

# Your membership matters.

Continue to help lead the fight against kidney disease. Renew today.

[www.asn-online.org/membership](http://www.asn-online.org/membership)



# CJASN

Clinical Journal of the  
American Society of Nephrology

[HOME](#) | [CURRENT ISSUE](#) | [ADVERTISE](#) | [SUBSCRIBE](#) | [ARCHIVES](#) | [FEEDBACK](#) | [ALERTS](#) | [HELP](#)

## Filtration Markers as Predictors of ESRD and Mortality: Individual Participant Data Meta-Analysis

Lesley A. Inker\*, Josef Coresh†, Yingying Sang†, Chi-yuan Hsu‡,  
Meredith C. Foster\*, John H. Eckfeldt§, Amy B. Karger§,  
Robert G. Nelson||, Xun Liu\*, Mark Sarnak\*, Lawrence J. Appel†,  
Morgan Grams†, Dawei Xie†, Paul L. Kimmel\*\*, Harold Feldman†,  
Vasan Ramachandran††, Andrew S. Levey\*, for the CKD Biomarkers  
Consortium

[+ Author Affiliations](#)

### Correspondence:

Dr. Lesley A. Inker, Division of Nephrology, Tufts Medical Center, 800 Washington Street, Box #391, Boston, MA 02111. Email: [Linker@tuftsmmedicalcenter.org](mailto:Linker@tuftsmmedicalcenter.org)

### Abstract

**Background and objectives** Serum  $\beta$ -trace protein (BTP) and  $\beta$ -2 microglobulin (B2M) are associated with risk of ESRD and death in the general population and in populations at high risk for these outcomes (GP/HR) and those with CKD, but results differ among studies.

**Design, setting, participants, & measurements** We performed an individual patient-level meta-analysis including three GP/HR studies ( $n=17,903$  participants) and three CKD studies ( $n=5415$ ). We compared associations, risk prediction, and improvement in reclassification of eGFR using BTP (eGFR<sub>BTP</sub>) and B2M (eGFR<sub>B2M</sub>) alone and the average (eGFR<sub>avg</sub>) of eGFR<sub>BTP</sub>, eGFR<sub>B2M</sub>, creatinine (eGFR<sub>Cr</sub>), and cystatin C (eGFR<sub>cys</sub>), to eGFR<sub>Cr</sub>, eGFR<sub>cys</sub>, and their combination (eGFR<sub>Cr-cys</sub>) for ESRD (2075 events) and death (7275 events).

**Results** Mean (SD) follow up times for ESRD and mortality for GP/HR and CKD studies were 13 (4), 6.2 (3.2), 14 (5), and 7.5 (3.9) years, respectively. Compared with eGFR<sub>Cr</sub>, eGFR<sub>BTP</sub> and eGFR<sub>B2M</sub> improved risk associations and modestly improved prediction for ESRD and death even after adjustment for established risk factors. eGFR<sub>avg</sub> provided the most consistent improvement in associations and prediction across both outcomes and populations. Assessment of heterogeneity did not yield clinically relevant differences. For ESRD, addition of albuminuria substantially attenuated the improvement in risk prediction and risk classification with novel filtration markers. For mortality, addition of albuminuria did not affect the improvement in risk prediction with the use of novel markers, but lessened improvement in risk classification, especially for the CKD cohort.

**Conclusions** These markers do not provide substantial additional prognostic information to eGFR<sub>Cr</sub> and albuminuria, but may be appropriate in circumstances where eGFR<sub>Cr</sub> is not accurate or albuminuria is not available. Educational efforts to increase measurement of albuminuria in clinical practice may be more cost-effective than measurement of BTP and B2M for improving prognostic information.

chronic kidney disease    albuminuria    glomerular filtration rate  
follow-up studies    humans    prostaglandin R2 D-isomerase  
intramolecular oxidoreductases    kidney failure, chronic    lipocalins  
renal insufficiency, chronic    risk factors    beta 2-microglobulin

Received March 30, 2016.  
Accepted October 4, 2016.

Copyright © 2016 by the American Society of Nephrology

User Name	<input type="text"/>
Password	<input type="password"/>
<input type="button" value="LOG-IN"/>	

Search   
[Advanced Search](#)

**Current Issue**  
March 07, 2018, 13 (3)



[Alert me to new issues of CJASN](#)

[« Previous](#) | [Next Article »](#)  
[Table of Contents](#)

### This Article

Published online before print November 2016,  
doi: 10.2215/CJN.03660316  
CJASN January 06, 2017  
vol. 12 no. 1 69–78

» Abstract **Free**  
Figures Only **Free**  
Full Text **Free**  
Full Text (PDF) **Free**  
Supplemental Data

### Article Usage Stats

[Article Usage Statistics](#)

### Services

[Email this article to a colleague](#)  
[Alert me when this article is cited](#)  
[Alert me if a correction is posted](#)  
[Similar articles in this journal](#)  
[Similar articles in PubMed](#)  
[Download to citation manager](#)  
[Get Permissions](#)

### Citing Articles

### Google Scholar

### PubMed

### ONLINE SUBMISSION

### AUTHOR RESOURCES

### ABOUT CJASN

### EDITORIAL BOARD

### REPRINTS / PERMISSIONS

### IMPACT FACTOR

### MOST READ

### MOST CITED

## CJASN ePress

Updated on:  
March 9, 2018  
By Date / By Subject



[Advertising Disclaimer](#)

We recommend

GFR estimating equations: getting closer to the truth?

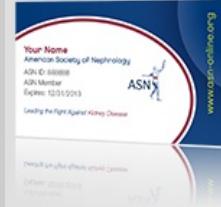
Andrew D Rule et al.. Clin J Am Soc Nephrol

Copyright © 2018 by the American Society of Nephrology

Be a part of something  
innovative,  
influential

Print ISSN: 1555-9041

Online ISSN: 1555-905X



ASN members enjoy  
discounts on ASN's  
educational programs,  
subscriptions to ASN's  
publications, and more.

Join or renew today at  
[www.asn-online.org/membership](http://www.asn-online.org/membership)

