THE LIFE WORK OF Professor Ben van Hout

2020 ISPOR Avedis Donabedian Outcomes Research Lifetime Achievement Award

He is responsible for many landmark papers in the field of health economics. The diversity of his contributions are remarkable, ranging from the introduction of cost-effectiveness planes that aided the visualization and comprehension of CEA by decision makers, to seminal work on value sets and mapping, and the development of new methods for utility measurement.

This year marks the quarter century anniversary of his landmark paper,¹ introducing the concept of the cost effectiveness acceptability curve.



This seminal paper has become a standard part of the way cost effectiveness analysis is reported and communicated by health economists around the world, advancing the use of probabilistic sensitivity analysis in economic evaluation. Taken together, his work has had a considerable impact establishing the critical role of health technology assessment (HTA) and methods, which has positively impacted population health around the world.

Professor van Hout

has devoted his 35+ year career to the advancement of health economics and outcomes research and to the betterment of the health of a wide range of patient populations. He is arguably one of the most creative and original methodologic pioneers in health economics of his generation. Professor van Hout's work has contributed to the methodology of economic evaluation in multiple ways that have pushed out the frontiers of HEOR science.



He continues his search for innovative solutions for complex problems, and is

currently exploring novel methods to account for unobserved heterogeneity in survival data.¹¹ Some of his work also focus on the joint simulation of the

interactions of patients and physicians and their behaviors in economics models (for instance, to test the value of new molecular tests in precision

medicine).12

was one of the first to apply Bayesian

techniques to the meta-analysis of

observational data.¹⁰

Professor van Hout co-authored the Dutch guidelines concerning cost estimations for economic analyses and has been involved in the development of guidelines regarding pharmaco-economic studies in the Netherlands.^{13,14}

In the early 1990s, he was one of the driving forces behind the establishment of the Institute for Medical Technology Assessment (iMTA) of the Erasmus University Rotterdam.

He is a founding member of the EuroQol Group and initiated the first data modeling for the valuation of the EQ-5D-3L, the most widely known and recommended generic utility measure used in clinical trials and health economics evaluations.¹⁵

For over a decade he chaired the EuroQol Group's Valuation Task Force, which leads the development of new approaches and EuroQol standards to valuing health, demonstrating considerable intellectual leadership. His contributions to the understanding of utilities and their estimation include the use of Bayesian statistics and the combination of discrete choice experiment (DCE) and time-trade off methodologies,¹⁶ and serving as a lead investigator (together with Nancy Devlin) of the England 5-level EQ-5D valuation study.¹⁷ He has also been a pioneer in mapping methods.¹⁸

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Professor van Hout has applied his methodological expertise to many therapeutic areas to improve evidence on cost effectiveness, including:



He has contributed to the quality of healthcare for Dutch cardiovascular patients through his membership in several guideline committees. His work in cardiovascular disease has been applied to multiple areas in numerous publications, including (among others) heart transplant,³ assessment of statins (including the Dutch guideline development),²⁸ interventional cardiology,²⁹ surgery,³⁰ and quality of life research.³¹ In hemophilia, he led some of the work on how to model the chronic nature of this condition^{25,32} and was part of the economic expert working group of the International Prophylaxis Study Group.³³

Professor van Hout is a founding member of the Transfusion Technology Assessment group, a research group within the UMC Utrecht Julius Center that concentrates on the economic assessment of transfusion technology, applying mathematical and statistical models. Professor van Hout has also been an active and supportive member of ISPOR for many years, including number of years contributing to the advanced modeling short course. His presentations in issues panels and workshops are memorable, impassioned and as insightful as they are idiosyncratic!

He is a member of the editorial board of *PharmacoEconomics*. He has been a referee for the *Journal of Health Economics, Medical Decision Making, Health Economics, European Heart Journal, Social Science and Medicine* and *The Lancet*. He has (co-)authored over 130 articles and has published in notable journals like *The Lancet*,³⁴ *British Medical Journal*,³⁵ *JAMA*,³⁶ and the *New England Journal of Medicine*.³⁷

Professor van Hout is one of the founders of Pharmerit, now OPEN Health, an international health economics and outcomes research organization whose mission is to improve patient access to health care through evidence. He has also acted as an advisor to numerous government agencies and leading pharmaceutical companies.

Finally, Professor van Hout is especially known for his truly original thinking, his continuous search for innovative solutions to complex problems, the humor with which he makes his points and interacts with his colleagues, and his often-brilliant presentations (including at ISPOR).^{38,39,40}

Those of us who have had the privilege of working with him can attest to having witnessed a truly brilliant mind at work, matched by a very big heart.

