

# Supplementary material

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# 1 Simulation settings

For all patients we observe covariates  $x_1, \dots, x_8$ , of which 4 are continuous and 4 are binary. More specifically,

$$x_1, \dots, x_4 \sim N(0, 1)$$

$$x_5, \dots, x_8 \sim B(1, 0.2)$$

We first, generate the binary outcomes  $y$  for the untreated patients ( $t_x = 0$ ), based on

$$P(y | \mathbf{x}, t_x = 0) = g(\beta_0 + \beta_1 x_1 + \dots + \beta_8 x_8) = g(lp_0), \quad (1)$$

where

$$g(x) = \frac{e^x}{1 + e^x}$$

For treated patients, outcomes are generated from:

$$P(y | \mathbf{x}, t_x = 1) = g(lp_1) \quad (2)$$

where

$$lp_1 = \gamma_2(lp_0 - c)^2 + \gamma_1(lp_0 - c) + \gamma_0$$

## 1.1 Base-case scenario

The base-case scenario assumes a constant odds ratio of 0.8 in favor of treatment. The simulated datasets are of size  $n = 4250$ , where treatment is allocated at random using a 50/50 split (80% power for the detection of an unadjusted OR of 0.8, assuming an event rate of 20% in the untreated arm). Outcome incidence in the untreated population is set at 20%. For the development of the prediction model we use the model defined in (1) including a constant treatment effect. When doing predictions,  $t_x$  is set to 0. The value of the true  $\beta$  is such that the above prediction model has an AUC of 0.75.

The previously defined targets are achieved when  $\beta = (-2.08, 0.49, \dots, 0.49)^t$ . For the derivations in the treatment arm we use  $\gamma = (\log(0.8), 1, 0)^t$ .

## 1.2 Deviations from base-case

We deviate from the base-case scenario in two ways. First, we alter the overall target settings of sample size, overall treatment effect and prediction model AUC. In a second stage, we consider settings that violate the assumption of a constant relative treatment effect, using a model-based approach.

For the first part, we consider:

- Sample size:
  - $n = 1064$
  - $n = 17000$
- Overall treatment effect:
  - $OR = 0.5$
  - $OR = 1$
- Prediction performance:

- $AUC = 0.65$
- $AUC = 0.85$

We set the true risk model coefficients to be  $\beta = (-1.63, 0.26, \dots, 0.26)^t$  for  $AUC = 0.65$  and  $\beta = (-2.7, 0.82, \dots, 0.82)^t$  for  $AUC = 0.85$ . In both cases,  $\beta_0$  is selected so that an event rate of 20% is maintained in the control arm.

For the second part linear, quadratic and non-monotonic deviations from the assumption of constant relative effect are considered. We also consider different intensity levels of these deviations. Finally, constant absolute treatment-related harms are introduced, i.e. positive ( $0.25 \times$  true average benefit), strong positive ( $0.50 \times$  true average benefit) and negative ( $-0.25 \times$  true average benefit; i.e. constant absolute treatment-related benefit). In case of true absent treatment effects, treatment-related harms are set to 1%, 2% and -1% for positive, strong positive and negative setting, respectively. The settings for these deviations are defined in Table S1.

### 1.3 Risk modeling

Merging treatment arms, we develop prediction models including a constant relative treatment effect:

$$E\{y | x, t_x\} = P(y | x, t_x) = g(\beta_0 + \beta_1 x_1 + \dots + \beta_8 x_8 + \gamma t_x) \quad (3)$$

Individualized predictions are derived setting  $t_x = 0$ .

### 1.4 Approaches to individualize benefit predictions

#### 1.4.1 Risk stratification

Derive a prediction model using the same approach as above and divide the population in equally sized risk-based subgroups. Estimate subgroup-specific absolute benefit from the observed absolute differences. Subject-specific benefit predictions are made by attributing to individuals their corresponding subgroup-specific estimate.

#### 1.4.2 Constant treatment effect

Assuming a constant relative treatment effect, fit the adjusted model in (1.3). Then, an estimate of absolute benefit can be derived from

$$\hat{f}_{\text{benefit}}(lp | \mathbf{x}, \hat{\beta}) = g(lp) - g(lp + \hat{\gamma})$$

#### 1.4.3 Linear interaction

The assumption of constant relative treatment effect is relaxed modeling a linear interaction of treatment with the risk linear predictor:

$$E\{y | \mathbf{x}, t_x, \hat{\beta}\} = g(lp + (\gamma_0 + \gamma_1 lp)t_x)$$

We predict absolute benefit from

$$\hat{f}_{\text{benefit}}(lp | \mathbf{x}, \hat{\beta}) = g(lp) - g(\gamma_0 + (1 + \gamma_1)lp)$$

#### 1.4.4 Restricted cubic splines

Finally, we drop the linearity assumption and predict absolute benefit using smoothing with restricted cubic splines with  $k = 3, 4$  and 5 knots. More specifically, we fit the model:

$$P(y = 1 \mid lp, t_x) = g(\beta_0 + \beta_{t_x} t_x + f_{RCS}(lp) + f_{RCS}(lp) \times t_x)$$

where

$$f_{RCS}(x) = \alpha_0 + \alpha_1 h_1(x) + \alpha_2 h_2(x) + \cdots + \alpha_{k-1} h_{k-1}(x)$$

with  $h_1(x) = x$  and for  $j = 2, \dots, k-2$

$$h_{j+1}(x) = (x - t_j)^3 - (x - t_{k-1})^3_+ \frac{t_k - t_j}{t_k - t_{k-1}} + (x - t_k)^3_+ \frac{t_{k-1} - t_j}{t_k - t_{k-1}}$$

where  $t_1, \dots, t_k$  are the selected knots. We predict absolute benefit from

$$\hat{f}_{\text{benefit}}(lp \mid \mathbf{x}, \hat{\boldsymbol{\beta}}) = P(y = 1 \mid lp, t_x = 0) - P(y = 1 \mid lp, t_x = 1)$$

Table S1: Scenario settings of the entire simulation study.

