



The NICE Disease Severity Modifier: A Retrospective Analysis on its Potential Impact on Previous Reimbursement Decisions in England

Sinha A, Howard D, Thurgar E
Mtech Access, Bicester, United Kingdom

ISPOR Poster Acceptance code: HTA37
Abstract ID: 121822

Introduction

On 1st February 2022, the National Institute for Health and Care Excellence (NICE) published updated manuals for methods, processes and topic selection for health technology assessments [NICE, 2022] (1). A key change made during the update was the introduction of a decision modifier for severe diseases.

Prior to the release of the updated manuals, NICE committees could recommend treatments with a higher cost for people who were in the last months of their life. During consultation for the updated manuals, NICE argued that there was no evidence that society valued end-of-life treatments over other

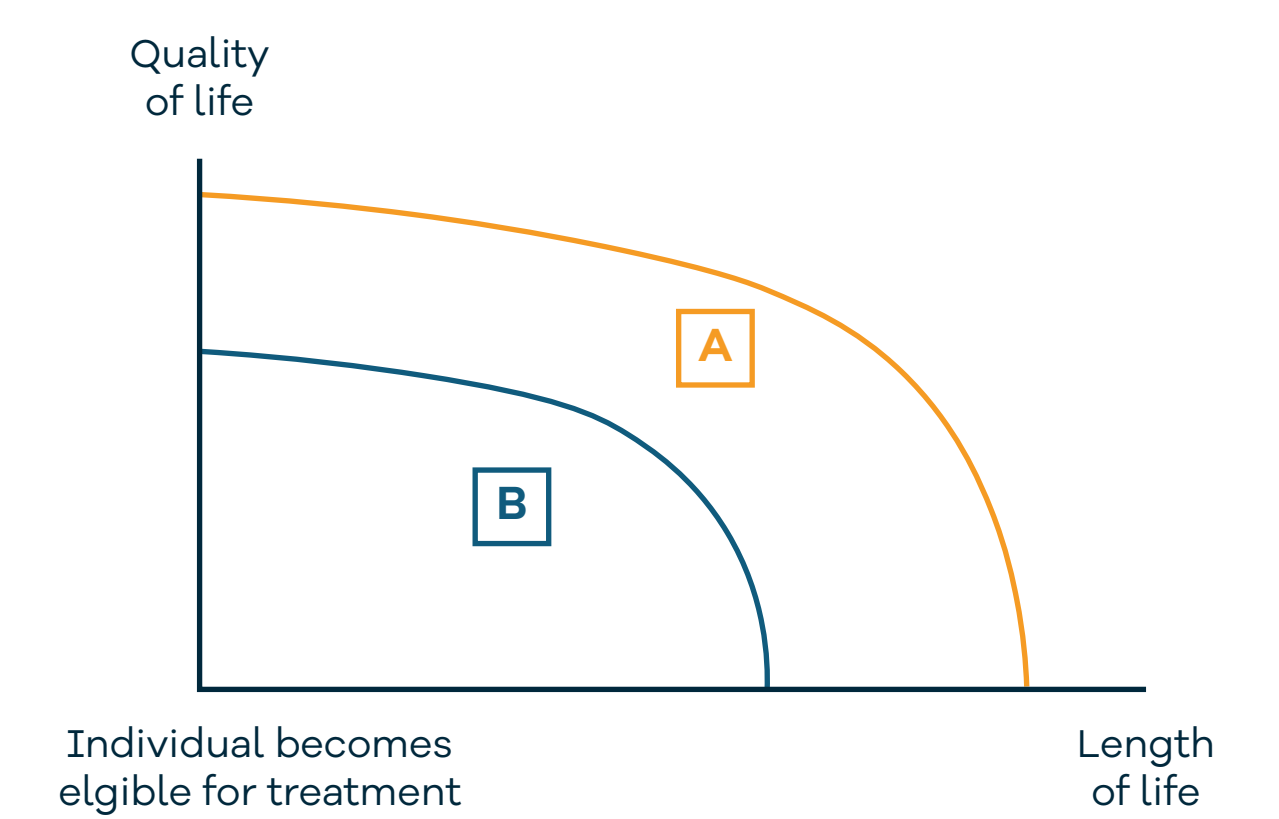
therapies; instead, NICE highlighted evidence that society placed additional value on treatments that produced health gains for severe diseases. So, the end-of-life modifier was removed, and a decision modifier that applied extra weight to outcomes (measured as quality-adjusted life years [QALYs]) for severe diseases was introduced.

