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Early health technology assessment of artificial intelligence in the intensive care unit: validation of a generic health economic model

L.R. Zwerwer[1*], S. van der Pol[1,2], M.J. Postma[1,2,3,4], A.D.I van Asselt[1,5]

1. Department of Health Sciences, University of Groningen, University Medical Center Groningen, Groningen, the Netherlands 2. Health-Ecore, Zeist, the Netherlands. 3. Department of Economics, Econometrics and Finance, Faculty of Economics and Business, University of Groningen, Groningen, the Netherlands. 4. Center of Excellence for Pharmaceutical Care, Universitas Padjadjaran, Bandung, Indonesia. 5. Department of Epidemiology, University of Groningen, University Medical Center Groningen, Groningen, the Netherlands.
*Presenting author: l.r.zwerwer@rug.nl

Introduction

Recently, an increasing number of studies emerge on improving care for intensive care unit (ICU) patients by using artificial intelligence (AI). The health economic impact of AI systems is quite rarely investigated though. In previously published research[1], we have developed a generic health economic model suitable for early health technology assessment (HTA) of different AI systems in the ICU. In this study we aim to validate this model, using cases taken from literature.

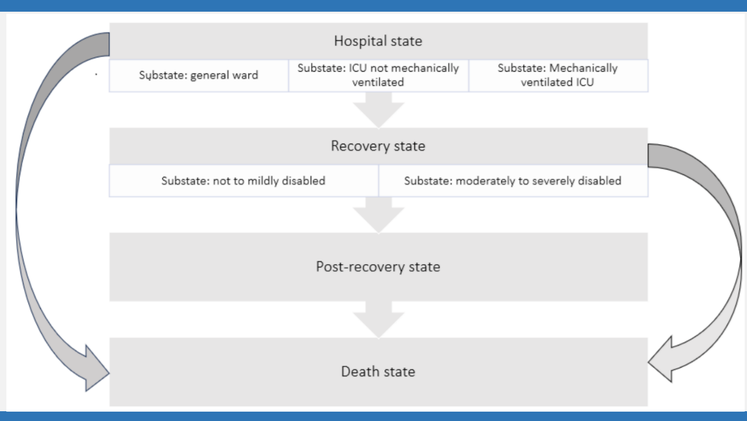
Methods

The generic health economic model simulates patients' life trajectory starting from their hospitalisation until their death. Care with the AI system was compared to care as usual. We applied the generic health economic model to an AI system predicting sepsis, and an AI system predicting ICU discharge. We compared the Incremental Cost Effectiveness Ratio (ICER) from the generic health economic model with results from two previously published health economic studies on these AI systems[2,3].

