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From Weight Loss to Lasting Value: The Economic Case for Structured Exercise in GLP-1 Therapy

Center for Healthcare Economics and Policy

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Executive Summary

Obesity stands as one of the most pressing global health challenges, affecting over 1 billion people as of 2022.[1] That number is projected to double by 2035, while the economic burden of obesity is predicted to grow to over US$4 trillion, or 3% of global GDP, over the same time horizon.

In recent years, glucagon-like-peptide-1 (GLP-1) receptor agonists have emerged as a transformative treatment option, enabling patients to achieve significant weight loss within relatively short timeframes. The remarkable efficacy of these medications, combined with the large population affected by obesity, has driven a dramatic increase in GLP-1 utilization over the last few years.[2]

While GLP-1 therapies have demonstrated robust efficacy during the period of active treatment, patients frequently lose significant lean body mass, a key indicator of muscle mass loss.[3] Additionally, over 50% of patients are likely to discontinue GLP-1 treatment after 1 year and over 70% after 2 years.[4] After discontinuing, patients in clinical trials have regained 67% of weight lost within a year, on average.[5]

Emerging evidence indicates that combining GLP-1 treatment with structured exercise can mitigate both muscle loss during treatment[6] and post-treatment weight rebound. However, the long-term clinical and financial implications of this approach are unknown.

This study aimed to use current evidence to estimate the long-term clinical and economic impacts of combining structured exercise with GLP-1 therapy. To do this, this study examines how structured exercise impacts patients' BMI trajectory and extrapolates these changes to estimate effects on obesity-related comorbidities, medical costs, and societal (i.e., productivity) costs. The model was developed using the United States (US) as the base case, given the availability of detailed and comprehensive data, and subsequently adapted to Australia, Canada, New Zealand, and the United Kingdom (UK) using country-specific inputs.

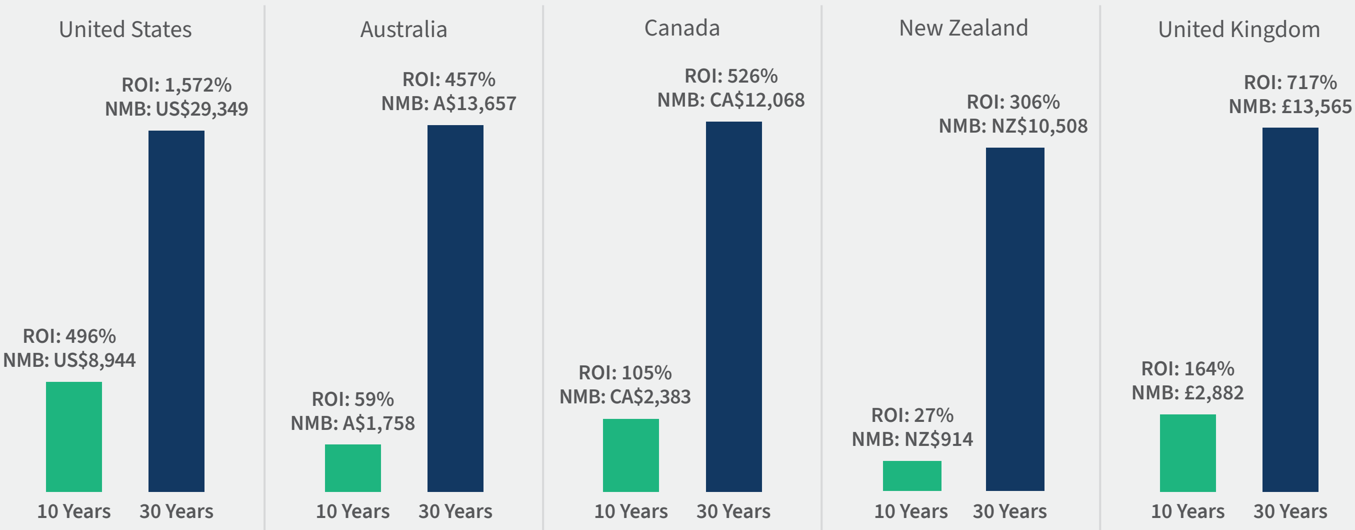
The study found that, compared to GLP-1 therapy alone, over a 10-year horizon:

- Structured exercise combined with GLP-1 therapy **reduces the number of acute cardiovascular events and joint replacements**; in the US this translates to **48,000 cardiovascular events and 160,000 joint replacements avoided**.
- Structured exercise combined with GLP-1 therapy **increases patient quality of life and overall survival**.
- Structured exercise combined with GLP-1 therapy **reduces medical costs and societal losses due to obesity**; in the US this results in **US$27 billion in medical costs and US$1 billion in societal costs avoided**.
- Structured exercise combined with GLP-1 therapy results in a **large return on investment in all countries studied**; across all countries, the **return on investment ranged from approximately 30-500% over 10 years and 300-1,500% over 30 years** (see Figure 1 below).
- Structured exercise combined with GLP-1 therapy produces **a net monetary benefit in all countries**. The total net monetary benefit in the US, for example, is **US$120 billion over 10 years and US$393 billion over 30 years**.

Utilization of GLP-1 therapy has been increasing, with roughly 1 in 8 US adults using the medication at the end of 2025.[7] As GLP-1 medications gain popularity and potentially broader insurance coverage, utilization is expected to increase further; these estimates therefore likely represent a conservative estimate of the total value that structured exercise may provide when combined with GLP-1 therapy.

Even so, given the current estimated benefits, policymakers should consider policy approaches aimed at encouraging strength training for individuals being treated with GLP-1s, such as reimbursement for structured evidence-based exercise programs, expansion of tax preferences for fitness expenses, and support for programs that improve long-term adherence to exercise. Failing to incentivize individuals taking GLP-1s to incorporate structured exercise risks leaving substantial economic value unrealized.

Figure 1: Per-Patient ROI and Net Monetary Benefit by Country



Notes: NMB: Net Monetary Benefit, representing the treatment benefit net of the treatment cost. The treatment cost is the incremental cost of the structured exercise in combination with the GLP-1 therapy. The treatment benefits are the medical cost savings, societal cost savings (savings from avoided productivity losses), and the value of health gains (measured as the monetary value of quality-adjusted life years, which incorporates impacts on both mortality and morbidity). ROI: Return on Investment, representing the value of the treatment benefits relative to the treatment costs.

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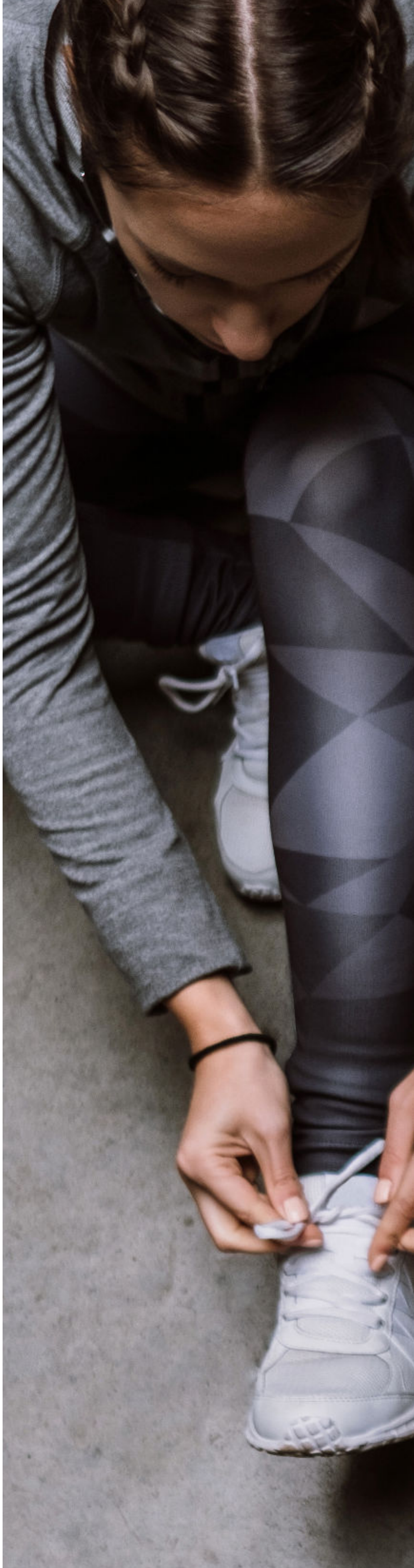

Foreword

GLP-1 therapies are reshaping the global conversation about obesity treatment. For many people, these medications offer a powerful new tool to support meaningful weight loss. But for policymakers, healthcare providers, payers, and public health systems, they also raise an urgent question: how do we ensure that the benefits of these treatments are sustained over time and translated into better health, improved quality of life, and stronger economic value?

