What is the net added value of personalised medicine? A systematic literature review.

Heleen Vellekoop MSc[1], Simone Huygens PhD[1], Matthijs Versteegh PhD[1], Isaac Corro Ramos PhD[1], László Szilberhorn PhD[2], Tamás Zelei PhD[2], Balázs Nagy PhD[2], Rositsa Koleva-Kolarova PhD[3], Apostolos Tsiachristas PhD[3], Prof Sarah Wordsworth PhD[3], Prof Maureen Rutten-van Mölken PhD[1,4], on behalf of the HEcoPerMed consortium

Background and objectives

- Amidst high expectations about the benefits of personalised medicine (PM) as well as concerns about the potentially high costs of implementing PM, we sought an overview of the available evidence on the added value of PM.

Methods

- A systematic literature review was conducted of economic evaluations of PM compared to non-PM published between 2009 and 2019.
- Various data items were extracted for included studies, with key items being patient-level incremental quality-adjusted life-years (ΔQALYs) and incremental costs (Δcosts). Δcosts were expressed in 2020 international dollars (Int $).
- ΔQALYs and Δcosts were combined with estimates of the national cost-effectiveness thresholds (k-thresholds) to calculate the incremental net monetary benefit (ΔNMB) from a healthcare perspective.
- ΔQALYs, Δcosts and ΔNMB were subsequently used as dependent variables in regression analysis, with 'PM category', 'type of treatment' and 'industry sponsorship' as independent variables.
- Random intercepts were used to cluster studies according to country.

Results (1/2)

- Out of 4,774 studies reviewed, 128 were selected, providing cost-effectiveness data for 279 PM interventions.
- Most studies were set in the US (48%) and the UK (16%) and adopted a healthcare perspective (82%).

Figure 1. Incremental QALYs, Costs and NMB (Healthcare perspective)

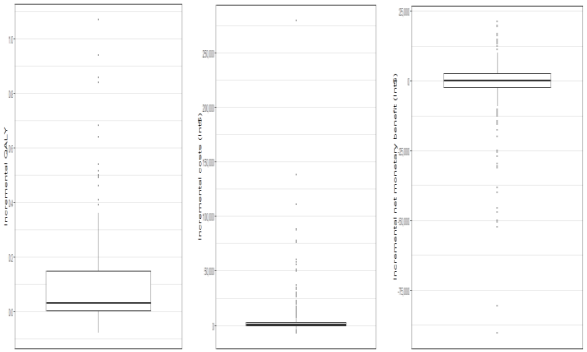
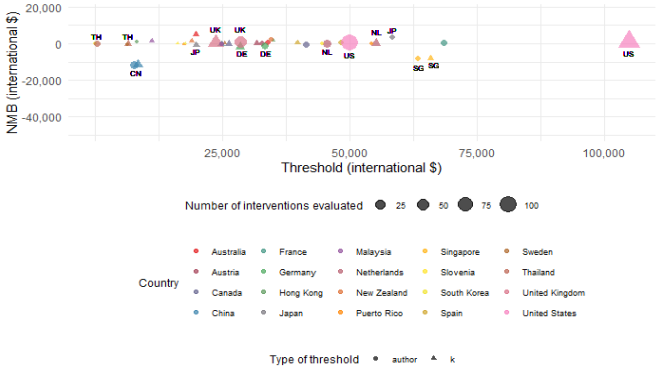


Figure 2. Median incremental net monetary benefit plotted against cost-effectiveness threshold, per country



Results (2/2)

- Cancer treatments (60%) and pharmaceutical interventions (72%) occurred frequently.
- Prognostic tests (19%) and tests to identify (non-)responders (37%) were most and least common, respectively.
- Industry-sponsorship occurred in 32%.
- Only 4% of evaluated interventions were gene therapies.
- Median ΔQALYs, Δcosts and ΔNMB per individual were 0.03, Int$ 575 and Int$ 18, respectively.
- We found large heterogeneity in cost-effectiveness outcomes.
- Regression analysis showed that gene therapies were associated with 3.3 higher ΔQALYs than other interventions, but also with higher costs and much lower (negative) ΔNMB.

Conclusions

- PM brings improvements in health but often at a high cost, resulting in zero to negative NMB on average.
- Pricing policies may be needed to reduce the costs of interventions with negative ΔNMB.
- A more precise division into subcategories of PM may be needed to uncover the most promising areas for further investment.

Affiliations
1 Institute for Medical Technology Assessment, Erasmus University Rotterdam, Rotterdam, The Netherlands
2 Syreon Research Institute, Budapest, Hungary
3 Health Economics Research Centre, University of Oxford, Oxford, UK3 Boehringer Ingelheim International GmbH, Ingelheim am Rhein, Germany
4 Erasmus School of Health Policy and Management, Erasmus University Rotterdam, Rotterdam, The Netherlands

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