**Title: A Novel Method for Identifying a Parsimonious and Accurate Predictive Model for Multiple Clinical Outcomes**

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**Description of data and SAS and R codes for reproducing the results of this article:**

**File name**: **originaldata**

File format: .csv

Description: HRS data with 39 predictors and 4 outcomes of 5,531 respondents

**File name: R\_LASSOselection**

File format: .R

Description: R code to perform LASSO Selection based on Optimal λ at Minimum BIC for Individual Outcome and Union methods

**File name: SAS\_** **LassoIndUnionNumPredCstat\_BS500**

File format: .sas

Description: SAS code to compute summary statistics for number of predictors and C-statistic for LASSO Individual and Union methods using 500 bootstrap samples

**File name: R\_Fig4.nBIC\_BICvsNumPred**

File format: .R

Description: R code for Fig. 4: Selection with the baBIC method and Individual Outcome Methods in the Case-study Data

**File name: R\_Fig7.NumPred**

File format: .R

Description: R code for Fig. 7: Comparison of Mean Number of Predictors Across Case-study Bootstrap Data and Simulations with Case-study Censoring and 25% Censoring

**File name: R\_Fig8.Cstat**

File format: .R

Description: R code for Fig. 8: Comparison of Mean Harrell’s C-statistic Across Case-study Bootstrap Data and Simulations with Case-study Censoring and 25% Censoring

**File name: 1.SAS\_BICbackwardIndOutcomeCR**

File format: .sas

Description: SAS code to perform BIC backward elimination by Outcome using HRS original data set. It uses Cox regression for Death, and Competing-risk regression for rest of outcomes.

**File name: 2.SAS\_BICbackwardIndOutcomeCox**

File format: .sas

Description: SAS code to perform BIC backward elimination by Outcome using HRS original data set. It uses Cox regression for 4 outcomes and Wolbers et. al (2009) adaptation to the Competing-risk settings.

**File name: 3.SAS\_baBICbackwardCR**

File format: .sas

Description: SAS code to perform best average BIC (baBIC) backward elimination using HRS original data set. It uses Cox regression for Death, and Competing-risk regression for rest of outcomes. baBIC=absolute(BICk-BICbest)/absolute(BICfull-BICbest): BICfull and BICbest are the BICs of the full and best individual models.

**File name: 4.SAS\_baBICbackwardCox**

File format: .sas

Description: SAS code to perform best average BIC (baBIC) backward elimination using HRS original data set. It uses Cox regression for 4 outcomes and Wolbers et. al (2009) adaptation to the Competing-risk settings. baBIC=absolute(BICk-BICbest)/absolute(BICfull-BICbest): BICfull and BICbest are the BICs of the full and best individual models.

**File name: 5a.SAS\_BetaCoefficientsSce1\_2\_3**

File format: .sas

Description: Compute Beta coefficients used in Scenarios 1, 2, and 3 of the simulation study

**File name: 5b.R\_CleanBetaCoefficientsSce1\_2\_3**

File format: .R

Description: Produce cleaner format of Beta coefficients used in Scenarios 1, 2, and 3 of the simulation study

**File name: 6.GenerateSimulationsSce1\_2\_3**

File format: .R

Description: R code to generate simulated data sets (training/test) for Scenarios 1, 2, and 3 with case-study censoring and 25% censoring

**File name: 7a.SAS\_SimSce1corigTrain**

File format: .sas

Description: SAS code to import training simulated data sets under Scenario 1 (baBIC method) with case-study censoring from R and obtain some general statistics

**File name: 7b.SAS\_SimSce1corigTest**

File format: .sas

Description: SAS code to import test simulated data sets under Scenario 1 (baBIC method) with case-study censoring from R and obtain some general statistics

**File name: 8a.SAS\_SimSce1c25Train**

File format: .sas

Description: SAS code to import training simulated data sets under Scenario 1 (baBIC method) with 25% censoring from R and obtain some general statistics

**File name: 8b.SAS\_SimSce1c25Test**

File format: .sas

Description: SAS code to import test simulated data sets under Scenario 1 (baBIC method) with 25% censoring from R and obtain some general statistics

**File name: 9a.SAS\_SimSce2corigTrain**

File format: .sas

Description: SAS code to import training simulated data sets under Scenario 2 (Individual Outcome method) with case-study censoring from R and obtain some general statistics

**File name: 9b.SAS\_SimSce2corigTest**

File format: .sas

Description: SAS code to import test simulated data sets under Scenario 2 (Individual Outcome method) with case-study censoring from R and obtain some general statistics

**File name: 10a.SAS\_SimSce2c25Train**

File format: .sas

Description: SAS code to import training simulated data sets under Scenario 2 (Individual Outcome method) with 25% censoring from R and obtain some general statistics

