Caregiver health-related quality of life in National Institute for Health and Care Excellence (NICE) appraisals: from inception to 2023

P2. HTA23

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Background

- Health technology assessments (HTAs) primarily focus on patient outcomes, but improvements in patients' health can also have significant impacts on carers, with the potential to improve carer health-related quality of life (HRQoL).
- The National Institute for Health and Care Excellence (NICE) reference case stipulates that health economic (HE) models should include costs to the National Health Service, personal social services, and outcomes that are direct health effects on patients or, when relevant, carers.[1] However, it does not specify how carer HRQoL should be included, or its relevance determined. Likewise, the impact of patients' treatment on carers has been inconsistently included in NICE appraisals, using varying methods.[2,3]
- When assessing health technologies in areas where caring for dependents significantly affects carers' HRQoL, it is crucial to consider the potential of treatment benefits on carer health. Given the uncertainty surrounding NICE's preferred approach for integrating carer HRQoL into HE models, a comprehensive review of previous NICE appraisals that evaluated carer HRQoL was undertaken.

Objectives

- To identify instances where carer HRQoL decrements or other impacts had been submitted, accepted, or considered important by the NICE decision-making committee in previous HTAs.
- To provide insight into possible sources and methodologies for generating and implementing carer utility impacts in HE models.

Methods

Searching and study selection

- The final appraisal documents and committee papers of technology appraisals (TAs) and highly specialized technologies (HSTs) published on nice.org.uk from inception of the HTA process in 2000 to August 2023 were screened using terms such as "carer", "caregiver", and "family".
- The eligibility criteria for inclusion in the review are shown in Table 1.

Table 1. Review eligibility criteria.

Criteria	Inclusion	Exclusion
Population	No limits	Not applicable
Intervention	No limits	Not applicable
Comparator	No limits	Not applicable
Outcomes	Caregiver/carer/family/sibling AND HRQoL/utilities/burden	Outcomes that do not apply
Study design	▪ NICE TAs ▪ NICE HSTs	Appraisals that do not apply
Limitations	Inception to August 2023	Not applicable

HRQoL, health-related quality of life; HST, highly specialized technology; NICE, National Institute for Health and Care Excellence; TA, technology appraisal.

Data extraction and data synthesis

- The data extracted from eligible appraisals included TA number, year, technology, indication, population, external assessment group (EAG), NICE committee, recommendation, whether carer HRQoL was incorporated into the model, source of utility estimates, elicitation methods, size of effect, EAG/NICE committee arguments, and key points on carer HRQoL inclusion/rejection.

Results

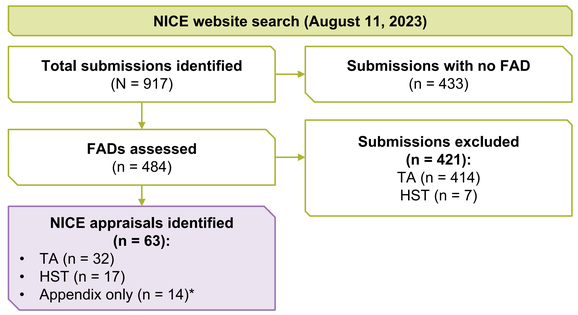
Carer HRQoL modeled in 10% of NICE appraisals

- In total, 484 HTAs have been published with NICE recommendations. Of these, carer HRQoL was submitted in the cost-utility analyses of 49 original submissions across multiple disease areas (10%; 32/460 TAs, 17/24 HSTs) and discussed in 14 TAs (but not incorporated in the HE model; Figure 1).

Carer HRQoL accepted in 27 disease areas

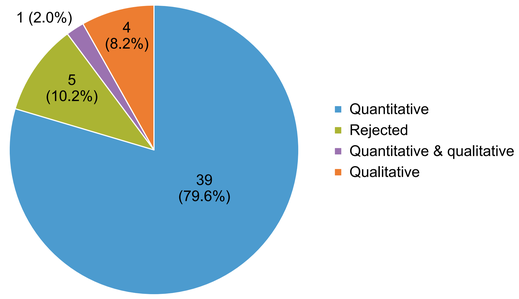
- Carer HRQoL was considered quantitatively (in the model) and qualitatively (carer perspective and experience) in the decision making of 44/484 (9%) appraisals in 27 disease areas (Figure 2). For 5 appraisals, carer HRQoL was rejected.
- Carer HRQoL was included in the committee base case in 40 (8%) appraisals.

