

Your membership matters.

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

www.asn-online.org/membership



CJASN

Clinical Journal of the
American Society of Nephrology

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

User Name

Password

LOG-IN

Search

Go

Advanced Search

Statistical Methods for Modeling Time-Updated Exposures in Cohort Studies of Chronic Kidney Disease

Dawei Xie^{*,†}, Wei Yang^{*,†}, Christopher Jepson[†], Jason Roy^{*,†},
Jesse Y. Hsu^{*,†}, Haochang Shou^{*,†}, Amanda H. Anderson^{*,†},
J. Richard Landis^{*,†}, Harold I. Feldman^{*,†} on behalf of the Chronic
Renal Insufficiency Cohort (CRIC) Study Investigators

[+](#) Author Affiliations

Correspondence:

Dr. Dawei Xie, Department of Biostatistics, Epidemiology and Informatics,
Perelman School of Medicine, University of Pennsylvania, 617 Blockley Hall, 423
Guardian Drive, Philadelphia, PA 19104. Email: dxie@mail.med.upenn.edu

Abstract

When estimating the effect of an exposure on a time-to-event type of outcome, one can focus on the baseline exposure or the time-updated exposures. Cox regression models can be used in both situations. When time-dependent confounding exists, the Cox model with time-updated covariates may produce biased effect estimates. Marginal structural models, estimated through inverse-probability weighting, were developed to appropriately adjust for time-dependent confounding. We review the concept of time-dependent confounding and illustrate the process of inverse-probability weighting. We fit a marginal structural model to estimate the effect of time-updated systolic BP on the time to renal events such as ESRD in the Chronic Renal Insufficiency Cohort. We compare the Cox regression model and the marginal structural model on several attributes (effects estimated, result interpretation, and assumptions) and give recommendations for when to use each method.

[Causal inference](#) [marginal structural models](#) [survival analysis](#)

[time-varying Cox model](#) [time-dependent confounding](#)

[inverse-probability treatment weight](#) [inverse-probability censoring weight](#)

[blood pressure](#) [Cohort Studies](#) [Kidney Failure](#) [Chronic](#) [Probability](#)

[Proportional Hazards Models](#) [Renal Insufficiency](#) [Chronic](#)

[chronic kidney disease](#)

« Previous | Next Article »
Table of Contents

This Article

Published online before
print August 2017, doi:
10.2215/CJN.00650117
CJASN November 07,
2017 vol. 12 no. 11 1892-
1899

» Abstract Free

Figures Only

Full Text

Full Text (PDF)

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](#)

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



Advertising Disclaimer



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

