Policy Statement of the World Hypertension League on non-invasive blood pressure measurement devices and blood pressure measurement in the clinical or community setting

The Authors listed below include members of the WHL Blood Pressure (BP) screening group and added external experts.

Norm RC Campbell, MD, Departments of Medicine, Community Health Sciences and of Physiology and Pharmacology, Libin Cardiovascular Institute, University of Calgary, Canada, 3280 Hospital Drive NW, Calgary Alberta, T2N 4Z6, Tel. No.: 001 403-210-7961, E-mail: ncampbell@ucalgary.ca. Dr. Campbell has no conflicts of interest to declare.

Lyne Cloutier, inf. Ph.D. Professeure titulaire Département des sciences infirmières, Université du Québec à Trois-Rivières. E-mail: Lyne.Cloutier@uqtr.ca. Dr. Cloutier has no conflicts of interest to declare.

Mark Gelfer, MD, Department of Family Practice, University of British Columbia, Vancouver, Canada, +1-604-619-6022, E-mail: mgelfer@telus.net. Dr. Gelfer has no conflicts of interest.

John G. Kenerson, MD, FACC, Colleagues in Care, Cardiovascular Associates, 1708 Old Donation Parkway, Virginia Beach, Virginia 23454, Tel. No.: +757 419-3000; E-mail: jgkcic@gmail.com. Dr. Kenerson has no conflicts to declare.

Tej K Khalsa, MD, Department of Medicine, University of Calgary, Canada. Foothills Medical Centre North Tower, 9th Floor, 1403 - 29th Street NW, Calgary Alberta, T2N 2T9, Tel. No.: 001 403-210-7961, E-mail: thekhalsas@gmail.com. Dr. Khalsa has no conflicts of interest to declare.

Daniel Lemogoum, MD, FESC, Department of Cardiovascular Medicine, Faculty of Medicine and Pharmaceutical Sciences, University of Douala, PO box 1236 Douala, Cameroon, E-mail: dlems2002@yahoo.fr. Dr. Lemogoum has no conflicts of interest to declare.

Birinder K. Mangat, MD. Departments of Medicine, University of Calgary, Canada, 3280 Hospital Drive NW, Calgary Alberta, T2N 4Z6, Tel. No.: 001 403-210-7961, E-mail: biri.mangat@gmailcom. Dr. Mangat has no conflicts of interest to declare.

Sailesh Mohan, MD, MPH, PhD. Public Health Foundation of India, 4 Institutional Area, ISID Campus, Vasant Kunj, New Delhi-110070, India. Tel. No.: +091-11-4956-6000, E-mail: smohan@phfi.org. Dr. Mohan has no conflicts of interest to declare.

Martin G. Myers, MD, FRCPC, Division of Cardiology, Schulich Heart Program, Sunnybrook Health Sciences Centre, Department of Medicine, University of Toronto, Toronto, ON, Canada, Tel. No.: +416-480-4927, E-mail: Martin.Meyers@sunnybrook.ca. Dr. Myers has no conflicts of interest to declare.
Eoin O’Brien, DSc, MRCP. Conway Institute of Biomolecular Research, University College Dublin, Belfield, Dublin 4, Ireland. Tel: +353-1-280-3865, E-mail: eobrien@iol.ie. Dr. O’Brien has no conflicts of interest to declare.

George S. Stergiou, MD, FRCP, Hypertension Center, STRIDE Hellas-7, Third University Department of Medicine, Sotiria Hospital, 152 Mesogion Avenue, Athens 11527, Greece. Tel No.: +30 210-776-3117, Fax: +30 2107719981, E-mail: gstergi@med.uoa.gr. Dr. Stergiou has received lecture payments from Omron Healthcare and consultation fees from Microlife AG.

Eugenia Velludo Veiga, Nurse PhD, Associate Professor at a General and Specialized Nurse. At Nursing College of Ribeirao Preto of University of São Paulo. E-mail: evveiga@eerp.usp.br. Dr. Veiga has no conflicts of interest to declare.

