**Title**: Effects of Serum Creatinine Calibration on Estimated Glomerular Filtration Rate and Chronic Kidney Disease Determination in African Americans: the Jackson Heart Study

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***Background***: The calibration of serum creatinine values to Isotope Dilution Mass Spectroscopy (IDMS) traceable creatinine is essential for valid use of the new Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equation to estimate the glomerular filtration rate (GFR).

***Methods***: For 5,210 participants in the Jackson Heart Study, serum creatinine concentration was measured with a multipoint enzymatic spectrophotometric assay at the baseline study visit (2000-2004). Serum creatinine was re-measured using the Roche enzymatic method, traceable to IDMS in a subset of 206 subjects. The 206 samples were divided into three disjoint sets - training, validation, and test - to select an appropriate calibration model, estimate true errors, and assess performance of the final calibration equation. The selected calibration equation was applied to serum creatinine measurements of all 5,210 subjects to estimate GFR and the prevalence of CKD.

***Results***: According to the true error estimate among four potential calibration models and justifiable assumption made, the final selected Deming regression model showed a slope of 0.968 (95% CI:0.904, 1.053; *P* < 0.001) and intercept of -0.0248 (95% CI: -0.0862, 0.0366; *P* = 0.430) with *R*2 = 0.9527. Applying the calibration equation to the unused test set (50 samples), calibrated serum creatinine concentration showed high agreement with actual measurements (concordance correlation coefficient 0.934, 95% CI: 0.894, 0.960). The baseline prevalence of CKD in the Jackson Heart Study (2000-2004) defined by eGFR less than 60 ml/min/1.73 m2 was 6.30% using calibrated serum creatinine concentrations, compared with 8.29% using non-calibrated serum creatinine values with CKD-EPI equation (p < 0.001).

***Conclusions***: A Deming regression model was generated and validated to calibrate baseline serum creatinine concentrations in the Jackson Heart Study to values traceable to IDMS and accurately estimate the prevalence of CKD.