References:

- 1 Van Hout BA, M Al, GS Gordon, FFH Rutten. Costs, effects and C/E-ratio's alongside a clinical trial. *Health Economics*, 1994, 3, 309-319.
- 2 van Hout B. Costs, effects and scenarios of the Dutch heart transplant programme. PhD Dissertation.
- 3 van Hout B, Bonsel G, Habbema D, van der Maas P, de Charro F. Heart transplantation in the Netherlands; costs, effects and scenarios. *J Health Econ.* 1993;12(1):73-93.
- 4 See for instance: Al MJ, van Hout BA, Michel BC, Rutten FF. Sample size calculation in economic evaluations. *Health Econ.* 1998;7(4):327-335.
- 5 van Hout BA, Al MJ, Gordon GS, Rutten FF. Costs, effects and C/E-ratios alongside a clinical trial. *Health Econ.* 1994;3(5):309-319.
- 6 Al MJ, van Hout BA. A Bayesian approach to economic analyses of clinical trials: the case of stenting versus balloon angioplasty. *Health Econ.* 2000;9(7):599-609.
- 7 van Hout BA. Discounting costs and effects: a reconsideration. Health Econ. 1998;7(7):581-594.
- 8 Brouwer W, van Hout BA. Diminishing marginal utility and discounting future effects have similar consequences [letter]. BMJ. 1998;317(7166):1155.
- 9 Devlin N, Shah K, Mulhern B, Pantiri K, van Hout B. A New Valuation Method: Directly Eliciting Personal Utility Functions. https://www.ohe.org/publications/new-valuation-method-directly-eliciting-personalutility-functions#. Office of Health Economics Research Paper 17/06. Published August 2017. Accessed February 4, 2018.
- 10 Treur MJ, McCracken F, Heeg B, Joshi AV, Botteman MF, de Charro F, van Hout B. Efficacy of recombinant activated factor VII vs. activated prothrombin complex concentrate for patients suffering from haemophilia complicated with inhibitors: a Bayesian meta-regression. *Haemophilia*. 2009;15(2):420-436.
- 11 Majer IM, Gueron B, Kotapati S, Van Hout B. Extrapolating survival in a heterogeneous patient population with metastatic melanoma; a case study of integrating statistical and clinical consideration. *Value in Health.* 2013, 16(7):A594
- 12 Van Hout B, Botteman M, Dukler A. The value of a predictive diagnostic blood test in multiple sclerosis (MS). *Value in Health.* 2010;13(3):A137.
- 13 Rutten FFH, van Ineveld BM, van Ommen R, van Hout BA, Huijsman R. Cost calculation in health care research; practical guidelines [in Dutch]. STG boek.
- 14 Casparie AF, van Hout BA, Simoons ML. Guidelines and costs [in Dutch]. Ned Tijdschr Geneeskd. 1998; 142(38):2075-2077.
- 15 van Hout BA, McDonnell J. Estimating a parametric relation between health description and health valuation using the EuroQol. Lund 1991 EuroQol Proceedings. Later published as: Busschbach JJV, McDonnell J, Essink-Bot ML, van Hout BA. Estimating parametric relations between health description and health valuation with an application to the EuroQol instrument. J Health Econ. 1999;18:551-571.
- 16 Rowen D, Brazier J, van Hout B. A comparison of methods for converting DCE values onto the full healthdead QALY scale. *Med Decis Making*. 2015;35(3):328-40. doi: 10.1177/0272989X14559542. Epub 2014 Nov 14.
- 17 Devlin NJ, Shah KK, Feng Y, Mulhern B, van Hout B. Valuing health-related quality of life: An EQ-5D-5L value set for England. *Health Econ.* 2017;1-16. doi: 10.1002/hec.3564.
- 18 See for instance: van Hout B, Janssen MF, Feng YS, Kohlmann T, Busschbach J, Golicki D, Lloyd A, Scalone L, Kind P, Pickard AS. Interim scoring for the EQ-5D-5L: mapping the EQ-5D-5L to EQ-5D-3L value sets. *Value Health.* 2012;15(5):708-715.
- 19 Michel BC, van Hout BA, Bonsel GJ. Assessing the benefits of transplant services. *Baillieres Clin Gastroenterol.* 1994;8(3):411-423.
- 20 Beutels P, Edmunds WJ, Antoñanzas F, De Wit GA, Evans D, Feilden R, Fendrick AM, Ginsberg GM, Glick HA, Mast E, Péchevis M, Van Doorslaer EK, van Hout BA; Viral Hepatitis Prevention Board. Economic evaluation of vaccination programmes: a consensus statement focusing on viral hepatitis. *Pharmacoeconomics.* 2002;20(1):1–7.
- 21 Groener MG, van Ineveld BM, Byttebier G, van Hout BA, Rutten FF. An economic evaluation of Tomudex _(raltitrexed) and 5-fluorouracil plus leucovorin in advanced colorectal cancer. *Anti-Cancer Drugs.* 1999;10(3):283-288.
- 22 See for instance: de Laet CE, van Hout BA, Hofman A, Pols HA. The burden of osteoporosis in the

Netherlands [in Dutch]. Ned Tijdschr Geneeskd. 1996;140(33):1684-1688.

