Performance of the CKD-EPI and MDRD equations to estimate the glomerular filtration rate: a systematic review of Latin American studies

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> In summary, the **CKD-EPI IDMS** and **MDRD-4 IDMS equations do not differ significantly** to estimate the glomerular filtration rate **in Latin American populations**.

Background: Most commonly used equations to estimate glomerular filtration rate (GFR) are the CKD-EPIdemiology Collaboration (CKD-EPI) and the Modification of Diet in Renal Disease (MDRD). It is possible that the results from regions with different ethnic composition cannot be extrapolated to Latin-American populations, due to ethnic differences.

Objective: To assess the performance of the CKD-EPI and MDRD equations to estimate the GFR in Latin American countries.

Methods: The study protocol has been registered in PROSPERO (CRD42019123434). In January 2019, we searched in PubMed, Scopus, and 'Biblioteca Regional de Medicina' (BIREME) to identify studies that reported estimated GFR using both equations and compared them with a measured GFR using exogenous filtration markers, among adults of Latin American countries.

Study selection, data extraction, and risk of bias evaluation were performed by two reviewers in parallel. We performed meta-analyses of P30, bias (using mean difference (MD) and its 95% confidence intervals (95% CI)), sensitivity, and specificity; and evaluated certainty of evidence using the GRADE methodology.

Results: We identified 379 records, of which 12 papers were included. We meta-analyzed 6(5 from Brazil and 1 from Mexico). Meta-analyses that compared CKD-EPI using creatinine measured with calibration traceable to isotope dilution mass spectrometry (CKD-EPI-Cr IDMS) with MDRD-4 IDMS did not show statistically significant differences in bias (5 studies; MD 0.55 mL/min/1.73m2, 95% CI −3.34 to 4.44), P30 (2 studies; MD 4%, 95% CI −4% to 13%; **Figure 1**), sensitivity (2 studies; 76% and 75%, respectively), and specificity (2 studies; 91% and 89%, respectively), with very low certainty of evidence for bias and P30, and low certainty of evidence for sensitivity and specificity.

Conclusions: We found that the performance of CKD-EPI-Cr IDMS and MDRD-4 IDMS do not differ significantly, although CKD-EPI-Cr IDMS tends to have a non-significant better performance in P30. Since most of the meta-analyzed studies were from Brazil, results may not be extrapolated to other Latin American countries.

Patient or healthcare consumer involvement: This study was commissioned by the Peruvian Social Security (which provides care to 35% of the Peruvian population) as part of the elaboration of the clinical practice guideline for diagnosis and management of chronic kidney disease.
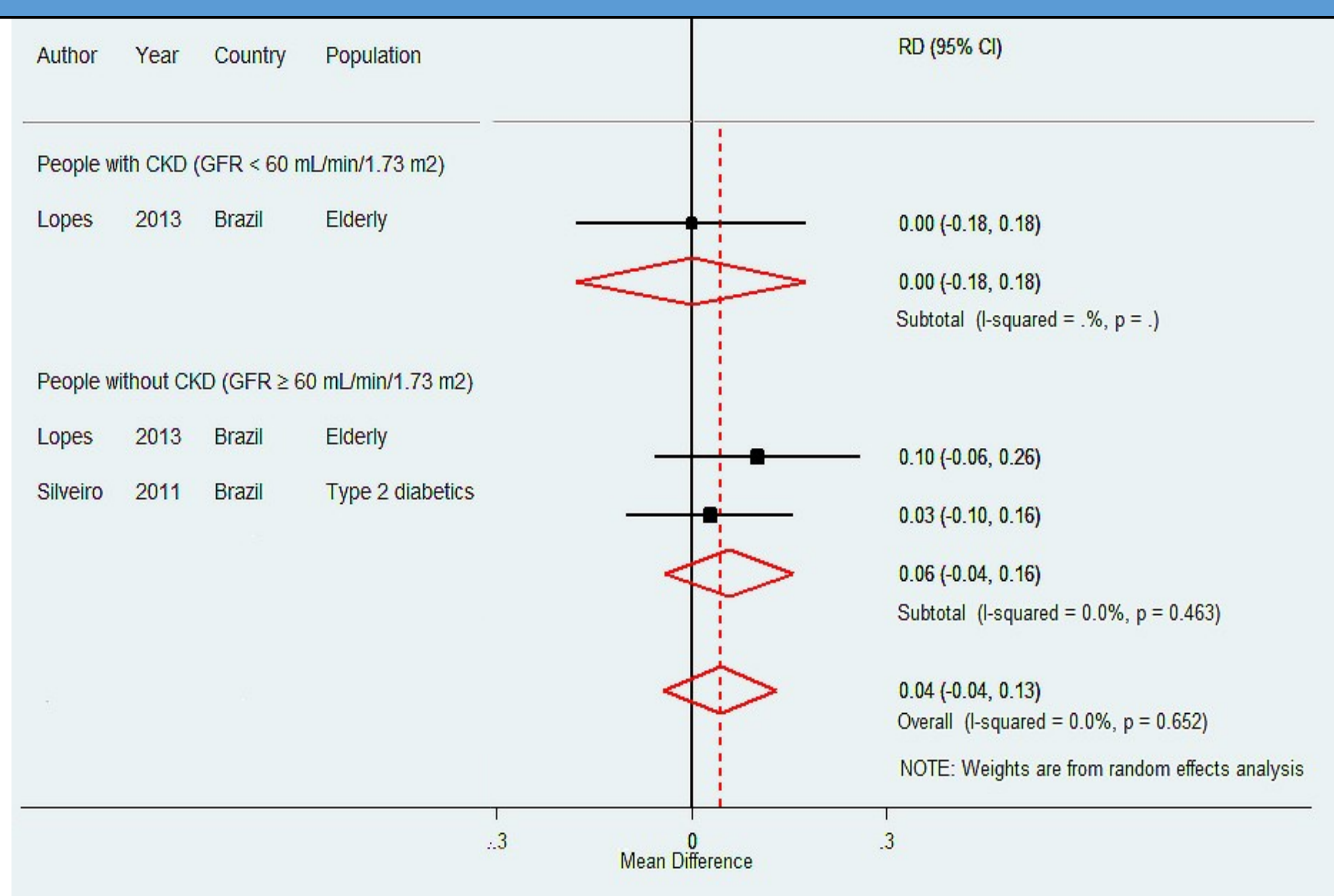
Figure 1

