Cost-effectiveness of tirzepatide versus semaglutide (both adjunct to a reduced-calorie diet and increased physical activity) in patients with obesity or overweight from a UK perspective

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OBJECTIVE

- To determine the cost-effectiveness of tirzepatide (5 mg, 10 mg, 15 mg) as an adjunct to diet and exercise (D&E) compared to semaglutide (2.4 mg) as an adjunct to D&E in the following populations:
  - SURMOUNT-1 trial population (patients with a BMI ≥30 kg/m^2 [obesity], or with a BMI ≥27 kg/m^2 to <30 kg/m^2 with ≥1 obesity-related complication [overweight]).
  - Semaglutide's NICE recommended population (patients with a BMI ≥35.0 kg/m^2, or a BMI of 30.0 kg/m^2 to 34.9 kg/m^2 with ≥1 obesity-related complication qualifying for specialist weight management services).

CONCLUSION

- At the UK WTP threshold of £20,000/QALY gained, the model estimated that tirzepatide as an adjunct to D&E is a cost-effective use of healthcare resources compared to semaglutide as an adjunct to D&E, resulting in positive INHBs in both the SURMOUNT-1 trial population and semaglutide's NICE recommended population.
- Tirzepatide 10 and 15 mg were dominant (less costly, more effective) over semaglutide in the SURMOUNT-1 trial population.

BACKGROUND

- The economic burden of obesity in the UK is substantial: the NHS spent £19.2 billion on overweight and obesity in 2021 alone, with wider total costs to the UK economy estimated at £97.9 billion.[1]
- Patients with obesity or overweight are susceptible to a broad range of comorbidities, such as CV and respiratory conditions as well as certain types of cancers.[2–4] Obesity treatment is therefore crucial to reduce patient health risks and alleviate its considerable economic impact.
- Tirzepatide as an adjunct to reduced-calorie diet and increased physical activity (referred to as D&E) has been approved by the MHRA in 2023 for the treatment of T2DM and weight management in adults with an initial BMI of ≥30 kg/m^2 (obesity), or ≥27 to <30 kg/m^2 with ≥1 weight-related comorbid condition (overweight).[5] This was the target population in this economic evaluation, hereafter referred to as the SURMOUNT-1 trial population.
- The comparator in this evaluation was semaglutide, a GLP-1 receptor agonist licensed as an adjunct to D&E for the treatment of weight management and recommended by NICE as an option for weight management in patients with a BMI≥ 35.0 kg/m^2, or a BMI of 30.0 kg/m^2 to 34.9 kg/m^2 with ≥1 obesity-related complication (alongside D&E).[6] A subgroup analysis was therefore explored in semaglutide's NICE recommended population.

KEY RESULTS

- Based on this model, all doses of tirzepatide were estimated to be cost-effective at the UK WTP threshold of £20,000/QALY gained compared to semaglutide (**Table 1**):
  - In the SURMOUNT-1 trial population, per patient cost savings ranged from £11,413–17,108 with positive INHBs for all tirzepatide doses. Tirzepatide 10 and 15 mg were dominant over semaglutide in this population.
  - In semaglutide's NICE recommended population, tirzepatide was associated with increased costs and increased QALYs versus semaglutide, corresponding to ICERs of £7,925–10,778 and positive INHBs for all tirzepatide doses.
- The PSA in the SURMOUNT-1 trial population estimated that under the UK WTP threshold (£20,000/QALY gained), tirzepatide 5 mg, 10 mg and 15 mg were cost-effective compared to semaglutide in 95%, 98%, and 96% of simulations, respectively.
- Cost-effectiveness results were driven by the lower drug price and improved clinical outcomes of tirzepatide versus semaglutide (**Figure 2**), which followed a modeled linear rate of change from baseline to the latest data point in the network meta-analysis trials, remaining constant thereafter.

