1   Description of DGP

$$W_1, W_2, W_3, W_4 \sim Normal(\mu = 0, \sigma^2 = 1)$$
$$A \sim Bernoulli(p = 0.5)$$
$$Y \sim Bernoulli(p) \ .$$

$$p = 0.5 * logit^{-1}(1 - W_1^2 + 3W_2 + 5W_3^2 A - 4.45A) + 0.5logit^{-1}(-0.5 - W_3 + 2W_1 W_2 + 3|W2|A - 1.5A) \ ,$$

True blip function is:

$$B_0(W) = 0.5[logit^{-1}(1 - W_1^2 + 3W_2 + 5W_3^2 - 4.45) + logit^{-1}(-0.5 - W_3 + 2W_1 W_2 + 3|W2| - 1.5)$$
$$- logit^{-1}(1 - W_1^2 + 3W_2) + logit^{-1}(-0.5 - W_3 + 2W_1 W_2)] \ .$$

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 EnYd0 for E0Yd0

	Library	Estimator	Bias	Variance	MSE
Psi_gcomp	GLMs	G-comp.	-0.0935	2e-04	0.0090
Psi_IPTW	GLMs	IPTW	-0.0004	8e-04	0.0008
Psi_IPTW_DR	GLMs	IPTW-DR	0.0002	4e-04	0.0004
Psi_TMLE	GLMs	TMLE	0.0004	4e-04	0.0004
Psi_CV.TMLE	GLMs	CV-TMLE	0.0007	5e-04	0.0005
Psi_gcomp1	ML + GLMs not aggressive	G-comp.	-0.1313	6e-04	0.0179
Psi_IPTW1	ML + GLMs not aggressive	IPTW	-0.0009	7e-04	0.0007
Psi_IPTW_DR1	ML + GLMs not aggressive	IPTW-DR	-0.0009	5e-04	0.0005
Psi_TMLE1	ML + GLMs not aggressive	TMLE	-0.0008	5e-04	0.0005
Psi_CV.TMLE1	ML + GLMs not aggressive	CV-TMLE	-0.0004	5e-04	0.0005
Psi_gcomp2	ML + GLMs aggressive	G-comp.	-0.1165	6e-04	0.0142
Psi_IPTW2	ML + GLMs aggressive	IPTW	0.0007	8e-04	0.0008
Psi_IPTW_DR2	ML + GLMs aggressive	IPTW-DR	-0.0074	5e-04	0.0006
Psi_TMLE2	ML + GLMs aggressive	TMLE	-0.0067	5e-04	0.0006

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Psi_CV.TMLE2     ML + GLMs aggressive   CV-TMLE  0.0007    5e-04 0.0005
            Coverage
Psi_gcomp         -
Psi_IPTW        95.8%
Psi_IPTW_DR     95.8%
Psi_TMLE        95.8%
Psi_CV.TMLE     95.3%
Psi_gcomp1        -
Psi_IPTW1       96.3%
Psi_IPTW_DR1      95%
Psi_TMLE1       94.8%
Psi_CV.TMLE1    94.9%
Psi_gcomp2        -
Psi_IPTW2       95.2%
Psi_IPTW_DR2    90.5%
Psi_TMLE2         91%
Psi_CV.TMLE2    94.7%
```

2.2 Table EnYdn for E0Yd0

	Library	Estimator	Bias	Variance	MSE
Psi_gcomp	GLMs	G-comp.	-0.0765	0.0003	0.0062
Psi_IPTW	GLMs	IPTW	-0.0569	0.0008	0.0041
Psi_IPTW_DR	GLMs	IPTW-DR	-0.0565	0.0007	0.0038
Psi_TMLE	GLMs	TMLE	-0.0563	0.0007	0.0038
Psi_CV.TMLE	GLMs	CV-TMLE	-0.0752	0.0009	0.0066
Psi_gcomp1	ML + GLMs not aggressive	G-comp.	-0.1325	0.0007	0.0182
Psi_IPTW1	ML + GLMs not aggressive	IPTW	0.0300	0.0010	0.0019
Psi_IPTW_DR1	ML + GLMs not aggressive	IPTW-DR	0.0295	0.0008	0.0016
Psi_TMLE1	ML + GLMs not aggressive	TMLE	0.0268	0.0007	0.0014
Psi_CV.TMLE1	ML + GLMs not aggressive	CV-TMLE	-0.0310	0.0007	0.0017
Psi_gcomp2	ML + GLMs aggressive	G-comp.	-0.1152	0.0007	0.0140
Psi_IPTW2	ML + GLMs aggressive	IPTW	0.1131	0.0114	0.0242
Psi_IPTW_DR2	ML + GLMs aggressive	IPTW-DR	0.0925	0.0096	0.0181
Psi_TMLE2	ML + GLMs aggressive	TMLE	0.0963	0.0118	0.0211
Psi_CV.TMLE2	ML + GLMs aggressive	CV-TMLE	-0.0281	0.0007	0.0015