Xin-Hua Zhang, MD, Professor of Medicine, Beijing Hypertension League Institute, Room 819, Block A2, Bailangyuan, Fuxing Road A36 Haidian District, Beijing 100039, China. E-mail: zhang_xh@hotmail.com.au. Dr. Zhang has no conflicts of interest to declare.

Adel E. Berbari, MD, FRCP, Professor of Medicine/Physiology, President Lebanese Hypertension League, Member, ISH Eastern Europe and Middle East Regional Advisory Group (RAG), American University of Beirut Medical Center, PO Box 11-0236, Riad El Solh 1107 2020, Beirut, Lebanon. E-mail: ab01@aub.edu.lb. Dr. Berbari has no conflicts of interest to declare.

Daniel T. Lackland, Dr. PH, Professor, Department of Neurosciences, Medical University of South Carolina, 19 Hagood Ave. Room 501 HOT, Charleston, South Carolina 29425, Tel. No.: +843-876-1141, E-mail: lackland@musc.edu. Dr. Lackland has no conflicts of interest to declare.

Mark L. Niebylski, PhD, MBA, MS, Chief Executive Officer, World Hypertension League, Room 11402, Blusson Hall, 8888 University Drive, Burnaby, British Columbia, Canada V5A 1S6. Tel. No. +406-443-8367, E-mail: mniebylski@yahoo.com. Dr. Niebylski has received payments from the World Hypertension League as a paid contractor.
Background:

Increased blood pressure (BP) is the leading risk factor for death and disability globally (1) with more than 40% of the adult population over age 40 having hypertension (2). Although much of hypertension is preventable, especially by reducing the amount of salt added to foods, hypertension treatment can also prevent the adverse consequences of stroke, heart attack and heart and kidney failure (2). Unfortunately, about ½ of those with hypertension remain undiagnosed (3). Hence, the World Hypertension League has made the increase in regular BP assessments and encouragement of wide spread BP screening programs linked to diagnosis and clinical management of hypertension to be amongst the highest of priorities.

Whether in low, middle, or high resource settings, recommendations for BP assessment are consistent and include a standardized approach to pre-measurement preparation, patient positioning, appropriate cuff selection and placement, measurement technique, and use of accurate BP measuring devices (4-9). For BP measuring devices, there is usually a choice between manual devices utilizing the auscultatory technique and either semi-automated (manual inflation) or fully automated (automated inflation) devices utilizing oscillometry (4-8;10).

For decades, the foundation of BP measurement in the community has been manual measurement utilizing the auscultatory technique (4;5). However, in spite of numerous recommendations on how to perform manual BP measurement accurately even with training, it is difficult to ensure quality measurements. Moreover, the recommendations are rarely followed outside of high quality research trials. In fact, a large body of evidence indicates that BP assessments are frequently inaccurate with a high potential to misdiagnose a large segment of the population (4;11-19). In particular, manual measurement of BP requires good hearing and extensive training in interpreting Korotkoff sounds (4;20;21). Even with training, the use of standardized manual techniques declines rapidly without regular retraining and accuracy testing.

The use of semi-automated devices requires much less training and automates many features of the measurement. Over the last decade, there have been many advances in technology that have reduced the costs of semi- and fully automated devices, improved their accuracy, and allowed them to be used in settings where there is limited access to replacement batteries and limited electricity for recharging (e.g. solar panels and use of a cell phone charger for recharging) (4;9;22-25). Nevertheless, challenges remain. There is a need to select a proper cuff size and several other technical aspects still rely on the observer’s training and skill. In many people, automated devices produce readings that differ from readings with manual
techniques and, in these settings, it is unclear which method is a better reflection of arterial BP (26-29). Further, in people with arrhythmias, regardless of method used, arrhythmias cause BP to be highly variable and multiple readings are required to increase accuracy.