		Analysis ID			Baseline risk									True treatment effect				Benefit	
Scenario	Base	N	AUC	Treatment-related harm	b0	b1	b2	b3	b4	b5	b6	b7	b8	g0	g1	g2	c	Before harms	After harms
C <sub>T</sub>	1	absent	4,250	0.75	absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.000	1.000	0.000	0	0.000	0.000
	2	absent	4,250	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.000	1.000	0.000	0	0.000	-0.010
	3	absent	4,250	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.000	1.000	0.000	0	0.000	-0.020
	4	absent	4,250	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.000	1.000	0.000	0	0.000	0.010
	5	absent	4,250	0.65	absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.000	1.000	0.000	0	0.000	0.000
	6	absent	4,250	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.000	1.000	0.000	0	0.000	-0.010
	7	absent	4,250	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.000	1.000	0.000	0	0.000	-0.020
	8	absent	4,250	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.000	1.000	0.000	0	0.000	0.010
	9	absent	4,250	0.85	absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.000	1.000	0.000	0	0.000	0.000
	10	absent	4,250	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.000	1.000	0.000	0	0.000	-0.010
	11	absent	4,250	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.000	1.000	0.000	0	0.000	-0.020
	12	absent	4,250	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.000	1.000	0.000	0	0.000	0.010
	13	absent	1,063	0.75	absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.000	1.000	0.000	0	0.000	0.000
	14	absent	1,063	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.000	1.000	0.000	0	0.000	-0.010
	15	absent	1,063	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.000	1.000	0.000	0	0.000	-0.020
	16	absent	1,063	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.000	1.000	0.000	0	0.000	0.010
	17	absent	1,063	0.65	absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.000	1.000	0.000	0	0.000	0.000
	18	absent	1,063	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.000	1.000	0.000	0	0.000	-0.010
	19	absent	1,063	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.000	1.000	0.000	0	0.000	-0.020
	20	absent	1,063	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.000	1.000	0.000	0	0.000	0.010
	21	absent	1,063	0.85	absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.000	1.000	0.000	0	0.000	0.000
	22	absent	1,063	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.000	1.000	0.000	0	0.000	-0.010
	23	absent	1,063	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.000	1.000	0.000	0	0.000	-0.020
	24	absent	1,063	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.000	1.000	0.000	0	0.000	0.010
	25	absent	17,000	0.75	absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.000	1.000	0.000	0	0.000	0.000
	26	absent	17,000	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.000	1.000	0.000	0	0.000	-0.010
	27	absent	17,000	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.000	1.000	0.000	0	0.000	-0.020
	28	absent	17,000	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.000	1.000	0.000	0	0.000	0.010
	29	absent	17,000	0.65	absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.000	1.000	0.000	0	0.000	0.000
	30	absent	17,000	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.000	1.000	0.000	0	0.000	-0.010
	31	absent	17,000	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.000	1.000	0.000	0	0.000	-0.020
	32	absent	17,000	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.000	1.000	0.000	0	0.000	0.010
	33	absent	17,000	0.85	absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.000	1.000	0.000	0	0.000	0.000
	34	absent	17,000	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.000	1.000	0.000	0	0.000	-0.010
	35	absent	17,000	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.000	1.000	0.000	0	0.000	-0.020
	36	absent	17,000	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.000	1.000	0.000	0	0.000	0.010
	37	absent	4,250	0.75	absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.060	0.947	0.000	0	0.000	0.000
	38	absent	4,250	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.060	0.947	0.000	0	0.000	-0.010
	39	absent	4,250	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.060	0.947	0.000	0	0.000	-0.020
	40	absent	4,250	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.060	0.947	0.000	0	0.000	0.010
	41	absent	4,250	0.65	absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-0.080	0.934	0.000	0	0.000	0.000



87	absent	1,063	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.250	0.796	0.000	0	0.000	-0.020
88	absent	1,063	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.250	0.796	0.000	0	0.000	0.010
89	absent	1,063	0.65	absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-0.290	0.776	0.000	0	0.000	0.000
90	absent	1,063	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-0.290	0.776	0.000	0	0.000	-0.010
91	absent	1,063	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-0.290	0.776	0.000	0	0.000	-0.020
92	absent	1,063	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-0.290	0.776	0.000	0	0.000	0.010
93	absent	1,063	0.85	absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.220	0.785	0.000	0	0.000	0.000
94	absent	1,063	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.220	0.785	0.000	0	0.000	-0.010
95	absent	1,063	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.220	0.785	0.000	0	0.000	-0.020
96	absent	1,063	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.220	0.785	0.000	0	0.000	0.010
97	absent	17,000	0.75	absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.250	0.796	0.000	0	0.000	0.000
98	absent	17,000	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.250	0.796	0.000	0	0.000	-0.010
99	absent	17,000	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.250	0.796	0.000	0	0.000	-0.020
100	absent	17,000	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.250	0.796	0.000	0	0.000	0.010
101	absent	17,000	0.65	absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-0.290	0.776	0.000	0	0.000	0.000
102	absent	17,000	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-0.290	0.776	0.000	0	0.000	-0.010
103	absent	17,000	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-0.290	0.776	0.000	0	0.000	-0.020
104	absent	17,000	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-0.290	0.776	0.000	0	0.000	0.010
105	absent	17,000	0.85	absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.220	0.785	0.000	0	0.000	0.000
106	absent	17,000	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.220	0.785	0.000	0	0.000	-0.010
107	absent	17,000	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.220	0.785	0.000	0	0.000	-0.020
108	absent	17,000	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.220	0.785	0.000	0	0.000	0.010
109	absent	4,250	0.75	absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.810	1.000	-0.013	-5	0.000	0.000
110	absent	4,250	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.810	1.000	-0.013	-5	0.000	-0.010
111	absent	4,250	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.810	1.000	-0.013	-5	0.000	-0.020
112	absent	4,250	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.810	1.000	-0.013	-5	0.000	0.010
113	absent	4,250	0.65	absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.770	1.000	-0.016	-5	0.000	0.000
114	absent	4,250	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.770	1.000	-0.016	-5	0.000	-0.010
115	absent	4,250	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.770	1.000	-0.016	-5	0.000	-0.020
116	absent	4,250	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.770	1.000	-0.016	-5	0.000	0.010
117	absent	4,250	0.85	absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.710	1.000	-0.016	-5	0.000	0.000
118	absent	4,250	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.710	1.000	-0.016	-5	0.000	-0.010
119	absent	4,250	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.710	1.000	-0.016	-5	0.000	-0.020
120	absent	4,250	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.710	1.000	-0.016	-5	0.000	0.010
121	absent	1,063	0.75	absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.810	1.000	-0.013	-5	0.000	0.000
122	absent	1,063	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.810	1.000	-0.013	-5	0.000	-0.010
123	absent	1,063	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.810	1.000	-0.013	-5	0.000	-0.020
124	absent	1,063	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.810	1.000	-0.013	-5	0.000	0.010
125	absent	1,063	0.65	absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.770	1.000	-0.016	-5	0.000	0.000
126	absent	1,063	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.770	1.000	-0.016	-5	0.000	-0.010
127	absent	1,063	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.770	1.000	-0.016	-5	0.000	-0.020
128	absent	1,063	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.770	1.000	-0.016	-5	0.000	0.010
129	absent	1,063	0.85	absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.710	1.000	-0.016	-5	0.000	0.000
130	absent	1,063	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.710	1.000	-0.016	-5	0.000	-0.010
131	absent	1,063	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.710	1.000	-0.016	-5	0.000	-0.020