Methods

Model Approach

- An individual patient simulation evaluated the costs and long-term clinical outcomes of once-weekly tirzepatide treatment versus semaglutide (both adjunct to D&E) over a lifetime horizon to capture the long-term impact of obesity on clinical events and complications (**Figure 1**).
- The model adopted a UK healthcare and Personal Social Services perspective.
- Treatment efficacy was measured by modelling changes in key surrogate endpoints and assessing their effect on obesity-related complications, healthcare resource use, health-related quality of life and mortality.
- The pivotal Phase 3 SURMOUNT-1 trial was used as the base case target population, with a 3.5% discount rate applied for costs and effects.
- Key model assumptions:
  - Tirzepatide was administered indefinitely, except when a patient discontinued due to adverse events or lack of response. The same was true for semaglutide, however, an additional two-year stopping rule for semaglutide was applied when analysing semaglutide's NICE recommended population to reflect the maximum treatment duration for SWMS.
  - Surrogate endpoints were modelled by assuming a linear rate of change from baseline to the most recent point of data availability from the trials in the NMA (72 weeks for tirzepatide; 52 weeks for semaglutide in the trial population; 68 weeks for semaglutide in the subgroup population), remaining constant after this timepoint.[7–10]
  - In both treatment arms, surrogate endpoints reverted to the corresponding levels of a hypothetical D&E arm at a linear rate over three years following discontinuation.

Model Inputs

- Clinical and economic systematic literature reviews were conducted prior to model build to identify inputs of the model, where relevant.
- Surrogate endpoints for each population analysed were informed by an NMA utilising the efficacy estimand, or the treatment regimen estimand where data for prediabetes was unavailable for the efficacy estimand.[7]
- Published risk equations—selected based on their external validity, sample size, use in previous economic models, and data recency—were used to determine the incidence of clinical events and complications.[11–17]
- Costs included in the model were treatment acquisition and administration, obesity monitoring and multidisciplinary team resource use, clinical events, and adverse events management costs.
  - An additional SWMS cost (£1,796 per patient per year) was applied to semaglutide when analysing semaglutide's NICE recommended population to reflect its reimbursement criteria.[18]
- Utility values captured the impact on quality of life of BMI, long-term obesity-related complications, adverse events and other acute clinical events.[19–22]

Model Outputs

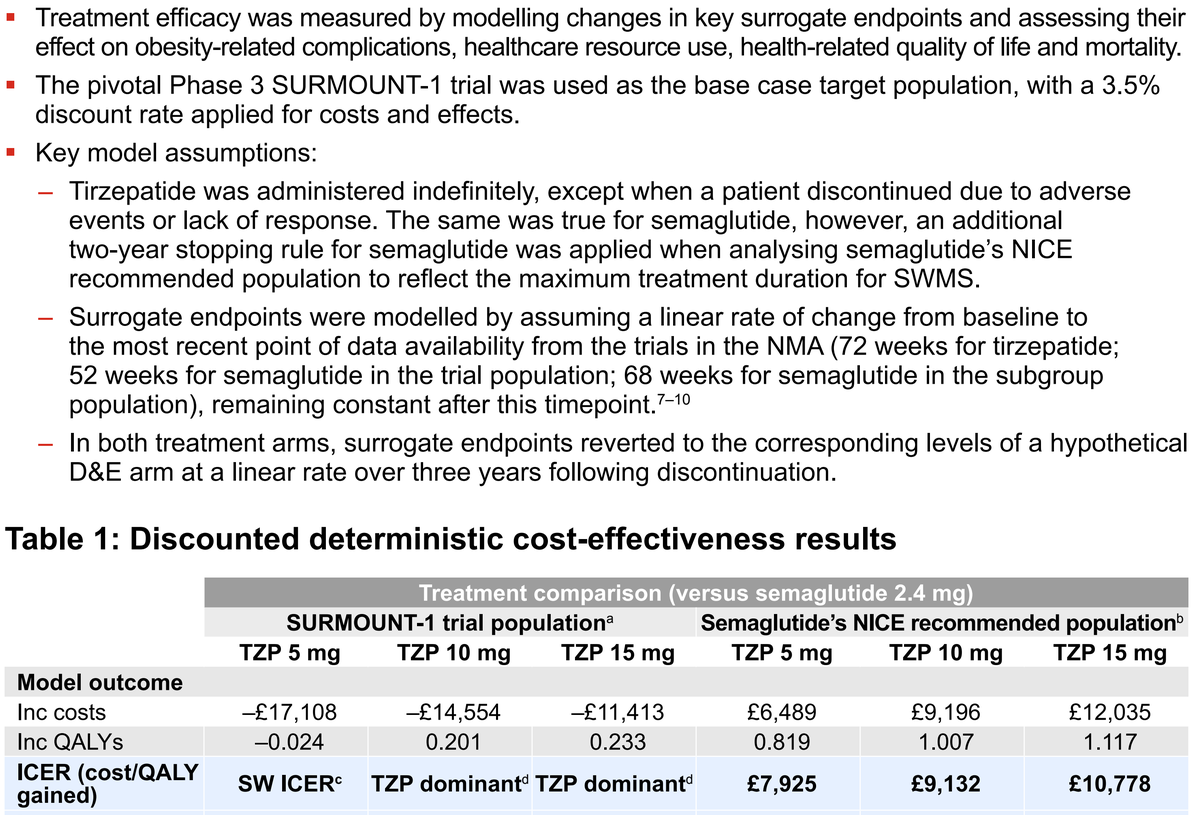
- Primary model outputs were costs, QALYs, INHB and ICERs (cost/QALY gained) (**Table 1**).
- Sensitivity analyses were performed to evaluate the robustness of the results, with a PSA conducted to assess the stability of the model outcomes under combined uncertainty in parameter values.

