**Age and the Association of Kidney Disease Measures with Mortality and End-Stage Renal Disease: A Meta-Analysis of 2 Million Participants from 46 Cohorts (for the CKD-PC Collaborators)**

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**BACKGROUND:** Chronic kidney disease (CKD) is prevalent in the elderly, but the risk implications of low estimated glomerular filtration rate (eGFR) and high albuminuria across the full age range are controversial.

**METHODS:** We investigated 2,051,244 participants from 46 cohorts. Hazard ratios (HRs) of mortality (112,325 deaths) and ESRD (8,411 events) according to eGFR and albuminuria were meta-analyzed across age categories of 18-54, 55-64, 65-74 and 75+ years. Attributable risks were calculated using HRs and weighted average incidence rates.

**RESULTS:** Mortality and ESRD risk increased progressively as eGFR decreased and albuminuria increased in every age category. In general/high-risk cohorts, adjusted HRs of mortality for reduced eGFR were lower at older age (e.g., at eGFR 45 [vs. 80] ml/min/1.73m$^2$, 3.50 [95% CI, 2.55-4.81] in 18-54 years, 2.21 [2.02-2.41] in 55-64 years, 1.59 [1.42-1.77] in 65-74 years, and 1.35 [1.23-1.48] in 75+ years); i.e. a substantial effect-modification by age (*P-values* for overall interaction <0.05 in every age category with 55-64 years as a referent). In contrast, attributable mortality risks were greater at older age (e.g., at eGFR 45, 2.8 extra deaths per 1,000 person-years in 18-54 years, 12.2 in 55-64 years, 26.6 in 65-74 years, and 74.9 in 75+ years). Similar patterns with mortality were observed for albuminuria. Relative and absolute ESRD risk were less influenced by age (*P-values* for interaction >0.1 for eGFR and albuminuria).

**CONCLUSIONS:** Low eGFR and high albuminuria are strongly associated with mortality and ESRD regardless of age.

Effect modification of age on adjusted HRs by eGFR
• on the line indicates p<0.05 vs. eGFR=80 in each age
group and + on the bottom indicates p<0.05 for age-
interaction compared to age 55-64 years.



All cause Mortality in General Population and High Risk Cohorts
Reference at eGFR=80



End Stage Renal Disease in General Population and High Risk Cohorts
Reference at eGFR=80