177	absent	17,000	0.85		absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-3.950	1.000	-0.059	-5	0.000	0.000
178	absent	17,000	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-3.950	1.000	-0.059	-5	0.000	-0.010	
179	absent	17,000	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-3.950	1.000	-0.059	-5	0.000	-0.020	
180	absent	17,000	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-3.950	1.000	-0.059	-5	0.000	0.010	
181	absent	4,250	0.75		absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	2.490	4.210	0.540	0	0.000	0.000
182	absent	4,250	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	2.490	4.210	0.540	0	0.000	-0.010	
183	absent	4,250	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	2.490	4.210	0.540	0	0.000	-0.020	
184	absent	4,250	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	2.490	4.210	0.540	0	0.000	0.010	
185	absent	4,250	0.65		absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.150	3.320	0.380	0	0.000	0.000
186	absent	4,250	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.150	3.320	0.380	0	0.000	-0.010	
187	absent	4,250	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.150	3.320	0.380	0	0.000	-0.020	
188	absent	4,250	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.150	3.320	0.380	0	0.000	0.010	
189	absent	4,250	0.85		absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.740	4.100	0.550	0	0.000	0.000
190	absent	4,250	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.740	4.100	0.550	0	0.000	-0.010	
191	absent	4,250	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.740	4.100	0.550	0	0.000	-0.020	
192	absent	4,250	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.740	4.100	0.550	0	0.000	0.010	
193	absent	1,063	0.75		absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	2.490	4.210	0.540	0	0.000	0.000
194	absent	1,063	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	2.490	4.210	0.540	0	0.000	-0.010	
195	absent	1,063	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	2.490	4.210	0.540	0	0.000	-0.020	
196	absent	1,063	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	2.490	4.210	0.540	0	0.000	0.010	
197	absent	1,063	0.65		absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.150	3.320	0.380	0	0.000	0.000
198	absent	1,063	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.150	3.320	0.380	0	0.000	-0.010	
199	absent	1,063	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.150	3.320	0.380	0	0.000	-0.020	
200	absent	1,063	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.150	3.320	0.380	0	0.000	0.010	
201	absent	1,063	0.85		absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.740	4.100	0.550	0	0.000	0.000
202	absent	1,063	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.740	4.100	0.550	0	0.000	-0.010	
203	absent	1,063	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.740	4.100	0.550	0	0.000	-0.020	
204	absent	1,063	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.740	4.100	0.550	0	0.000	0.010	
205	absent	17,000	0.75		absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	2.490	4.210	0.540	0	0.000	0.000
206	absent	17,000	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	2.490	4.210	0.540	0	0.000	-0.010	
207	absent	17,000	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	2.490	4.210	0.540	0	0.000	-0.020	
208	absent	17,000	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	2.490	4.210	0.540	0	0.000	0.010	
209	absent	17,000	0.65		absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.150	3.320	0.380	0	0.000	0.000
210	absent	17,000	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.150	3.320	0.380	0	0.000	-0.010	
211	absent	17,000	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.150	3.320	0.380	0	0.000	-0.020	
212	absent	17,000	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.150	3.320	0.380	0	0.000	0.010	
213	absent	17,000	0.85		absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.740	4.100	0.550	0	0.000	0.000
214	absent	17,000	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.740	4.100	0.550	0	0.000	-0.010	
215	absent	17,000	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.740	4.100	0.550	0	0.000	-0.020	
216	absent	17,000	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.740	4.100	0.550	0	0.000	0.010	
217	moderate	4,250	0.75		absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.223	1.000	0.000	0	0.029	0.029
218	moderate	4,250	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.223	1.000	0.000	0	0.029	0.022	
219	moderate	4,250	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.223	1.000	0.000	0	0.029	0.015	
220	moderate	4,250	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.223	1.000	0.000	0	0.029	0.036	
221	moderate	4,250	0.65		absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-0.223	1.000	0.000	0	0.033	0.033









402	moderate	4,250	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.481	1.783	0.137	0	0.033	0.025
403	moderate	4,250	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.481	1.783	0.137	0	0.033	0.016
404	moderate	4,250	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.481	1.783	0.137	0	0.033	0.041
405	moderate	4,250	0.85	absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.085	1.354	0.074	0	0.024	0.024
406	moderate	4,250	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.085	1.354	0.074	0	0.024	0.018
407	moderate	4,250	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.085	1.354	0.074	0	0.024	0.012
408	moderate	4,250	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.085	1.354	0.074	0	0.024	0.030
409	moderate	1,063	0.75	absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.173	1.560	0.105	0	0.029	0.029
410	moderate	1,063	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.173	1.560	0.105	0	0.029	0.022
411	moderate	1,063	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.173	1.560	0.105	0	0.029	0.015
412	moderate	1,063	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.173	1.560	0.105	0	0.029	0.036
413	moderate	1,063	0.65	absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.481	1.783	0.137	0	0.033	0.033
414	moderate	1,063	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.481	1.783	0.137	0	0.033	0.025
415	moderate	1,063	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.481	1.783	0.137	0	0.033	0.016
416	moderate	1,063	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.481	1.783	0.137	0	0.033	0.041
417	moderate	1,063	0.85	absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.085	1.354	0.074	0	0.024	0.024
418	moderate	1,063	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.085	1.354	0.074	0	0.024	0.018
419	moderate	1,063	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.085	1.354	0.074	0	0.024	0.012
420	moderate	1,063	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.085	1.354	0.074	0	0.024	0.030
421	moderate	17,000	0.75	absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.173	1.560	0.105	0	0.029	0.029
422	moderate	17,000	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.173	1.560	0.105	0	0.029	0.022
423	moderate	17,000	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.173	1.560	0.105	0	0.029	0.015
424	moderate	17,000	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.173	1.560	0.105	0	0.029	0.036
425	moderate	17,000	0.65	absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.481	1.783	0.137	0	0.033	0.033
426	moderate	17,000	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.481	1.783	0.137	0	0.033	0.025
427	moderate	17,000	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.481	1.783	0.137	0	0.033	0.016
428	moderate	17,000	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.481	1.783	0.137	0	0.033	0.041
429	moderate	17,000	0.85	absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.085	1.354	0.074	0	0.024	0.024
430	moderate	17,000	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.085	1.354	0.074	0	0.024	0.018
431	moderate	17,000	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.085	1.354	0.074	0	0.024	0.012
432	moderate	17,000	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.085	1.354	0.074	0	0.024	0.030
433	high	4,250	0.75	absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.693	1.000	0.000	0	0.079	0.079
434	high	4,250	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.693	1.000	0.000	0	0.079	0.059
435	high	4,250	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.693	1.000	0.000	0	0.079	0.040
436	high	4,250	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.693	1.000	0.000	0	0.079	0.099
437	high	4,250	0.65	absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-0.693	1.000	0.000	0	0.089	0.089
438	high	4,250	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-0.693	1.000	0.000	0	0.089	0.067
439	high	4,250	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-0.693	1.000	0.000	0	0.089	0.044
440	high	4,250	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-0.693	1.000	0.000	0	0.089	0.111
441	high	4,250	0.85	absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.693	1.000	0.000	0	0.069	0.069
442	high	4,250	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.693	1.000	0.000	0	0.069	0.052
443	high	4,250	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.693	1.000	0.000	0	0.069	0.034
444	high	4,250	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.693	1.000	0.000	0	0.069	0.086
445	high	1,063	0.75	absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.693	1.000	0.000	0	0.079	0.079
446	high	1,063	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.693	1.000	0.000	0	0.079	0.059