**File name: 10b.SAS\_SimSce2c25Test**

File format: .sas

Description: SAS code to import test simulated data sets under Scenario 2 (Individual Outcome method) with 25% censoring from R and obtain some general statistics

**File name: 11a.SAS\_SimSce3corigTrain**

File format: .sas

Description: SAS code to import training simulated data sets under Scenario 3 (Full method) with case-study censoring from R and obtain some general statistics

**File name: 11b.SAS\_SimSce3corigTest**

File format: .sas

Description: SAS code to import test simulated data sets under Scenario 3 (Full method) with case-study censoring from R and obtain some general statistics

**File name: 12a.SAS\_SimSce3c25Train**

File format: .sas

Description: SAS code to import training simulated data sets under Scenario 3 (Full method) with 25% censoring from R and obtain some general statistics

**File name: 12b.SAS\_SimSce3c25Test**

File format: .sas

Description: SAS code to import test simulated data sets under Scenario 3 (Full method) with 25% censoring from R and obtain some general statistics

**File name: 13.SAS\_BICbackwardIndOutcomeSimSce1corig**

File format: .sas

Description: SAS code to perform BIC backward elimination for individual outcomes for simulations of Scenario 1 with case-study censoring and training data.

**File name: 14.SAS\_BICbackwardIndOutcomeSimSce1c25**

File format: .sas

Description: SAS code to perform BIC backward elimination for individual outcomes for simulations of Scenario 1 with 25% censoring and training data.

**File name: 15.SAS\_baBICbackwardSimSce1corig**

File format: .sas

Description: SAS code to perform baBIC backward elimination for simulations of Scenario 1 with case-study censoring and training data

**File name: 16.SAS\_baBICbackwardSimSce1c25**

File format: .sas

Description: SAS code to perform baBIC backward elimination for simulations of Scenario 1 with 25% censoring and training data

**File name: 17.SAS\_BICbackwardIndOutcomeSimSce2corig**

File format: .sas

Description: SAS code to perform BIC backward elimination for individual outcomes for simulations of Scenario 2 with case-study censoring and training data.

**File name: 18.SAS\_BICbackwardIndOutcomeSimSce2c25**

File format: .sas

Description: SAS code to perform BIC backward elimination for individual outcomes for simulations of Scenario 2 with 25% censoring and training data.

**File name: 19.SAS\_baBICbackwardSimSce2corig**

File format: .sas

Description: SAS code to perform baBIC backward elimination for simulations of Scenario 2 with case-study censoring and training data

**File name: 20.SAS\_baBICbackwardSimSce2c25**

File format: .sas

Description: SAS code to perform baBIC backward elimination for simulations of Scenario 2 with 25% censoring and training data

**File name: 21.SAS\_BICbackwardIndOutcomeSimSce3corig**

File format: .sas

Description: SAS code to perform BIC backward elimination for individual outcomes for simulations of Scenario 3 with case-study censoring and training data.

**File name: 22.SAS\_BICbackwardIndOutcomeSimSce3c25**

File format: .sas

Description: SAS code to perform BIC backward elimination for individual outcomes for simulations of Scenario 3 with 25% censoring and training data.

**File name: 23.SAS\_baBICbackwardSimSce3corig**

File format: .sas

Description: SAS code to perform baBIC backward elimination for simulations of Scenario 3 with case-study censoring and training data

**File name: 24.SAS\_baBICbackwardSimSce3c25**

File format: .sas

Description: SAS code to perform baBIC backward elimination for simulations of Scenario 3 with 25% censoring and training data

**File name: 25.SAS\_** **BICIndNumPredCstatTest\_SimSce1corig**

File format: .sas

Description: SAS code to compute summary statistics for number of predictors and C-statistic for Individual, Union, Intersection, and Full methods in simulations of Scenario 1 with case-study censoring and testing data

**File name: 26.SAS\_** **BICIndNumPredCstatTest\_SimSce1c25**

File format: .sas

Description: SAS code to compute summary statistics for number of predictors and C-statistic for Individual, Union, Intersection, and Full methods in simulations of Scenario 1 with 25% censoring and testing data

**File name: 27.SAS\_baBICNumPredCstatTest\_SimSce1corig**

File format: .sas

Description: SAS code to compute summary statistics for number of predictors and C-statistic for baBIC method in simulations of Scenario 1 with case-study censoring and testing data

**File name: 28.SAS\_baBICNumPredCstatTest\_SimSce1c25**

File format: .sas

Description: SAS code to compute summary statistics for number of predictors and C-statistic for baBIC method in simulations of Scenario 1 with 25% censoring and testing data

**File name: 29.SAS\_** **BICIndNumPredCstatTest\_SimSce2corig**

File format: .sas

Description: SAS code to compute summary statistics for number of predictors and C-statistic for Individual, Union, Intersection, and Full methods in simulations of Scenario 2 with case-study censoring and testing data