The use of ambulatory BP measurement during routine daily activity and home/self-measurement of BP have documented benefits in assessing people with increased BP and their use has been recommended in many different national and international hypertension guidelines (5;5;7;30-32). The use of these methods, however, requires resources and expertise that are not broadly available throughout much of the globe and are not the focus of this policy statement. In addition, devices that measure BP without an observer present in a clinic environment (automated office blood pressure [AOBP]) also have advantages including a reduced ‘white coat effect’ (33-36). However, these devices are more expensive and not globally accessible at this time, and their role in hypertension management is outside the focus of this policy.

The World Health Organization (WHO) has recommended the use of a validated semi-automated oscillometric device in the STEPS survey (http://www.who.int/chp/steps/manual/en/ accessed Feb 14 2014), and a WHO expert meeting also recommended these types of devices for clinics in low resource settings ‘given serious inherent inaccuracy of the auscultatory technique’ (2;4;15;25). Automated devices allow training to be shorter and to focus on fewer essential aspects of BP measurement. Critical, however, is the selection of devices that have been independently assessed and have passed international validation testing and the selection of a proper cuff size (refer to http://www.dableducational.org/ for an up to date listing of devices that have passed standards, accessed Feb 14 2014).

The World Hypertension League has developed this policy statement to stimulate health and scientific organizations to adopt the WHO recommendation broadly, not only in low but also in middle and high resource settings, to work towards the use of these devices for training health care professionals and the public, to advocate that all clinical settings have and use these devices for routine BP assessment, and better ensure that all communities have screening programs utilizing automated devices at a capacity to ensure that a vast majority of those with hypertension are identified. Wherever mentioned in this policy statement, semi- and fully automated devices refer only to devices that have passed international standards for accuracy and that utilize an upper arm cuff. Devices that have not passed international accuracy standards and where the cuff is not positioned on the upper arm are not recommended for routine BP assessment, and should not be used in the assessment of hypertension (4;31).
The World Hypertension League recommends:

That in community screening settings for non-invasive BP assessment, a semi- or fully automated oscillometric BP device that utilizes a range of upper arm cuffs be used wherever feasible.

That in clinical settings for non-invasive BP assessment, a semi- or fully automated oscillometric BP device that utilizes a range of upper arm cuffs be used routinely and that manual BP measurement with a recently calibrated device, appropriate cuff size, and a recently trained observer be used to estimate BP only where automated measures are not feasible for technical reasons.

That where resources allow, consideration be given to incorporate self/home BP measurement, automated office blood pressure (AOBP) measurement and ambulatory BP measurement in the diagnosis and management of hypertension.

That training programs for health care professionals focus on the use of semi- or fully automated oscillometric BP devices that utilize a range of upper arm cuffs in conjunction with the importance of diagnosis and managing hypertension.

That systematic approaches are put in place in all clinical settings to have routine BP assessment at all clinical encounters.

That governmental and non governmental organizations work to ensure all communities around the globe have BP screening programs utilizing semi- or fully automated oscillometric BP devices and the programs have a capacity to ensure a vast majority of those with hypertension are both screened and appropriately referred for diagnosis and management. The expectation is that people identified with high BP readings will be referred to clinical settings for evaluation.

That in clinical settings, the manual method be retained as a back up to automated measurements with the understanding that BP readings are likely to be inaccurate in the absence of a well-calibrated device, appropriate cuff size selection, regular training and accuracy testing.

Though use of manual/auscultatory technique is not endorsed as the standard, it is recommended that when clinical settings and screening programs require the use of manual
devices then there should be appropriate resources for ongoing training and testing for accuracy.

That governments, health and scientific communities, and BP pressure device manufacturers work to ensure widespread availability of affordable validated automated BP devices and specifically include those that will operate in settings without a reliable electricity supply.

Reference List


(9) Padfield PL. Reduction of cardiovascular morbidity and mortality in the third world: the importance of accurate blood pressure measurement. Hypertension 2010; 56(6):1038-1039.


