

# Twenty-four-hour ambulatory blood pressure monitoring

Ann Bugeja MD, Ayub Akbari MD MSc, Swapnil Hiremath MD MPH

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## 1 Twenty-four-hour ambulatory blood pressure monitoring (ABPM) is recommended for the diagnosis of hypertension

Indications for ABPM include concern for white-coat hypertension (i.e., when blood pressure is higher in v. out of the clinic) or masked hypertension (i.e., when blood pressure is higher out v. in the clinic), and evaluation of blood pressure that remains above target thresholds despite appropriate therapy.<sup>1,2</sup> An average awake blood pressure of 135/85 mm Hg or higher, or an average 24-hour blood pressure of 130/80 mm Hg or higher is considered high (Appendix 1, available at [www.cmaj.ca/lookup/doi/10.1503/cmaj.220990/tab-related-content](http://www.cmaj.ca/lookup/doi/10.1503/cmaj.220990/tab-related-content)).<sup>1</sup>

## 2 Ambulatory blood pressure monitoring can uncover nocturnal hypertension

A minimum of 20 readings while the patient is awake and 7 while the patient is asleep are required for complete evaluation. Normally, blood pressure decreases by 10% during sleep. An average nocturnal blood pressure of 120/70 or higher is considered nocturnal hypertension, which can be seen with volume overload and sleep apnea, and is associated with adverse cardiovascular outcomes.<sup>3</sup>

## 3 Masked hypertension can be diagnosed with ABPM

Masked hypertension is common, with prevalence ranging from 10% in the general population to as high as 30%–40% among people with comorbid conditions such as diabetes or kidney disease.<sup>3,4</sup> It is associated with the same cardiovascular risk as untreated hypertension.<sup>1</sup>

## 4 Ambulatory blood pressure monitoring is underused despite being cost-effective

Only 14% of family physicians in Canada report using ABPM.<sup>1,4</sup> Ambulatory blood pressure monitoring has an incremental cost-effectiveness ratio of \$30 per quality-adjusted life-year (far below the common threshold of \$50 000), but variable coverage across all provinces may contribute to its underuse.<sup>2</sup>

## 5 Home measurement of blood pressure is an alternative when ABPM is not affordable

Accurate daytime home monitoring is acceptable for those without timely access to ABPM, as home measurement is a less expensive out-of-office option, and allows identification of white-coat and masked hypertension.<sup>1</sup> However, it cannot provide a detailed assessment of variability in blood pressure, and cannot identify nocturnal hypertension.<sup>5</sup>

## References

1. Rabi DM, McBrien KA, Sapir-Pichhadze R, et al. Hypertension Canada's 2020 comprehensive guidelines for the prevention, diagnosis, risk assessment, and treatment of hypertension in adults and children. *Can J Cardiol* 2020;36:596-624.
2. Health Quality Ontario. Twenty-four-hour ambulatory blood pressure monitoring in hypertension: an evidence-based analysis. *Ont Health Technol Assess Ser* 2012;12:1-65.
3. Banegas JR, Ruilope LM, de la Sierra A, et al. High prevalence of masked uncontrolled hypertension in people with treated hypertension. *Eur Heart J* 2014;35:3304-12.
4. Kaczorowski J, Myers MG, Gelfer M, et al. How do family physicians measure blood pressure in routine clinical practice? *Can Fam Physician* 2017;63:e193-9.
5. Mostarac I, Thomas J, Atzema C. Monitoring blood pressure at home: guidance for Canadian patients. *CMAJ* 2021;193:E1045.

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**Affiliation:** Division of Nephrology (Bugeja, Akbari, Hiremath), Department of Medicine, Kidney Research Centre, Ottawa Hospital Research Institute, University of Ottawa, Ottawa, Ont.

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**Correspondence to:** Ann Bugeja, [abugeja@toh.ca](mailto:abugeja@toh.ca)

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