NICE defines severity of a disease as the future QALYs lost by people living with the disease and receiving standard of care (SoC) in the NHS. Two estimates are considered in this context: the absolute QALY shortfall, and the proportional QALY shortfall.

The absolute and proportional QALY shortfall

The *absolute QALY shortfall* represents future QALYs lost from living with a condition and receiving SoC versus future QALYs for someone without the illness. It is calculated by subtracting future QALYs that people with the condition can expect from future QALYs expected by the general population and equates to the area **A** in Figure 1.

Figure 1: Calculating the QALY shortfall



The *proportional QALY shortfall* is the proportion of future QALYs lost due to the condition. It is calculated by dividing the absolute QALY shortfall by future QALYs expected by the general population and equates to the area **A / (A + B)** in Figure 1.

The absolute or proportional QALY shortfall value will determine the weight that is applied to QALYs for the product being appraised.

Objectives

This research aimed to explore whether therapies appraised prior to the new NICE methods might have benefited from the disease severity modifier.

The outcomes of single technology appraisals (STAs) in a 12-month period were appraised so as to understand which therapies would have been eligible for the new modifier, and whether the outcome of the original appraisal might have changed had severity of disease been considered.

Methods

All technology appraisals published between June 2021 and June 2022 were identified:

- Appraisals were excluded from the review if they were not an STA or were terminated
- For STAs published between February 2022 and June 2022, data were extracted provided that the technology appraisal began prior to February 2022 and did not follow the updated NICE methods, processes and topic selection guidance
- STAs were excluded if SoC QALYs and baseline age and sex characteristics of the patient population were unavailable, since these data were required to calculate the QALY shortfall

Documentation associated with each included STA was reviewed and relevant data extracted:

- It was noted whether the end-of-life decision modifier was a factor in the recommendation of a treatment
- Data for age and sex and SoC QALYs were sourced from the manufacturer's submission or, if unavailable, the Evidence Review Group report
- The QALY shortfall was estimated using an online calculator (Schneider et al 2021) (2)
- Based on the absolute and proportional QALY shortfalls, the QALY weight that may have been applied had the therapy been assessed via the updated NICE methods was calculated (Table 1)

Table 1: Absolute and proportional QALY shortfall threshold values for disease severity

QALY weight	Inferred willingness-to-pay threshold	Absolute QALY shortfall	Proportional QALY shortfall
x1	Up to £30,000	<12	<0.85
x1.2	Up to £36,000	12–18	0.85–0.95
x1.7	Up to £51,000	18+	0.95+

Abbreviations: QALY, quality-adjusted life year.

Results

A total of 89 completed technology appraisals published during the period of June 2021 to June 2022 were identified, of which 17 met the inclusion criteria. Appraisals were excluded from the evaluation due to not being a STA (n=4) the appraisal being terminated (n=15), or a lack of reporting of SoC QALYs or baseline patient characteristics necessary to estimate the QALY shortfall (n=53).

The absolute and proportional QALY shortfall was estimated for the 17 appraisals included. Based on the estimates of QALY shortfall, five of the included appraisals were identified as treatments that might have been eligible for the disease severity modifier. Summary data for each of these five appraisals were extracted, including the NICE committee's most plausible incremental cost-effectiveness ratio (ICER), the calculated disease severity modifier, and the inferred willingness-to-pay threshold (WTP, Table 2, (3-7)). All five appraisals were assessments of treatments for cancer and were all recommended for use by NICE.

Of the five appraisals, four satisfied NICE's original end-of-life criteria (3-6):

- For TA716, the most plausible ICER was less than £20,000. The removal of the end-of-life modifier and introduction of the disease severity modifier is unlikely to have affected the positive recommendation
- TA736, TA728 and TA713 had plausible ICERs of between £30,000 and £50,000 and thus, end-of-life is likely to have been a key factor in the decision to recommend the products within these appraisals
- Only TA736 is likely to have been recommended had the new methods been in place for this appraisal. The remaining two appraisals TA713 and TA728 may have had plausible ICERs above the WTP threshold implied by the disease severity modifier, and may not have been recommended under the new methods

One appraisal, TA772, did not meet the end-of-life criteria and was recommended based on an ICER of less than £30,000. The positive recommendation for this therapy is unlikely to have been affected by the disease severity modifier.