- 23 Stephens S, Botteman MF, Cifaldi MA, van Hout BA. Modelling the cost-effectiveness of combination therapy for early, rapidly progressing rheumatoid arthritis by simulating the reversible and irreversible effects of the disease. *BMJ Open.* 2015; 5(6):e006560.
- 24 van Hout BA, Rutten FFH, Lorijn RHW. Cost-effectiveness of treatment of patients with sepsis with HA-1A lin Dutch]. *Ned Tijdschr Geneeskd.* 1993;137(7):360-364.
- 25 Angus DC, Linde-Zwirble WT, Clermont G, Ball DE, Basson BR, Ely EW, Laterre PF, Vincent JL, Bernard GR, van Hout B. Cost-effectiveness of drotrecogin alfa (activated) in the treatment of severe sepsis. *Crit Care Med.* 2003;31(1):1-11.
- 26 See for instance: Janssen MP, Cator EA, van der Poel CL, Schaasberg WP, Bonsel GJ, van Hout BA. Monitoring viral incidence rates: tools for the implementation of European Union regulations. *Vox Sang.* 2009;96(4):298-308.
- 27 See for instance: Fischer K, van Hout BA, van der Bom JG, Grobbee DE, van den Berg HM. Association between joint bleeds and Pettersson scores in severe haemophilia. *Acta Radiol.* 2002;43(5):528-532. PMID: 12423465.
- 28 See for instance: van Hout BA, Simoons ML. Cost-effectiveness of HMG coenzyme reductase inhibitors; whom to treat? *Eur Heart J.* 2001;22(9):751-761.
- 29 See for instance: van Hout BA, van der Woude T, de Jaegere P, van den Brand M, van Es GA, Serruys PW, Morel MA. Costs and effects of stent implantation versus PTCA, The BENESTENT experience. *Semin Interv Cardiol.* 1996;1(4):263-268
- 30 VandenBergh MF, Kluytmans JA, van Hout BA, Maat AP, Seerden RJ, McDonnel J, Verburgh HA. Cost effectiveness of perioperative mupirocin nasal ointment in cardio thoracic surgery. *Infect Control Hosp Epidemiol.* 1996;17(12):786-792.
- 31 Cohen D J, van Hout B, Serruys PW, Mohr FW, Macaya C, den Heijer P, Vrakking MM, Wang K, Mahoney EM, Audi S, Leadley K, Dawkins KD, Kappetein AP; Synergy between PCI with Taxus and Cardiac Surgery Investigators. Quality of life after PCI with drug-eluting stents or coronary-artery bypass surgery. N Engl J Med. 2011;364(11):1016-1026.
- 32 Fischer K, Pouw ME, Lewandowski D, Janssen MP, van den Berg HM, van Hout BA. A modeling approach to evaluate long-term outcome of prophylactic and on demand treatment strategies for severe hemophilia A. *Haematologica*. 2011;96(5):738-743. doi: 10.3324/haematol.2010.029868. Epub 2011 Jan 27.
- 33 Nicholson A, Berger K, Bohn R, Carcao M, Fischer K, Gringeri A, Hoots K, Mantovani L, Schramm W, van Hout BA, Willan AR, Feldman BM. Recommendations for reporting economic evaluations of haemophilia prophylaxis: a nominal groups consensus statement on behalf of the Economics Expert Working Group of The International Prophylaxis Study Group. *Haemophilia*. 2008;14(1):127-132.
- 34 Serruys PW, van Hout B, Bonnier H, Legrand V, Garcia E, Macaya C, Sousa E, van der Giessen W, Colombo A, Seabra-Gomes R, Kiemeneij F, Ruygrok P, Ormiston J, Emanuelsson H, Fajadet J, Haude M, Klugmann S, Morel MA. Randomised comparison of implantation of heparin-coated stent with balloon angioplasty in selected patients with coronary artery disease (Benestent II). *Lancet.* 1998;352(9129):673-681.
- 35 De Laet CE, van Hout BA, Burger H, Hofman A, Pols HA. Bone density and risk of hip fracture risk in men and women: cross sectional analysis. *BMJ.* 1997;315(7102):221-227.
- 36 van Bergen PF, Jonker JJ, van Hout BA, van Domburg RT, Deckers JW, Hofman A. Cost and effects of longterm oral anticoagulant treatment after myocardial infarction. *JAMA*. 1995; 273(12):925-928.
- 37 Serruys PW, Unger F, Sousa JE, Jatene A, Bonnier HJ, Schonberger JP, Buller N, Bonser R, van den Brand MJ, van Herwerden LA, Morel MA, van Hout BA. Comparison of coronary-artery bypass surgery and stenting for the treatment of multivessel disease. *N Engl J Med.* 2001;344(15):1117-1124.
- 38 Best contributed paper award poster presentation: Gagnon DD, Martin SC, van Hout B. Comparing mean vs median survival as a prelude to cost-effectiveness (C/E) analysis. Poster presented at: ISPOR 6th Annual International Meeting; May 21, 2001; Arlington, VA.
- 39 Best new investigator research presentation podium award: Lieuw On MML, Heeg BMS, De Charro F, van Hout BA. Comparison of three meta-models for uncertainty analysis. Presented at: ISPOR 12th Annual European Congress; October 26, 2009; Paris, France.
- 40 Best podium research presentation award: van Hout BA, Oppe M. Combining DCE and TTO into a single value function. Presented at: ISPOR 14th Annual European Congress; November 7, 2011; Madrid, Spain.