Avalere Health

Exploring the impact of changes in health valuation post-COVID-19 pandemic on an existing cost-effectiveness analyses

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Background

The COVID-19 pandemic exposed millions of people globally to significant morbidity and mortality, leading to over 7 million deaths worldwide as of September 2024 (WHO, 2024). There is also evidence of persistent and potentially permanent consequences of the disease because of long COVID, which has been estimated to affect approximately 65 million individuals worldwide leading to long-lasting morbidity (Davis et al., 2023). Outside of direct consequences of the disease, the associated lockdowns and isolation also contributed to mental health impacts, including anxiety and depression. Based on the breadth and depth of the many impacts of the COVID-19 pandemic, the way in which the general population values health may have fundamentally changed.

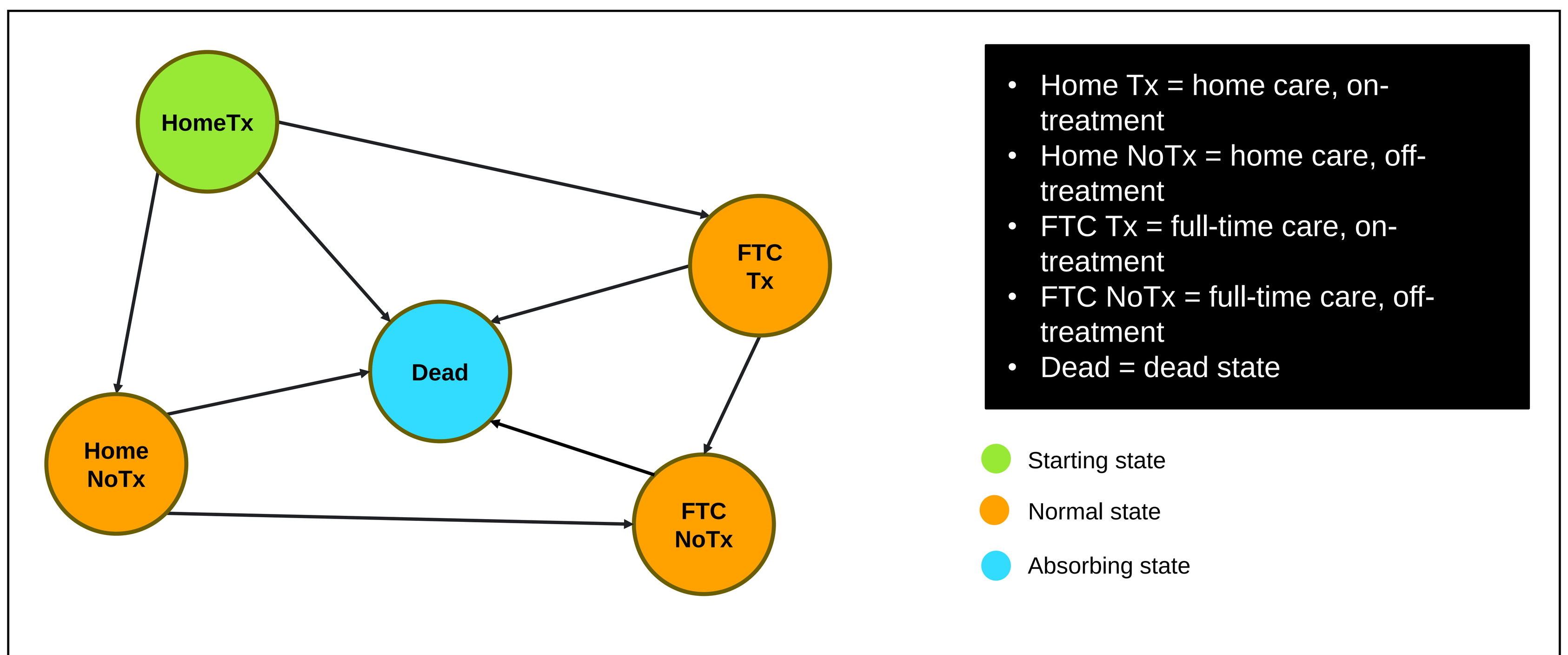
Webb et al. (2021) investigated changes in health valuation, using EQ-5D-5L to derive utility values and then comparing responses from patients before and after the pandemic to infer the effects of the pandemic on health valuation. In this study, the best health state (as defined by the EQ-5D-5L) was rated 9 points lower on the 0 to 100 visual analog scale (VAS) by respondents post-pandemic (2020) versus before the pandemic (2018); the worst health state was rated 10 points higher post-pandemic compared with before the pandemic. The results also showed that respondents rated death 7 points lower after the pandemic.