582	high	4,250	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.840	1.000	-0.059	-5	0.089	0.067
583	high	4,250	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.840	1.000	-0.059	-5	0.089	0.044
584	high	4,250	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.840	1.000	-0.059	-5	0.089	0.111
585	high	4,250	0.85	absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.510	1.000	-0.059	-5	0.069	0.069
586	high	4,250	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.510	1.000	-0.059	-5	0.069	0.052
587	high	4,250	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.510	1.000	-0.059	-5	0.069	0.034
588	high	4,250	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.510	1.000	-0.059	-5	0.069	0.086
589	high	1,063	0.75	absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.860	1.000	-0.052	-5	0.079	0.079
590	high	1,063	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.860	1.000	-0.052	-5	0.079	0.059
591	high	1,063	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.860	1.000	-0.052	-5	0.079	0.040
592	high	1,063	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.860	1.000	-0.052	-5	0.079	0.099
593	high	1,063	0.65	absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.840	1.000	-0.059	-5	0.089	0.089
594	high	1,063	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.840	1.000	-0.059	-5	0.089	0.067
595	high	1,063	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.840	1.000	-0.059	-5	0.089	0.044
596	high	1,063	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.840	1.000	-0.059	-5	0.089	0.111
597	high	1,063	0.85	absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.510	1.000	-0.059	-5	0.069	0.069
598	high	1,063	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.510	1.000	-0.059	-5	0.069	0.052
599	high	1,063	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.510	1.000	-0.059	-5	0.069	0.034
600	high	1,063	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.510	1.000	-0.059	-5	0.069	0.086
601	high	17,000	0.75	absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.860	1.000	-0.052	-5	0.079	0.079
602	high	17,000	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.860	1.000	-0.052	-5	0.079	0.059
603	high	17,000	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.860	1.000	-0.052	-5	0.079	0.040
604	high	17,000	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.860	1.000	-0.052	-5	0.079	0.099
605	high	17,000	0.65	absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.840	1.000	-0.059	-5	0.089	0.089
606	high	17,000	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.840	1.000	-0.059	-5	0.089	0.067
607	high	17,000	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.840	1.000	-0.059	-5	0.089	0.044
608	high	17,000	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.840	1.000	-0.059	-5	0.089	0.111
609	high	17,000	0.85	absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.510	1.000	-0.059	-5	0.069	0.069
610	high	17,000	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.510	1.000	-0.059	-5	0.069	0.052
611	high	17,000	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.510	1.000	-0.059	-5	0.069	0.034
612	high	17,000	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.510	1.000	-0.059	-5	0.069	0.086
613	high	4,250	0.75	absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.084	2.035	0.210	0	0.079	0.079
614	high	4,250	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.084	2.035	0.210	0	0.079	0.059
615	high	4,250	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.084	2.035	0.210	0	0.079	0.040
616	high	4,250	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.084	2.035	0.210	0	0.079	0.099
617	high	4,250	0.65	absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.786	2.762	0.321	0	0.089	0.089
618	high	4,250	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.786	2.762	0.321	0	0.089	0.067
619	high	4,250	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.786	2.762	0.321	0	0.089	0.044
620	high	4,250	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.786	2.762	0.321	0	0.089	0.111
621	high	4,250	0.85	absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.621	1.566	0.138	0	0.069	0.069
622	high	4,250	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.621	1.566	0.138	0	0.069	0.052
623	high	4,250	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.621	1.566	0.138	0	0.069	0.034
624	high	4,250	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.621	1.566	0.138	0	0.069	0.086
625	high	1,063	0.75	absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.084	2.035	0.210	0	0.079	0.079
626	high	1,063	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.084	2.035	0.210	0	0.079	0.059

627	high	1,063	0.75		strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.084	2.035	0.210	0	0.079	0.040
628	high	1,063	0.75		negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.084	2.035	0.210	0	0.079	0.099
629	high	1,063	0.65		absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.786	2.762	0.321	0	0.089	0.089
630	high	1,063	0.65		moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.786	2.762	0.321	0	0.089	0.067
631	high	1,063	0.65		strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.786	2.762	0.321	0	0.089	0.044
632	high	1,063	0.65		negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.786	2.762	0.321	0	0.089	0.111
633	high	1,063	0.85		absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.621	1.566	0.138	0	0.069	0.069
634	high	1,063	0.85		moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.621	1.566	0.138	0	0.069	0.052
635	high	1,063	0.85		strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.621	1.566	0.138	0	0.069	0.034
636	high	1,063	0.85		negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.621	1.566	0.138	0	0.069	0.086
637	high	17,000	0.75		absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.084	2.035	0.210	0	0.079	0.079
638	high	17,000	0.75		moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.084	2.035	0.210	0	0.079	0.059
639	high	17,000	0.75		strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.084	2.035	0.210	0	0.079	0.040
640	high	17,000	0.75		negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.084	2.035	0.210	0	0.079	0.099
641	high	17,000	0.65		absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.786	2.762	0.321	0	0.089	0.089
642	high	17,000	0.65		moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.786	2.762	0.321	0	0.089	0.067
643	high	17,000	0.65		strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.786	2.762	0.321	0	0.089	0.044
644	high	17,000	0.65		negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.786	2.762	0.321	0	0.089	0.111
645	high	17,000	0.85		absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.621	1.566	0.138	0	0.069	0.069
646	high	17,000	0.85		moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.621	1.566	0.138	0	0.069	0.052
647	high	17,000	0.85		strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.621	1.566	0.138	0	0.069	0.034
648	high	17,000	0.85		negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.621	1.566	0.138	0	0.069	0.086

