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Projected lifetime impact of tirzepatide on health and economic outcomes for moderate-to-severe OSA with obesity: a Chinese modeling analysis

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OBJECTIVE

- This study aimed to evaluate the long-term clinical and economic outcomes of tirzepatide added to lifestyle modification (LM) versus LM alone for treating moderate-to-severe OSA in adults with obesity in China.

CONCLUSION

- In this modeling analysis, tirzepatide added to lifestyle modification (LM) substantially reduced the long-term clinical burden of moderate-to-severe OSA in adults with obesity in China.
- Treatment with tirzepatide resulted in clinically meaningful gains in life expectancy and health-related quality of life, alongside substantial reductions in both direct complication-related costs and indirect productivity losses.
- These findings support the value of tirzepatide in alleviating both the clinical and economic burden of OSA.

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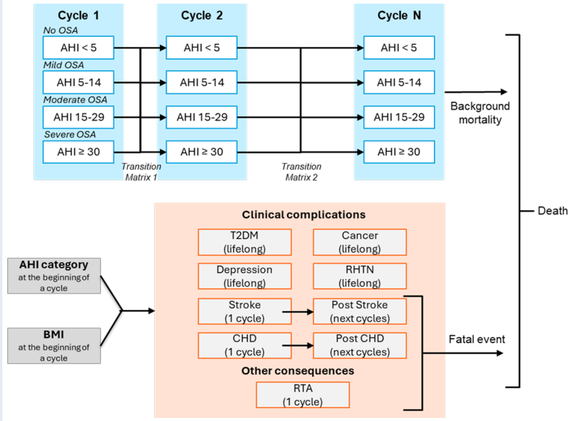
BACKGROUND

- Obstructive sleep apnea (OSA) is a common, chronic sleep disorder characterized by repeated episodes of upper airway collapse, causing intermittent hypoxemia and sleep fragmentation.[1,2] Symptoms include loud snoring, gasping or choking during sleep and excessive daytime sleepiness, all of which can impair cognitive function and quality of life.[1]
- OSA is associated with an increased risk of cardiovascular disease, type 2 diabetes mellitus (T2DM), and road traffic accidents (RTA), contributing to substantial health and economic burden.[1,3,4]
- OSA severity is assessed using the apnea-hypopnea index (AHI), which measures the number of complete and partial reductions in airflow per hour of sleep; moderate-to-severe OSA is defined as AHI ≥ 15 events/hour.[5]
- Tirzepatide is a dual GIP and GLP-1 receptor agonist that has demonstrated significant weight reduction and improvement in OSA severity.[6] In July 2025, it was approved in China for the treatment of moderate-to-severe OSA in adults with obesity.

MODEL STRUCTURE

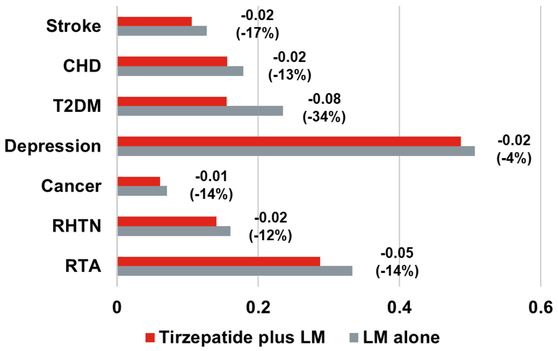
Figure 1. Markov model structure



AHI – apnea-hypopnea index, BMI – body mass index, CHD – coronary heart disease, OSA – obstructive sleep apnea, RHTN – resistant hypertension, RTA – road traffic accident, T2DM – type 2 diabetes mellitus

KEY RESULT

Figure 2. Model results: cumulative complication rates (per patient, discounted)



CHD – coronary heart disease, LM – lifestyle modification, RHTN – resistant hypertension, RTA – road traffic accident, T2DM – type 2 diabetes mellitus