That question lies at the center of this white paper.

Our countries face three overlapping challenges: the growing burden of obesity and related chronic disease; the persistent challenge of physical inactivity that continues to undermine population health; and the mounting pressure of rising healthcare costs. These challenges are global in scale, but their consequences are felt every day in how people live, how clinicians support patients, and how governments allocate limited resources.

This research, conducted in partnership with FTI Consulting's Center for Healthcare Economics and Policy, makes a meaningful contribution to that conversation. It translates the well-established clinical rationale for combining GLP-1 therapy with structured exercise into health-economic terms, quantifying the impact of exercise on long-term outcomes, healthcare costs, and productivity losses. The findings are clear: structured exercise significantly improves the return on investment from GLP-1 treatment, supports more sustainable outcomes, and reduces avoidable downstream costs. They leave no doubt about the serious financial and human consequences of failing to make structured exercise a pillar of GLP-1 care.

For individuals, the research reaffirms that lasting success means more than weight loss alone. It means preserving health, function, mobility, and quality of life for years to come. For healthcare providers, it reinforces the need for clearer pathways between clinical care and practical exercise support, ensuring that patients receiving GLP-1 therapy have access to guidance, referral options, and structured programs that help them exercise safely and consistently. For payers and policymakers, it makes the economic case compellingly and urgently.

As leaders of fitness and exercise industry organizations across multiple countries, we recognize that our sector has an important role to play in supporting the next phase of obesity care. We can provide accessible spaces, skilled professionals, and evidence-based programs at scale. But that role must be grounded in evidence, built on genuine partnership, and pursued through credible engagement with healthcare systems.

We call on policymakers, payers, healthcare providers, and public health leaders to treat structured exercise as a core component of comprehensive obesity care, particularly as GLP-1 therapies become more widely used. That means creating stronger referral pathways, reducing barriers to participation, supporting qualified exercise professionals and facilities, and developing policies that help people access structured exercise as part of their treatment journey.

The promise of GLP-1 therapy should not end with weight loss. With the right support, it can become a pathway to more lasting health and to better value for health systems and the people they serve.

Greta Wagner
President and CEO (Interim)
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President
HFA Foundation

Amy Bantham
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A Note from the Authors

Healthcare economics and outcomes research is focused on understanding the full value of interventions that seek to improve health, incorporating an analysis of not just clinical benefits from an intervention, but also the costs and broader benefits that accrue to patients, payers, and society. The goal is to translate clinical evidence into evidence that supports informed decision-making around the allocation of scarce resources.

In the context of combining GLP-1 therapy with structured exercise for the treatment of people with obesity or overweight, healthcare economics and outcomes research bridges the gap between clinical trials and real-world evidence that document the impact of these therapies on patient health and answers key questions such as: Does the added benefit associated with structured exercise justify the added cost? If so, how are the benefits realized, whether through reduced comorbidities, reductions in medical costs, and/or the value of improved health and function? By providing additional evidence that explicitly considers the value of structured exercise, this research supports clinicians, health plans, employers, policymakers, and patients in navigating the rapidly evolving landscape of obesity treatment.

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Introduction

Obesity has become a leading global public health challenge, with over 1 billion people living with obesity worldwide.[8,9] Among Organisation for Economic Co-operation and Development (OECD) countries, nearly one in five residents (19%) live with obesity.[10] The prevalence is expected to increase into the future, with the number of individuals with obesity reaching 2 billion by 2035. The economic burden of obesity is predicted to grow to over US$4 trillion, or 3% of global GDP, over the same time horizon.[11]

Historically, the standard of care for obesity has comprised behavioral and lifestyle changes, anti-obesity medications, and surgical techniques.[12] Recently, glucagon-like-peptide-1 (GLP-1) receptor agonists have proved highly effective at treating obesity, with over 50% of patients achieving a clinically meaningful and statistically significant 20% of total body weight loss.[13] Strong evidence of efficacy has driven demand; utilization of GLP-1s for adults with overweight or obesity and without type 2 diabetes increased nearly 2,000% from 2019-2024 in the US.2 By the end of 2025, 1 in 8 US adults were taking a GLP-1.[7]

Despite the benefits of GLP-1 medications, they do have limitations. First, while GLP-1 therapies are effective at reducing weight during treatment, patients may regain weight after discontinuation.[14] Discontinuation is highly prevalent among GLP-1 users, with over 70% stopping treatment within 2 years.[4] Upon discontinuation, patients in clinical trials regained 67% of the weight lost within a year of stopping treatment.[5] Second, patients treated with GLP-1s often report loss of lean body mass, a common proxy for muscle mass loss, as a side effect of treatment.[3,15] Although loss of lean body mass is common during weight loss, constituting 6-26% of total weight loss in behavioral interventions, the loss has been larger with GLP-1 therapy, ranging from 20-50% of weight loss.[3] Loss of muscle mass can lead to reductions in bone density, strength, and balance, increased fatigue, and heightened risk of injury due to falls.[16,17]

Combining GLP-1 treatment with exercise can mitigate loss of muscle mass during GLP-1 therapy and improve weight loss maintenance after discontinuation.[6, 18, 19] Although evidence points to short-term clinical improvements, the long-term health and economic impacts of combining structured exercise with GLP-1 use are not known.

To address this gap, this study examines the impact of combining structured exercise with GLP-1 therapy on long-term patient health and societal costs by estimating the incremental value of more durable BMI reductions.
The research questions addressed in this paper are:

1. How does combining structured exercise with GLP-1 therapy impact the incidence of cardiovascular conditions, diabetes, and joint replacements?
2. Does combining structured exercise with GLP-1 therapy extend survival and/or improve quality of life?
3. Does combining structured exercise with GLP-1 therapy reduce medical or societal spending?
4. What is the return on investment of incorporating structured exercise into GLP-1 therapy?
5. What is the total net monetary benefit of incorporating structured exercise into GLP-1 therapy?

Methodology

Figure 2: Five-Step Methodology

The study uses the steps in Figure 2 to estimate the value of structured exercise in combination with GLP-1 therapy in five countries. More details are in the Appendix. Definitions of key terms in this section are provided in the “Definitions” box.

