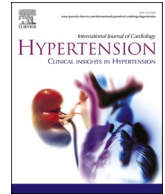


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# International Journal of Cardiology Hypertension

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## Invited Commentary

### Is it time we consider treating blood pressure measurement as a real medical test?



When one thinks of the word "vital," something that is absolutely necessary or important or something that is essential comes to mind. For too long we have been treating the "vital" sign of blood pressure and how we obtain it with ambiguity. It's time to treat blood pressure measurement as a real medical test.

Diseases arising from hypertension are major drivers of mortality and morbidity worldwide, and cause a substantial strain on the national economies. For a disease with such serious consequences, it is shocking that the first recommendation of the 2017 ACC/AHA Guidelines on hypertension is that blood pressure readings must be properly done which would normally go without saying [1]. We've come incredibly far in our management tools for hypertension over the past 70 years, but the failure of our healthcare system to allow time for accurate blood pressure readings is a glaring weakness that poses a constant impediment to providing optimum medical care in most offices. Office blood pressure, automated office blood pressure, and ambulatory blood pressure monitoring are all subject to potential bias [2] which must be recognized in order for data to be useful in clinical management.

Measurement of blood pressure has become an almost ceremonial starting point of any interaction with a health care provider. The proliferation of automated devices for blood pressure measurement has made measuring this important vital sign to be so easy that it is frequently done on a fly-by nature, often while a patient is passing from a waiting room to a clinic room, stopping to be weighed while being asked some general medical questions. The ubiquitous electronic medical record sets an expectation for many that the "blank" for blood pressure must be filled before the visit can continue. In a systematic review done by Kallionien et al. [3], many potential confounding factors were identified as the source of inaccuracy for blood pressure measurement. Studies comparing blood pressure measurements taken with strict adherence to guidelines vs. 'usual' technique have reported marked variation and differential treatment decisions between the two methods.

We would not tolerate a complete blood count or lipid testing done by a lab without controls being run, EKG's being done with the electrodes placed on one's sweater, or a chest x-ray being done with the caveat that it must be accomplished within 90 seconds – and that we'd be willing to accept a sub-standard chest x-ray if more time was needed. Medical tests must be done properly and it is time to place blood pressure measurements that guide chronic therapy into that same category.

The necessity for patient through-put has made proper blood pressure measurement almost impossible in most offices. Patients must be comfortably seated, back and arm supported, bladder empty, and several minutes of quiet provided before serial readings are taken. Feet must not be dangling, and proper sized cuffs must be used. Such care in taking the blood pressure can take up half of a valuable clinic visit, particularly in the general medicine arena where numerous other

problems must be addressed in a small number of relatively short visits per year. Time spent taking blood pressure is time that cannot be devoted to other important and often critical issues.

This time crunch, however, results in readings that are not useful in chronic patient management much of the time. Time constraints often affect the accuracy of blood pressure measurements and BP variability is increased when measurements do not follow a specific study protocol [4]. The readings can substantially over-estimate blood pressure in many patients, and it is unclear at the site whether these elevated readings are truly white coat spikes or whether they represent a chronic elevation in blood pressure that requires initiation or intensification of treatment. With more attention being given to intensive blood pressure control, the potential for overtreatment and treatment related adverse outcomes is of concern [5]. Studies including the Systolic Blood Pressure Intervention Trial (SPRINT) have shown improved outcomes with lower BP goals, intensive BP control does not come without risk particularly in the elderly population where risk of fall is elevated [5,6]. Similarly, up to 20% of patients have masked hypertension where their blood pressure is actually lower in the office than at home. These are patients who are at risk for adverse outcomes and who need treatment intensification to slow organ damage.

The numerous public health initiatives that have highlighted the importance of blood pressure measurement have also resulted in blood pressure being taken at times that cannot shape appropriate chronic therapy such as before uncomfortable dental procedures, medical procedures, or at office visits where unsettling topics might be discussed. Readings taken may have value, but not in the diagnosis and long-term management of chronic hypertension. It is often argued that frequent blood pressure measurement can show, in aggregate, a pattern that can help formulate treatment. This would be true if one were to look at a pattern of properly measured blood pressures. Major concerns with using blood pressure measurements obtained in clinical practice for research are the lack of standardization and the questionable accuracy of clinic measurements, with potential for both systematic and random errors [4]. Averaging serial readings when there is a systematic error does not yield useful data any more than sweeping several small piles of dirt together does not yield a diamond, but just yields a large pile of dirt.

Despite the fact that a large number of office readings are simply not reflective of the patient's overall blood pressure pattern, we continue to rely on these readings for chronic management mainly because it works okay for some patients, and it's the way that we've been doing it for about a century. The proliferation of blood pressure kiosks has enabled people easy access to out-of-office blood pressure readings. These readings done in retail store settings are often done hurriedly and may not be reflective of one's true resting blood pressure.

All roads lead to better insurer support for ambulatory blood pressure readings or, at the least, supporting the purchase of home monitors

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for patients who can take their blood pressure properly. Ambulatory blood pressure measurements is viewed as an awkward and uncomfortable test by many patients, even though it provides the best data for the 24-h pattern. As an alternative, the blood pressure measurement should only be taken at an outpatient visit if it answers an immediate clinical question (suspected hypertensive crisis), or is being used for judging potential therapy for long-term hypertensive therapy at that visit – but in all cases, it must be done properly – and that will take time. Insurers should also support visits solely for the proper measurement of blood pressure that can be used for future provider visits. These visits would be done in a relaxed atmosphere with proper measurement techniques and periods of quiet rest. It will be done in the same way that an EKG or chest x-ray is done in the outpatient setting. It will be a piece of data that the clinician and patient can rely upon for making rational clinical judgements resulting in appropriate treatment of most patients without the dangers of both under- and over-treatment.

It is time that we broke away from the engrained tradition of taking a blood pressure at every possible clinical opportunity at the expense of getting shoddy data that will drive shoddy medical decisions and patient outcomes. The approach of the twentieth century was innovative at the time, but it is time to move on and make blood pressure measurement a real medical test that can only be done properly, or not at all.

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