Table 1: Discounted deterministic cost-effectiveness results

	Treatment comparison (versus semaglutide 2.4 mg)					
	SURMOUNT-1 trial population[a]			Semaglutide's NICE recommended population[b]		
	TZP 5 mg	TZP 10 mg	TZP 15 mg	TZP 5 mg	TZP 10 mg	TZP 15 mg
Model outcome						
Inc costs	–£17,108	–£14,554	–£11,413	£6,489	£9,196	£12,035
Inc QALYs	–0.024	0.201	0.233	0.819	1.007	1.117
ICER (cost/QALY gained)	**SW ICER[c]**	**TZP dominant[d]**	**TZP dominant[d]**	**£7,925**	**£9,132**	**£10,778**
INHB[e]	**0.832**	**0.929**	**0.803**	**0.494**	**0.547**	**0.515**

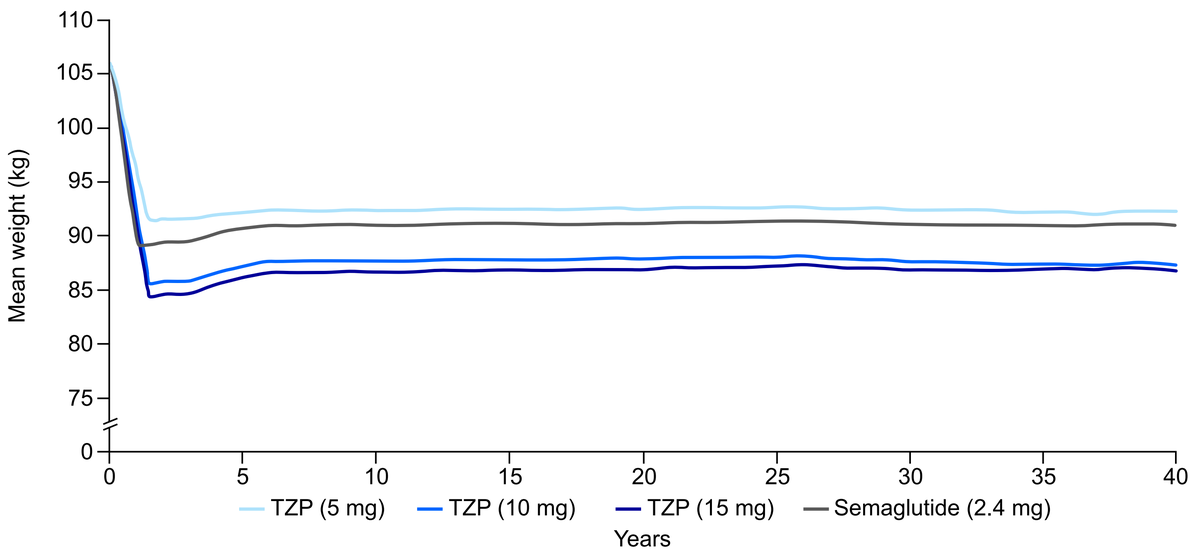
All interventions are adjunct to D&E. [a]Patients with BMI ≥30 kg/m^2, or BMI ≥27 kg/m^2 to <30 kg/m^2 + ≥1 obesity-related complication; [b]Patients with ≥1 obesity-related complication and a BMI ≥35.0 kg/m^2, or a BMI of 30.0 kg/m^2 to 34.9 kg/m^2 + ≥1 obesity-related complication qualifying for SWMS; [c]Less costly and less effective; [d]Less costly and more effective; [e]A positive INHB implies that the health benefits gained outweigh the additional costs incurred by the intervention, at a WTP threshold of £20,000/QALY gained.