## 2 Adaptive model selection frequencies

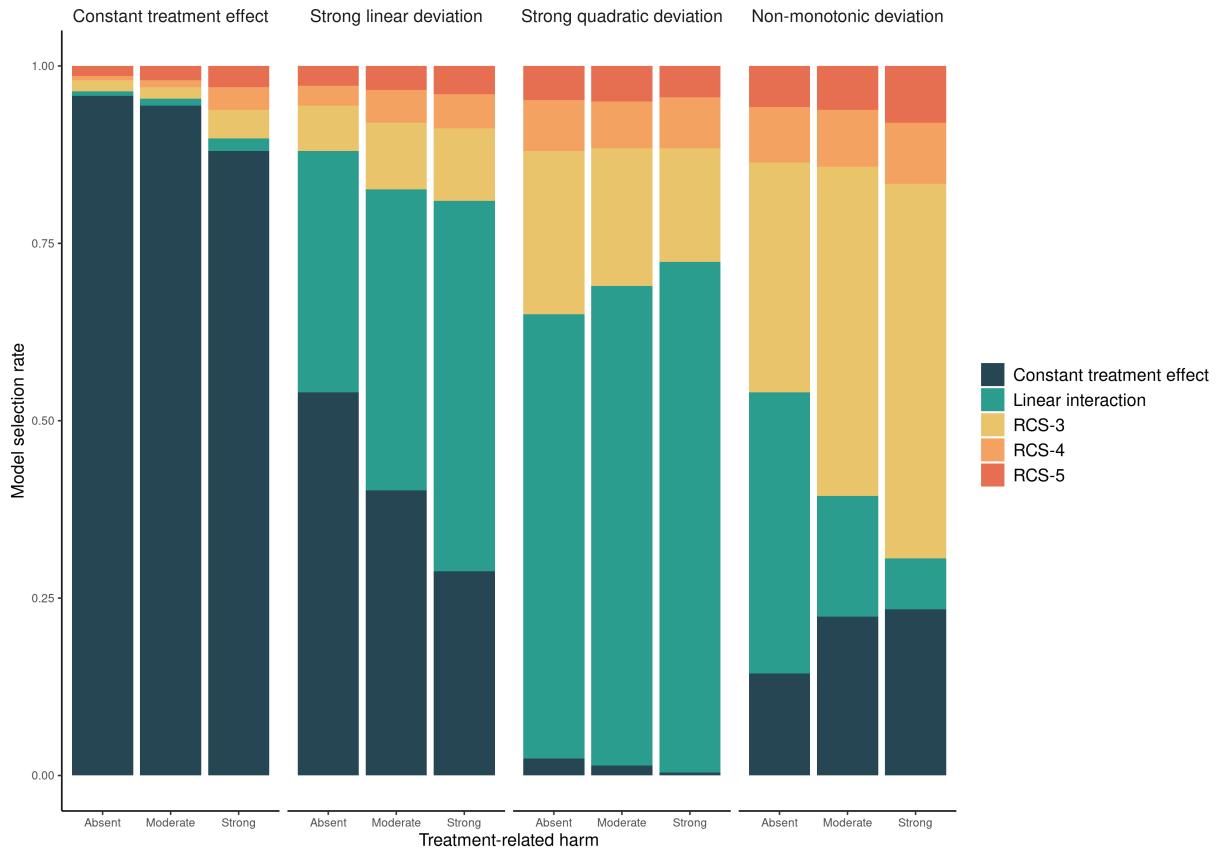


Figure S1: Model selection frequencies of the adaptive approach based on Akaike's Information Criterion across 500 replications. The scenario with the true constant relative treatment effect (first panel) had a true prediction AUC of 0.75 and sample size of 4,250.

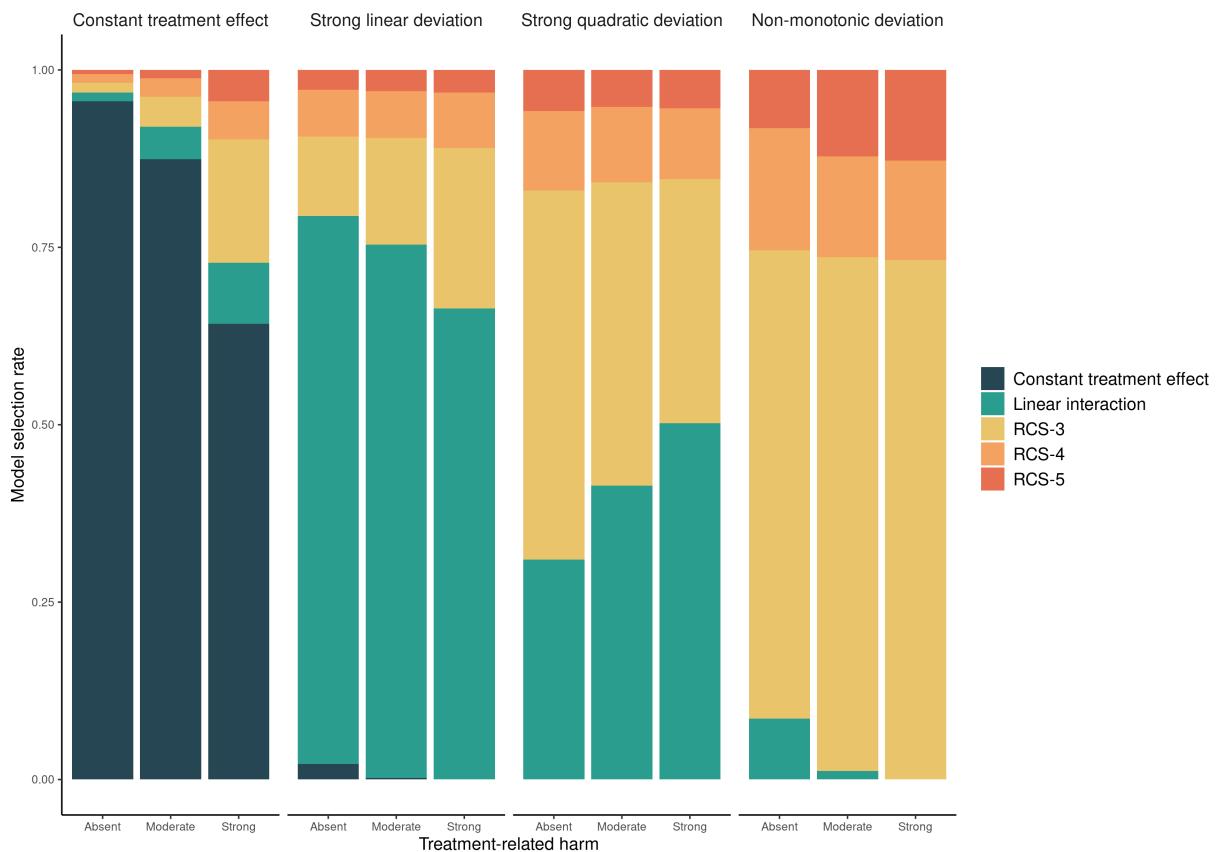


Figure S2: Model selection frequencies of the adaptive approach based on Akaike's Information Criterion across 500 replications. Sample size is 17,000 rather than 4,250 in Figure S1

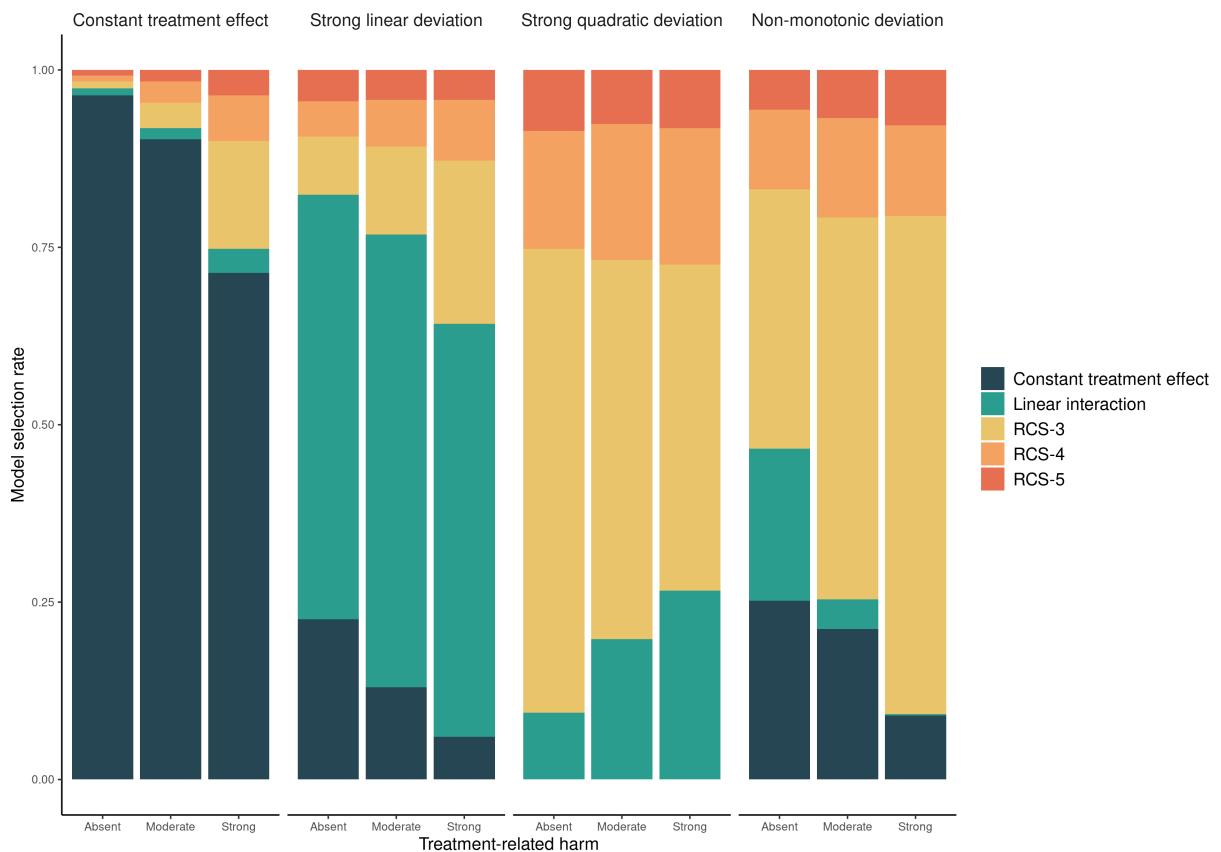


Figure S3: Model selection frequencies of the adaptive approach based on Akaike's Information Criterion across 500 replications. AUC is 0.85 rather than 0.75 in Figure S1