1.1 Mean bias difference (CKD-EPI-Cr IDMS minus MDRD-4 IDMS)
Bias: mean of the difference between eGFR and mGFR
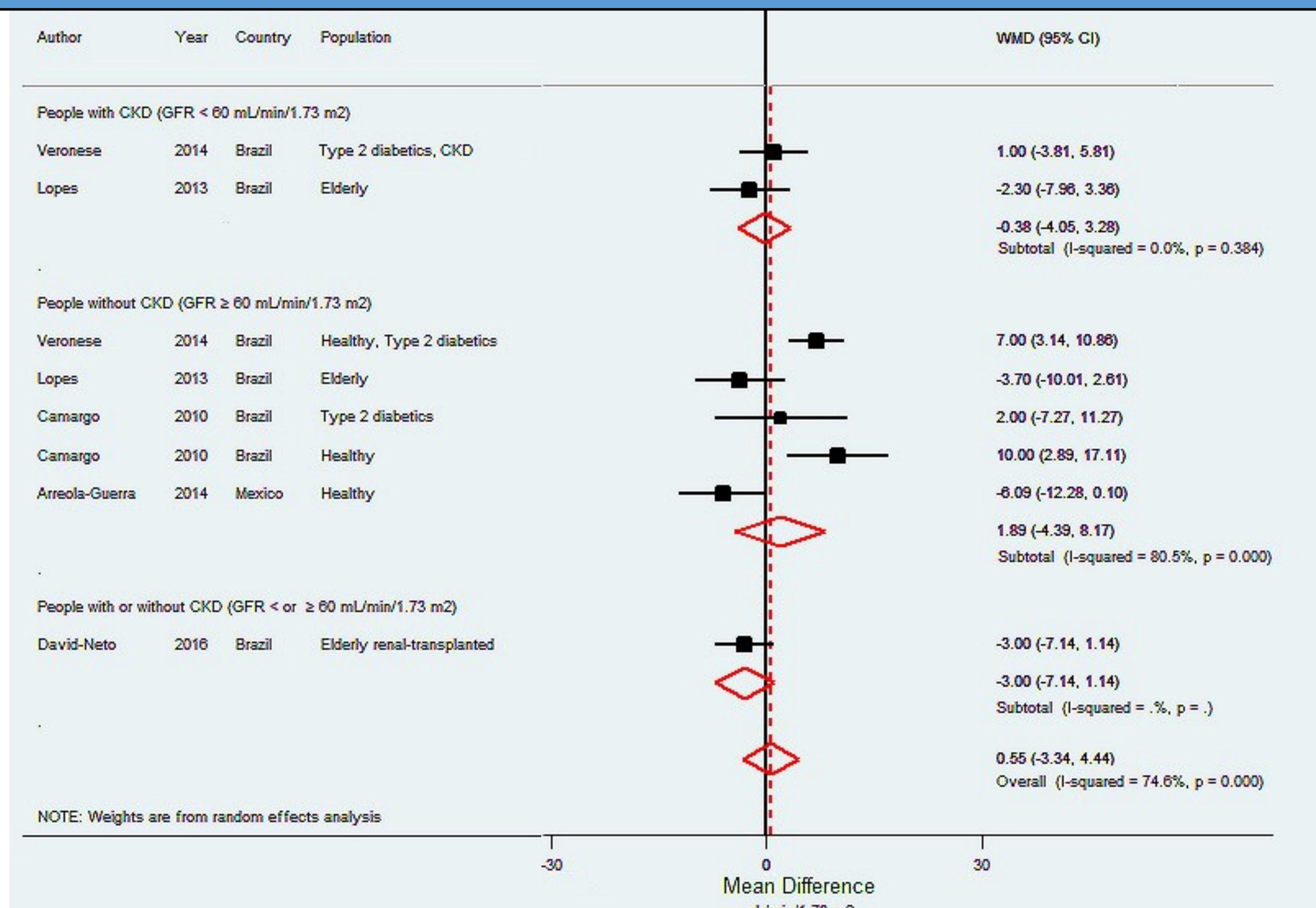
1.2 Mean P30 difference (CKD-EPI-Cr IDMS minus MDRD-4 IDMS)
P30: percentage of results of eGFR that did not deviate more than 30% from mGFR

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