Based upon the findings of Webb et al. (2021), we aimed to explore the potential implications of changes in health valuation after the COVID-19 pandemic on cost-effectiveness analyses, by using the data to adjust utility values for a published cost-effectiveness model and assessing any impact on the analysis results.

Methods

A published Markov model, designed to estimate the cost-effectiveness of deep brain stimulation (DBS), levodopa–carbidopa intestinal gel (LCIG), and best medical treatment (BMT) for the treatment of advanced Parkinson's disease (**Figure 1**) was replicated to serve as the basis of the current study (National Institute of Health and Care Excellence, 2017).

Figure 1: Cost-effectiveness model schematic

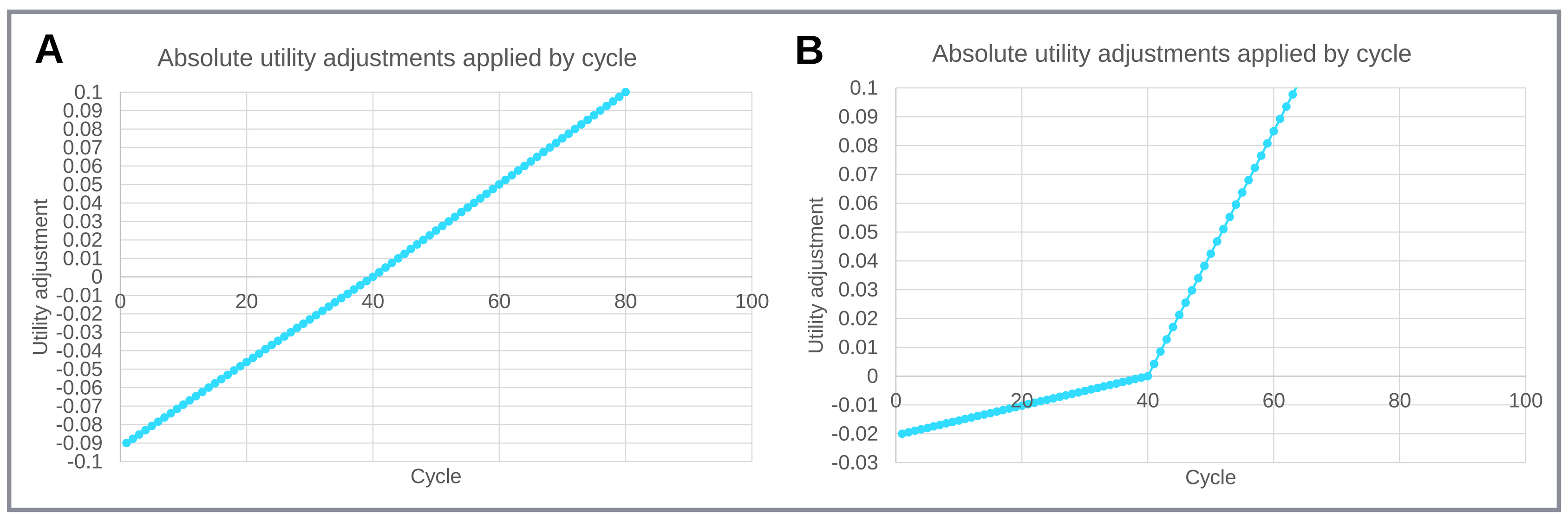


Other than the utility adjustments, all other aspects of the original model remained the same.