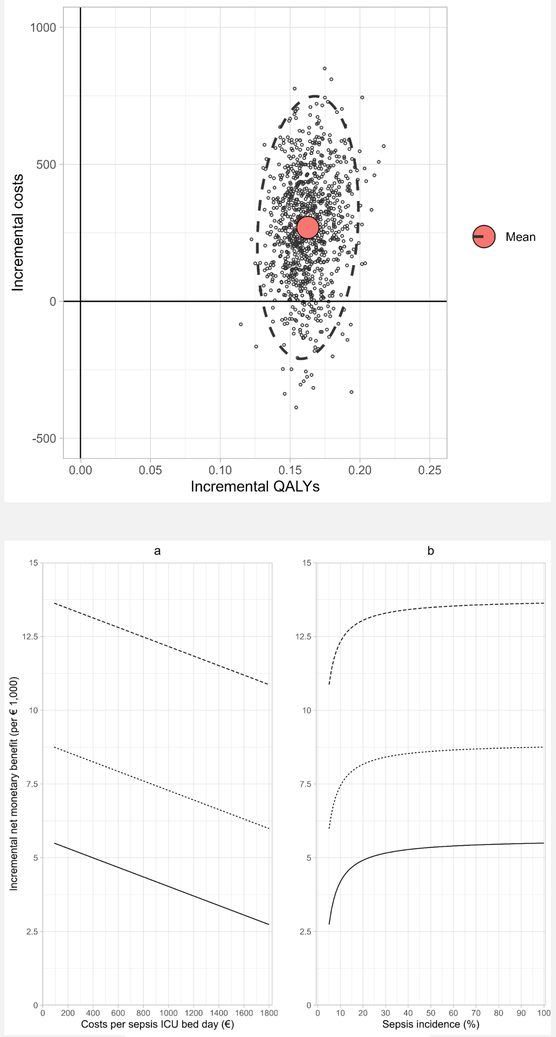
Results

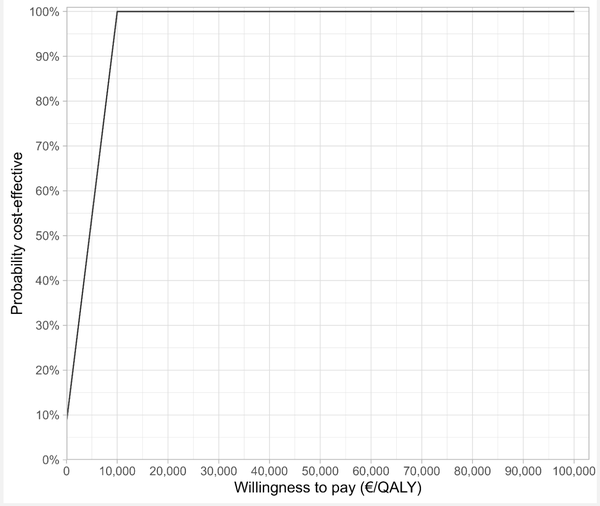
The generic health economic model was able to estimate the cost-effectiveness of both AI systems across different intervention effects. Compared to the previously published studies both ICERs were higher: for the base case of the AI model predicting sepsis, the ICER was €1,704 (vs. ~€-50), and for the AI system predicting ICU discharge, it was €44,929 (vs. €18,507).

The model

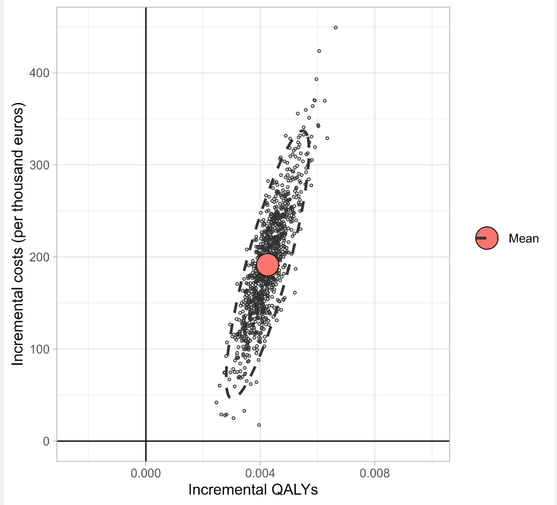


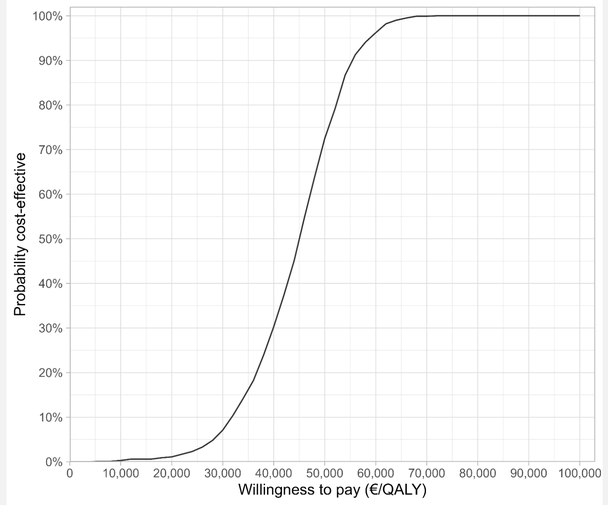
Sepsis study CE results





Early discharge CE results





Conclusion

The validation of the generic health economic model demonstrates the adaptability, flexibility, and reliability of the model. ICERs were higher than in the original study, potentially due to differences in input parameters and reproducibility issues in one of the studies, which requires further investigation. While results of more tailored approaches are likely to be more precise, the time gain of using the generic health economic model is considerable, making it ideal for early HTA of AI systems in the ICU.

References

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