

Economic evaluations in healthcare

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Valorisation

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This dissertation aimed to contribute to the clarification of methodological aspects of economic evaluation in terms of bias and quality of life, as measured using the TTO method. It further aimed to assess the cost-effectiveness of ACE inhibitors and ARBs in renal disease, i.e. nephropathy, in various patient populations. All of these studies have clinical, economic and societal implications, as they might help to improve treatment and to more efficiently allocate scarce healthcare resources.

This chapter shows how the main findings of this dissertation could be applied in practice. In addition, possible dissemination strategies and implications for future research and practice are shown.

With regard to the first part of the thesis about methodological aspects, studies on bias in economic evaluations can be helpful for researchers as well as for policymakers, as they provide an overview of the possible biases that should be taken into account in order to perform a good evaluation or to rate an evaluation more adequately. This accounts for trial-based as well as for model-based studies. The ECOBIAS checklist that was developed in this thesis can be seen as a complementary tool next to existing guidelines and checklists to increase the quality of economic evaluations. We discussed the ECOBIAS checklist at this year's annual conference of the Lowland Health Economists' Study Group (LolaHESG). Although a lot of disciplines such as epidemiology and psychology have longstanding traditions of discussing bias, this tradition is not yet established in the field of health economics. One way to do that could be to create an ISPOR taskforce on bias. This could be the next step forward in raising further awareness of the importance of a systematic approach to bias in economic studies. The checklist could be used or recommended by editors and reviewers to assess bias in a systemic way. Submitting a checklist like ECOBIAS together with the research article could be made a requirement for authors, and journals could adjust their author instructions. This would make things more transparent, as literature further suggests that barriers to the use of economic evaluations include a lack of transparency, a limited understanding and sometimes also a lack of quality.¹⁻³ Researchers could agree upon an open storage of models, which would allow for open access to the model structures and data. This would be a significant step towards achieving more transparency. An increased use of economic

evaluations will consequently lead to a more efficient way of allocating healthcare resources, which society will benefit from.

Limiting bias is becoming extremely important, as it increases confidence in and the usability of economic evaluations. Our research on bias has limitations, as discussed in detail in Chapters 2 and 3, and of course further research on bias is needed. We hope that our articles will stimulate other researchers to work further on bias in economic evaluation, which we would consider to be a success.

Our work on the time trade-off method showed that the inclusion of consumption costs in the numerator of the ICER should be considered, not only for life-extending but also for quality-of-life enhancing interventions, at least for those respondents who spontaneously consider non-health-related utility from treatment. Further research should surely be done with other patient populations, diseases and countries, but researchers could adapt those results to create a valid ICER, at least for the disease population investigated. Our results also show that researchers should provide a good description of the impact of disease on consumptive and leisure activities when doing exercises eliciting health valuations from the general public for the purpose of conducting economic evaluations from a societal perspective. Currently, this is rarely the case. This is something which clinical researchers as well as economists should consider and which can be transferred into practice immediately.

The second part of the thesis, i.e. cost-effectiveness analyses of ACE inhibitors and ARBs in renal disease in different patient populations, also has important implications. As there has been an increasing incidence and prevalence of patients undergoing renal replacement therapy in Western countries in recent years, ESRD represents a challenge for healthcare systems. The costs of ESRD treatment amount to €42,000 per patient per year in the Netherlands,^{4,5} and up to €45,000 in Germany⁶ (from a healthcare perspective, respectively), with the proportion of the national expenditures devoted to ESRD in European countries ranging from 0.7% in the UK to 1.8% in Belgium,^{4,7} as mentioned previously.

Hence, ESRD is not only a huge burden from the patients' perspective, as it is associated with a reduced quality of life and life expectancy, but also for healthcare systems. Thus, prevention of ESRD is not only important from a patient and medical viewpoint, but also from a societal viewpoint. Treating

patients with ACE inhibitors or ARBs will delay the state of ESRD, which has a poor prognosis. Our research was extensively discussed on national and international levels, at medical as well as health economic conferences.⁸⁻¹⁸ It has been made available to expert panels and guideline committees and will at least be considered in the next update of treatment guidelines of diabetic and non-diabetic renal disease. Thus, the results of our studies suggest a change of current treatment guidelines. Nevertheless, clinicians should already adapt those results and adjust their treatment regimens. Besides clinical aspects, the economic aspects of treatment, as investigated in Chapters 5 to 7 of the thesis, should be discussed more with clinicians, e.g. at clinical conferences. Here, health economic topics are hardly to be found. This is most likely due to the fact that HTA does not play a role in medical education and that physicians are not familiar with tools and methodologies of health economists. An alternative would be to offer post-doctoral courses for clinicians to get deeper insights into HTA. Optimally, HTA should be better integrated into medical education so that medical students are confronted early and more intensely with HTA topics. Hence, a solid background could be created which allows physicians in training, and eventually physicians in clinical practice, to better understand the drawbacks and opportunities of health economic study results.

All actions mentioned above would have at least two positive effects: first, results from HTA would be transferred to practice faster; and second, overall acceptance of HTA could be improved and anchored into clinical medicine and patient-related treatment decisions.

Further research in other countries besides Germany and the Netherlands is needed to investigate and confirm the transferability of our results from the cost-effectiveness analyses of ACE inhibitors and ARBs. Although the drug classes under investigation are no longer patent-protected, pharmaceutical companies could contribute to the support of research in this field, where significant benefits for patients in terms of quality of life and reduced morbidity can be achieved. As this also accounts for mortality (a life-prolonging effect from treatment was shown), long-term costs and outcomes of a very widespread disease would be influenced in a positive way.

