Advertising Disclaimer

Your membership matters.
Continue to help lead the fight against kidney disease. Renew today.
www.asn-online.org/membership

ASN LEADING THE FIGHT AGAINST KIDNEY DISEASE

CJASN Clinical Journal of the American Society of Nephrology

Predicting 5-Year Risk of RRT in Stage 3 or 4 CKD: Development and External Validation

Emily B. Schroeder[*,†], Xiuhai Yang[‡], Micah L. Thorp[§], Brent M. Arnold[‖], David C. Tabano[*], Amanda F. Petrik[‡], David H. Smith[‡], Robert W. Platt[¶], Eric S. Johnson[‡]

Author Affiliations

Correspondence:
Dr. Emily B Schroeder, Institute for Health Research, Kaiser Permanente Colorado, 10065 E. Harvard Ave, Suite 300, Denver, CO 80231. Email: Emily.x.schroeder@kp.org

Abstract

Background and objectives Only a minority of patients with CKD progress to renal failure. Despite the potential benefits of risk stratification in the CKD population, risk prediction models are not routinely used. Our objective was to develop and externally validate a clinically useful and pragmatic prediction model for the 5-year risk of progression to RRT in stage 3 or 4 CKD.

Design, setting, participants, & measurements We used a retrospective cohort design. The development cohort consisted of 22,460 Kaiser Permanente Northwest members with stage 3 or 4 CKD (baseline 2002–2008). The validation cohort consisted of 16,553 Kaiser Permanente Colorado members with stage 3–4 CKD (baseline 2006–2008). The final model included eight predictors: age, sex, eGFR, hemoglobin, proteinuria/albuminuria, systolic BP, antihypertensive medication use, and diabetes and its complications.

Results In the Northwest and Colorado cohorts, there were 737 and 360 events, and observed 5-year Kaplan–Meier risks of 4.72% (95% confidence interval [95% CI], 4.38 to 5.06) and 2.57% (95% CI, 2.30 to 2.83), respectively. Our prediction model performed extremely well in the development cohort, with a c-statistic of 0.96, an R^2 of 79.7%, and good calibration. We had similarly good performance in the external validation cohort, with a c-statistic of 0.95, R^2 of 81.2%, and good calibration. In the external validation cohort, the observed risk was slightly lower than the predicted risk in the highest-risk quintile. Using the top quintile of predicted risk as a cutpoint gave a sensitivity of 92.2%.

Conclusions We developed a pragmatic prediction model and risk score for predicting the 5-year RRT risk in stage 3 and 4 CKD. This model uses variables that are typically available in routine primary care settings, and can be used to help guide important decisions such as timing of referral to nephrology and fistula placement.

chronic kidney disease | renal failure | risk assessment | disease progression | prognosis | clinical prediction rule | albuminuria | Antihypertensive Agents | blood pressure | Calibration | Colorado | diabetes mellitus | Fistula | glomerular filtration rate | Hemoglobins | Humans | nephrology | Primary Health Care | proteinuria | Referral and Consultation | Renal Insufficiency | renal insufficiency, chronic | renal replacement therapy | retrospective studies

Received February 4, 2016.
Accepted September 7, 2016.

Copyright © 2016 by the American Society of Nephrology

« Previous | Next Article »
Table of Contents

This Article

Published online before print December 2016, doi: 10.2215/CJN.01290216
CJASN January 06, 2017 vol. 12 no. 1 87–94

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

Article Usage Stats
Article Usage Statistics
2

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
Related Content

Current Issue
March 07, 2018, 13 (3)

Alert me to new issues of CJASN

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

RSS

Advertising Disclaimer

Related articles

Editorials:
Morgan E. Grams and Josef Coresh
Predicting Risk of RRT in Patients with CKD
CJASN January 06, 2017 12): (1) 3–4; published ahead of print
December 27, 2016, doi:10.2215/CJN.11841116
»Full Text »Full Text (PDF)

We recommend

Preoperative proteinuria predicts adverse renal outcomes after coronary artery bypass grafting.
Tao-Min Huang et al., J Am Soc Nephrol

Systolic BP and Mortality in Older Adults with CKD.
Jessica W Weiss et al., Clin J Am Soc Nephrol

Risk Prediction for Early CKD in Type 2 Diabetes.
Daniela Dunkler et al., Clin J Am Soc Nephrol

Screening for albuminuria identifies individuals at increased renal risk.
Marije van der Velde et al., J Am Soc Nephrol

Impact of age and overt proteinuria on outcomes of stage 3 to 5 chronic kidney disease in a referred cohort.
Yoshitsugu Obi et al., Clin J Am Soc Nephrol

Cardiac Autonomic Neuropathy Predicts Renal Function Decline in T2DM
PracticeUpdate

Proteinuria, Not eGFR, Predicts Stroke Risk in Chronic Kidney Disease
PracticeUpdate

Practical prediction model for the risk of 2-year mortality of individuals in the general population
Robert S Brown et al., J Investig Med

Recent advances in management of autosomal-dominant polycystic kidney disease
Jacob W. Potts et al., American Journal of Health-System Pharmacy

Estimating One-Year Risk of Incident Chronic Kidney Disease: Retrospective Development and Validation Study Using Electronic Medical Record Data From the State of Maine
Shiying Hao, JMIR Publications

Powered by TrendMD

Articles citing this article

Predicting Risk of RRT in Patients with CKD
CJASN January 6, 2017 12): (1) 3–4
»Full Text »Full Text (PDF)

Be a part of something innovative, influential and dynamic.
Be a part of ASN.

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

ASN LEADING THE FIGHT AGAINST KIDNEY DISEASE

Copyright © 2018 by the American Society of Nephrology

Print ISSN: 1555-9041
Online ISSN: 1555-905X