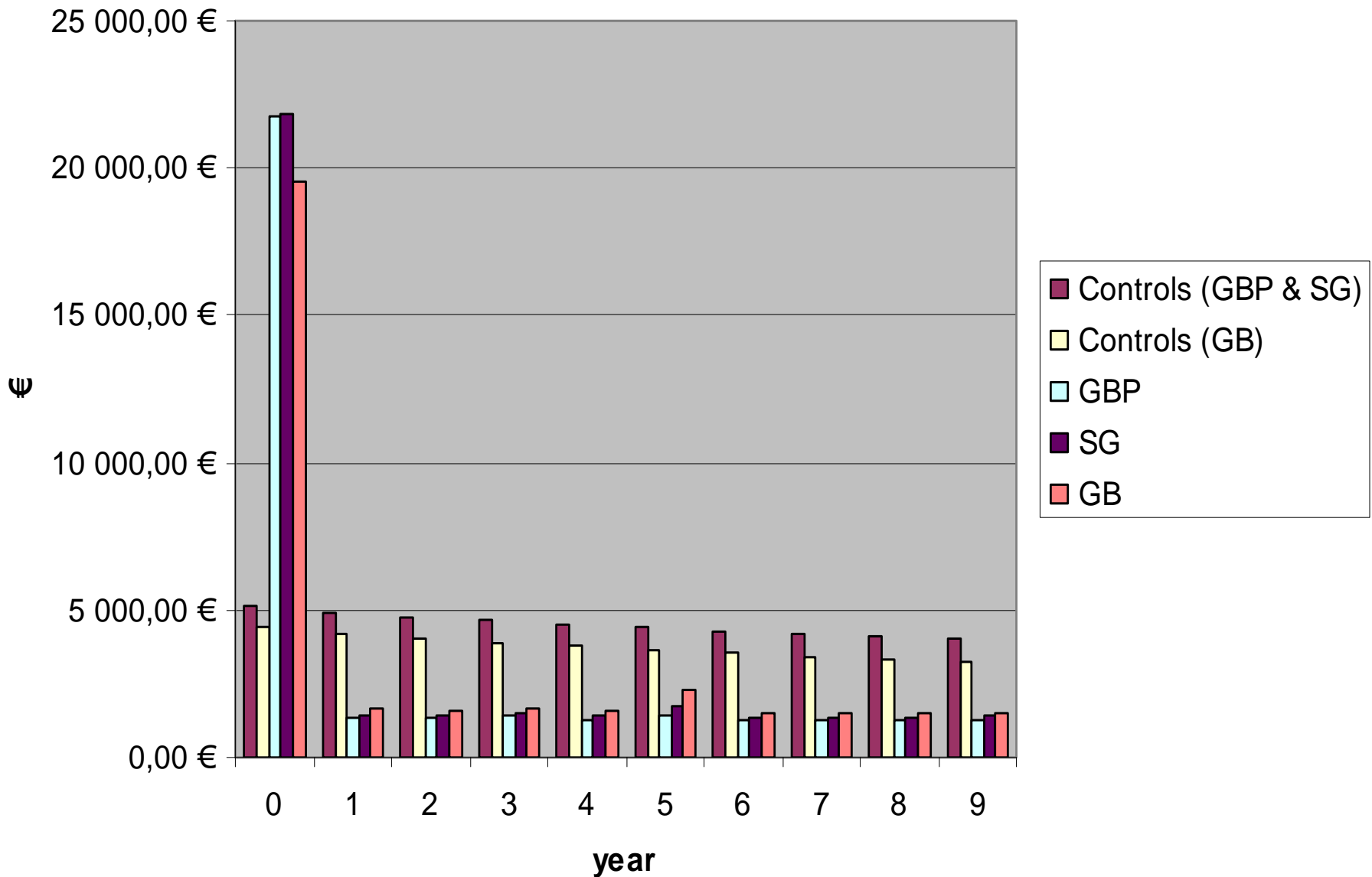
# Results



# Results

- Bariatric surgery reduces the total health care costs and increases the quality of life, within the 10 years
- Bariatric surgery strongly dominates the current standard treatment for severe obesity
- Dominance exists also in sub-groups, i.e. when each of the surgical methods was examined individually





# Results: Base case

	Costs	Incr. C	Utility	Incr.U	ICER
Bariatric	31 763 €	-13 000 €	7.05	0.54	Ext dom
Controls	44 763 €		6.51		
GB	33 470 €	-3 879 €	6.63		Ext dom
Controls GB	37 349 €		6.82		
SG	32 564 €	-12 351 €	6.99	0.49	Ext dom
GBP	31 359 €	-13 556 €	7.08	0.58	Ext dom
Controls GBP/Sleeve	44 915 €		6.50		



# Sensitivity analysis

- Uncertainty in the model and parameters was tested in one-way and two-way sensitivity analyses, and worst-case scenario
- Results were robust:
  - Even in the worst-case scenario, bariatric surgery was still the more effective and less costly alternative



# Results: Sensitivity analysis

- Only varying the baseline BMI removed the dominance
  - When initial BMI < 38; Bariatric surgery more effective, more costly
- Subgroup analysis showed this to be a result of GB
  - SG and GBP strongly dominated the current standard treatment even when baseline BMI = 35
  - GB was dominated when baseline BMI < 38
  - GB was more effective and more costly when baseline BMI = 39–41, and
  - When baseline BMI > 41, GB dominates the control treatment



# Discussion

- Results similar to evidence on other studies
  - Also supports the evidence from other domains
- Unit costs from actual patient data
- Limited data on other health care resource use and QoL
  - derived from a representative population data
  - Unique data set but not data from surgical patients
- Time horizon is rather short
  - Positive effects and cost-savings of the surgery appear later (eg. Cardiovascular)
- Comparison with current standard, not with best possible conservative treatment



# Conclusions

- Results were robust and similar to results published earlier
- However, the data is limited and thus further research is needed to fill the gaps
- Bariatric surgery is cost-effective treatment for severe obesity



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# Thank you for the attention!

- Contact details:

Suvi Mäklin, Finohta  
Suvi.maklin@thl.fi

