

CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

Home Blood Pressure Monitors: Clinical Accuracy and Guidelines

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Research Questions

1. What is the clinical accuracy of home blood pressure monitors for patients with chronic conditions?
2. What are the evidence-based guidelines regarding the accuracy of home blood pressure monitors compared with in-office blood pressure monitors?

Key Findings

One meta-analysis was identified regarding the clinical accuracy of home blood pressure monitors for patients with chronic conditions. No relevant evidence-based guidelines were identified regarding the accuracy of home blood pressure monitors compared with in-office blood pressure monitors.

Methods

A limited literature search, with main concepts appearing in title, abstract, or major subject heading, on key resources including PubMed, the Cochrane Library, University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. Methodological filters were applied to limit retrieval to health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, and guidelines. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2014 and January 25, 2019. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Individuals with chronic conditions requiring at home monitoring of blood pressure (e.g., hypertension, hypotension, masked hypertension, white coat syndrome, pregnancy)
Intervention	Upper arm digital home blood pressure monitor (out-of-office blood pressure monitor, home sphygmomanometer)
Comparator	In-office digital blood pressure monitors
Outcomes	Q1: Clinical accuracy (e.g., difference in mmHg) Q2: Guidelines regarding testing of blood pressure monitors for accuracy, guidelines regarding the clinically acceptable measurement difference between monitors
Study Designs	Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, evidence based guidelines

Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials and evidence-based guidelines.

One meta-analysis was identified regarding the clinical accuracy of home blood pressure monitors for patients with chronic conditions. No relevant health technology assessments or randomized controlled trials were identified. Furthermore, no evidence-based guidelines were identified regarding the accuracy of home blood pressure monitors compared with in-office blood pressure monitors.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings

One meta-analysis¹ was identified regarding the clinical accuracy of home blood pressure monitors for patients with chronic conditions. In a comparison of automated office blood pressure with other blood pressure measurement techniques, authors of the meta-analysis observed no significant differences between automated office blood pressure and home blood pressure monitoring.¹

No relevant evidence-based guidelines were identified; therefore, no summary can be provided.

References Summarized

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

1. Pappaccogli M, Di Monaco S, Perlo E, et al. Comparison of automated office blood pressure with office and out-off-office measurement techniques. *Hypertension*. 2019;73(2):481-490.
[PubMed: PM30624994](#)

Randomized Controlled Trials

No literature identified.

Guidelines and Recommendations

No literature identified.

Appendix — Further Information

Systematic Reviews and Meta-Analyses

Alternative Comparator – Mercurial Sphygmomanometer

2. Bello NA, Woolley JJ, Cleary KL, et al. Accuracy of blood pressure measurement devices in pregnancy: a systematic review of validation studies. *Hypertension*. 2018;71(2):326-335.
[PubMed: PM29229741](#)
3. Piper MA, Evans CV, Burda BU, et al. Screening for high blood pressure in adults: a systematic evidence review for the U.S. Preventive Services Task Force. (*Evidence syntheses no. 121*). Rockville (MD): Agency for Healthcare Research and Quality; 2014: <https://www.ncbi.nlm.nih.gov/books/NBK269495/>. Accessed 2019 Feb 07.

Intervention Insufficiently Described

4. Clark CE, McDonagh STJ, McManus RJ. Accuracy of automated blood pressure measurements in the presence of atrial fibrillation: systematic review and meta-analysis. *J Hum Hypertens*. 2019.
[PubMed: PM30631126](#)
5. Reboussin DM, Allen NB, Griswold ME, et al. Systematic review for the 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Circulation*. 2018;138(17):e595-e616.
[PubMed: PM30354656](#)

Randomized Controlled Trials – Uncertain Comparator

6. Muhammad J, Jamial MM, Ishak A. Home blood pressure monitoring has similar effects on office blood pressure and medication compliance as usual care. *Korean J Fam Med*. 2019.
[PubMed: PM30636386](#)

Non-Randomized Studies

7. Kollias A, Papadatos SS, Dominiczak AF, Parati G, Stergiou GS. Automated office blood pressure measurements in primary care are misleading in more than one third of treated hypertensives: the VALENTINE-Greece home blood pressure monitoring study. *Hellenic J Cardiol*. 2019.
[PubMed: PM30639355](#)

