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The Accuracy of Blood Pressure Measurement by Two Cuff-Less Wearable and Portable Health Devices

Dylan M. Bard

Thomas Jefferson University, dylan.bard@jefferson.edu

Noud van Helmond

Thomas Jefferson University, noud.van.helmond@jefferson.edu

Christina Hahnen

Thomas Jefferson University, christina.hahnen@jefferson.edu

Nilanjan Haldar

Thomas Jefferson University, nilanjan.haldar@jefferson.edu

Cecilia Freeman

*Thomas Jefferson University, cecilia.freeman@jefferson.edu**See next page for additional authors*

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Authors

Dylan M. Bard, Noud van Helmond, Christina Hahnen, Nilanjan Haldar, Cecilia Freeman, Jacquelyn N. Hamati, Vignesh Murali, and Jeffrey I. Joseph

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Dylan Bard
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The Accuracy of Blood Pressure Measurement by Two Cuff-Less Wearable and Portable Health Devices

Noud van Helmond¹, Cecilia G. Freeman², Christina Hahnen¹, Nilanjan Haldar², Jacquelyn N. Hamati², Dylan M. Bard², Vignesh Murali², Geno J. Merli³, Jeffrey I. Joseph¹

¹Department of Anesthesiology, Sidney Kimmel Medical College, Thomas Jefferson University, Philadelphia, PA, USA

²Sidney Kimmel Medical College, Thomas Jefferson University, Philadelphia, PA, USA

³Department of Internal Medicine, Sidney Kimmel Medical College, Thomas Jefferson University, Philadelphia, PA, USA

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Introduction: Wearable and portable devices that claim to measure blood pressure without the need of a cuff are becoming increasingly popular among consumers. Given that hypertension is the leading cause for cardiovascular mortality worldwide, a portable technology that allows consumers to easily measure their BP several times a day would be of great value. However, the convenience that portable health technology provides is useless, and even dangerous, if the measurements are inaccurate.

Objective: Investigate the accuracy of two popular commercial cuff-less BP device, the Bodimetrics Performance Monitor and Everlast TR10 watch.

Methods: A sample of 127 ambulatory patients (>18y) were recruited from the Thomas Jefferson University Hospital Preadmission Testing Center. Following the 2013 ANSI/AAMI/ISO standard protocol for evaluating non-invasive automated sphygmomanometers, four reference and three investigational BP measurements were obtained after a five minute initial rest period. Reference measurements were taken with the validated Cardiocap 5 sphygmomanometer.

Results: 85 subjects met inclusion criteria. The average absolute differences (SD) between the Everlast watch and reference were 22.7 (27.4) mmHg for SBP and 6.9 (6.2) mmHg for DBP. The average absolute difference (SD) between the BodiMetrics Performance Monitor and the reference was 5.3 (4.7) mmHg for systolic BP.

Discussion: The Everlast fitness watch tested is not accurate enough to be used as BP measurement device. The Bodimetrics device was more accurate, likely due to calibration immediately prior to validation, but even with this advantage the BP device failed to meet accuracy guidelines. Widespread use of this technology likely results in the misclassification of patients' BP status.