```
            Coverage
Psi_gcomp         -
Psi_IPTW        45.7%
Psi_IPTW_DR     29.8%
Psi_TMLE        29.4%
Psi_CV.TMLE       14%
Psi_gcomp1        -
Psi_IPTW1       79.5%
Psi_IPTW_DR1    69.9%
Psi_TMLE1       72.2%
Psi_CV.TMLE1    70.3%
Psi_gcomp2        -
Psi_IPTW2       38.3%
Psi_IPTW_DR2    38.9%
Psi_TMLE2       38.5%
```

Psi_CV.TMLE2   71.9%

2.3 Table EnYdn for E0Ydn

	Library	Estimator	Bias	Variance	MSE
Psi_gcomp	GLMs	G-comp.	-0.0035	0.0003	0.0004
Psi_IPTW	GLMs	IPTW	0.0162	0.0008	0.0011
Psi_IPTW_DR	GLMs	IPTW-DR	0.0166	0.0007	0.0009
Psi_TMLE	GLMs	TMLE	0.0167	0.0007	0.0009
Psi_CV.TMLE	GLMs	CV-TMLE	0.0002	0.0009	0.0009
Psi_gcomp1	ML + GLMs not aggressive	G-comp.	-0.1048	0.0007	0.0117
Psi_IPTW1	ML + GLMs not aggressive	IPTW	0.0577	0.0010	0.0043
Psi_IPTW_DR1	ML + GLMs not aggressive	IPTW-DR	0.0572	0.0008	0.0041
Psi_TMLE1	ML + GLMs not aggressive	TMLE	0.0545	0.0007	0.0037
Psi_CV.TMLE1	ML + GLMs not aggressive	CV-TMLE	-0.0008	0.0007	0.0007
Psi_gcomp2	ML + GLMs aggressive	G-comp.	-0.0842	0.0007	0.0078
Psi_IPTW2	ML + GLMs aggressive	IPTW	0.1442	0.0114	0.0322
Psi_IPTW_DR2	ML + GLMs aggressive	IPTW-DR	0.1236	0.0096	0.0248
Psi_TMLE2	ML + GLMs aggressive	TMLE	0.1274	0.0118	0.0280
Psi_CV.TMLE2	ML + GLMs aggressive	CV-TMLE	0.0013	0.0007	0.0007

	Coverage
Psi_gcomp	–
Psi_IPTW	94.9%
Psi_IPTW_DR	90.6%
Psi_TMLE	90.5%
Psi_CV.TMLE	93.9%
Psi_gcomp1	–
Psi_IPTW1	48%
Psi_IPTW_DR1	33%
Psi_TMLE1	33.9%
Psi_CV.TMLE1	93.9%
Psi_gcomp2	–
Psi_IPTW2	25%
Psi_IPTW_DR2	22.6%
Psi_TMLE2	22.5%
Psi_CV.TMLE2	93.9%

3 Results

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null device
       1
```