### 3 Discrimination and calibration for benefit

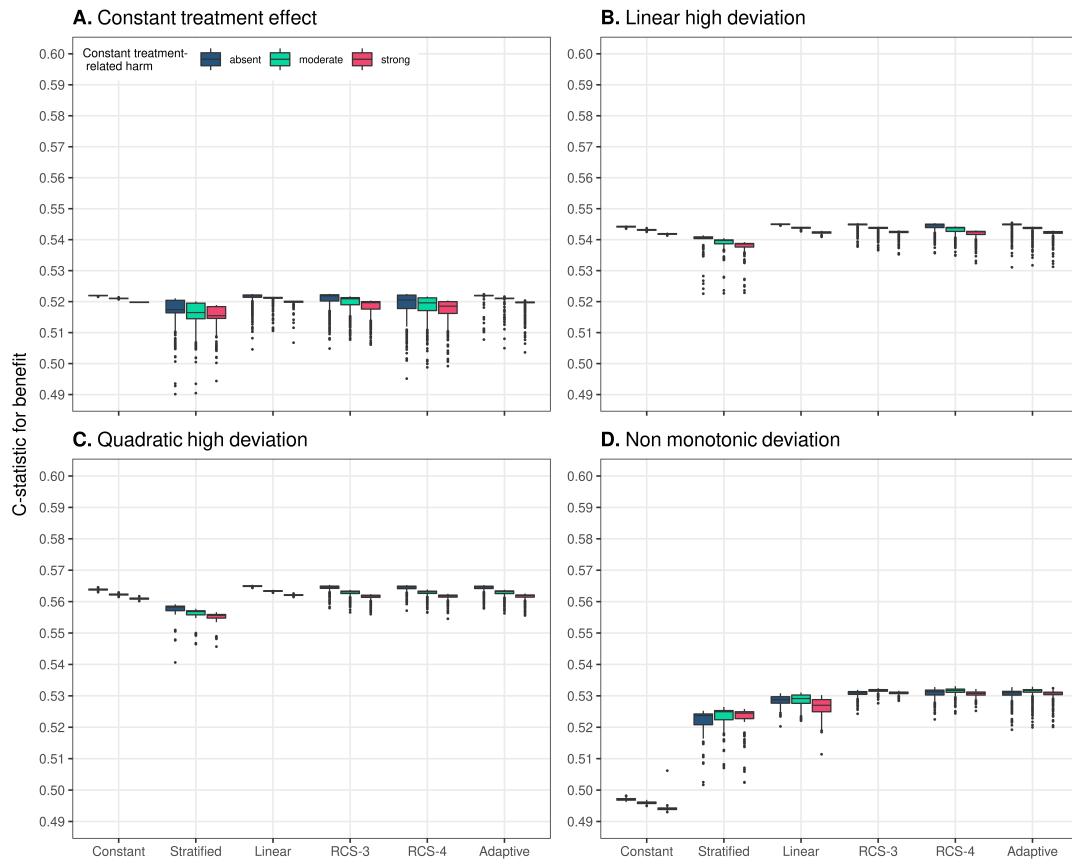


Figure S4: Discrimination for benefit of the considered methods across 500 replications calculated in a simulated sample of size 500,000. True prediction AUC of 0.75 and sample size of 17,000

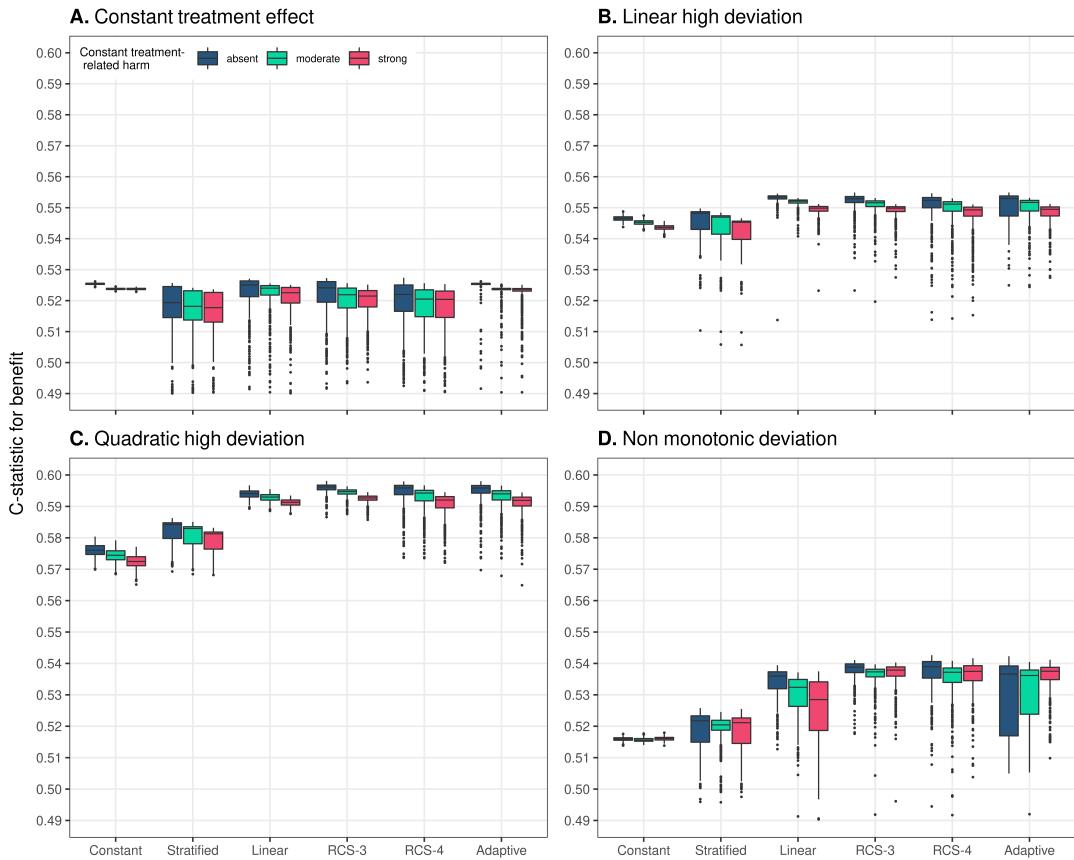


Figure S5: Discrimination for benefit of the considered methods across 500 replications calculated in a simulated sample of size 500,000. True prediction AUC of 0.85 and sample size of 4,250