Given that the findings by Webb et al. (2021) only provided information about changes in ratings for the best and worst health states post-pandemic, potential changes for intermediate health states/EQ-5D-5L profiles were inferred based on the assumption that changes in valuation would be greatest for the best and worst health states, with the magnitude of changes decreasing proportionally toward intermediate health states. Health state utility values used in the model were not state-dependent (except for death) and instead were assigned based on treatment and patients' age; the highest utility states exist at the first cycle and the lowest utility states at the end of the model (Cycle 80). To align with the results from Webb et al. (2021), we applied an adjustment of -0.09 at Cycle 1, reducing proportionally each cycle to 0.00 adjustment at cycle 40, and then increasing proportionally each cycle to reach +0.10 at Cycle 80. This assumed that intermediate health states would be impacted proportionally—this represents Scenario 1 (**Figure 2A**).

An alternative scenario (Scenario 2) was also modeled to account for the reported changes in valuation of dead health states in the Webb et al. (2021) analysis, ie, respondents rated death 7 points lower post-pandemic. In this scenario, the adjustments decreased from -0.02 at Cycle 1, down to 0.00 at Cycle 40 and then up to +0.17 at Cycle 80 (**Figure 2B**).

Figure 2: Health state utility value adjustments applied for Scenario 1 and Scenario 2, by cycle



Results

Figure 3: Scenario 1 original utility values compared with adjusted utility values by cycle

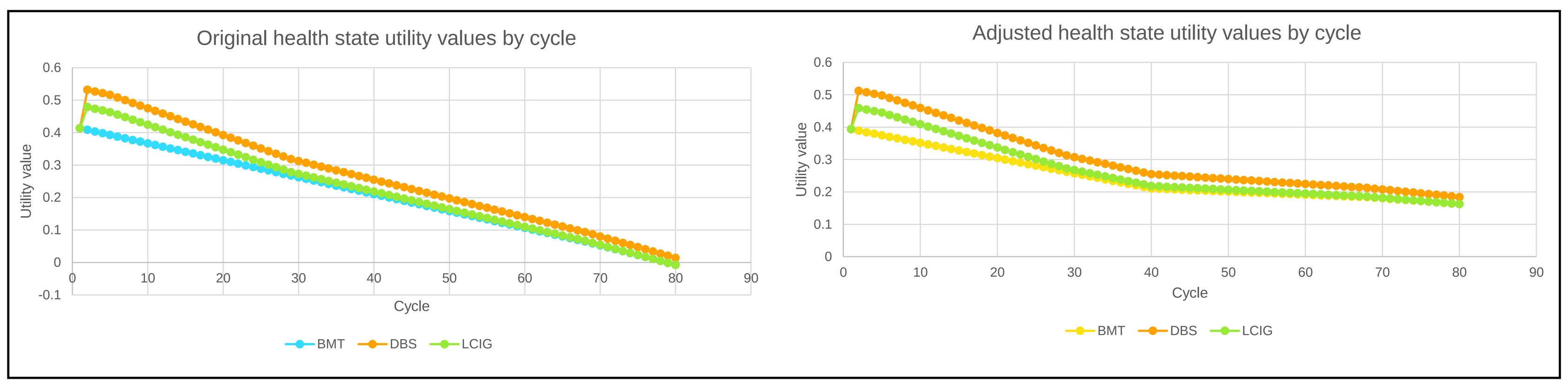


Figure 4: Scenario 2 original utility values compared with adjusted utility values by cycle