Step 1: Project BMI Path

The first step computed the trajectory for body mass index (BMI) in patients treated with GLP-1s and structured exercise (treatment arm) and patients treated with GLP-1s alone (comparison). Patients entered the model in the overweight, obese I, obese II, or obese III BMI group. In both arms, patients either discontinued GLP-1 therapy after two years or continued for the remainder of the time horizon, based on real-world evidence indicating that most patients who discontinue treatment do so within the first two years.[4,20] Consistent with other recent models exploring the impact of GLP-1s, patients that did not discontinue after two years were assumed to remain on GLP-1 therapy indefinitely.[21] Using evidence from a systematic review of weight regain post-GLP-1 discontinuation, weight regain in kilograms was converted to BMI impacts. Patients in the GLP-1 only arm were estimated to experience approximately 67% weight regain for 2 years.[5] Evidence from trials examining the incremental difference in weight regain between GLP-1 alone and GLP-1 plus structured exercise was then incorporated to estimate the weight regain for the treatment arm, resulting in approximately 43% weight regain for 2 years.[19] Patients continuing treatment remained at the BMI level achieved after 2 years. Because the evidence regarding changes in lean body mass is still developing, we do not include any direct impacts of structured exercise on that outcome. We projected impacts over 5, 10, and 30 years.

Step 2: Estimate Impact on Comorbidities

The second step estimated the incidence of obesity-related comorbidities. We examined the incidence of type 2 diabetes, heart attacks, heart failure events, strokes, and knee and hip replacements.

Step 3: Assess Impact on Quality-of-Life and Survival

Next, we assessed the impact on the patients’ quality-of-life and overall survival. Patient mortality rates were estimated using age and comorbidities. We adjusted overall survival for patient quality-of-life using quality-adjusted life years (“QALYs”).

Step 4: Quantify Impact on Medical and Societal Costs

The changes in clinical outcomes impacted treatment costs, medical costs, and societal costs. Treatment costs in the comparison arm included GLP-1s alone; in the treatment arm costs included the cost of GLP-1s plus the cost of structured exercise. The cost of structured exercise was estimated as the median annual cost of a fitness membership, which was used as a proxy for the costs to access the equipment and facilities required to follow a structured exercise program. Patients in the exercise treatment arm were assumed to retain fitness membership for 4 years.[22] Medical costs were attributed to patients based on their BMI level and comorbidities. Societal costs were estimated as the monetary value of patient productivity losses associated with chronic conditions.

Step 5: Calculate Return on Investment and Net Monetary Benefits

Return on investment was calculated as the ratio of the incremental value of treatment benefits to costs, while net monetary benefit was computed as the value of treatment benefits net of costs. Both outcomes were calculated using discounted costs.

Understanding the Mechanisms Driving Model Findings

Key drivers of the model's results include the proportion of patients discontinuing GLP-1 treatment after 2 years, the weight regain for patients discontinuing therapy, and the finite duration of the structured exercise intervention. Clinical impacts in the model were derived exclusively from sustained BMI reductions, and thus excluded benefits of exercise unrelated to BMI. Outcomes represent the incremental benefit of adding structured exercise to GLP-1 therapy, and therefore do not represent the benefits of GLP-1 therapy alone.

Definitions

Discounted costs: The value of future dollars presented in today's dollars, accounting for the fact that a dollar today is worth more than one in the future due to inflation and investment potential.

Net Monetary Benefit (NMB): The difference between treatment benefits (health gains, medical and societal cost savings) and treatment costs.

Return on Investment (ROI): The ratio between treatment benefits and treatment costs, representing the value gained for each dollar invested.

Quality-adjusted life years (QALYs): A measure that combines quality-of-life on a 0-1 scale (where 0 = death and 1 = perfect health) with length of life. One QALY is equivalent to 1 year of perfect health.

Structured exercise: An exercise program that includes both aerobic activity and muscle-strengthening activity. In this analysis, structured exercise reflects guideline-consistent physical activity, including muscle-strengthening or resistance-training activities on four days per week, totaling at least 150 minutes per week of moderate-intensity aerobic physical activity, 75 minutes per week of vigorous-intensity aerobic physical activity, or an equivalent combination of both.[6,19]

Findings

Finding #1: Structured Exercise Combined with GLP-1 Therapy Reduces the Number of Acute Cardiovascular Events and Joint Replacements

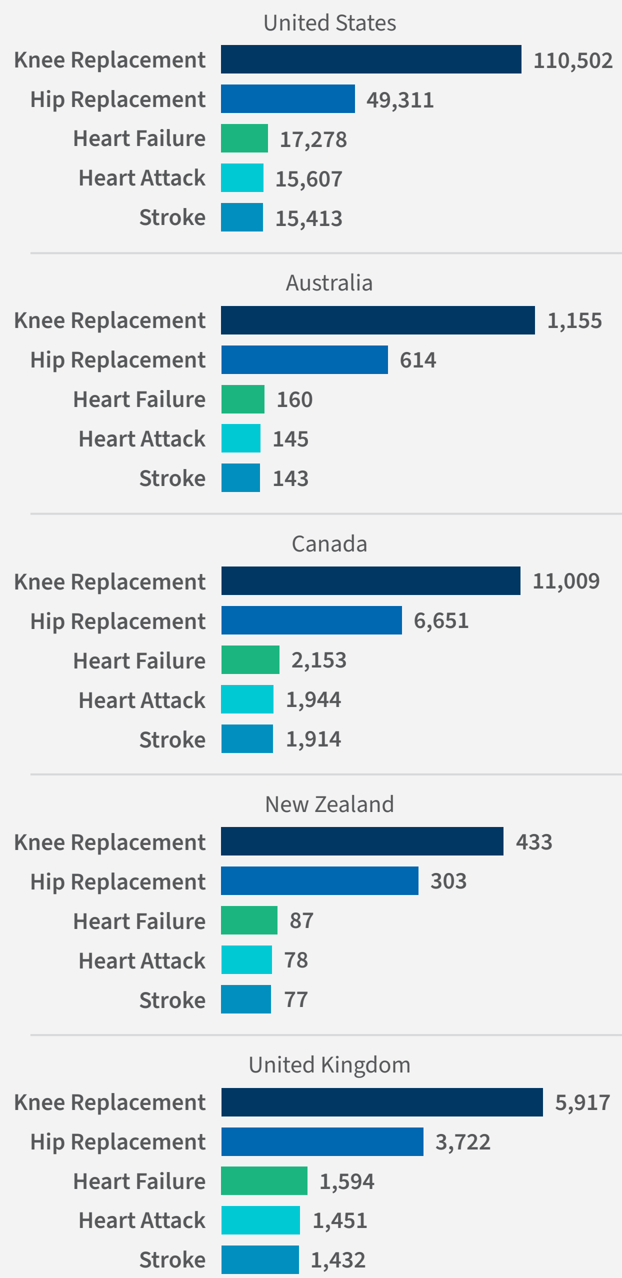
The addition of structured exercise to GLP-1 therapy resulted in a greater proportion of patients reaching lower BMI levels, and led those patients to sustain their weight loss longer, compared to the GLP-1 only arm. As a result, patients incorporating structured exercise experienced fewer acute cardiovascular events and joint replacements. For instance, in the US, patients avoided nearly 110,000 knee replacements, 50,000 hip replacements, 17,000 heart failure events, 15,000 heart attacks, and 15,000 strokes over 10 years.

Knee replacements constituted the majority of acute event reductions in each country, followed by hip replacements. The acute cardiovascular events avoided were relatively equally distributed across reductions in heart attacks, strokes, and heart failure events (Figure 3).

Finding #2: Structured Exercise Combined with GLP-1 Therapy Improves Patient Longevity and Quality of Life

Because structured exercise reduced cardiovascular events and joint replacements, patient mortality decreased in all countries. Reductions in acute events also improved patient quality-of-life, which contributed to the incremental benefit of combining structured exercise with GLP-1 therapy (QALY gains, i.e., the number of years of "perfect health" gained, over 10 years were 0.057 years per-patient in the US, 0.067 years in Australia, 0.064 years in Canada, 0.067 years in New Zealand, and 0.118 years in the UK).

