

Prerequisites for cost-effective Home Blood Pressure Telemonitoring: Insights from an early health economic analysis



Job van Steenkiste, MD*^{1,2,3}, <u>Pim van Dorst</u>, MSc*^{4,5}, Daan Dohmen¹, Prof, PhD, and Cornelis Boersma^{1,4,5}, Prof, PhD ¹Faculty of Management Sciences, Open University, ²Department of Internal Medicine, Maasstad Hospital, ³Department of Hospital Pharmacy, Erasmus MC University Medical Center, ⁴University of Groningen, University Medical Center Groningen, Department of Health Sciences, ⁵Health-Ecore Ltd. *Authors contributed equally

Introduction

Methods

Home Blood Pressure Telemonitoring (HBPT) has been proposed to enhance adherence and optimize healthcare delivery in patients with hypertension [1-3], but widespread adoption of HBPT is still limited in the Netherlands. Clinical trials evaluating the effectiveness of HBPT often have limited follow-up durations and only demonstrate short-term benefits on blood pressure control [4]. Evidence on long-term advantages, such as reductions in cardiovascular (CV) events, is lacking as are cost-effectiveness analyses on the long-term added value of HBPT.

To improve adoption, there is a need to quantify the long-term value of HBPT in terms of costs and health outcomes while considering the limited data availability on resource use and effectiveness.

We aim to quantify the potential of HBPT in terms of costeffectiveness with an early health economic analysis in patients with hypertension and identify important prerequisites for costeffective implementation of HBPT.

A decision analytic Markov model (see figure 1) was developed with a lifetime (30 years) time horizon. The model included a hypothetical population of 1,000 patients and consisted of 12 health states (Figure 1).

Patient population

Patients without a history of CV events receiving treatment for hypertension.

Standard-of-Care

Patients are treated with drug therapy and lifestyle interventions. Patients would on average have three outpatient department (OPD) consultations with their clinician during each 1-year cycle.

HBPT intervention

Patients received similar drug treatment compared to the usual care group. With the HBPT intervention, patients measured their blood pressure at home based on a measurement schedule in line with the latest ESH guidelines. These measurements were transmitted to the hospital using a smartphone- or tablet app (Luscii). Automated alerts were generated in off-target patients. Specialized e-nurses assessed all the alarms generated by the monitoring platform and discussed these alarms with clinicians if needed.



Figure 1. Markov model including 12 different health states

In the base-case, the incremental costs and effects of HBPT vs. Standardof-Care were € 1,267,034 and 62.43 QALYs, respectively. The resulting ICER for the base-case analysis was € 20,297 per QALY.



HBPT is cost-effective in case a 51% reduction in consultations is realized

HBPT will become cost-effective (< \leq 20,000 per QALY) with the current reimbursement of € 504 per year at 1.48 OPD consultations per year and will become cost-saving at 1.18 OPD consultations per year (see Figure 2).



The younger the age of the patient starting with HBPT, the lower the ICER. If HBPT is started at an age of 64 or below, HBPT could be



considered a cost-effective intervention.

Conclusion

Based on the current early health economic analysis, we found HBPT to be cost-effective, provided it will result in a genuine digital transformation in healthcare and thereby substantially reduce the number of standard outpatient department consultations with 51%.

Number of consultations per year

Figure 2. ICER results of scenario analysis calculated over a range of costs for HBPT per year and a range of the number of consultations per year.

References

- 1. Schelleman H, Klungel OH, Kromhout D, de Boer A, Stricker BH, Verschuren WM. Prevalence and determinants of undertreatment of hypertension in the Netherlands. J Hum Hypertens. 2004 May;18(5):317-24. PMID: 15103311
- 2. Duan Y, Xie Z, Dong F, Wu Z, Lin Z, Sun N, Xu J. Effectiveness of home blood pressure telemonitoring: a systematic review and meta-analysis of randomised controlled studies. J Hum Hypertens. 2017 Jul;31(7):427-37. PMID: 28332506.
- 3. Versmissen J, van Steenkiste J, Koch BCP, Peeters LEJ. 'Under pressure': The role of therapeutic drug monitoring in the treatment of hypertension. Br J Clin Pharmacol. 2024 Jun 7. PMID: 38845455.
- 4. Kaihara T, Intan-Goey V, Scherrenberg M, Falter M, Kario K, Akashi Y, Dendale P. Automatic transmission of home blood pressure data can be effective in managing hypertension: a systematic review and meta-analysis. Eur Heart J Digit Health. 2022 Dec;3(4):638-53. PMID: 36710899.

www.health-ecore.com – contact: pimvandorst@health-ecore.com



