Figure 1. Model Schematic

A diagram of a diagram with Ice hockey rink in the background

AI-generated content may be incorrect.

Table 1. Model variables with base-case values and ranges used in one-way sensitivity analysis

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Input** | **Source** |
| Mean Age | 29 | 2021 birth rate, National population by age distribution |
| Mean BMI (SD) | 37.92 kg/m^2 (5.76) | CONQUER1, EQUIP2, COR-I3, SCALE4, STEP 15, STEP 86, |
| Mean systolic BP (SD) | 124.11mmHg (12.71) |
| Diagnosis of T2DM | 0% | Assumption |
| Prevalence of Smoking 3m pp | 0.07 | Allen et al. 20257 |
| **Starting Prevalence** | | |
| probability of starting healthy | 1-p\_htn-p\_cvd |  |
| Age-adjusted prevalence of HTN among women in US in 2017-2020 (4year) | 0.467 | Martin et al. 20258 |
| Prevalence of CVD excluding HTN overall, 2017-2020 NHANES (4year) | 0.099 |
| **Disease Attributable Mortality Rate** | | |
| Age-adjusted mortality rate attributable to CVD (include htn), female, 2022 (per 100,000) | 183.1 (182.6–183.7) | Martin et al. 20258 |
| Age-adjusted mortality rate attributable primarily to HBP, female, 2022 (per 100,000) | 27.6 (27.4–27.8) |
| Age-adjusted mortality rate attributable to diabetes, female, 2022 (per 100,000) | 18.8 (18.6–18.9) |
| **Absolute difference in % weight change** | | |
| Mean (95% CI) diff in kg weight change LST | 0 | Assumption |
| Absolute diff in % weight change SEM vs. LST | -0.137 | ICER REPORT 20229 |
| Absolute diff in % weight change LIR vs. LST | -0.05 |
| Absolute diff in % weight change P/T vs. LST | -0.091 |
| Absolute diff in % weight change B/N vs. LST | -0.046 |
| Absolute diff in % weight change Met vs. LST |  |  |
| **Transition Probability** | | |
| 4yr Risk of HTN | 1-exp(-exp((log(4)-(22.9495-0.1564\*(age\_initial+t)-0.2029\*1-0.0593\*SBP-0.1285\*DBP-0.1907\*smoke-0.1661\*0-0.0339\*BMI+0.0016\*(age\_initial+t)\*DBP))/0.8769)) | Framingham Heart Study: Parikh et al. 200810 |
| 10yr Risk of CVD | 1-0.94833^exp((2.72107\*log(age\_initial+1)+0.51125\*BMI+2.88267\*log(SBP)+0.61868\*smoke+0.77763\*n\_t2dm)-29.4016) | Framingham Heart Study: D’Agostino et al. 200811 |
| 7year Risk of diabetes | 1/(1+exp(-(-5.517-0.018\*if((age\_initial+t>=50) & (age\_initial+t<=64),1,0)-0.081\*if(age\_initial+t>=65,1,0)+0.301\*if((BMI>=25) & (BMI<=29.9),1,0)+0.92\*if(BMI>=30,1,0)+0.498\*if(SBP>130,1,0)+0.944\*if(hdlc<50,1,0)+0.575\*if(triglyceride>=150,1,0)+1.98\*if((fglucose>=100) & (fglucose<=126),1,0)))) | Framingham Heart Study: Wilson et al. 2007 12 |
| **Utility Input** | | |
| Utility Normal BMI | 0.9442- 0.0007×Age | ICER Report9 |
| Disutility per BMI increase | 0.0033 |
| multiplicative proportion of Other CVD | 0.55 |
| multiplicative proportion of MI | 0.22 |
| multiplicative proportion of Stroke | 0.23 |
| Disutility of Other CVD (Heart Disease), additive beta (SD) | -0.014 (0.0001) | Sullivan et al. 200513 |
| Disutility of MI, additive beta (SD) | -0.012 (0.0002) |
| Disutility of Stroke, additive beta (SD) | -0.04 (0.0002) |
| Disutility of HTN, additive beta (SD) | -0.02 (0.0001) |
| Disutility of T2DM, additive beta (SD) | -0.024 (0.0001) |
| **Cost Input** | | |
| Average annual per capita cost of Coronary Heart Disease, 2021 dollars | 12143.29 (681.89) | Kazi et al. 202414 |
| Average annual medical expenditure attributable to patients with T2DM, 2021 dollars | $11,230 | Parker et al. 202415 |
| unadjusted mean annual medical expenditure attributable to patients with HTN, 2021 dollars | 10200.69 (9988.58, 10412.81) | Kirkland et al. 201816 |
| Cost of Life Style Therapy | 0 | Assumption |
| Cost of Semaglutide | 13618 | ICER report9 |
| Cost of Liraglutide | 11309 |
| Cost of Phentermine/Topiramate | 1355 |
| Cost of Bupropion/Naltrexone | 2034 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Table 2. Estimated lifetime Costs ($), quality-adjusted life years (QALYs), and incremental cost-effectiveness ratios ($/QALY) of weight loss medications for base-case analysis | | | |  |
| **Strategy** | **Cost** | **QALE** | **ICER** | **Notes** |
| Lifestyle Therapy (LST) | $ 1,777,367,450.01 | 210198.3868 | --- | Baseline |
| Phentermine/Topiramate + LST | $ 2,031,767,246.58 | 212449.003 | 113035.6185 |  |
| Bupropion/Naltrexone + LST | $ 2,254,721,580.14 | 211182.3747 | --- | Strongly Dominated |
| Liraglutide + LST | $ 4,552,268,936.26 | 211159.4478 | --- | Strongly Dominated |
| Semaglutide + LST | $ 5,057,530,379.98 | 214080.153 | 1854987.659 |  |

