**SAS Appendix**

This package contains the SAS programs used for the main analyses. SAS 9.4 was used for all analyses. We used a previously developed SAS macro to get the parametric g-formula estimates (1). The macro is available at: <http://www.hsph.harvard.edu/causal/software/>

The code appendix contains the following programs:

1. RunMacros.sas

This program takes as input the parameters used to simulate the dataset for analyses, the number of subjects in the desired simulated cohort, and the number of bootstrap samples to run, and feeds this information into the macros which perform the analyses.

1. Macros.sas

This program contains the macros required to execute the simulation, except the previously published g-formula macro(1) (version: June-2015), restricted cubic spline macro(2, 3), and SAS %lst macro(4).

If you have any questions, comments, or discover an error, please contact Eleanor Murray at [emurray@mail.harvard.edu](mailto:emurray@mail.harvard.edu). For the most updated versions of the SAS programs, please visit www.hsph.harvard.edu/causal/.

**References**

1. Taubman SL, Young JG, Picciotto S, Logan R, Hernán MA. G-formula SAS macro 2012. Available from: <http://www.hsph.harvard.edu/causal/software/>.

2. Harrell FE. %rcspline macro. Clinical Biostatistics Duke University Medical Center, 1988.

3. Devlin TF, Weeks BJ, editors. Spline functions for logistic regression modeling. Proceedings of the Eleventh Annual SAS Users Group International; 1986 February 9-12; Atlanta, Georgia: Cary NC: SAS Institute.

4. Sample 44124: Counting the number of missing and non-missing values for each variable in a data set: SAS Institute Inc; [11/30/2016]. Available from: <http://support.sas.com/kb/44/124.html>.