Comparator Insufficiently Described

8. Cupisti A, Ghiadoni L, Zullo C, et al. Home blood pressure measurement as a systematic tool for clinical practice in CKD patients: a real-world picture. *Panminerva Med.* 2018;60(1):1-7.
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[PubMed: PM25143267](#)
10. Niiranen TJ, Asayama K, Thijs L, et al. Optimal number of days for home blood pressure measurement. *Am J Hypertens.* 2015;28(5):595-603.
[PubMed: PM25399016](#)

Alternative Comparator – Mercurial or Aneroid Sphygmomanometers

11. L H, Desai N, Bhandiwad A. Self home blood pressure monitoring in pregnancy: how reliable is it? *Int J Reprod Contracept Obstet Gynecol.* 2018;7(2):419-423.
<https://www.ijrcog.org/index.php/ijrcog/article/view/4195>
12. Topouchian J, Hakobyan Z, Asmar J, Gurgonian S, Zelveian P, Asmar R. Clinical accuracy of the Omron M3 Comfort((R)) and the Omron Evolv((R)) for self-blood pressure measurements in pregnancy and pre-eclampsia - validation according to the Universal Standard Protocol. *Vasc Health Risk Manag.* 2018;14:189-197.
[PubMed: PM30214220](#)
13. Treskes RW, Wolterbeek R, van der Velde ET, Eindhoven DC, Schaliij MJ. Comparison of the diagnostic accuracy of four smartphone-compatible blood pressure monitors in post-myocardial infarction patients. *J Telemed Telecare.* 2018;24(6):404-409.
[PubMed: PM28457182](#)
14. Ringrose JS, Polley G, McLean D, Thompson A, Morales F, Padwal R. An assessment of the accuracy of home blood pressure monitors when used in device owners. *Am J Hypertens.* 2017;30(7):683-689.
[PubMed: PM28430848](#)
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[PubMed: PM27096901](#)
16. Ruzicka M, Akbari A, Bruketa E, Kayibanda JF, Baril C, Hiremath S. How accurate are home blood pressure devices in use? A cross-sectional study. *PLoS One.* 2016;11(6):e0155677.
[PubMed: PM27249056](#)

17. Wu N, Zhang X, Wang W, Zhang H. Validation of the Andon KD5031 for clinical use and self-measurement according to the European Society of Hypertension International Protocol. *Blood Press Monit.* 2016;21(5):310-312.
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[PubMed: PM26544523](#)
19. Takahashi H, Yoshika M, Yokoi T. Validation of two automatic devices for the self-measurement of blood pressure according to the ANSI/AAMI/ISO81060-2:2009 guidelines: the Omron BP765 (HEM-7311-ZSA) and the Omron BP760N (HEM-7320-Z). *Vasc Health Risk Manag.* 2015;11:49-53.
[PubMed: PM25657587](#)
20. Wu N, Zhang X, Wang W, Zhang H. Validation of the Konsung QD217A for clinical use and self-measurement according to the European Society of Hypertension International Protocol. *Blood Press Monit.* 2015;20(4):225-227.
[PubMed: PM25715088](#)

Review Articles

21. O'Brien E, Stergiou GS, Turner MJ. The quest for accuracy of blood pressure measuring devices. *J Clin Hypertens (Greenwich).* 2018;20(7):1092-1095.
[PubMed: PM30003703](#)
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[PubMed: PM30382178](#)
23. Cloutier L, Daskalopoulou SS, Padwal RS, et al. A new algorithm for the diagnosis of hypertension in Canada. *Can J Cardiol.* 2015;31(5):620-630.
[PubMed: PM25828374](#)
24. Daskalopoulou SS, Rabi DM, Zarnke KB, et al. The 2015 Canadian Hypertension Education Program recommendations for blood pressure measurement, diagnosis, assessment of risk, prevention, and treatment of hypertension. *Can J Cardiol.* 2015;31(5):549-568.
[PubMed: PM25936483](#)

Additional References

Position Statements

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[PubMed: PM27214089](#)