Table 3. Estimated lifetime health outcomes

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Strategy** | **Life Expectancy (mean (SD))** | **#HTN cases per 100,000 people** | **Incremental HTN cases** | **#CVD cases per 100,000 people** | **Incremental CVD cases** | **#T2DM cases per 100,000 people** | **Incremental T2DM cases** |
| Lifestyle Therapy | 51.56 (14.1) | 77570 | Ref | 9640 | Ref | 14120 | Ref |
| Phentermine/Topiramate | 51.27 (14.25) | 76410 | -1160 | 9230 | -410 | 13870 | -250 |
| Bupropion/Naltrexone | 51.35 (14.17) | 77270 | -300 | 9560 | -80 | 14230 | 110 |
| Liraglutide | 51.23 (14.1) | 76780 | -790 | 8830 | -810 | 14160 | 40 |
| Semaglutide | 51.35 (14.25) | 76130 | -1440 | 8730 | -910 | 13980 | -140 |

Figure 2. Cost-effectiveness plane

![A graph with numbers and lines

AI-generated content may be incorrect.]()![A graph of a number of people

AI-generated content may be incorrect.]()

Figure 3. Tornado Diagram of one-way sensitivity analysis by Incremental Cost Effectiveness Ratio for Phentermine/Topiramate

A graph with numbers and a bar

AI-generated content may be incorrect.

Figure 4. Probabilistic Sensitivity Analysis Cost-effectiveness acceptability curve with second-order uncertainty, n=1000, 100 PSA’s

![A graph of a number of people

AI-generated content may be incorrect.]()

Appendix Table 1. Strategy comparisons and trade-offs

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Strategy** | **Mechanism of Action** | **Route** | **Frequency** | **Annual Cost  (net price, ICER report, US FSS database)** | **Difference in % weight loss at 1 yr compared to placebo \*** | **Common side-effects** |
| Semaglutide | GLP-1 receptor agonist | Subcutaneous | Weekly | $13,618 | -13.7 (-12.6 to -15.1) | GI side effects: Nausea, vomiting, diarrhea, constipation, abdominal pain, headache, fatigue, GERD |
| Liraglutide | GLP-1 receptor agonist | Subcutaneous | Daily | $11,309 | -5.0 (-3.9 to -6.1) | GI side effects similar to Semaglutide |
| Bupropion/Naltrexone | Combination opioid antagonist/aminoketone antidepressant | Oral | Daily | $2,034 | -4.6 (-3.0 to -6.0) | Blurred vision, discouragement, dizziness, fear or nervousness, feeling sad or empty, headache, irritability, loss of interest or pleasure, insomnia, trouble concentrating, fatigue |
| Phentermine/Topiramate | Central Nervous System stimulant/carbonic anhydrase inhibitor and glutamate receptors antagonist | Oral | Daily | $1,355 | -9.1 (-7.1 to -11) | Dysgeusia (taste disorder), insomnia, constipation, dry mouth, Paresthesia (tingling), dizziness, |

*\*among participants with obesity alone; source: ICER report 2022.*

Appendix Table 2. Estimated 2-year postpartum Costs ($), quality-adjusted life years (QALYs), and incremental cost-effectiveness ratios ($/QALY) of weight loss medications for base-case analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Strategy** | **Cost** | **QALE** | **ICER** | **Notes** |
| Lifestyle Therapy | $ 39,498,875.32 | 16313.5622 | --- | Baseline |
| Phentermine/Topiramate | $ 64,286,838.08 | 16526.6785 | 116311.9118 |  |
| Bupropion/Naltrexone | $ 77,433,040.90 | 16419.5467 | --- | Strongly Dominated |
| Liraglutide | $ 252,018,805.69 | 16428.8194 | --- | Strongly Dominated |
| Semaglutide | $ 295,102,917.61 | 16633.3992 | 2162804.474 |  |

Appendix Table 3. Estimated 2-year postpartum Health Outcomes

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Strategy** | **#HTN cases per 100,000 people** | **Incremental HTN cases** | **#CVD cases per 100,000 people** | **Incremental CVD cases** | **#T2DM cases per 100,000 people** | **Incremental T2DM cases** |
| Lifestyle Therapy | 9070 | Ref | 460 | Ref | 1050 | Ref |
| Phentermine/Topiramate | 7940 | -1130 | 480 | 20 | 930 | -120 |
| Bupropion/Naltrexone | 8810 | -260 | 500 | 40 | 1020 | -30 |
| Liraglutide | 8480 | -590 | 460 | 0 | 1080 | 30 |
| Semaglutide | 7650 | -1420 | 480 | 20 | 980 | -70 |

