EE655

Potential Solutions for the Cost-Effectiveness Paradox of Improving Carer Quality-of-Life in Terminal Conditions

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Objectives

Published systematic reviews [1] (updated May 2022) have identified very limited application of carer quality-of-life (QoL) within cost-utility analyses (CUA) for terminal conditions. This is expected given the findings of a previous reviews of the application of carer QoL in NICE appraisal, where in all cases, carer QoL was applied as disutilities [2-4].

Despite treatments providing a benefit for patients, application of carer disutility in terminal conditions via a standard disutility approach [BOX 1] paradoxically results in reduced cost-effectiveness, driven by the removal of carer disutility when the patient has passed. In the absence of comprehensive research determining the impact of bereavement on carer QoL, this study considers potential methods to allow this missed impact on carer QoL in terminal conditions to be incorporated in CUAs.

Standard method: utility decrement/ disutility applied within each health state (HS)

Alive HSs — Carer utility loss applied to patients utility — **Total potential QALYs/year <1**

Death HS — In general, death HS carer utility =0, but other methods can be considered — **=0**

Methods

Alternative methods

Method I: utility increment
Heath state (HS)1 carer increment = HS2 carer disutility – HS1 care disutility i.e. benefit to the carer of maintaining a patient within that HS

Alive HSs — Carer utility gain added to patients utility — **Total potential QALYs/year >1**

Death HS — For comparability, death HS carer utility =0 — **=0**

Method II: average of the patient and carer utility *within each HS*

Alive HSs — Sum of patient and carer utility divided by 2 — **Total potential QALYs/year =1**

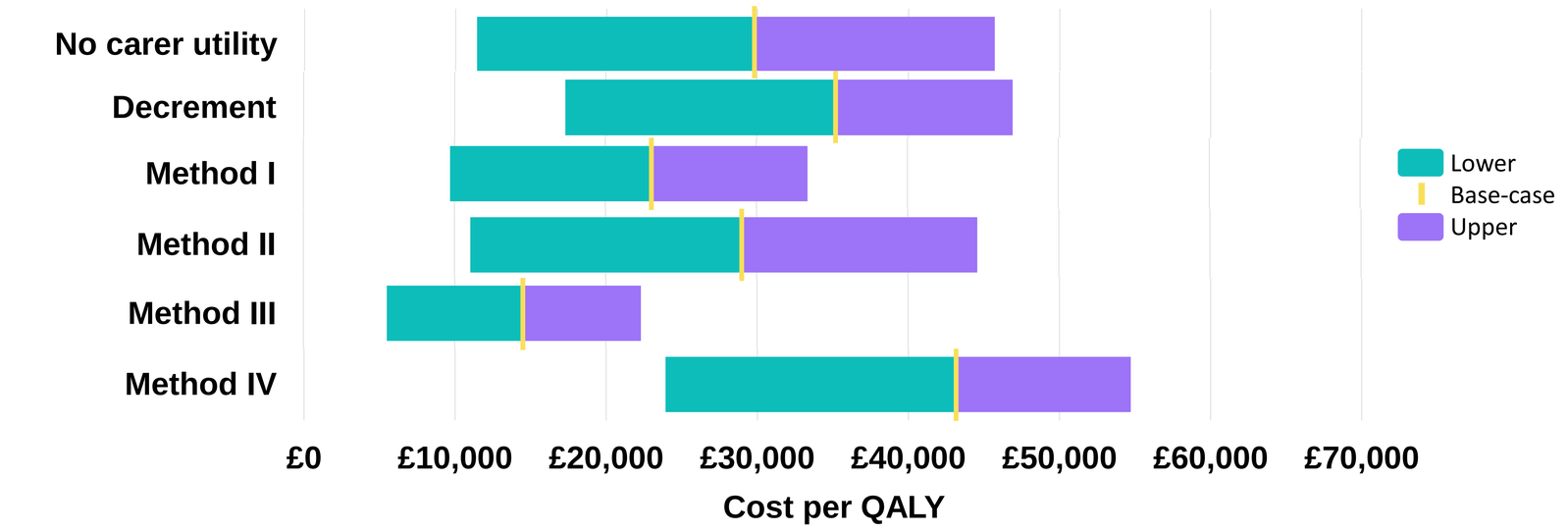
Death HS — For comparability, death HS carer utility =0 — **=0**