In the light of this research and clinical evidence published on this topic, those drugs should not be kept back from patient groups that would – in the majority of cases – benefit from early treatment. This would lead to better

outcomes in these patient populations and consequently to a societal benefit due to cost-savings in this disease area.

Summing up, our research has some important implications for researchers, clinicians and policymakers. It might be just a small step, and there are still some barriers to overcome, but bringing study results from health economics to clinicians is something this dissertation might have contributed to.

References

1. Bouter LM. Commentary: perverse incentives or rotten apples? *Account Res.* 2015;22: 148-61.
2. Brousselle A, Lessard C. Economic evaluation to inform health care decision-making: promise, pitfalls and a proposal for an alternative path. *Soc Sci Med.* 2011;72(6):832-9.
3. Peters G-JY, Abraham C, Crutzen R. Full disclosure: doing behavioural science necessitates sharing. *Eur Health Psychol* 2012;14:77-84.
4. Vegter S, Perna A, Hiddema W, Ruggenti P, Remuzzi G, Navis G, Postma MJ. Cost effectiveness of ACE inhibitor therapy to prevent dialysis in nondiabetic nephropathy: influence of the ACE insertion/deletion polymorphism. *Pharmacogenet Genomics* 2009;19:695-703.
5. van Os N, Niessen LW, Bilo HJ, Casparie AF, van Hout BA. Diabetes nephropathy in the Netherlands: a cost effectiveness analysis of national clinical guidelines. *Health Policy* 2000;51:135-47.
6. Icks A, Haastert B, Gandjour A, et al. Costs of dialysis—a regional population-based analysis. *Nephrol Dial Transplant.* 2010;25:1647-52.
7. Peeters P, Rublee D, Just PM, Joseph A. Analysis and interpretation of cost data in dialysis: review of Western European literature. *Health Policy* 2000;54:209-27.
8. Adarkwah CC, Gandjour A, Akkerman M, Evers S. Cost-effectiveness of angiotensin-converting enzyme inhibitors and angiotensin II receptor blockers for the prevention of diabetic nephropathy in the Netherlands – a Markov model. CAPHRI annual research meeting, May 19th, 2011, Castle Vaeshartelt, Maastricht, The Netherlands.
9. Adarkwah CC, Gandjour A. Cost-effectiveness of angiotensin-converting enzyme inhibitors and angiotensin II receptor blockers in newly diagnosed type 2 diabetes in Germany. German Diabetes Association Annual Conference (DDG), June 3rd, 2011, Conference Center Leipzig, Leipzig, Germany.
10. Adarkwah CC, Gandjour A. Kosten-Nutzen der ACE-Hemmer-Therapie bei nicht-diabetischer fortgeschrittener chronischer Niereninsuffizienz. German Nephrology Annual Conference 2011, 12th September 2011, Conference Center, Estrel Hotel, Berlin.
11. Adarkwah CC, Gandjour A, Akkerman M, Evers S. Cost-effectiveness of angiotensin-converting enzyme inhibitors for the prevention of diabetic nephropathy in the Netherlands - a Markov model. German Nephrology Annual Conference 2011, 12th September 2011, Estrel Hotel, Berlin.
12. Adarkwah CC, Gandjour A, Akkerman M, Evers S. Cost-effectiveness of angiotensin-converting enzyme inhibitors and angiotensin II receptor blockers for the prevention of diabetic nephropathy in the Netherlands – a Markov model. Annual Conference of the German Association of Primary Care and Family Medicine (DEGAM), 20th-22nd September 2011, Salzburg, Austria.
13. Adarkwah CC, Gandjour A. Cost-effectiveness of angiotensin-converting enzyme inhibitors and angiotensin II receptor blockers in newly diagnosed type 2 diabetes in Germany. Annual Conference of the German Association of Primary Care and Family Medicine (DEGAM), 20th-22nd September 2011, Salzburg, Austria.

14. Adarkwah CC, Gandjour A, Akkerman M, Evers S. Cost-effectiveness of angiotensin-converting enzyme inhibitors and angiotensin II receptor blockers for the prevention of diabetic nephropathy in the Netherlands – a Markov model. 10. Congress on Health Services Research und 10th GAA Annual Conference, Maternushaus Tagungszentrum, 20th-22nd October 2011, Cologne, Germany.
15. Adarkwah CC, Gandjour A, Akkerman M, Evers S. Cost-effectiveness of angiotensin-converting enzyme inhibitors and angiotensin II receptor blockers for the prevention of diabetic nephropathy in the Netherlands – a Markov model. ISPOR Taskforce European Conference, 05th-08th November 2011, Madrid, Spain.
16. Adarkwah CC, Gandjour A, Akkerman M, Evers SM. Cost-effectiveness of angiotensin-converting enzyme inhibitors in non-diabetic advanced renal disease – a Dutch perspective. CAPHRI annual research meeting, April 3rd, 2012, Castle Vaeshartelt, Maastricht, The Netherlands.
17. Adarkwah CC, Gandjour A, Akkerman M, Evers SM. Cost-effectiveness of angiotensin-converting enzyme inhibitors in non-diabetic advanced renal disease – a Dutch perspective. Jahreskongress der Deutschen Gesellschaft für Nephrologie, 6th – 9th October 2012, CCH Congress Center, Hamburg.
18. Adarkwah CC, Gandjour A, Akkerman M, Evers SM. Cost-effectiveness of angiotensin-converting enzyme inhibitors in non-diabetic advanced renal disease – a Dutch perspective. ISPOR 15th Annual European Congress, 03rd-07th November 2012, Berlin.