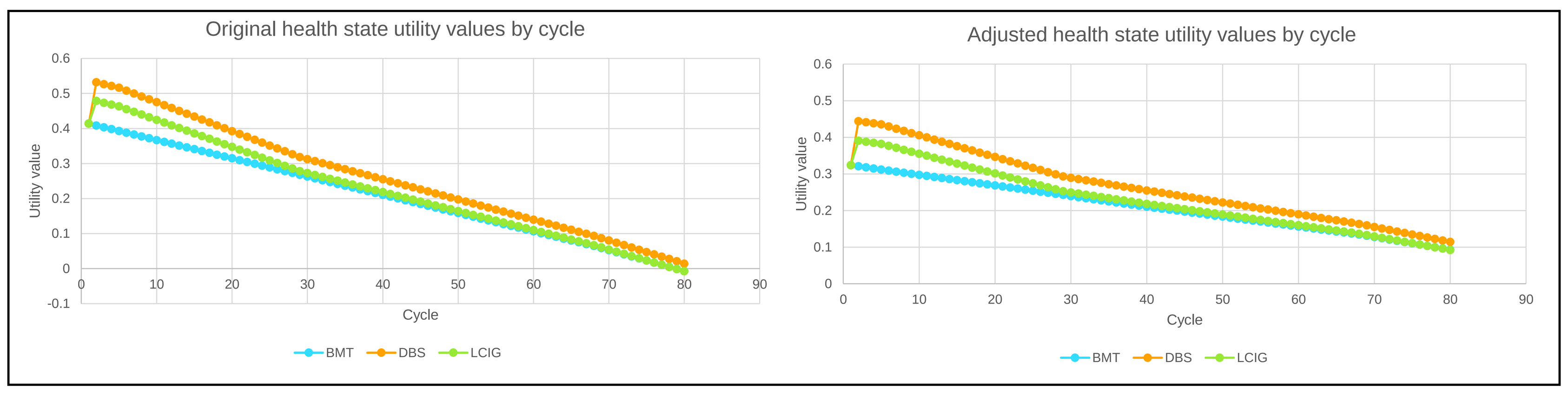


Table 1: Total QALYs by treatment for original model and scenarios

	Original Model			Scenario 1			Scenario 2		
	BMT	DBS	LCIG	BMT	DBS	LCIG	BMT	DBS	LCIG
Total QALYs	2.353	3.207	2.596	2.00	2.869	2.246	2.299	3.189	2.539

Table 2: Incremental QALYs and incremental cost-effectiveness ratios for original model and scenarios

	Original Model		Scenario 1		Scenario 2	
	DBS vs BMT	LCIG vs DBS	DBS vs BMT	LCIG vs DBS	DBS vs BMT	LCIG vs DBS
Inc. QALYs	0.854	-0.612	0.866	-0.623	0.889	-0.649
ICER	£31,264.76	Dominated	£30,843.75 **(-1.3% vs original ICER)**	Dominated	£30,022.83 **(-4.0% vs original ICER)**	Dominated

Both scenarios resulted in lower total quality-adjusted life years (QALYs) for all treatments, with a greater absolute reduction seen for Scenario 1 (**Table 1**). This likely reflects the lower utility assigned to "better" health states at earlier cycles in the model due to the utility adjustments, combined with the fact that patients moved quickly to the dead state in the model with 90% of patients being dead by Cycle 54, meaning that most patients in the model did not benefit from the increased utilities of health states in later cycles because of the adjustments. This impact was attenuated slightly in Scenario 2 as the utility decrements applied in cycles 1 to 40 were lower and the utility increment applied in cycles 41 to 80 were much greater (**Figure 2**).

Conclusions

The adjustments in Scenario 1 and Scenario 2 did not materially impact the outcomes of the cost-effectiveness analysis. Incremental cost-effectiveness ratio (ICER) thresholds did, however, reduce between **1.3%** and **4.0%** in the adjusted utility scenarios when DBS was compared with BMT (**Table 2)**, which demonstrates the potential for ICERs to change after accounting for changes in health valuation post-COVID pandemic. Although only modest changes were demonstrated in this analysis, these changes could realistically be the difference between showing an intervention is cost-effective at a given threshold, or not.

Our analysis was limited by the available data describing post-pandemic changes in health valuation and relied heavily on assumptions for how the results of Webb et al. (2021) translated to intermediate health states. To improve upon this work, these utility adjustments should be tested in different cost-effectiveness models, perhaps for chronic diseases with a longer life expectancy, and to further investigate changes in health valuation following the COVID-19 pandemic, value sets for general populations should be collected and compared against value sets produced before the pandemic. If significant changes are found, it may be prudent to update these value sets to ensure they correctly reflect the general population's current perspectives of health valuation.

Scan here for poster references

Poster presented at ISPOR EU, 17–20 November 2024, Barcelona, Spain