Method III: patient and carer utilities are combined within each HS

Alive HSs — Sum of patient and carer utility — **Total potential QALYs/year =2**

Death HS — For comparability, death HS carer utility =0 — **=0**

Figure 1: Base-case and sensitivity analyses (cost per QALY)



Method IV: method III with carer utility post patient death

Alive HSs — Sum of patient and carer utility — **Total potential QALYs/year =2**

Death HS — Carer age-adjusted utility and mortality beyond patient death with no bereavement impact applied — **=1**

Hypothetical model

These methods were compared to the standard disutility approach within a three-health state partitioned survival model.

All data was hypothetical with the model calibrated to a disease with standard-of-care leading to mean progression-free survival (PFS) of one year and mean post-progression survival (PPS) of one year i.e. approximately two years survival with current treatment. The new intervention then provided a six month gain to PFS and a negligible impact on PPS.

Sensitivity analysis

Key parameters varied in sensitivity analysis included:

- Differential in carer impact between PFS and PPS
- Absolute carer impact
- Differential treatment efficacy on PFS and PPS
- Baseline PFS and PPS
- Age of carer

Results

Applying a decrement consistently increased the ICER to varying degrees across scenarios. Method I resulted in consistently lower ICERs, whereas, Method II had a slightly decreased ICERs with most scenarios but a few with marginally higher ICERs. Methods III and IV had significant decreases and increases in the ICERs, respectively.

Key drivers were as expected with i) greater survival gains and ii) greater differential in carer impact across HSs, leading to a more substantial impact of the carer QALY paradox and therefore, a divergence in results across the proposed methods.

Table 1: Base-case results of each method

Method	Incremental cost (£)	Incremental QALYs	ICER	% change from no carer utility
No carer utility	**£10,480**	**0.352**	**£29,783**	-
Decrement	£10,480	0.298	£35,167	18.1%
Method I	£10,480	0.454	£23,081	-22.5%
Method II	£10,480	0.362	£28,978	-2.7%
Method III	£10,480	0.723	£14,489	-51.4%
Method IV	£10,480	0.243	£43,142	44.9%

Conclusion

The range of ICERs (Figure 1) with methods III/IV demonstrate the importance of understanding the impact of bereavement on carer QoL. However, Method I may provide an estimate of the additional value of carer impact for payer deliberation today.

Further research is required on i) the underlying assumption within each method; ii) exploring the application of these methods in more scenarios/ model structures; iii) consideration of alternative utility decrement method (for example re-basing decrement to 0); iv) factoring bereavement in alterative ways (for example having a shorter time horizon for carer impact compared to patients).

This would potentially allow a number of these methods to be combined into a framework and allow HTA bodies to account for carer impact more explicitly when this paradox is evident.

References

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2. L. Richardson, H. Tuson, B. Mikudina, A. Pownel and S. Large (2020) *PNS82 The Methods for Incorporating Carer HRQoL Should be More Clearly Defined By NICE.* Value in Health, Volume 24, S188
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4. Basarir H, Brockbank J, Knight C, Wolowacz (2019) *The Inclusion of Utility Values for Carers and Family Members in HTAs: A Case Study of Recent NICE Appraisals in the U.* Available at: https://www.rtihs.org/sites/default/files/29662%20Basarir%202019%20The%20inclusion%20of%20the%20utility%20values%20for%20carers%20and%20family%20members%20in%20HTAs%20a%20case%20study%20of%20recent%20NICE%20appraisals%20in%20the%20UK.pdf