Figure 1. PRISMA flowchart.



FAD, final appraisal document; HST, highly specialized technologies; NICE, National Institute for Health and Care Excellence; TA, technology appraisal.
*Inclusion only in the appendix implied that carer HRQoL was discussed but not explored in economic analyses.

Figure 2. Committee judgement where carer HRQoL was included (n = 49; 32 TA and 17 HST).

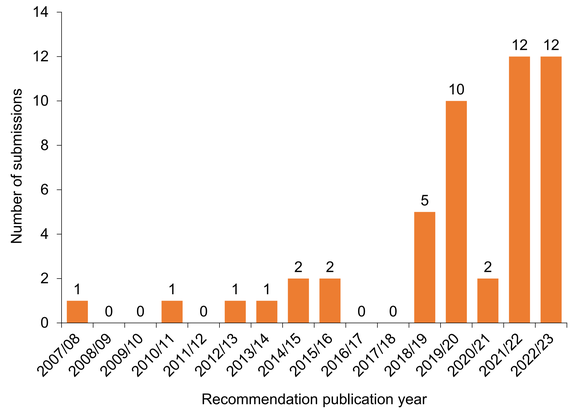


HRQoL, health-related quality of life; HST, highly specialized technologies; TA, technology appraisal.

Effect of the 2019 report on inclusion of carer HRQoL

- Chronologically, most appraisals that included carer HRQoL occurred after 2019, when the NICE Decision Support Unit published a report on modeling carer HRQoL in their HTAs (Figure 3).
- The 2020/21 year was affected by the COVID-19 pandemic, which was the likely cause for the lower number of appraisals. The 2022/23 appraisal year coincided with the publication of the NICE 2022 Methods Guide.

Figure 3. Inclusion of carer HRQoL in NICE health economic models.



HRQoL, health-related quality of life; NICE, National Institute for Health and Care Excellence.

Sources of utility estimates varied

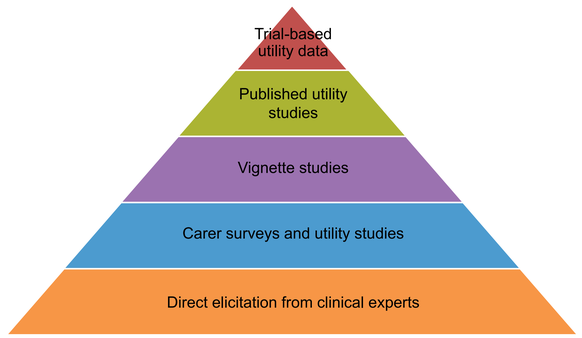
- In the quantitative consideration of carer HRQoL, several sources of carer utility/disutility estimates were employed across all 49 appraisals.
- The 32 TAs and 17 HSTs referred to various sources, including HRQoL publications, *de novo* utility studies and carer burden surveys, clinical trials, vignette studies, and Delphi panels, to inform carer utility estimates for HE modeling (Figure 4).
- Some proved more uncertain than others; however, in general, the EAG and committee's preference largely followed a hierarchy of evidence (Figure 5).
- The lack of availability of trial-based data and published literature on the quantitative HRQoL of carers influenced the choice of source.

Figure 4. Published sources of carer HRQoL estimates used in NICE appraisals.

Carer HRQoL studies	
Alzheimer's disease	Neumann et al. (*Med Care*. 1999;37:27-32)
Multiple sclerosis	Orme et al. (*Value Health*. 2007;10:54-60)
Multiple sclerosis	Gani et al. (*Pharmacoeconomics*. 2008;26:617-27)
Mixed	Kuhlthau et al. (*Matern Child Health*. 2010;14:155-63)
Multiple sclerosis	Acaster et al. (*BMC Health Serv Res*. 2013;13:346)
Mixed	Wittenberg et al. (*Pharmacoeconomics*. 2013;31:489-500)
Glioma	Minaya Flores et al. (*Neurooncol Pract*. 2014;1:191-7)
Duchenne muscular dystrophy	Landfeldt et al. (*Neurology*. 2014;83:529-36) Landfeldt et al. (*Neurology*. 2016;263:906-15) Landfeldt et al. (*Pharmacoeconomics*. 2017;35:249-58)
Meningitis	Christensen et al. (*BMJ*. 2014;349:g5725)
Meningitis	Al-Janabi et al. (*Health Econ*. 2016;25:1529-44)
Rare disease	López-Bastida et al. (*Orphanet J Rare Dis*. 2017;12:141)
Pediatric	Wu et al. (*Qual Life Res*. 2020;29:2445-54)
Metachromatic leukodystrophy	Pang et al. (16th Annual World Symposium; Orlando, FL, USA; 2020)

HRQoL, health-related quality of life; NICE, National Institute for Health and Care Excellence.