Methods

Model structure

- A de novo Markov model was developed to simulate long-term clinical and economic outcomes in Chinese adults with moderate-to-severe OSA and obesity, from a societal perspective. A lifetime time horizon and 6-month cycle length were adopted.
- The model used AHI-based health states corresponding to OSA severity and incorporated a range of OSA-related consequences: clinical complications and RTA, to account for additional impacts on patients' health-related quality of life and total cost.
- Patient characteristics were aligned with SURMOUNT-OSA trial populations. Transitions between OSA severity states were driven by changes in AHI, using 52-week treatment effects from SURMOUNT-OSA. Body mass index (BMI) trajectories were modelled to reflect their influence on the incidence of clinical events.
- Two sets of transition matrices were applied:
  - Cycle 1 matrix capturing initial treatment effects,
  - Maintenance matrix for subsequent cycles.

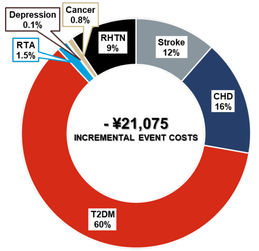
Model inputs and outcomes

- Mortality was estimated using Chinese life tables, with adjustments for BMI-related risks and risks associated with OSA-related events.
- Health-related quality of life was captured using utilities assigned to OSA severity and BMI levels, with event-specific utility decrements applied for complications.
- Direct medical costs included treatment of health events. Indirect costs included productivity losses and informal care costs.
- Costs and health outcomes were discounted at 5% annually, following Chinese pharmacoeconomic guidelines.[7]
- Model outcomes include number of complications, life years, quality-adjusted life years (QALYs), complication costs, indirect costs.

Results

- Over a lifetime horizon, LM alone resulted in a substantial clinical burden with per-patient event rates of 0.127 for stroke, 0.179 for coronary heart disease (CHD), 0.161 for resistant hypertension (RHTN), 0.235 for T2DM, 0.333 for RTA, 0.507 for depression and 0.071 for cancer.
- Tirzepatide plus LM reduced event rates by 17% for stroke, 13% for CHD, 12% for RHTN, 34% for T2DM, 14% for RTA, 4% for depression and 14% for cancer, compared with LM alone.

Figure 3. Model results: estimated health-event cost savings for tirzepatide + LM vs. LM alone



CHD – coronary heart disease, LM – lifestyle modification, RHTN – resistant hypertension, RTA – road traffic accident, T2DM – type 2 diabetes mellitus

- Patients receiving tirzepatide gained an additional 4.8 months of life and 1.24 QALYs versus LM alone.
- Total complication-related costs were reduced by −¥21,075 (−22.2%) per patient, driven by reduction in cardiometabolic complications costs (−¥12,714 for T2DM, −¥3,436 for CHD, −¥2,419 for stroke and −¥1,985 for RHTN).
- Indirect costs decreased by −¥17,097 (−16.9%), reflecting reduced productivity losses.

Table 1. Model results: cumulative costs (per patient, discounted)

Outcome	Tirzepatide plus LM	LM alone	Incremental
Indirect costs	¥83,886	¥100,983	-¥17,097 (-16.9%)
Cost of complications			
Stroke	¥11,414	¥13,832	-¥2,419 (-17.5%)
CHD	¥22,870	¥26,306	-¥3,436 (-13.1%)
T2DM	¥21,306	¥34,020	-¥12,714 (-37.4%)
Depression	¥681	¥709	-¥28 (-3.9%)
Cancer	¥1,046	¥1,219	-¥173 (-14.2%)
RHTN	¥14,304	¥16,289	-¥1,985 (-12.2%)
RTA	¥2,026	¥2,347	-¥321 (-13.7%)

CHD – coronary heart disease, LM – lifestyle modification, RHTN – resistant hypertension, RTA – road traffic accident, T2DM – type 2 diabetes mellitus

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