**File name: 30.SAS\_** **BICIndNumPredCstatTest\_SimSce2c25**

File format: .sas

Description: SAS code to compute summary statistics for number of predictors and C-statistic for Individual, Union, Intersection, and Full methods in simulations of Scenario 2 with 25% censoring and testing data

**File name: 31.SAS\_baBICNumPredCstatTest\_SimSce2corig**

File format: .sas

Description: SAS code to compute summary statistics for number of predictors and C-statistic for baBIC method in simulations of Scenario 2 with case-study censoring and testing data

**File name: 32.SAS\_baBICNumPredCstatTest\_SimSce2c25**

File format: .sas

Description: SAS code to compute summary statistics for number of predictors and C-statistic for baBIC method in simulations of Scenario 2 with 25% censoring and testing data

**File name: 33.SAS\_** **BICIndNumPredCstatTest\_SimSce3corig**

File format: .sas

Description: SAS code to compute summary statistics for number of predictors and C-statistic for Individual, Union, Intersection, and Full methods in simulations of Scenario 3 with case-study censoring and testing data

**File name: 34.SAS\_** **BICIndNumPredCstatTest\_SimSce3c25**

File format: .sas

Description: SAS code to compute summary statistics for number of predictors and C-statistic for Individual, Union, Intersection, and Full methods in simulations of Scenario 3 with 25% censoring and testing data

**File name: 35.SAS\_baBICNumPredCstatTest\_SimSce3corig**

File format: .sas

Description: SAS code to compute summary statistics for number of predictors and C-statistic for baBIC method in simulations of Scenario 3 with case-study censoring and testing data

**File name: 36.SAS\_baBICNumPredCstatTest\_SimSce3c25**

File format: .sas

Description: SAS code to compute summary statistics for number of predictors and C-statistic for baBIC method in simulations of Scenario 3 with 25% censoring and testing data

**File name: 37.** **SAS\_Gen500bs**

File format: .sas

Description: Generation of 500 bootstrap samples from HRS case-study data

**File name: 38.SAS\_BICbackwardIndOutcome500bs**

File format: .sas

Description: Perform BIC backward elimination for individual outcomes in 500 bootstrap samples

**File name: 39.SAS\_BICIndFullNumPredCstat\_BS500**

File format: .sas

Description: Compute summary statistics for number of predictors and C-statistic for Individual, Union, Intersection, and Full methods in 500 bootstrap samples

**File name: 40.SAS\_baBICbackward500bs**

File format: .sas

Description: Perform baBIC backward elimination in 500 bootstrap samples

**File name: 41.SAS\_baBICNumPredCstat\_BS500**

File format: .sas

Description: Compute summary statistics for number of predictors and C-statistic for baBIC method in 500 bootstrap samples

**File name: 42a.SAS\_CumIncSce1corig**

File format: .sas

Description: Compute Cumulative Incidence for simulations of Scenario 1 with case-study censoring and training data

**File name: 42b.R\_CumIncSce1corig**

File format: .R

Description: Figure of Cumulative Incidence for simulations of Scenario 1 with case-study censoring and training data

**File name: 43a.SAS\_CumIncSce1c25**

File format: .sas

Description: Compute Cumulative Incidence for simulations of Scenario 1 with 25% censoring and training data

**File name: 43b.R\_CumIncSce1c25**

File format: .R

Description: Figure of Cumulative Incidence for simulations of Scenario 1 with 25% censoring and training data

**File name: 44a.SAS\_CumIncSce2corig**

File format: .sas

Description: Compute Cumulative Incidence for simulations of Scenario 2 with case-study censoring and training data

**File name: 44b.R\_CumIncSce2corig**

File format: .R

Description: Figure of Cumulative Incidence for simulations of Scenario 2 with case-study censoring and training data

**File name: 45a.SAS\_CumIncSce2c25**

File format: .sas

Description: Compute Cumulative Incidence for simulations of Scenario 2 with 25% censoring and training data

**File name: 45b.R\_CumIncSce2c25**

File format: .R

Description: Figure of Cumulative Incidence for simulations of Scenario 2 with 25% censoring and training data

**File name: 46a.SAS\_CumIncSce3corig**

File format: .sas

Description: Compute Cumulative Incidence for simulations of Scenario 3 with case-study censoring and training data

**File name: 46b.R\_CumIncSce3corig**

File format: .R

Description: Figure of Cumulative Incidence for simulations of Scenario 3 with case-study censoring and training data

**File name: 47a.SAS\_CumIncSce3c25**

File format: .sas

Description: Compute Cumulative Incidence for simulations of Scenario 3 with 25% censoring and training data

**File name: 47b.R\_CumIncSce3c25**

File format: .R

Description: Figure of Cumulative Incidence for simulations of Scenario 3 with 25% censoring and training data