Figure 5. Hierarchy of evidence on carer utility.



Number of modeled carers

- The number of carers modeled across appraisals ranged from 0.5 to 3, depending on the patient population (if adult, juvenile, or pediatric) and the patient's health state and severity.
- The number modeled was based on published literature, clinical expert input, and assumptions from previous TAs.

Approaches to modeling carer HRQoL were explored

- Using 1 or more of the 3 methods and 2 adjustments that can be applied (additive carer utility, additive carer disutility, absolute carer, applying a cap, and carer bereavement), carer HRQoL was generally applied as a function of patient health state, treatment arm, or mortality.
- These methods were not always mutually exclusive of each other; for example, a cap could be applied in addition to the disutility approach and bereavement approach, whereas the utility and disutility approach cannot be simultaneously used to model carer HRQoL.

Additive carer utility approach (used in 7 appraisals)

- Applying additive carer utilities as a function of the patient's treatment or health state/disease severity.
- Limitation: No negative impact on carer HRQoL when patient dies.

Additive carer disutility approach (used 44 in appraisals)

- Applying carer utility decrements per patient treatment or health state/disease severity.
- Limitations: It is more cost effective not to prolong the lives of patients in severe health states. Assumes carer HRQoL rebounds to general utility after the patient's death.
- Suggestion: Potential to partially mitigate through utility/disutility capping.

Absolute carer approach (used in 1 appraisal)

- Applied by multiplying the probability that a patient will reside in a health state in each cycle by the carer utility associated with the patient being in that state.
- Limitations: Quality-adjusted life-years (QALYs) accrued by carers is linked to the patient's survival status. Assumes that when the patient dies, the carer also dies or survives with 0 utility.

Age/utility cap approach (used in 2 appraisals)

- Applying a cap in several ways:
  - Median survival age cap: Absolute carer QALYs until the patient reaches the trial age of joint median overall survival for the treatment arm.
  - Carer/patient age cap: QALY gains/losses until the patient/carer reaches a certain age, eg, 18 years for patients and/or 64 years for carers.
  - *Disutility* cap: Cap on QALY loss for carers of patients in the treatment arm to not exceed the total carer QALY loss for those in the control arm in each cycle.
  - Utility cap: A general population utility cap to ensure that if carer utility > population utility = no decrement, and if carer utility < population utility = difference in utility (negative number) × patient life-years.
- Limitations: The median survival age cap means QALYs accrued by bereaved carers are not counted. The disutility cap may require social value judgement that only positive carer benefits should be included in an economic analysis.

Carer bereavement approach (used in 2 appraisals)

- Applied in 1 of 2 ways:
  - A lump-sum QALY loss after premature death of the patient.
  - Carer utility decrements for a period after the premature death of the patient, modeled for the rest of the carer's life or the child's life expectancy.
- Limitations: Modeling carer QALY loss/gain after patient death + lump-sum QALY loss = double counting bereavement.

Conclusions

- This is the most comprehensive and up-to-date study investigating the inclusion of carer HRQoL in NICE appraisals, although it is not the first.[2,3]
- There is no clear consensus on committee and EAG preference for incorporating carer HRQoL in cost-utility analyses.
- However, the most frequently used approach to modeling carer HRQoL was the carer disutility approach, rather than the carer utility and absolute carer approaches.
- There appears to be a preference within the EAG and NICE committee to retain continuity across appraisals in similar indications in the modeling methods employed to include carer HRQoL and the sources of estimates.
- The carer perspective is an increasingly important factor in NICE HTA decision making.
- Solid justifications, robust evidence sources, and precedent modeling approaches are required to support the inclusion of carer HRQoL in economic modeling.

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