Does NICE's New Severity Modifier Capture the Value of Treatments for Long-Term Progressive Diseases? A Retrospective Analysis of Past Appraisals in Multiple Sclerosis

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OBJECTIVES

- This research aimed to retrospectively assess the potential impact of the new severity modifier by calculating quality-adjusted life year (QALY) shortfall in previous National Institute for Health and Care Excellence (NICE) appraisals in multiple sclerosis (MS).

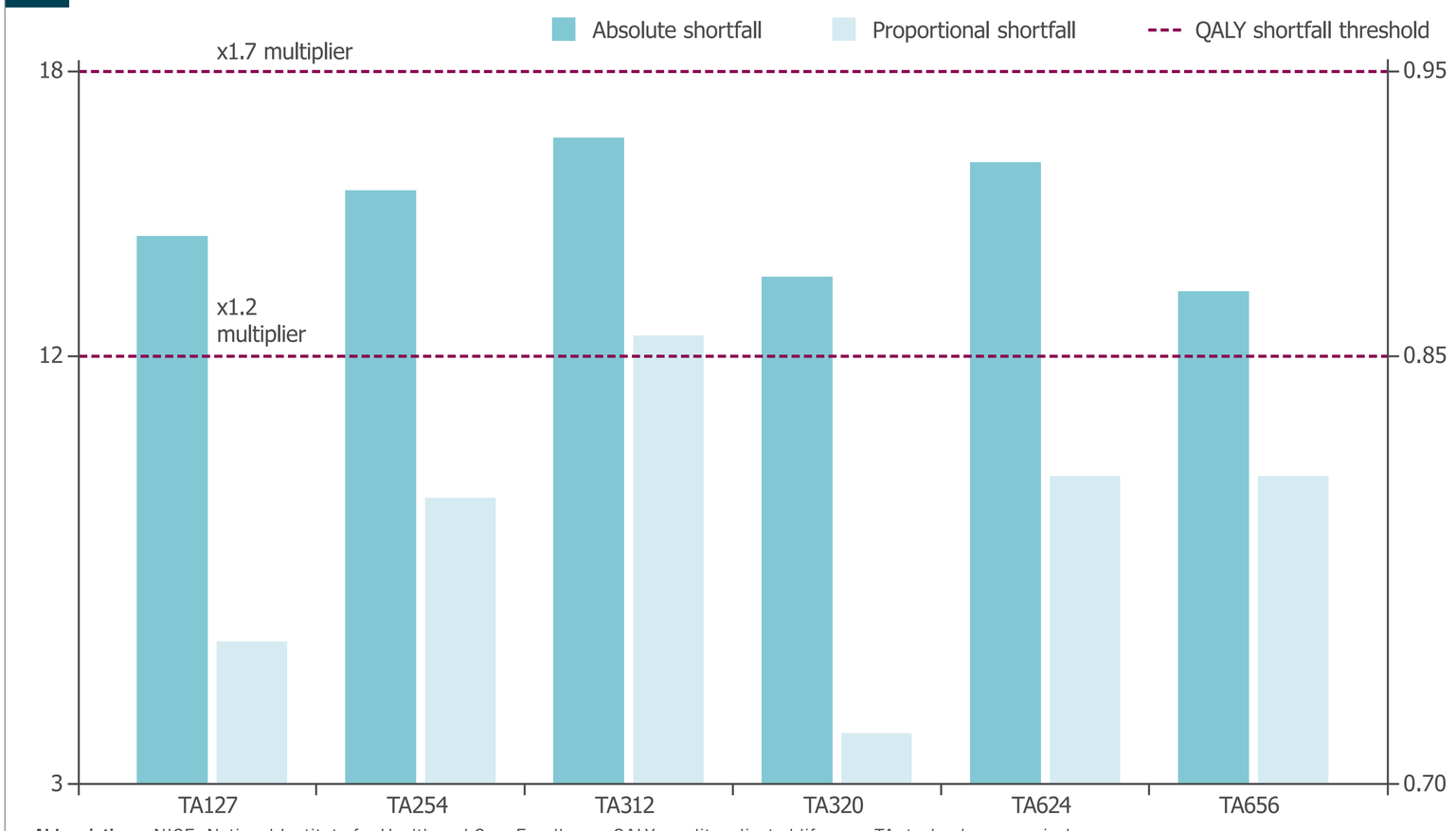
BACKGROUND

- With the January 2022 update to the NICE methods guide, NICE have introduced a new decision modifier that takes into account disease severity, based on QALY shortfall.[1]
- This replaced the end-of-life criteria previously used to give additional weight to treatments expected to extend life by three months in diseases with an estimated life expectancy of less than 24 months.
- The end-of-life criteria did not place increased value on treatments for long-term, progressive conditions that are not associated with short life-expectancy. The new severity modifier provides a broader context for considering the potential additional value of treatments for more severe disease.