Table 2: Summary of appraisals that would have qualified for the disease severity modifier

Appraisal number (Ref.)	Condition of interest	Treatment	Eligible for end-of-life criteria in the original appraisal?	Original most plausible ICER (incremental cost per QALY gained)	Recommended for use in original appraisal (with or without restrictions)?	Calculated disease severity modifier	Inferred WTP threshold with disease severity modifier	Likely to be recommended for use based on new methods?
TA772 (7)	Relapsed or refractory classical Hodgkin lymphoma after stem cell transplant/at least three previous therapies	Pembrolizumab	No	<£30,000	Yes	1.2	Up to £36,000	Yes
TA736 (6)	Recurrent or metastatic squamous cell carcinoma of the head and neck after platinum-based chemotherapy	Nivolumab	Yes	<£50,000	Yes	1.7	Up to £51,000	Yes
TA728 (5)	Advanced systemic mastocytosis	Midostaurin	Yes	<£50,000	Yes	1.2	Up to £36,000	Unclear
TA716 (4)	Previously treated metastatic colorectal cancer with high microsatellite instability or mismatch repair deficiency	Nivolumab with ipilimumab	Yes	<£20,000	Yes	1.7	Up to £51,000	Yes
TA713 (3)	Advanced non-squamous non-small-cell lung cancer after chemotherapy	Nivolumab	Yes	£44,169–£44,547	Yes	1.2	Up to £36,000	No

Abbreviations: ICER, incremental cost-effectiveness ratio; QALY, quality-adjusted life year; WTP, willingness-to-pay.

Conclusion

A simple review was performed to investigate whether therapies evaluated prior to the new NICE methods might have benefited from the disease severity modifier.

We made several simplifying assumptions to facilitate the analysis. It was assumed that manufacturer QALY estimates for the least effective comparator represented SoC QALYs. In addition, it was assumed that the decision to recommend a product rested solely on the most plausible ICER. The analysis was limited by the large proportion of identified STAs in which SoC

QALYs were redacted or baseline characteristics were unavailable.

Based on the data identified, no products were identified that had been assessed in the period from June 2021 to June 2022 that would be eligible for the disease severity modifier if assessed now, and that were originally not recommended. Instead, two products were identified that benefited from the original end-of-life modifier and, had they been assessed under the new methods, may not have been recommended.



ISPOR Europe 2022, 6–9 November 2022, Vienna, Austria

(Stand No. X2-304)

References

1. National Institute for Health and Care Excellence. NICE health technology evaluations: the manual. 2022. <https://www.nice.org.uk/process/pmg36/chapter/introduction-to-health-technology-evaluation>.
2. Paul Schneider, Simon McNamara, James Love-Koh, Tim Doran, Nils Gutacker. QALY Shortfall Calculator. 2021. <https://r4scharr.shinyapps.io/shortfall/>.
3. National Institute for Health and Care Excellence. Single Technology Appraisal. Nivolumab for previously treated locally advanced or metastatic non-squamous non-small-cell lung cancer (CDF reviewTA484) [ID1572]. Committee Papers 2021.
4. National Institute for Health and Care Excellence. Single Technology Appraisal. Nivolumab with ipilimumab for previously treated metastatic colorectal cancer with high microsatellite instability or mismatch repair deficiency [ID1332]. Committee Papers 2021.
5. National Institute for Health and Care Excellence. Single Technology Appraisal. Midostaurin for treating advanced systemic mastocytosis [ID1573]. Committee Papers 2021.
6. National Institute for Health and Care Excellence. Single Technology Appraisal. Nivolumab for treating recurrent or metastatic squamous cell carcinoma of the head and neck after platinum-based chemotherapy. (CDF Review of TA490) [ID1585] Committee Papers. 2021.
7. National Institute for Health and Care Excellence. Single Technology Appraisal. Pembrolizumab for treating relapsed or refractory classical Hodgkin lymphoma after stem cell transplant or at least three previous therapies. [ID1557] Committee Papers. 2021.

Abbreviations

ICER: incremental cost-effectiveness ratio
NICE: National Institute for Health and Care Excellence
QALY: quality-adjusted life year
SoC: standard of care
STA: single technology appraisal
WTP: willingness-to-pay