Figure 3: 10 Year Reduction in Acute Events by Type and Country



Finding #3: Structured Exercise Combined with GLP-1 Therapy Reduces Spending on Medical Costs and Patient Productivity Losses

Reductions in acute events also generated substantial medical cost savings as patients avoided costs for obesity-related comorbidities. These findings were amplified in the GLP-1 and structured exercise arm, where sustained lower BMI levels were associated with reduced direct medical costs compared to GLP-1s alone. Decreased incidence of chronic conditions also reduced productivity losses for patients. The combined savings in medical and societal costs were estimated to be US$28 billion in the US, A$143 million in Australia, CA$2.1 billion in Canada, NZ$54 million, and £1 billion in the UK over 10 years. Figure 4 displays the per-patient and national-level medical, societal, and total cost savings from incorporating structured exercise.

The varying magnitude of savings in medical and societal costs between countries are due to a variety of population factors and features of the market for healthcare among the modeled countries. This is further covered under Model Sensitivity to Assumptions.

Finding #4: Structured Exercise Combined with GLP-1 Therapy Results in Large Positive Returns on Investment

Return on investment (ROI) measures the value of gains from improved health outcomes and reduced cost relative to the cost of accessing structured exercise, which we measure as the cost of a monthly fitness membership. ROI is calculated by aggregating the incremental changes in benefit to society and dividing by the amount paid in fitness membership fees. For each country studied, structured exercise generated a positive and substantial ROI at both the 10-year and 30-year time horizons.

United States

Combining the value of health gains from improvements in longevity and quality-of-life (10 years: US$8,618; 30 years: US$24,458) with the medical and societal cost savings resulted in a total treatment benefit per-patient of US$10,748 over 10 years and US$31,217 over 30 years in the US. The return on investment, representing the return for each dollar spent on structured exercise, was 496% over the 10-year horizon, and 1,572% over 30 years (Figure 5). In other words, from a societal perspective, covering the cost of structured exercise for an individual on GLP-1 therapy would be expected to generate a fivefold return over 10 years.

Figure 4: Per-Patient and National Medical and Societal Cost Savings Over 10 Years

United States

Savings Category	Medical	Societal	Total
Per-Patient	US$2,034	US$96	**US$2,130**
National	US$27B	US$1B	**US$28B**

Australia

Savings Category	Medical	Societal	Total
Per-Patient	A$1,333	A$46	**A$1,379**
National	A$138M	A$5M	**A$143M**

Canada

Savings Category	Medical	Societal	Total
Per-Patient	CA$1,431	CA$36	**CA$1,466**
National	CA$2B	CA$53M	**CA$2.1B**

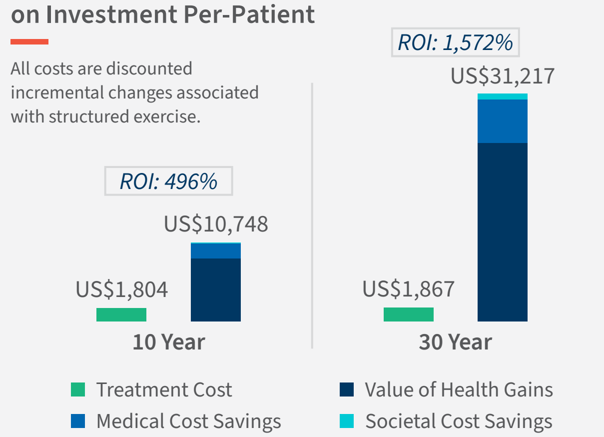
New Zealand

Savings Category	Medical	Societal	Total
Per-Patient	NZ$908	NZ$48	**NZ$956**
National	NZ$51M	NZ$3M	**NZ$54M**

United Kingdom

Savings Category	Medical	Societal	Total
Per-Patient	£1,027	£84	**£1,111**
National	£961M	£78M	**£1B**

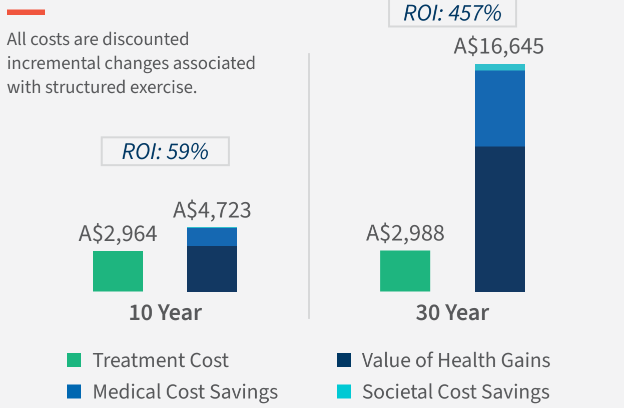
Figure 5: US 10-Year and 30-Year Returns on Investment Per-Patient



Australia

Adding the value of health gains (10 years: A$3,343; 30 years: A$10,604) to the medical and societal cost savings resulted in a total per-patient treatment benefit of A$4,723 over 10 years and A$16,645 over 30 years in Australia. When compared to the treatment cost of the structured exercise arm, the return on investment was 59% over 10 years and 457% over 30 years (Figure 6).

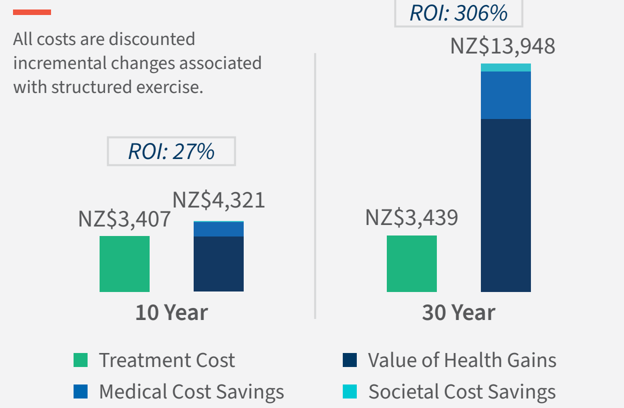
Figure 6: Australia 10-Year and 30-Year Returns on Investment Per-Patient



New Zealand

Adding the value of health gains (10 years: NZ$3,364; 30 years: NZ$10,569) to the medical and societal cost savings resulted in a total per-patient treatment benefit of NZ$4,321 over 10 years and NZ$13,948 over 30 years in New Zealand. When compared to the treatment cost of the structured exercise arm, the return on investment was 27% over 10 years and 306% over 30 years (Figure 8).

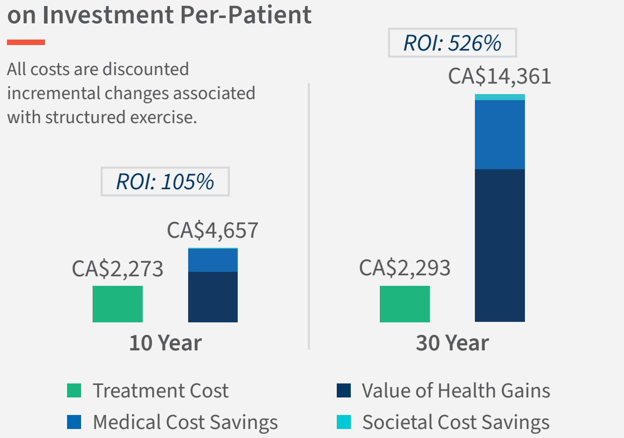
Figure 8: New Zealand 10-Year and 30-Year Returns on Investment Per-Patient



Canada

Adding the value of health gains (10 years: CA$3,190; 30 years: CA$9,646) to the medical and societal cost savings resulted in a total per-patient treatment benefit of CA$4,657 over 10 years and CA$14,361 over 30 years in Canada. When compared to the treatment cost of the structured exercise arm, the return on investment was 105% over 10 years and 526% over 30 years (Figure 7).

