Cost-Effectiveness of Glucagon-Like Peptide-1 Versus Bariatric Surgery in the Management of Obesity: A Systematic Literature Review

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Background

- Obesity is a chronic, complex disease affecting millions of adults worldwide, contributing to significant morbidity, mortality, and healthcare costs.[1,2]
- According to the WHO 16% of adults live with obesity in 2022, a prevalence that more than doubled between 1990 and 2022. [1]
- Obesity is one of the leading causes of non-communicable disease mortality, contributing to diabetes, cardiovascular disease, and cancer. [1,2]
- Bariatric surgery is the most effective long-term obesity treatment, but remains underutilized due to high costs, invasiveness, and limited access.[2,3]
- GLP-1 receptor agonists (GLP-1 RAs) have emerged as effective pharmacological alternatives, achieving 15–20% weight loss in clinical trials. [2,4]
- The GLP-1 RA market reached USD 53.46 billion in 2024, yet robust economic evidence to guide coverage decisions remains limited.[4,5]
- Direct head-to-head cost-effectiveness comparisons of GLP-1 RAs versus bariatric surgery in model-based frameworks remain scarce. [3,4]

Objective

- To evaluate the current evidence on the cost-effectiveness of Glucagon-Like Peptide-1 (GLP-1) compared to bariatric surgery among adults with obesity.

Materials and Methods

Study Design

- Systematic literature review of economic evaluations comparing GLP-1. RAs and/or bariatric surgery for obesity management.
- Conducted and reported following PRISMA guidelines.

Data Sources

- Systematic search across PubMed/MEDLINE, Embase, Scopus, and Web of Science.
- No date restriction applied; search limited to English-language publications.

Eligibility Criteria

- Adults (≥18 years) with obesity (BMI ≥30 kg/m²).
- Studies reporting cost-effectiveness analyses (CEA) of GLP-1 RAs or bariatric surgery.
- Exclusions: non-economic evaluations, observational designs, irrelevant populations or comparators, and non-comparative analyses.

Results

Author	Country	Intervention vs Comparator	Time horizon	ICER/Findings
Rennert-May et al., 2025	Canada	SEM vs SOC	Lifetime	$72,962 per QALY gained
Evans et al., 2025	UK	TZP	72 weeks	£102.86, £85.41, and £89.24/ Kg lost
Capehorn et al., 2025	UK	TZP vs liraglutide (both adjunct to D&E)	Lifetime	All doses of tirzepatide dominated liraglutide
Albon et al., 2025	UK	ESG vs LSG vs SEM vs (GB	5 years	£10,593/QALY (LSG vs ESG); £7,267/QALY (ESG vs SEM); Dominant (SEM vs IGB
Papantoniou et al., 2025	Greece	SEM vs Liraglutide	68 weeks	SEM achieved lower costs of control
McEwan et al., 2025	USA	SEM vs Standard of Care	Lifetime	$127,707 per QALY gained
Fu et al., 2025	China	Liraglutide, SEM, tirzepatide, BN vs LSM	Lifetime	$42,818/QALY gained
Hoog et al., 2025	USA	TZP vs LSM	Lifetime	$146,331/QALY (5 mg); $127,644/QALY (10 mg); $125,053/QALY (15 mg)
Betensky et al., 2025	USA	SEM, TZP, bariatric surgery vs D&E	Lifetime	$57,400/QALY (Tirzepatide)
Ramos et al., 2025	UK	SEM + D&E vs D&E alone	40 Years	£17,547 per QALY (Semaglutide)
Nagi et al., 2025	Saudi Arabia	Bariatric Surgery vs Standard Treatment	Lifetime	SAR 119,660/QALY (societal); SAR 136,324/QALY (healthcare)
Hwang et al., 2025	USA	TZP, SEM, NB, Phen/Top vs lifestyle modification	Lifetime	TZP: $197,023/QALY; SEM: $467,676/QALY; Phen/Top: $85,229/QALY
Liu et al., 2025	USA	TZP, SEM, liraglutide	68 weeks	$34,212/QALY (Tirzepatide)
Zomer et al., 2025	Australia	SEM vs Placebo	20 Years	A$96,055/QALY
Silva Miguel et al., 2024	Portugal	SEM + D&E vs D&E alone	40 Years	€13,459/QALY
Alshahawey et al., 2024	USA	SEM vs Liraglutide vs Placebo	68 weeks	
Olivieri et al., 2024	Canada	SEM vs D&E, orlistat, NB, liraglutide 3.0 mg	Lifetime	CAD 29,014/QALY (vs D&E); CAD 31,243/QALY (vs orlistat)
Gómez Lumbreras et al., 2023	USA	TZP, SEM, liraglutide, Phen/Top, and NB	40 Years	Tirzepatide: $355,616/QALY
Sandhu et al., 2023	UK	SEM vs D&E	40 Years	£14,827/QALY
Hu et al., 2022	USA	GLP-1 vs no treatment	6 months	$135,467/QALY (Semaglutide)

Abbreviations used: SEM, semaglutide; TZP, Tirzepatide; D&E, Diet and Exercise; ESG, Endoscopic sleeve gastroplasty; LSG, laparoscopic sleeve gastrectomy; IGB, intragastric balloon; BN, Beinaglutide; NB, naltrexone and bupropion; Phen/Top, phentermine and topiramate; GLP-1, Glucagon-Like Peptide-1. Hu et al., 2022 compare Exenatide, Dulaglutide, Liraglutide, and Semaglutide versus no treatment.

Results

Overall findings:

- 272 records identified → 24 studies included.
- Majority used Markov/decision models with QALYs & ICERs.
- Cost-effectiveness outcomes varied by: Drug price, comparator, time horizon, and country perspective.
- Most studies used Markov or decision-analytic models with QALYs and ICERs as primary outcomes.

Treatment Strategies:

- Semaglutide: Cost-effective in EU/Canada (~£14k–£31k/QALY) with consistent QALY gains. Not cost-effective at current US prices; highly sensitive to drug cost.
- Tirzepatide: Greater weight loss and QALY gains vs semaglutide across studies. Often, the most cost-effective pharmacotherapy, but price remains limiting.
- Bariatric Surgery: Highest long-term effectiveness with greater QALY gains. High upfront costs and limited access reduce overall scalability.

Discussion

- Recent major price reductions in GLP-1 therapies (e.g., initiatives such as “TrumpRX”) were not captured in existing models, representing an important gap.
- Lower GLP-1 pricing could significantly improve ICERs and potentially shift these therapies from not cost-effective to cost-effective, highlighting the need for updated economic evaluations.
- New anti-obesity therapies provide substantial clinical benefit, particularly in reducing cardiometabolic risk and improving QALYs.
- Tirzepatide shows the strongest value signal, driven by greater weight loss and downstream health benefits.
- High medication costs offset clinical gains.

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