# Physician-Measured Blood Pressures Are Significantly Higher Than Ambulatory Blood Pressures

*Little P, Barnett J, Barnsley L, et al. Comparison of agreement between different measures of blood pressure in primary care and daytime ambulatory blood pressure. BMJ 2002;325:254–9.*

Objective. To assess alternatives to 24-hour ambulatory blood pressure monitoring.

Design. Validation study.

Setting and participants. Patients from 3 general practices in England with newly diagnosed borderline or high blood pressure and treated patients with poor hypertensive control.

Main outcome measures. The blood pressure for all patients was measured by a 24-hour ambulatory monitor, self-measurement using a semi-automated cuff at home, and in a research setting by a nurse in a clinic and by their personal physician in the clinic. Primary outcomes were agreement with ambulatory pressure and prediction of high ambulatory pressure (> 135/85 mm Hg) and treatment thresholds.

Main results. 173/200 patients had a complete set of all measurements. Physicians' measured systolic blood pressure 18.9 mm Hg (95% confidence interval, 16.1–21.7) higher than automated ambulatory measurements; this applied to both newly diagnosed patients and treated patients with poor control. Physicians' measurements were poorly predictive of hypertension using 24-hour ambulatory monitoring as the gold standard (sensitivity, 91%; specificity, 26%; positive likelihood ratio, 1.2). Other methods had better specificities and positive likelihood ratios (nurse, 72% and 2.1; self-measurement in research setting, 81% and 4.7; self-measurement at home, 60% and 2.2). Physicians' measurements also were not predictive of blood pressure treatment thresholds.

Conclusion. Blood pressures obtained in clinic by a physician are markedly higher than ambulatory blood pressures. The "white coat" effect on blood pressure is substantial and is not a research artifact. If ambulatory monitoring is not available, repeated measures by the nurse or patient should result in less initiation, monitoring, or changing of treatment. Physician-measured blood pressures should not be used to make treatment decisions.

## Commentary

Nurses or physicians traditionally perform blood pressure screening in physicians' offices. Decisions to initiate treatment are often made without confirming the finding of hypertension with automated ambulatory monitoring or self-measurements at home. Physician measurements often continue to drive subsequent treatment decisions, including titration of antihypertensives and workups for secondary hypertension. In this well-designed and -conducted trial of blood pressure monitoring, the authors make a persuasive argument that the widely accepted practice of physician blood pressure screening is inappropriate and may lead to unnecessary drug administration, physician visits, and laboratory monitoring. The recommended alternative is to use 24-hour ambulatory monitoring, if it is available, and repeated nurse measurements or patient self-measurements when it is not available.

The counterargument to using alternative blood pressure measurements is that many treatment thresholds are derived from studies where blood pressures are measured by a physician or research staff. However, subsequent comparative studies have demonstrated that ambulatory monitoring is a better predictor of target–organ damage [1] and has similar costs to repeated measurements by clinic staff [2]. This study adds to the rebuttal by demonstrating that physicians' measurements are poorly predictive of high blood pressure and other treatment thresholds, and thus one cannot adjust the thresholds upward and continue to use them as proxies for ambulatory measurements.

The study is strengthened by the use of familiar environments and staff for patients, which should recreate the usual "alerting response" they experience during clinic visits. The findings are limited by the lack of blinding of patients or providers; however, a retrospective review of past clinic measurements made by physicians also showed a large discrepancy between physician-measured systolic pressures and ambulatory systolic pressure.

## Applications for Clinical Practice

Physicians should be cautious in making treatment decisions