Figure 1: Model structure



[a]Previously termed NAFLD.

Figure 2: Mean weight trajectory over time



Results presented are for the SURMOUNT-1 trial population analysis (patients with a BMI ≥30 kg/m^2, or BMI ≥27 kg/m^2 to <30 kg/m^2 + ≥1 obesity-related complication). All interventions are adjunct to D&E.

Abbreviations: AE: adverse event; **BMI:** body mass index; **CV:** cardiovascular; **D&E:** diet & exercise; **GLP-1:** glucagon-like peptide-1; **ICER:** incremental cost-effectiveness ratio; **Inc:** incremental; **INHB:** incremental net health benefit; **MAFLD:** metabolic dysfunction-associated fatty liver disease; **MHRA:** Medicines and Healthcare products Regulatory Agency; **MI:** myocardial infarction; **NAFLD:** non-alcoholic fatty liver disease; **NHS:** National Health Service; **NICE:** National Institute for Health and Care Excellence; **NMA:** network meta-analysis; **OSA:** obstructive sleep apnoea; **PSA:** probabilistic sensitivity analysis; **QALY:** quality-adjusted life year; **SW:** south west; **SWMS:** specialist weight management service; **TZP:** tirzepatide; **T2DM:** type 2 diabetes mellitus; **UK:** United Kingdom; **USA:** United States of America; **WTP:** willingness-to-pay.

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References: 1. Institute for Global Change. Unhealthy Numbers: The Rising Cost of Obesity in the UK. Last accessed: June 2024. **2.** Cancer Research UK. New analysis estimates over 21 million UK adults will be obese by 2040. Last accessed: June 2024. **3.** Fruh SM. J Am Assoc Nurse Pract 2017;29:S3-s14. **4.** NICE. Clinical Knowledge Summary Obesity. Volume 2024. **5.** Medicines and Healthcare products Regulatory Agency (MHRA). Mounjaro 15 mg solution for injection in pre-filled pen. Last accessed: 2021. **6.** NICE. TA875. **7.** Ciudin et al. Efficacy and safety of tirzepatide, liraglutide and semaglutide in patients with obesity: A Bayesian network meta-analysis of RCTs. Presented at ISPOR EU 2024. Poster #CO113. **8.** Jastreboff et al. N Engl J Med. 2022. **9.** O'Neil PM et al. Lancet. 2018; 392(10148):637–49. **10.** Wilding JP et al. N Engl J Med. 2021 18;384(11):989-1002. **11.** Hippisley-Cox J, Coupland C. BMJ 2017;359. **12.** Hippisley-Cox J et al. BMJ 2017;357. **13.** D'Agostino RB et al. Am Heart J 2000;139:272–281. **14.** Hayes AJ et al. Diabetologia 2013;56:1925–1933. **15.** Wendelboe AM et al. Am J Prev Med 2003;25:290–295. **16.** Erridge S et al. Obstructive sleep apnea in obese patients: a UK population analysis. Obes Surg 2021;31:1986–1993. **17.** Loomis AK et al. J Clin Endocrinol Metab. 2016;101:945–952. **18.** NICE. Early Value Assessment. GID-HTE10007. Last accessed: June 2024. **19.** Søltoft F et al. Qual Life Res 2009;18:1293–1299. **20.** Sullivan PW et al. MDM 2011;31:800–804. **21.** Campbell J et al. Am J Manag Care 2010;16:e174–187. **22.** Kim N et al. J Manag Care Spec 2022; 28:740–752.