

“Association of estimated glomerular filtration rate and albuminuria with all-cause and cardiovascular mortality in general population cohorts: a collaborative meta-analysis”

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1. **Clinical Case:** Several recent patients age 45-55 in my VA COC clinic with Type II DM and urinary microalbumin levels of >300 but with normal eGFRs (>60). I wondered if high levels of albuminuria with preserved renal function increases mortality.
2. **Search Characteristics:** PubMed search for “albuminuria AND eGFR AND mortality” using the clinical query for Prognosis which identified 9 articles.
3. **Study Description:** Large multi-national meta-analysis of general population cohorts
4. **Research Question:**
 - P:** General population cohorts
 - I:** Presence of increase albuminuria or decreased eGFR
 - C:** Compared to patient with normal eGFR and albuminuria
 - O:** All-cause and Cardiovascular Mortality
5. **Study Importance/Relevance:** CKD known to increase all-cause and cardiovascular mortality, and progression to ESRD. Substantial controversy about using eGFR and albuminuria to define stages of CKD. No comprehensive study that adjusts for both measures, tests their interactions on risk, or examines the association of risk separately by age group.
6. **Methods:**
 - P:** 21 general population cohort studies including 1,234,182 patients identified using well-defined PubMed search. Inclusion Criteria: >1000 general population patients; data on baseline eGFR, urinary albumin levels, and either of the 2 primary end-points (minimum 50 mortality events). Exclusion Criteria: Studies that selected patients with CVD or risk factors for CKD.
 - IC:** Compared patients with eGFR<90 or urinary albumin >5 to patient with normal.
 - O:** All-cause mortality and cardiovascular mortality over follow-up time of 7.9 years.
7. **Results:**
 - eGFR and albuminuria are associated with all-cause and cardiovascular mortality independently of each other and traditional cardiovascular risk factors.
 - Pooled adjusted HR shows increasing mortality for eGFR<60 and ACR >10. (Fig 2)
 - Pooled adjusted HR show that eGFR and ACR are multiplicative independent risk factors (Table 2 and Figure 3).

8. **Validity:** Large patient samples, Patient sample representative of general population, Moderate and significant heterogeneity in some studies, Median follow-up of 7.9 years seemed adequate, Objective and unbiased outcome criteria.
Limitations: Measurements of Cr and Albuminuria not standardized, Heterogeneity
9. **Application to patient:** Mortality risk due to albuminuria is independent of eGFR. Study provides quantitative assessment of risk based on eGFR and albuminuria. Question on how study applies to VA male population with Type II DM.
10. **Clinical Utility:** Provide a quantitative assessment of risk of all-cause and cardiovascular mortality using eGFR and ACR. Should ACR be used in definition and staging of CKD?