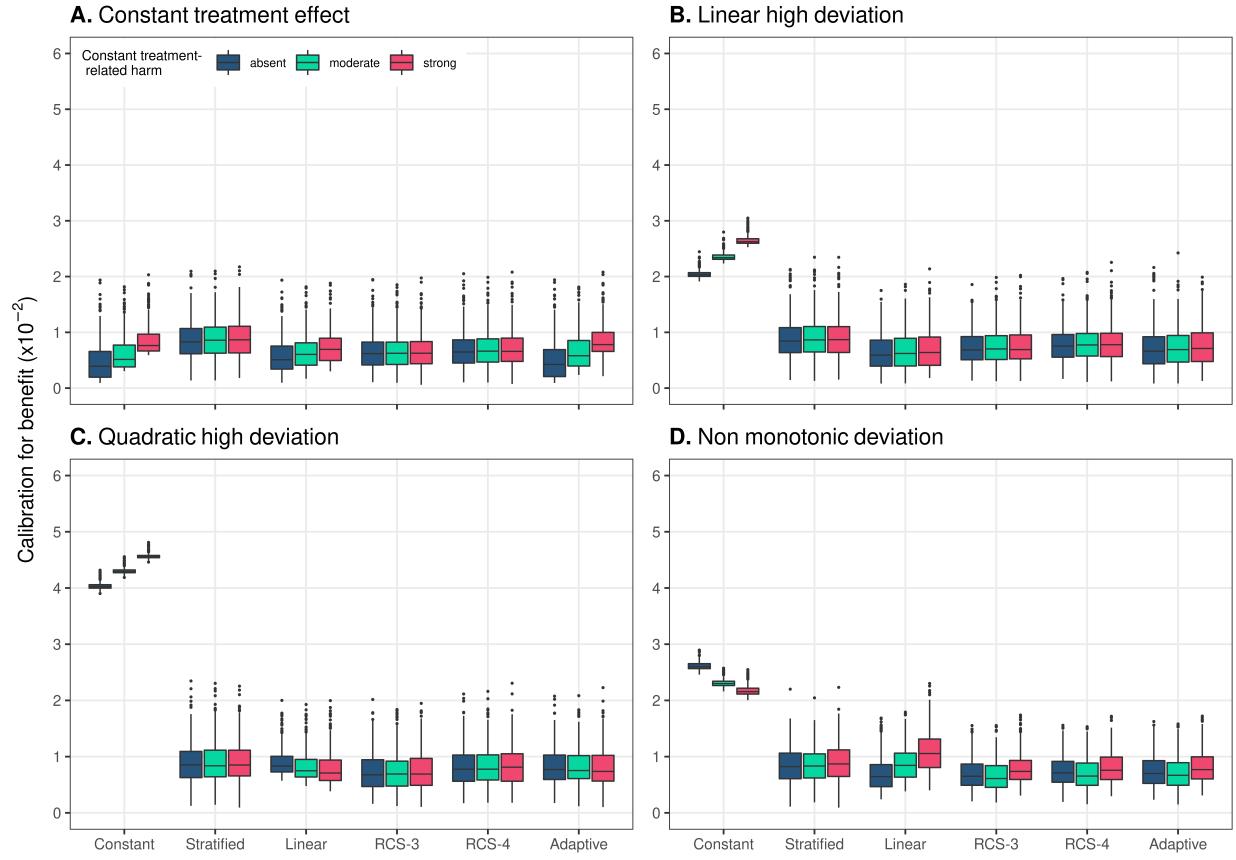


Figure S6: Calibration for benefit of the considered methods across 500 replications calculated in a simulated sample of size 500,000. True prediction AUC of 0.75 and sample size of 17,000

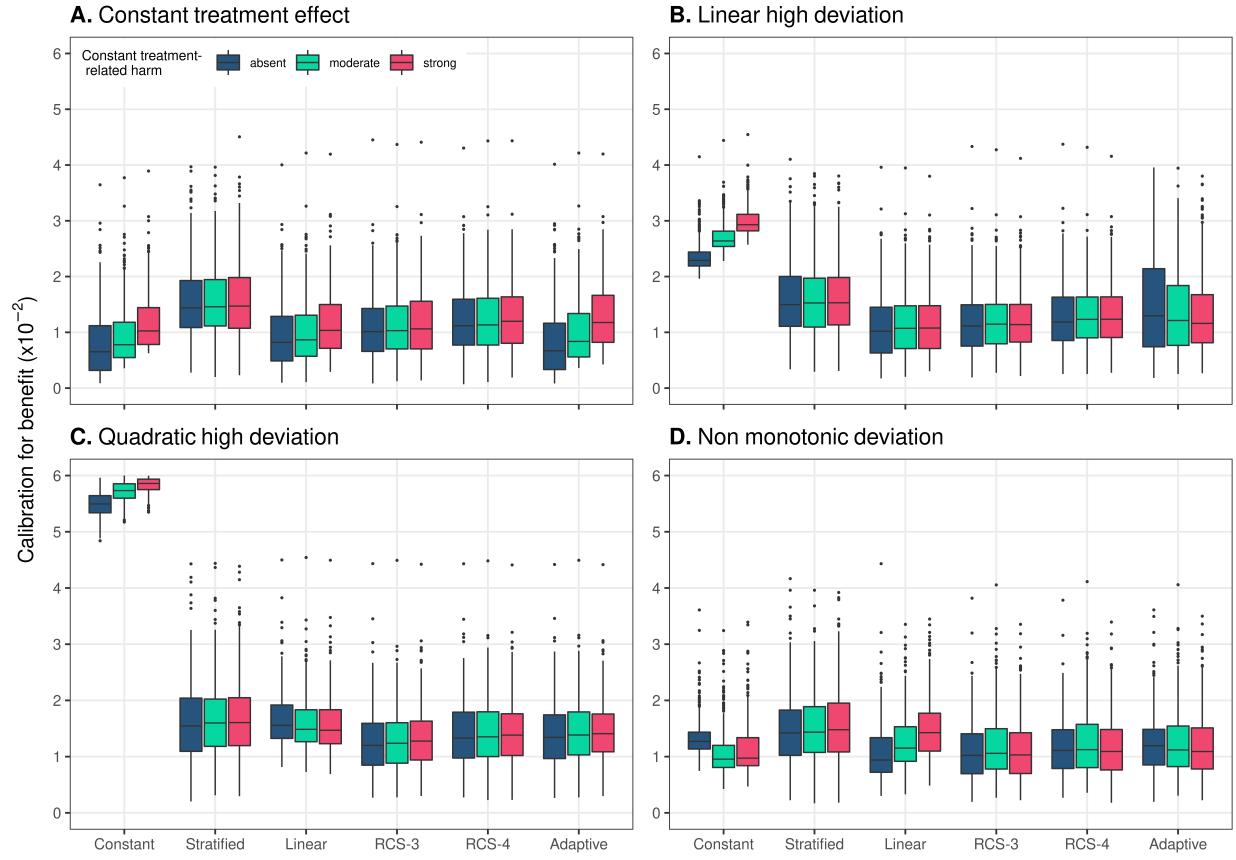


Figure S7: Calibration for benefit of the considered methods across 500 replications calculated in a simulated sample of size 500,000. True prediction AUC of 0.85 and sample size of 4,250

## 4 Strong relative treatment effect

Here we present the root mean squared error of the considered methods using strong constant relative treatment effect ( $OR = 0.5$ ) as the reference. Again, the same sample size and prediction performance settings were considered along with the same settings for linear, quadratic and non-monotonic deviations from the base case scenario of constant relative treatment effects are considered. All results can be found at [https://arekkas.shinyapps.io/simulation\\_viewer/](https://arekkas.shinyapps.io/simulation_viewer/).

