# The clinical applicability of monitoring antihypertensive drug levels in blood

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**Objective** Dried blood spot (DBS) analysis is a novel analytical method for therapeutic drug monitoring to identify non-adherence to antihypertensive drugs. This study was conducted to evaluate the clinical applicability of measuring drug concentrations of eight antihypertensive drugs, using DBS and venipuncture. Furthermore, this study aimed to provide more insight into the between-patient variability in drug concentrations.

**Methods** False negative values from DBS compared to a venipuncture were determined to assess drug adherence. A Generalized Estimating Equation (GEE) was used to estimate the model parameters including sex, dose, age, weight and the time interval between drug intake and sampling, on the $C_{plasma}$ (drug concentration in plasma).

**Results** In total 135 patients were included from which both DBS and a venipuncture were retrieved. The number of samples per drug ranged from 38 (enalaprilate) to 85 (hydrochlorothiazide). When drug concentrations from DBS and plasma were compared, no real false negative values were found. A high variability in $C_{plasma}$ between patients was observed, especially at peak concentrations with a fold change reaching from 2.3 (canrenone) to 35.2 (losartan-carboxylic acid). The time of intake was significantly related to the height of the $C_{plasma}$ in 7 of the 8 measured drugs with a p-value < 0.05 with the exception of hydrochlorothiazide, but the influence of dose, weight, age and sex on drug levels differed largely between the measured drugs.

**Conclusion** DBS is a reliable and convenient method to assess non-adherence to antihypertensive drugs in clinical practice. The $C_{plasma}$ of the eight antihypertensive drugs in this study show a large inter-individual difference and therefore low plasma concentrations do not necessarily mean non-adherence. Non-adherence can only be confirmed if drug levels are undetectable, i.e. values below the lower limit of detection.