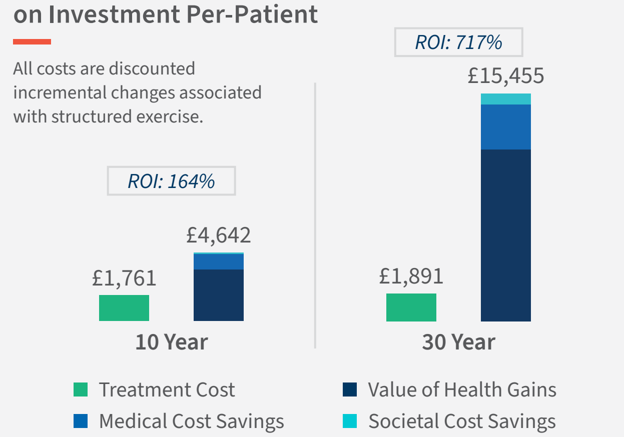
Figure 7: Canada 10-Year and 30-Year Returns on Investment Per-Patient



United Kingdom

Adding the value of health gains (10 years: £3,532; 30 years: £11,660) to the medical and societal cost savings resulted in a total per-patient treatment benefit of £4,642 over 10 years and £15,455 over 30 years. When compared to the treatment cost of the structured exercise arm, the return on investment was 164% over 10 years and 717% over 30 years. (Figure 9).

Figure 9: UK 10-Year and 30-Year Returns on Investment Per-Patient



Finding #5: Structured Exercise Combined with GLP-1 Therapy Produces Substantial National Net Monetary Benefit.

Net monetary benefit (NMB) measures the net value of all changes associated with combining structured exercise with GLP-1 therapy. It is computed by summing the value of incremental health benefits and reduction in medical and societal costs, then subtracting the incremental change in spending associated with fitness memberships. National net monetary benefit is the per-patient value multiplied by the number of individuals receiving the treatment, and represents the total country-wide benefit.

For all countries, the net monetary benefit was positive at both the 10-year and 30-year horizons. For example, in the US, the national net monetary benefit was US$120 billion over 10 years and US$393 billion over 30 years. Combining structured exercise with GLP-1 therapy generates a positive national net monetary benefit in all countries studied (see Figure 10).

Figure 10: National Net Monetary Benefit at 10 and 30 Years

United States

NMB	10 Year	30 Year
National	US$120B	US$393B

Australia

NMB	10 Year	30 Year
National	A$182M	A$1.4B

Canada

NMB	10 Year	30 Year
National	CA$3.5B	CA$17.9B

New Zealand

NMB	10 Year	30 Year
National	NZ$51M	NZ$592M

United Kingdom

NMB	10 Year	30 Year
National	£2.7B	£13B

Model Sensitivity to Assumptions

Both the market for GLP-1 therapies and the evidence base examining detailed impacts of their use over the long term are still developing. While this study uses the best evidence available at this time, the analysis is dependent on a variety of assumptions.

First, impacts on muscle mass during the treatment period are only considered indirectly through changes in BMI. That is, the analysis does not directly model clinical benefits stemming from the preservation of lean muscle mass when structured exercise is combined with GLP-1 therapy. Studies examining the incremental benefit of muscle preservation beyond BMI reduction in the context of GLP-1 therapy are still in progress. While maintenance of muscle mass can lower the risk of chronic conditions such as type 2 diabetes, support cardiovascular health, and reduce frailty,[23] to avoid double-counting benefits and in recognition of the developing literature, this study focused exclusively on benefits associated with reduced BMI.

Similarly, benefits from structured exercise outside of the GLP-1 context (i.e., benefits of exercise alone) are not considered. In addition, the structured exercise intervention modeled was short-term in nature, and thus the benefits of long-term structured exercise are not captured. Because these benefits were not incorporated into the model, the estimates produced may not capture the full positive impact of structured exercise.

Further, the study does not separately consider variations in adherence. Adherence to structured exercise programs may vary across individuals and over time, which may influence the combined impact of structured exercise and GLP-1 therapy. The likelihood of discontinuing GLP-1s may also change over time as treatment modalities evolve; for example, there is little evidence on discontinuation over the long term for newer oral GLP-1s. The results are moderately sensitive to GLP-1 discontinuation rates. If discontinuation rates decrease in the future, return on investment would likely also decrease, as the benefit of sustained BMI reduction after GLP-1 continuation that is produced by structured exercise would be reduced.

Finally, the analysis does not consider treatment efficacy or uptake rates among newer GLP-1s. While the number of people taking GLP-1 therapies has grown substantially in recent years, across most countries it remains low relative to the number of individuals that meet clinical criteria for using these therapies to treat obesity or overweight. Thus, as a sensitivity analysis, we have modeled the impact of increased rates of GLP-1 uptake on the findings. Generally, increases in the rate of GLP-1 uptake increase the level of savings associated with incorporating structured exercise into treatment. For example, assuming an increase in the uptake rate of GLP-1 therapy of 20%, total net monetary benefit in the base model for the US also increased by 20% (see Figure 11).

Figure 11: GLP-1 Uptake Scenario Analysis Net Monetary Benefit Over 30-Year Horizon

United States

Scenario	Current Uptake	Increased Uptake
Uptake Rate	11.2%	13.4%
Net Monetary Benefit	US$393B	US$471B

Given that this analysis does not incorporate all pathways through which structured exercise may provide benefits and that uptake of GLP-1 therapy is currently low relative to the eligible population, estimates of the incremental value of structured exercise in this study are likely conservative.

Drivers of Returns

While we found universally positive return on investment and net monetary benefit in each country studied, the magnitude varied by country due to a variety of factors. One such factor is the size of the population taking GLP-1s, which is dependent on country size, obesity rates, and GLP-1 uptake. Uptake among the eligible population is in turn influenced by numerous features of the market for healthcare among the modeled countries, including timing of GLP-1 approvals, insurance coverage of GLP-1 therapies, and out-of-pocket costs for medical services and prescription drugs. As the treatment population expands, total savings from improved clinical outcomes increase proportionally. This is evident in the substantially larger national-level savings observed in the US compared to the other countries modeled, which have smaller populations. In addition to the size of the treatment population, the structure of health services in a country is also likely to impact cost savings at the per-person level. Countries with higher costs (e.g., higher prices for healthcare services) to treat obesity-related complications will incur more savings, as each prevented acute event generates larger cost reductions. Moreover, where the cost of structured exercise is low relative to medical treatment costs, return on investment will be even higher.

The model produced positive return on investment and net monetary benefit at the 10 and 30 year horizons in each country studied, despite variation in healthcare delivery systems and treatment populations. This suggests that structured exercise is likely to have positive returns across many countries, particularly in similarly affluent OECD countries with high chronic disease burden.

Policy Implications

As GLP-1 therapies become more widely used, policymakers, payers, and health systems should focus not only on access to these medications, but also on how to maximize the long-term value of treatment. This analysis suggests that structured exercise can improve the clinical and economic value of GLP-1 therapy by supporting more durable BMI reduction, reducing downstream obesity-related costs, and generating positive returns across all countries studied.

These findings support the deliberate integration of structured exercise into GLP-1 treatment pathways. Policymakers and payers should consider reimbursement, coverage, tax-preferred treatment, or subsidy models that reduce financial barriers to structured exercise for individuals receiving GLP-1 therapy. Health systems should also strengthen referral pathways between clinicians and qualified exercise professionals, community-based, evidence-based programs, or fitness facilities.