METHODS

- The NICE website was manually searched on 6 May 2022 for past NICE appraisals in MS.
- Calculating QALY shortfall requires data on (a) modelled baseline characteristics (age and sex) and (b) total discounted QALYs. Only appraisals which reported sufficient data for QALY shortfall calculations were included (**Table 1**).
- Quality-adjusted life expectancy (QALE) was derived from English life tables (2018–2020) and 2014 Health Survey for England general population utility data, using the model baseline characteristics reported in each appraisal.
- An annual discount rate of 3.5% was applied to the calculated QALEs, in line with the discount rate applied to QALYs extracted in each appraisal.
- Expected QALYs with the condition were modelled using the lowest reported comparator total discounted QALYs as a simplifying assumption. A scenario analysis was conducted in which the highest reported comparator total discounted QALYs were used to estimate expected QALYs with the condition.
- Both absolute and proportional QALY shortfall were assessed for each appraisal.

1 Absolute and proportional shortfall



Abbreviations: NICE: National Institute for Health and Care Excellence; QALY: quality-adjusted life year; TA: technology appraisal.

RESULTS

- The search returned 23 NICE appraisals in MS, of which 6 reported sufficient data for QALY shortfall calculations (**Table 1**).[2-7]
- Absolute QALY shortfall must be ≥12.0 or ≥18.0 for a severity modifier of x1.2 and x1.7, respectively, to apply.[1] Alternatively, proportional QALY shortfall should be ≥0.85 or ≥0.95 for a severity modifier of x1.2 and x1.7 to apply, respectively.[1]
- Among the included studies, absolute QALY shortfall ranged from 13.37 to 16.61. Therefore, a severity modifier of x1.2 would have applied to incremental QALYs in all six appraisals (**Figure 1**).
- Proportional QALY shortfall ranged from 0.72 to 0.86. Based on proportional shortfall alone, a severity modifier of x1.2 would have applied in the case of only one appraisal, TA312 (**Figure 1**), which was associated with a proportional QALY shortfall of 0.86.
- A scenario analysis in which the highest reported comparator QALYs were used to estimate expected QALYs with the condition yielded similar results. A severity modifier of x1.2 would have applied to all six appraisals, based on absolute shortfall alone, however none of the appraisals were now associated with a proportional QALY shortfall ≥0.85.

CONCLUSIONS

- A potentially increased value of treatments for long-term, progressive diseases, such as MS, has not previously been quantitatively considered in past NICE appraisals. This research suggests that NICE's new severity modifier may result in a higher value being placed on incremental QALYs associated with new interventions in future appraisals in MS.
- The application of a severity modifier in previous appraisals in MS was driven by absolute QALY shortfall rather than proportional QALY shortfall, due to an accumulation of lost QALYs over an extended period of time.
- Future research may aim to retrospectively assess the impact of NICE's new severity modifier on previous appraisals in other long-term, progressive diseases in which end-of-life criteria did not apply.

1 Summary of appraisals included in QALY shortfall calculations

Appraisal ID	Appraisal title	Baseline Characteristics		Estimated QALE	Lowest reported comparator QALY	Highest reported comparator QALY
		Age	Percentage Female			
TA127	Natalizumab for the treatment of adults with highly active relapsing–remitting multiple sclerosis	36.0	75.6%	19.74	5.02	6.59
TA254	Fingolimod for the treatment of highly active relapsing–remitting multiple sclerosis	37.3	70.0%	19.47	3.98	N/A[a]
TA312	Alemtuzumab for treating highly active relapsing remitting multiple sclerosis	37.9	71.6%	19.25	2.63	3.43
TA320	Dimethyl fumarate for treating relapsing-remitting multiple sclerosis	37.8	71.4%	19.25	5.45	5.81
TA624	Peginterferon beta-1a for treating relapsing–remitting multiple sclerosis	36.0	71.0%	19.71	3.65	5.48
TA656	Siponimod for treating secondary progressive multiple sclerosis	48.0	60.1%	16.74	3.17	N/A[a]

[a]Only one comparator considered. **Abbreviations:** N/A: not applicable; QALE: Quality-adjusted life expectancy; QALY: quality-adjusted life year; TA: technology appraisal.

References

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