Reference (Tables, exhibits, and appendix)

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# CHEERS 2022 Checklist

| **Topic** | **No.** | **Item** | **Location where item is reported** |
| --- | --- | --- | --- |
| **Title** |  |  |  |
| 1 | Identify the study as an economic evaluation and specify the interventions being compared. | Page 1, before abstract |
| **Abstract** |  |  |  |
| 2 | Provide a structured summary that highlights context, key methods, results, and alternative analyses. | Page1 |
| **Introduction** |  |  |  |
| **Background and objectives** | 3 | Give the context for the study, the study question, and its practical relevance for decision making in policy or practice. | under Introduction |
| **Methods** |  |  |  |
| **Health economic analysis plan** | 4 | Indicate whether a health economic analysis plan was developed and where available. | Methods, simulation model |
| **Study population** | 5 | Describe characteristics of the study population (such as age range, demographics, socioeconomic, or clinical characteristics). | Methods, cohort |
| **Setting and location** | 6 | Provide relevant contextual information that may influence findings. | Methods, cohort |
| **Comparators** | 7 | Describe the interventions or strategies being compared and why chosen. | Methods, comparison strategies |
| **Perspective** | 8 | State the perspective(s) adopted by the study and why chosen. | Methods, outcomes |
| **Time horizon** | 9 | State the time horizon for the study and why appropriate. | Methods, simulation model |
| **Discount rate** | 10 | Report the discount rate(s) and reason chosen. | Methods, outcomes |
| **Selection of outcomes** | 11 | Describe what outcomes were used as the measure(s) of benefit(s) and harm(s). | Methods, outcomes |
| **Measurement of outcomes** | 12 | Describe how outcomes used to capture benefit(s) and harm(s) were measured. | Methods, outcomes |
| **Valuation of outcomes** | 13 | Describe the population and methods used to measure and value outcomes. | Methods, outcomes |
| **Measurement and valuation of resources and costs** | 14 | Describe how costs were valued. | Methods, outcomes |
| **Currency, price date, and conversion** | 15 | Report the dates of the estimated resource quantities and unit costs, plus the currency and year of conversion. | Methods, outcomes |
| **Rationale and description of model** | 16 | If modelling is used, describe in detail and why used. Report if the model is publicly available and where it can be accessed. | Methods, simulation model |
| **Analytics and assumptions** | 17 | Describe any methods for analysing or statistically transforming data, any extrapolation methods, and approaches for validating any model used. | Methods, simulation model |
| **Characterising heterogeneity** | 18 | Describe any methods used for estimating how the results of the study vary for subgroups. | Not Applicable |
| **Characterising distributional effects** | 19 | Describe how impacts are distributed across different individuals or adjustments made to reflect priority populations. | Not Applicable |
| **Characterising uncertainty** | 20 | Describe methods to characterise any sources of uncertainty in the analysis. | Methods, Sensitivity Analyses |
| **Approach to engagement with patients and others affected by the study** | 21 | Describe any approaches to engage patients or service recipients, the general public, communities, or stakeholders (such as clinicians or payers) in the design of the study. | Not Applicable |
| **Results** |  |  |  |
| **Study parameters** | 22 | Report all analytic inputs (such as values, ranges, references) including uncertainty or distributional assumptions. | Tables and exhibits; Table 1 |
| **Summary of main results** | 23 | Report the mean values for the main categories of costs and outcomes of interest and summarise them in the most appropriate overall measure. | Results, paragraph 1-2 |
| **Effect of uncertainty** | 24 | Describe how uncertainty about analytic judgments, inputs, or projections affect findings. Report the effect of choice of discount rate and time horizon, if applicable. | Results, paragraph 3-4 |
| **Effect of engagement with patients and others affected by the study** | 25 | Report on any difference patient/service recipient, general public, community, or stakeholder involvement made to the approach or findings of the study | Not Applicable |
| **Discussion** |  |  |  |
| **Study findings, limitations, generalisability, and current knowledge** | 26 | Report key findings, limitations, ethical or equity considerations not captured, and how these could affect patients, policy, or practice. | Discussion |
| **Other relevant information** |  |  |  |
| **Source of funding** | 27 | Describe how the study was funded and any role of the funder in the identification, design, conduct, and reporting of the analysis | Not Applicable |
| **Conflicts of interest** | 28 | Report authors conflicts of interest according to journal or International Committee of Medical Journal Editors requirements. | Not Applicable |

*From:* Husereau D, Drummond M, Augustovski F, et al. Consolidated Health Economic Evaluation Reporting Standards 2022 (CHEERS 2022) Explanation and Elaboration: A Report of the ISPOR CHEERS II Good Practices Task Force. Value Health 2022;25. <doi:10.1016/j.jval.2021.10.008>