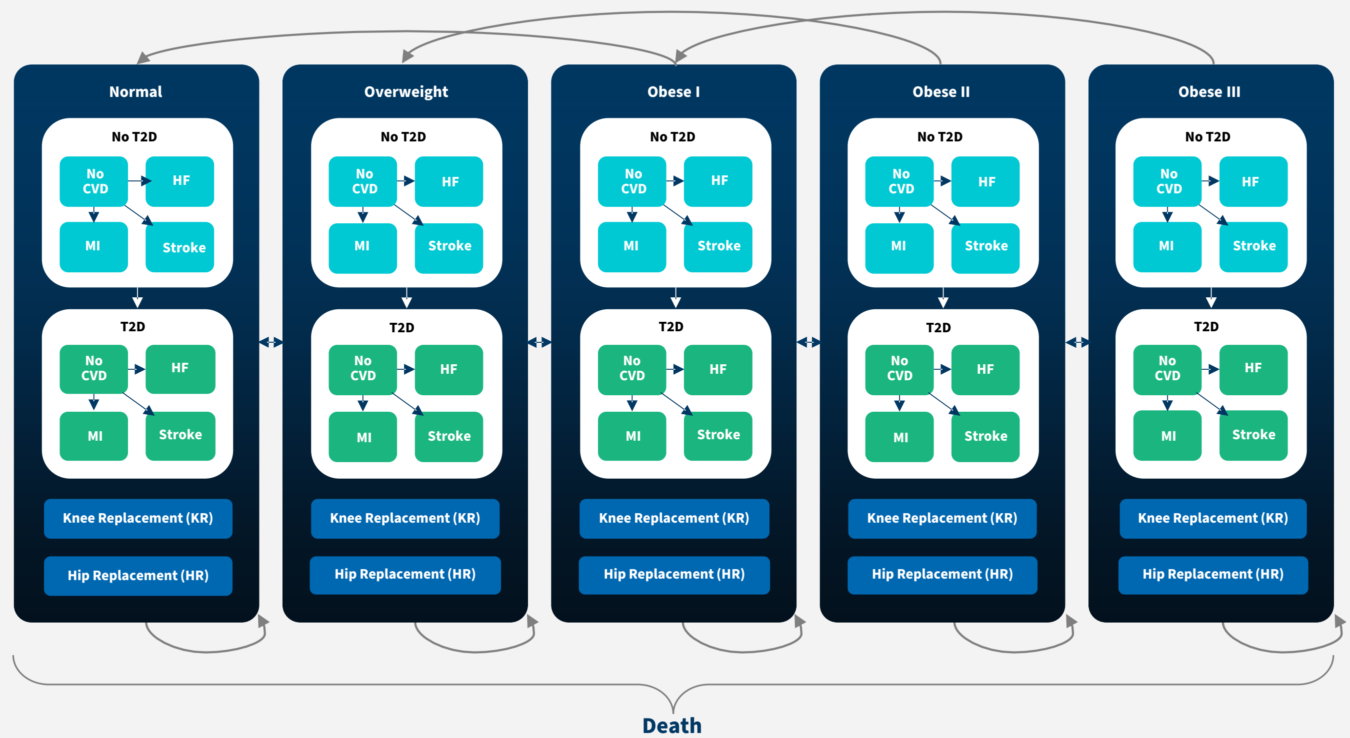
Clinical and coverage frameworks should more clearly recognize structured exercise as part of comprehensive obesity care, including guidance on physical activity and strength or resistance training. As GLP-1 utilization grows, failing to support access to structured exercise risks leaving health and economic benefits unrealized.

Conclusions

Sustained BMI reductions driven by structured exercise combined with GLP-1 therapy offer both monetary and clinical value. Compared to GLP-1 therapy alone, the incremental benefit of incorporating structured exercise significantly reduced acute cardiovascular events and joint replacements while generating positive returns in every country studied, with 30-year return on investment exceeding 1,500% in the base model for the United States. As GLP-1 medications gain popularity and broader insurance coverage, expected increases in utilization will amplify these returns, underscoring the urgent need to promote structured exercise as a standard component of GLP-1 treatment protocols.

Appendices

Supplemental Methods



CVD = Cardiovascular Diseases, HF = Heart Failure, MI = Myocardial Infarction (heart attack), T2D = type 2 diabetes

Patients flow through the model between body mass index (BMI) levels, diabetes health states, cardiovascular health states (heart attack, stroke, heart failure), joint replacement health states (knee or hip replacement), and death. Patients transition between these groups in one-year cycles over a 30-year time horizon.

BMI Pathway

First, we determined the trajectory for the BMI of patients treated with GLP-1 alone vs. GLP-1 therapy and structured exercise. Patients were tracked between 5 BMI "levels": normal weight, overweight, obese I, obese II, and obese III. The treatment population for each country considered four factors: (1) the adult population (2) the portion of adults with obesity, or overweight with obesity-related comorbidities, (3) the portion of adults with overweight or obesity without type 2 diabetes, (4) and the proportion of eligible patients who are likely to receive a GLP-1 prescription. Within this treatment population, the baseline distribution of patient BMI was determined using real-world studies of GLP-1 utilization. The distribution of patient prevalent comorbidities was based on country-specific demographics.

The proportion of eligible patients who are likely to receive a GLP-1 prescription was based on current utilization data where available.

Uptake Rates Among Eligible Patients by Country

Country	Uptake Rate	Sources
United States	11.2%	FAIR Health[24]
Australia	13.4%	Australian Bureau of Statistics[25] ; Australian Institute of Health and Welfare[26] ; Ezendu, Pohl, Lee, Wang, Li and Dunn[27]; Pearson-Stuttard, Holloway, Sommer Matthiessen, Thompson and Capucci[28]; Falster, de Oliveira Costa, Milder, Carson, Shadbolt, Neuen, Arnott, Wilson, Jun, Pratt and Pearson[29]
Canada	13.4%	Statistics Canada[30]; Colley, Bushnik and Barnes[31]; Public Health Agency of Canada[32]; Leger[33]
New Zealand	13.4%	Stats NZ[34]; World Obesity Foundation[35]; Pearson-Stuttard, Holloway, Sommer Matthiessen, Thompson and Capucci[28]; Ezendu, Pohl, Lee, Wang, Li and Dunn[27]; Christensen[36]
United Kingdom	13.4%	Office for National Statistics[37]; Pearson-Stuttard, Holloway, Sommer Matthiessen, Thompson and Capucci[28]; UK Parliament[38]; Gatineau, Hancock, Holman, Outwaite, Oldridge, Christie and Ells[39]; Office for Health Improvement & Disparities[40]; Jackson, Brown, Llewellyn, Mytton and Shahab[41]

Patients entered the model in the overweight, obese I, obese II, or obese III BMI group based on the real-world distribution in GLP-1 studies.[4, 42, 43, 44] The GLP-1 treatment effect was based on clinical trials of tirzepatide, as it is currently the most recently-approved and most effective injectable GLP-1. Early trials of agents in development suggest even greater efficacy, making this a conservative representation of the future treatment landscape.[45] The treatment effect of incorporating structured exercise was derived from the incremental treatment effect of exercise in clinical trials with liraglutide therapy, as it is one of the only high-quality studies examining the effect of exercise in the GLP-1 context.

We then tracked two treatment path variations for each treatment arm. The first assumed no patients discontinued. The second variation assumed patients discontinued treatment after 2 years. The trajectories were broken down into two to three stages. The first stage was the same in both the discontinuation and non-discontinuation arms, and was the treatment phase. The second stage was then determined by the discontinuation status. For those that did not discontinue, patients were assumed to remain at the BMI level they reached after 2 years of treatment for the remainder of the time horizon. For patients that discontinued, they experienced 2 years of rapid weight regain,[5] after which they experienced age-related weight regain for the remainder of the 30-year time horizon.[21] Patients using structured exercise were assumed to continue for 4 years regardless of GLP-1 discontinuation.

