



CARDI•OH

Ohio Cardiovascular Health Collaborative



In partnership with:



Cardi-OH ECHO - Hypertension

Thursday, February 14, 2019

What's new in measurement?



Goutham Rao, MD

Chief Clinician Experience and Well-Being
Officer, University Hospitals Health System

Jack H. Medalie Endowed Professor and
Chairman

Department of Family Medicine and
Community Health

Division Chief, Family Medicine, Rainbow
Babies and Children's Hospital

Case Western Reserve University School of
Medicine & University Hospitals of Cleveland

Shireen Khoury, MD, MPH

Department of Internal Medicine

MetroHealth Medical Center

Clinical Lead of the Learning &
Engagement team for Cardi-OH

Disclosure Statements



The following planners, speakers, moderators, and/or panelists of the CME activity have financial relationships with commercial interests to disclose:

- Adam T. Perzynski, PhD reports being co-founder of Global Health Metrics LLC, a Cleveland-based software company and royalty agreements for forthcoming books with Springer publishing and Taylor Francis publishing.
- Siran M. Koroukian, PhD reports ownership interests in American Renal Associates, and Research Investigator subcontract support from Celgene Corporation.
- George L. Bakris, MD reports partial salary from Bayer as FIDELIO PI, partial salary from Janssen as CREDENCE Steering Committee, partial salary from Vascular Dynamics as Calm-2 Steering Committee, and receiving honorarium as a consultant to Merck, NovoNordisk.
- These financial relationships are outside the presented work.

All other planners, speakers, moderators, and/or panelists of the CME activity have no financial relationships with commercial interests to disclose.

The challenge of clinic-based measurement

- Technique
- Inaccuracy
- Insufficient data
- Not necessarily a strong relationship to cardiovascular outcomes

Table 4 Principles of office and home blood pressure measurement

Conditions for blood pressure measurements

5 min rest, 30 min without smoking/caffeine

Seated, back supported, arm outstretched, resting on the table

Correct cuff bladder placement

Immobile, legs uncrossed, not talking, relaxing

Repeated readings at 1–2 min intervals

Results written down (if device without memory)

AOBP



[JAMA Intern Med.](#) 2019 Feb 4. doi: 10.1001/jamainternmed.2018.6551. [Epub ahead of print]

Comparing Automated Office Blood Pressure Readings With Other Methods of Blood Pressure Measurement for Identifying Patients With Possible Hypertension: A Systematic Review and Meta-analysis.

[Roerecke M](#)¹, [Kaczorowski J](#)², [Myers MG](#)³.

[+](#) **Author information**



White Coat Hypertension

- Blood pressure consistently high **in-office**, but not elevated when checked outside the office.
- Some studies - associated with increased risk of developing sustained hypertension.





Masked Hypertension

- Blood pressure is only elevated on **home** readings – not in-office
- Common in CKD
- Risk of missed diagnosis
- Compare devices in same setting



24 – Hour Ambulatory BP Monitoring

- Technique/intervals
- Confirmation of diagnosis, titration/monitoring
- Advantages (correlation with events, diagnosis of WCH, masked hypertension, monitoring response)
- Cost/daBI educational trust
- http://www.dableducational.org/sphygmomanometers/devices_3_abpm.html#AbpmTable



Corresponding Values of SBP/DBP for Clinic, HBPM, Daytime, Nighttime, and 24-Hour ABPM Measurements



Clinic	HBPM	Daytime ABPM	Nighttime ABPM	24-Hour ABPM
120/80	120/80	120/80	100/65	115/75
130/80	130/80	130/80	110/65	125/75
140/90	135/85	135/85	120/70	130/80
160/100	145/90	145/90	140/85	145/90

ABPM indicates ambulatory blood pressure monitoring; BP, blood pressure; DBP diastolic blood pressure; HBPM, home blood pressure monitoring; and SBP, systolic blood pressure.

Nighttime BP Monitoring

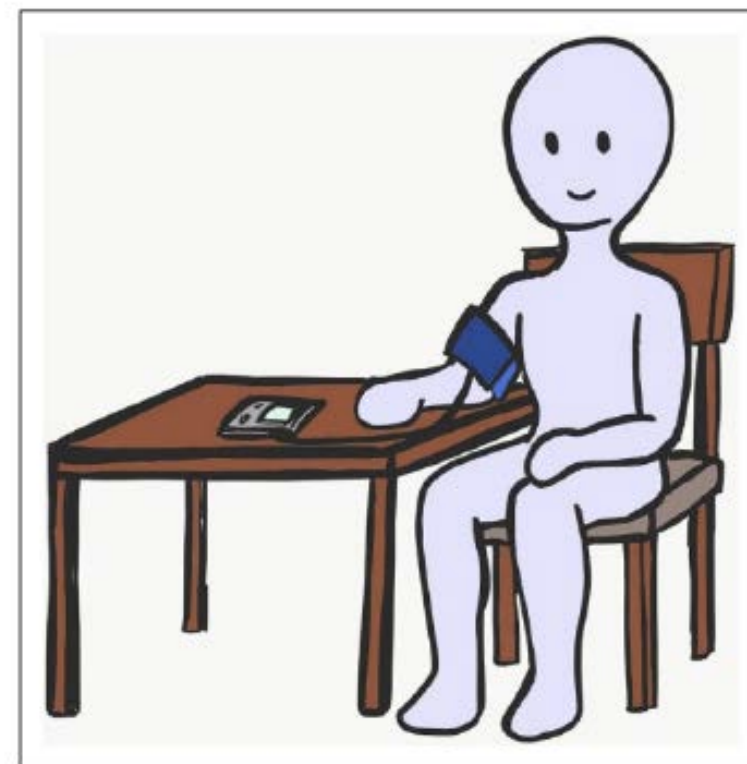
- Dipping/Non-dipping
- Prognostic value
- Convenience
- Protocol (2AM, 3AM, 4AM)



Home BP measurement

- Avoid caffeine and alcohol 30 min before
- Feet flat on floor
- Back supported by chair
- Correct cuff size
- Upper arm resting at heart level
- 5 minutes quiet rest
- Avoid talking during measurement
- Take 2 readings
- Bring home device to office
- LOG RESULTS for office visit (paper, app)

- Wrist measurement less reliable
- Small differences between arms (<10-12 mmHg) usually not a concern





New & Emerging Devices

- Apple CareKit / ResearchKit
- Bluetooth-enabled devices
- Reliability concerns
- Impact of reviews on uptake?
- Important to validate
- Studies using these, e.g., MiCORE



Summary



- Challenges to accurate and efficient home and in-office BP measurement
- Education on accurate home BP measurement with log and/or **ABPM** may overcome variability in BP assessment
- Align patient and presentation with appropriate techniques to evaluate BP



THANK YOU

