# 1 Description of DGP

$$
\begin{aligned}
W_1 &\sim Normal(\mu = 0, \sigma^2 = 1) \\
W_2, W_3, W_4 &\sim \mathcal{N}(\boldsymbol{\mu} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}, \boldsymbol{\Sigma} = \begin{bmatrix} 1.0 & 0.3 & 0.7 \\ 0.3 & 1.0 & 0.8 \\ 0.7 & 0.8 & 1.0 \end{bmatrix}) \\
A &\sim Bernoulli(p = 0.5) \\
Y &\sim Bernoulli(p) \ .
\end{aligned}
$$

$$
p = logit^{-1}(W1 + 0.1 * A + W1 * A) \ ,
$$

True blip function is:

$$
\begin{aligned}
B_0(W) = & logit^{-1}(W1 + 0.1 + W1) \\
& - logit^{-1}(W1) \ .
\end{aligned}
$$

# 2 Library legend

- Simple - GLMs
  - QAW.SL.library = linear model with $W_j$ and A as main terms and $W_j$*A interaction for each $j$
  - blip.SL.library = linear model with main terms $W_j$ for each $j$
- Medium - ML + GLMs not aggressive
  - QAW.SL.library = GLMs library AND SL.glm, SL.mean, SL.glm.interaction, SL.earth, SL.nnet, SL.svm, SL.rpart
  - blip.SL.library = GLMs library AND SL.glm, SL.mean, SL.glm.interaction, SL.earth, SL.nnet, SL.svm, SL.rpart
- Aggressive - ML + GLMs not aggressive
  - QAW.SL.library = ML + GLMs aggressive library AND SL.randomForest
  - blip.SL.library = ML + GLMs aggressive library AND SL.randomForest

## 2.1 Table Simple Library

```
## $table_EnYdn_for_E0Yd0
##                Bias Variance   MSE Coverage
## Psi_gcomp   -0.0022    4e-04 4e-04        -
## Psi_IPTW     0.0010    7e-04 7e-04    96.6%
## Psi_IPTW_DR  0.0018    4e-04 4e-04    95.9%
## Psi_TMLE     0.0018    4e-04 4e-04    95.9%
## Psi_CV.TMLE -0.0076    5e-04 5e-04    91.5%
##
## $table_EnYd0_for_E0Yd0
##               Bias Variance   MSE Coverage
```

```
## Psi_gcomp   -4e-04    3e-04 3e-04        -
## Psi_IPTW    -1e-03    7e-04 7e-04    96.4%
## Psi_IPTW_DR  0e+00    4e-04 4e-04    95.4%
## Psi_TMLE     0e+00    4e-04 4e-04    95.2%
## Psi_CV.TMLE  0e+00    4e-04 4e-04    94.8%
##
## $table_EnYdn_for_E0Ydn
##                Bias Variance   MSE Coverage
## Psi_gcomp   0.0060    4e-04 4e-04        -
## Psi_IPTW    0.0092    7e-04 8e-04    96.5%
## Psi_IPTW_DR 0.0100    4e-04 5e-04    94.8%
## Psi_TMLE    0.0100    4e-04 5e-04    94.9%
## Psi_CV.TMLE 0.0018    5e-04 5e-04    95.8%
```

## 2.2 Table Medium Library

```
## $table_EnYdn_for_E0Yd0
##                 Bias Variance    MSE Coverage
## Psi_gcomp   -0.0123    4e-04 0.0006        -
## Psi_IPTW     0.0196    8e-04 0.0012    89.1%
## Psi_IPTW_DR  0.0196    5e-04 0.0009    81.3%
## Psi_TMLE     0.0196    5e-04 0.0009    80.8%
## Psi_CV.TMLE -0.0092    5e-04 0.0006    89.6%
##
## $table_EnYd0_for_E0Yd0
##                 Bias Variance   MSE Coverage
## Psi_gcomp   -0.0087    4e-04 5e-04        -
## Psi_IPTW     0.0002    8e-04 8e-04    95.6%
## Psi_IPTW_DR  0.0000    4e-04 4e-04    94.6%
## Psi_TMLE     0.0000    5e-04 5e-04    94.6%
## Psi_CV.TMLE  0.0001    5e-04 5e-04    94.5%
##
## $table_EnYdn_for_E0Ydn
##                 Bias Variance    MSE Coverage
## Psi_gcomp   -0.0036    4e-04 0.0004        -
## Psi_IPTW     0.0283    8e-04 0.0016    83.6%
## Psi_IPTW_DR  0.0283    5e-04 0.0013    69.3%
## Psi_TMLE     0.0283    5e-04 0.0013    68.9%
## Psi_CV.TMLE  0.0007    5e-04 0.0005    95.8%
```

## 2.3 Table Aggressive Library

```
## $table_EnYdn_for_E0Yd0
##                 Bias Variance    MSE Coverage
## Psi_gcomp   -0.0140   0.0005 0.0007        -
## Psi_IPTW     0.0707   0.0083 0.0133    57.9%
## Psi_IPTW_DR  0.0673   0.0067 0.0112    51.1%
## Psi_TMLE     0.0705   0.0080 0.0129    50.9%
```

```
## Psi_CV.TMLE -0.0107   0.0006 0.0007    87.2%
##
## $table_EnYd0_for_E0Yd0
##                Bias Variance   MSE Coverage
## Psi_gcomp   -0.0089    4e-04 5e-04        -
## Psi_IPTW     0.0002    8e-04 8e-04    96.3%
## Psi_IPTW_DR -0.0008    4e-04 4e-04    94.8%
## Psi_TMLE    -0.0008    4e-04 4e-04    94.7%
## Psi_CV.TMLE -0.0002    4e-04 4e-04    94.4%
##
## $table_EnYdn_for_E0Ydn
##                Bias Variance    MSE Coverage
## Psi_gcomp   -0.0032   0.0005 0.0005        -
## Psi_IPTW     0.0815   0.0083 0.0150    53.7%
## Psi_IPTW_DR  0.0781   0.0067 0.0128    44.9%
## Psi_TMLE     0.0813   0.0080 0.0146      45%
## Psi_CV.TMLE  0.0000   0.0006 0.0006    95.6%
```

# 3 Results

```
## pdf
##   2
```