



# Effect of different cuff types on blood pressure measurement: Variation in BP values for different cuff types

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## Abstract

Accurate measurement of blood pressure is very important as high blood pressure is a major cause of cardiovascular disease. Most non-invasive blood pressure measurement systems depend on a blood pressure cuff mostly made of fabrics but these differ widely in geometry and mechanical properties. To investigate the effect of differences in cuff construction on the arterial pressure, a numerical model using DICOM data obtained from magnetic resonance imaging scan is presented. The model arm was loaded with experimentally obtained interface pressures for eight different types of cuffs made of coated woven and non-woven fabrics. Variations of up to 27 mmHg in estimated systolic and up to 17 mmHg diastolic BP were found. Data were collected at inflation pressures between 80 and 130 mmHg to reflect the normal range of human systolic and diastolic blood pressure. Pressure transmission from the arm to the arterial surface was less than 90% under all the blood pressure cuffs except one with a rubber bladder which showed a 95% transmission ratio. The results from this study demonstrate wide variations in the arterial pressure values between cuffs of different types and cuffs supplied by a single manufacturer. It is crucial that a blood pressure cuff applies a known value of pressure around the arm. This study shows that blood pressure measurements may be critically affected by the fabric types used to construct blood pressure cuffs, leading to potentially serious errors in the assessment of cardiovascular risk.

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