Comorbidities

For each treatment arm, patients moved between 5 BMI levels: normal (BMI < 25.0), overweight (BMI 25.0-29.9), obese I (BMI 30.0-34.9), obese II (BMI 35.0-39.9), obese III (BMI ≥ 40.0). Within each BMI level, patients moved between 7 primary sub health states: no comorbidities, type 2 diabetes (T2D), heart failure (separated by prevalent and incident), myocardial infarction ("heart attack", separated by prevalent and incident), stroke (separated by prevalent and incident), combination health state (T2D + any cardiovascular status (heart failure, myocardial infarction, or stroke)), and death. Within the combination T2D and CVD health state, incident heart attacks and strokes were also tracked. As diabetes and cardiovascular status were unlikely to impact the risk of knee and hip replacement, we tracked joint replacements independently of CVD related comorbidities.

To move patients among the health states, we applied the transition probability between BMI levels for that treatment year, mortality risk, and risk of acquiring a new comorbidity (including any risk of mortality associated with acute heart attack or stroke), as described in the paragraph below. For patients that had a heart attack or stroke, we then applied the probability of dying from the acute event. This pattern continued to move patients through each health state through the 30-year time horizon.

The probability of a patient becoming diabetic was determined solely by their BMI level. Using the Framingham Heart Study,[46] we estimated the risk of general CVD based on patient age, BMI, diabetes status, smoker status, hypertension treatment status, and gender. To aggregate these estimates into age-BMI-diabetes level estimates, we averaged the scores for each group among the broader BMI level, and then applied population weights based on the real-world distribution of age-diabetes-smoker-hypertension-gender groups.[47] To extrapolate this age-BMI-diabetes status general CVD risk estimates into heart attack, heart failure, and stroke specific estimates, we use the share of the prevalent sum of these events attributed to each disease. These estimates were used to estimate the risk of incident CVD for each patient group.

The risk of knee and hip replacement was based on patient BMI level.[48] We used country-specific joint replacement prevalence rates and demographic breakdown to adjust the estimates for each country. For the structured exercise arm, the risk was reduced by 9.2% for the first 6 years of the time horizon.[49]

QALYs and Survival

We incorporated patient quality-of-life by applying health state utility values (i.e., a measure of patient quality-of-life on a scale of 0-1) to each patient group. We extracted health state utility values from the literature for each BMI level and comorbidity, which were applied to the patient groups. In estimates providing utility multipliers, utility values were combined multiplicatively. For those providing a utility decrement, utility values were combined additively. The utility multipliers/decrements were applied to country-age-specific baseline utility values. Overall survival was tracked by counting the number of people alive after each year. The overall survival count was then multiplied by the patient group's corresponding utility value to estimate quality-adjusted life years (QALYs).

Costs

The model tracked three costs: treatment costs, medical costs, and societal costs. Treatment costs for GLP-1s were based on country-specific wholesale acquisition costs or list prices for GLP-1s, for a one year (52 week) dose. The median price of an annual fitness membership was used as the cost of the structured exercise program in all countries with the exception of the UK; due to lack of data, the mean price of annual fitness membership was used instead. For those in the structured exercise treatment arm, we assumed these patients stopped using a structured exercise program (i.e., stopped paying for the membership) after 4 years.[22] The duration of GLP-1 treatment costs was dependent on whether patients discontinued treatment: those that discontinued experienced 2 years of GLP-1 costs, while those that did not experienced GLP-1 costs for the whole time horizon.

Gym Membership Fee by Country

Country	United States	Australia	Canada	New Zealand	United Kingdom
Membership Fee	US$39/month	A$65/month	CA$48.25/month	NZ$17/week	£38/month

Medical costs were attributed to patients based on their comorbidity status. Prevalent CVD costs were applied to patients that had experienced each CVD event, and incident event costs were applied to acute events. Type 2 diabetes costs were applied annually after acquiring diabetes. Knee and hip replacements were one-off costs.

Societal costs were estimated as the value of productivity losses for patients. These costs were incorporated for patients with T2D, heart failure, heart attack, or stroke.

Returns on Investment and Net Monetary Benefit

To estimate returns on investment and net monetary benefit we used an estimate of the total treatment benefit. This was calculated as the sum of the value of health gains, the medical cost savings, and the societal cost savings. The value of health gains was quantified by multiplying the QALYs by the societal willingness-to-pay per QALY.

Country Analyses

For the United Kingdom, Australia, and Canada, where country-specific inputs were not available, we imputed inputs from US estimates using available country-specific literature; where estimates could not be imputed, we used US estimates. Where country-specific results were not available for New Zealand, results were imputed or assumed from Australian inputs. Population funnels, WTP per QALY, discount rates, treatment costs, and medical costs used direct country-specific inputs, or estimated country-specific inputs through imputation. Country-specific estimates for mortality, utility, and disease prevalence and incidence were widely available for the US, UK, and Australia, but required more assumptions of equivalency to other countries for Canada and New Zealand.

Supplemental Results

United States Supplemental Results

10-Year Results (in US$)

Parameter		Per Person Results			National Results		
		Comparator	Intervention	Difference	Comparator	Intervention	Difference
Life-years	Life-years	9.63	9.63	0.00	128,730,277.43	128,744,527.59	14250.16
Utility	QALYs	8.62	8.68	0.057	115,313,689.67	116,082,109.01	768,419.35
Costs	Treatment	$56,734	$58,539	$1,804	$758,760,137,262	$782,892,971,403	$24,132,834,140
	Medical	$94,899	$92,865	$ (2,034)	$1,269,174,430,244	$1,241,971,079,065	$(27,203,351,179)
	Societal	$12,986	$12,891	$ (96)	$173,679,438,031	$172,397,260,009	$(1,282,178,022)
	Total	$164,620	$164,294	$ (325)	$2,201,614,005,538	$2,197,261,310,476	$(4,352,695,061)
NMB		$8,944			$119,615,596,946		
ROI		496%			496%		

NMB: Net Monetary Benefit, QALYs: Quality-Adjusted Life Years, ROI: Return on Investment

30-Year Results (in US$)

Parameter		Per Person Results			National Results		
		Comparator	Intervention	Difference	Comparator	Intervention	Difference
Life-years	Life-years	24.14	24.16	0.024	322,839,695.00	323,158,591.35	318,896.34
Utility	QALYs	19.65	19.81	0.163	262,748,190.18	264,928,856.06	2,180,665.88
Costs	Treatment	$113,978	$115,845	$1,867	$1,524,327,436,903	$1,549,299,183,570	$24,971,746,668
	Medical	$286,497	$280,505	$(5,992)	$3,831,586,392,055	$3,751,450,421,520	$(80,135,970,535)
	Societal	$63,283	$62,516	$(767)	$846,341,593,107	$836,089,516,265	$(10,252,076,842)
	Total	$463,757	$ 458,866	$ (4,891)	$6,202,255,422,064	$6,136,839,121,355	$(65,416,300,709)
NMB		$29,349			$392,516,182,390		
ROI		1,572%			1,572%		

NMB: Net Monetary Benefit, QALYs: Quality-Adjusted Life Years, ROI: Return on Investment

Australia Supplemental Results

10-Year Results (in A$)

Parameter		Per Person Results			National Results		
		Comparator	Intervention	Difference	Comparator	Intervention	Difference
Life-years	Life-years	9.87	9.87	0.001	1,020,447.01	1,020,542.52	95.51
Utility	QALYs	8.38	8.45	0.067	866,503.15	873,418.01	6,914.87
Costs	Treatment	$35,826	$38,790	$2,964	$3,705,044,796	$4,011,586,827	$306,542,031
	Medical	$49,928	$48,594	$(1,334)	$5,163,352,862	$5,025,433,542	$(137,919,319)
	Societal	$3,700	$3,654	$(46)	$382,614,988	$377,883,790	$(4,731,198)
	Total	$89,454	$91,038	$1,585	$9,251,012,646	$9,414,904,159	$163,891,514
NMB		$1,758			$181,851,771		
ROI		59%			59%		

NMB: Net Monetary Benefit, QALYs: Quality-Adjusted Life Years, ROI: Return on Investment

30-Year Results (in A$)

Parameter		Per Person Results			National Results		
		Comparator	Intervention	Difference	Comparator	Intervention	Difference
Life-years	Life-years	27.75	27.76	0.014	2,869,744.56	2,871,223.71	1,479.15
Utility	QALYs	21.11	21.32	0.212	2,183,199.88	2,205,132.21	21,932.33
Costs	Treatment	$78,850	$81,838	$2,988	$8,154,432,386	$8,463,420,075	$308,987,690
	Medical	$214,684	$209,097	$(5,587)	$22,201,968,529	$21,624,197,194	$(577,771,336)
	Societal	$23,904	$23,450	$(454)	$2,472,104,391	$2,425,140,059	$(46,964,332)
	Total	$317,438	$314,385	$(3,053)	$32,828,505,306	$32,512,757,328	$(315,747,978)
NMB		$13,657			$1,412,364,396		
ROI		457%			457%		

NMB: Net Monetary Benefit, QALYs: Quality-Adjusted Life Years, ROI: Return on Investment

Canada Supplemental Results

10-Year Results (in CA$)

Parameter		Per Person Results			National Results		
		Comparator	Intervention	Difference	Comparator	Intervention	Difference
Life-years	Life-years	9.82	9.82	0.001	14,526,048.57	14,527,869.37	1,820.80
Utility	QALYs	8.39	8.45	0.064	12,408,027.46	12,502,455.17	94,427.70
Costs	Treatment	$22,496	$24,770	$2,273	$33,290,091,826	$36,654,353,935	$3,364,262,109
	Medical	$44,228	$42,797	$(1,431)	$65,449,040,273	$63,331,907,003	$(2,117,133,269)
	Societal	$4,007	$3,971	$(36)	$5,929,621,572	$5,876,774,792	($52,846,780)
	Total	$70,731	$71,539	$807	$104,668,753,670	$105,863,035,730	$1,194,282,060
NMB		$2,383			$3,527,103,042		
ROI		105%			105%		

NMB: Net Monetary Benefit, QALYs: Quality-Adjusted Life Years, ROI: Return on Investment

30-Year Results (in CA$)

Parameter		Per Person Results			National Results		
		Comparator	Intervention	Difference	Comparator	Intervention	Difference
Life-years	Life-years	26.78	26.80	0.019	39,624,326.65	39,652,347.76	28,021.11
Utility	QALYs	20.65	20.84	0.193	30,559,179.72	30,844,678.62	285,498.90
Costs	Treatment	$48,354	$50,647	$2,293	$71,555,044,908	$74,947,644,069	$3,392,599,161
	Medical	$159,785	$155,426	$(4,359)	$236,450,346,167	$230,000,372,058	$(6,449,974,109)
	Societal	$23,821	$23,465	$(356)	$35,250,239,648	$34,723,942,239	$(526,297,410)
	Total	$231,960	$229,538	$(2,422)	$343,255,630,724	$339,671,958,367	$(3,583,672,357)
NMB		$12,068			$17,858,617,142		
ROI		526%			526%		

NMB: Net Monetary Benefit, QALYs: Quality-Adjusted Life Years, ROI: Return on Investment

New Zealand Supplemental Results

10-Year Results (in NZ$)

Parameter		Per Person Results			National Results		
		Comparator	Intervention	Difference	Comparator	Intervention	Difference
Life-years	Life-years	9.84	9.84	0.001	554,652.90	554,714.58	61.68
Utility	QALYs	7.86	7.93	0.067	443,209.03	447,001.50	3,792.47
Costs	Treatment	$46,029	$49,436	$3,407	$2,593,966,932	$2,785,957,735	$191,990,803
	Medical	$23,568	$22,661	$(908)	$1,328,197,102	$1,277,052,381	$(51,144,721)
	Societal	$3,914	$3,866	$(48)	$220,562,300	$217,843,159	$(2,719,140)
	Total	$73,511	$75,962	$2,451	$4,142,726,334	$4,280,853,276	$138,126,942
NMB		$914			$51,496,609		
ROI		27%			27%		

NMB: Net Monetary Benefit, QALYs: Quality-Adjusted Life Years, ROI: Return on Investment

30-Year Results (in NZ$)

Parameter		Per Person Results			National Results		
		Comparator	Intervention	Difference	Comparator	Intervention	Difference
Life-years	Life-years	27.28	27.29	0.015	1,537,298.78	1,538,168.53	869.75
Utility	QALYs	19.88	20.10	0.211	1,120,616.91	1,132,529.37	11,912.46
Costs	Treatment	$100,143	$103,583	$3,439	$5,643,577,891	$5,837,410,021	$193,832,130
	Medical	$77,126	$74,217	$(2,909)	$4,346,452,363	$4,182,518,551	$(163,933,812)
	Societal	$24,892	$24,422	$(470)	$1,402,764,205	$1,376,283,150	$(26,481,055)
	Total	$202,161	$202,222	$61	$11,392,794,459	$11,396,211,723	$3,417,264
NMB		$10,508			$592,205,888		
ROI		306%			306%		

NMB: Net Monetary Benefit, QALYs: Quality-Adjusted Life Years, ROI: Return on Investment

United Kingdom Supplemental Results

10-Year Results

Parameter		Per Person Results			National Results		
		Comparator	Intervention	Difference	Comparator	Intervention	Difference
Life-years	Life-years	9.79	9.80	0.002	9,161,751.39	9,163,727.95	1,976.56
Utility	QALYs	8.81	8.93	0.118	8,239,493.62	8,349,606.12	110,112.50
Costs	Treatment	£61,058	£62,818	£1,761	£57,111,991,228	£58,758,761,272	£1,646,770,045
	Medical	£32,348	£31,321	£(1,027)	£30,257,881,724	£29,297,261,564	£(960,620,160)
	Societal	£6,153	£6,070	£(84)	£5,755,815,761	£5,677,486,584	£(78,329,176)
	Total	£99,559	£100,209	£650	£93,125,688,712	£93,733,509,420	£607,820,708
NMB		£2,882			£2,695,554,168		
ROI		164%			164%		

NMB: Net Monetary Benefit, QALYs: Quality-Adjusted Life Years, ROI: Return on Investment

30-Year Results

Parameter		Per Person Results			National Results		
		Comparator	Intervention	Difference	Comparator	Intervention	Difference
Life-years	Life-years	26.30	26.33	0.039	24,596,661.48	24,632,811.63	36,150.15
Utility	QALYs	20.66	21.05	0.389	19,326,035.82	19,689,574.09	363,538.27
Costs	Treatment	£137,560	£139,451	£1,891	£128,670,944,014	£130,439,356,774	£1,768,412,761
	Medical	£101,580	£98,495	£(3,085)	£95,015,578,217	£92,129,999,914	£(2,885,578,303)
	Societal	£33,749	£33,039	£(711)	£31,568,353,338	£30,903,677,410	£(664,675,929)
	Total	£272,890	£270,985	£(1,905)	£255,254,875,569	£253,473,034,098	£(1,781,841,471)
NMB		£13,565			£12,687,989,575		
ROI		717%			717%		

NMB: Net Monetary Benefit, QALYs: Quality-Adjusted Life Years, ROI: Return on Investment

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