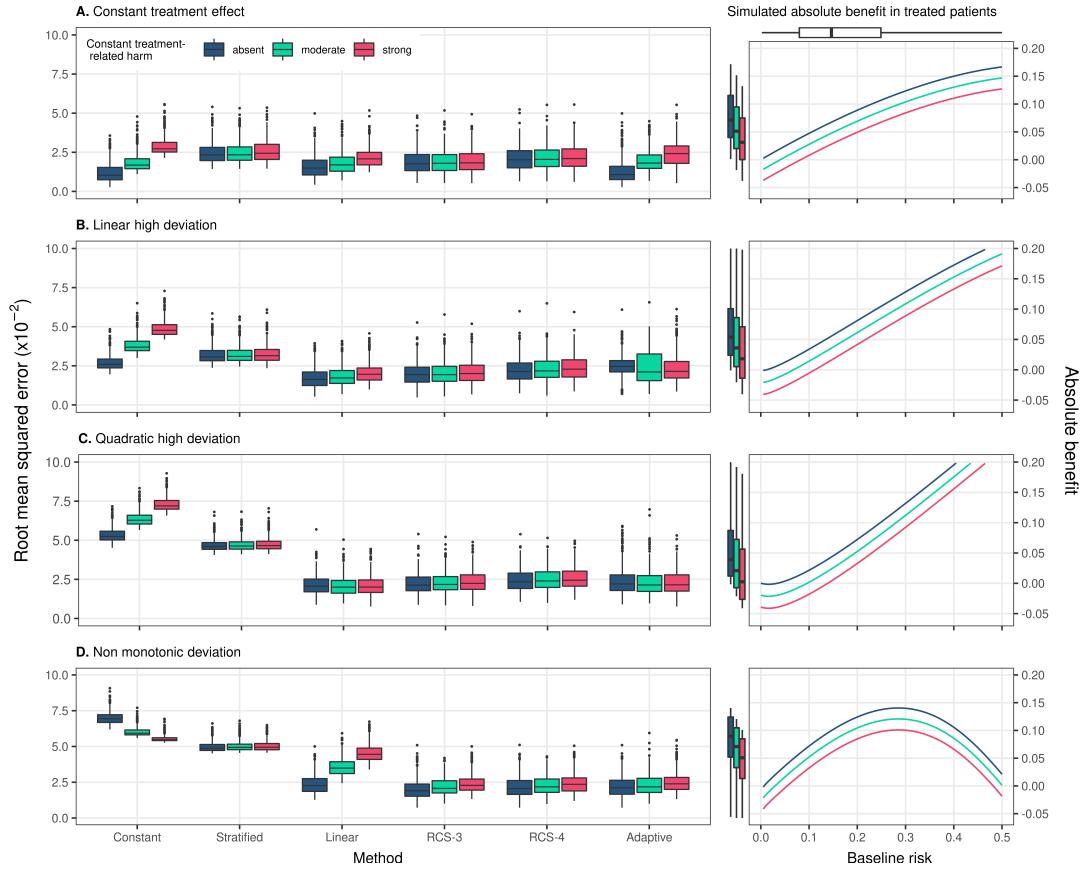


Figure S8: RMSE of the considered methods across 500 replications calculated in a simulated super-population of size 500,000. The scenario with true constant relative treatment effect (panel A) had a true prediction AUC of 0.75 and sample size of 4,250. The RMSE is also presented for strong linear (panel B), strong quadratic (panel C), and non-monotonic (panel D) deviations from constant relative treatment effects. Panels on the right side present the true relationship between baseline risk (x-axis) and absolute treatment benefit (y-axis). The 2.5, 25, 75 and 97.5 percentiles of the risk distribution are expressed in the boxplot.

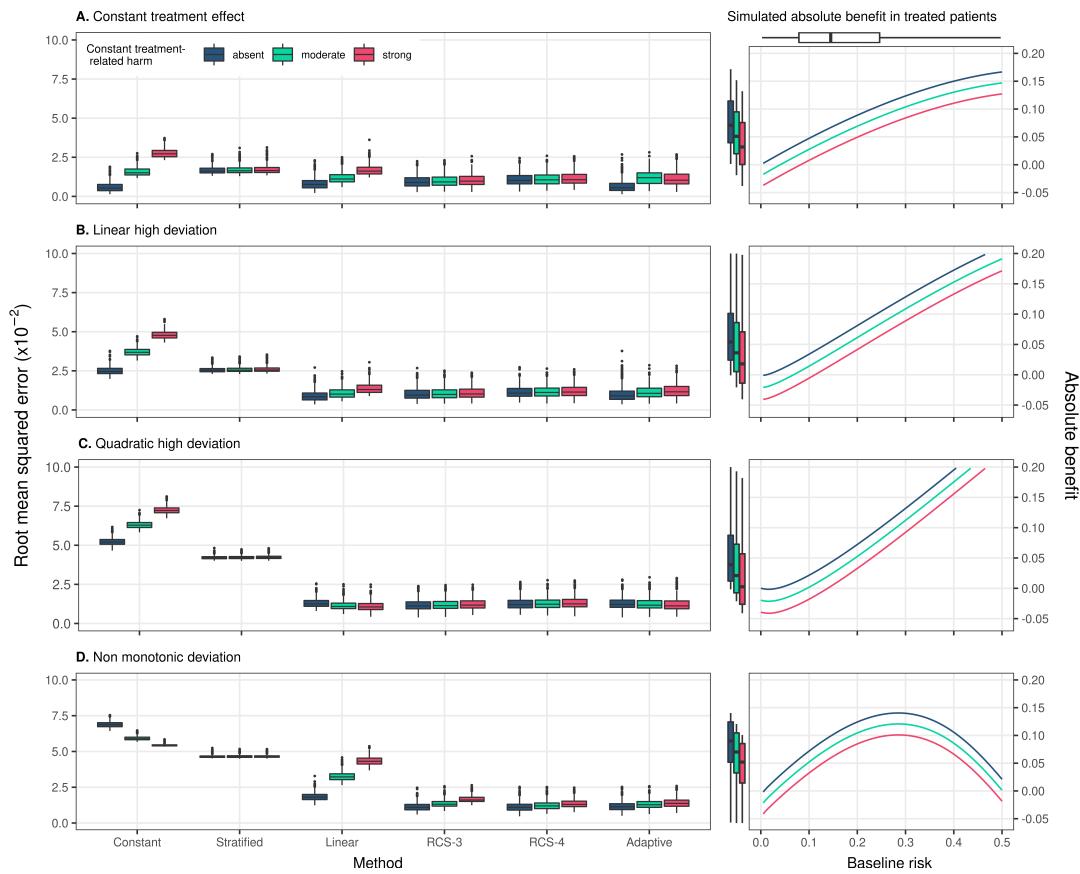


Figure S9: RMSE of the considered methods across 500 replications calculated in a simulated sample of size 500,000. Sample size is 17,000 rather than 4,250 in Figure S8.

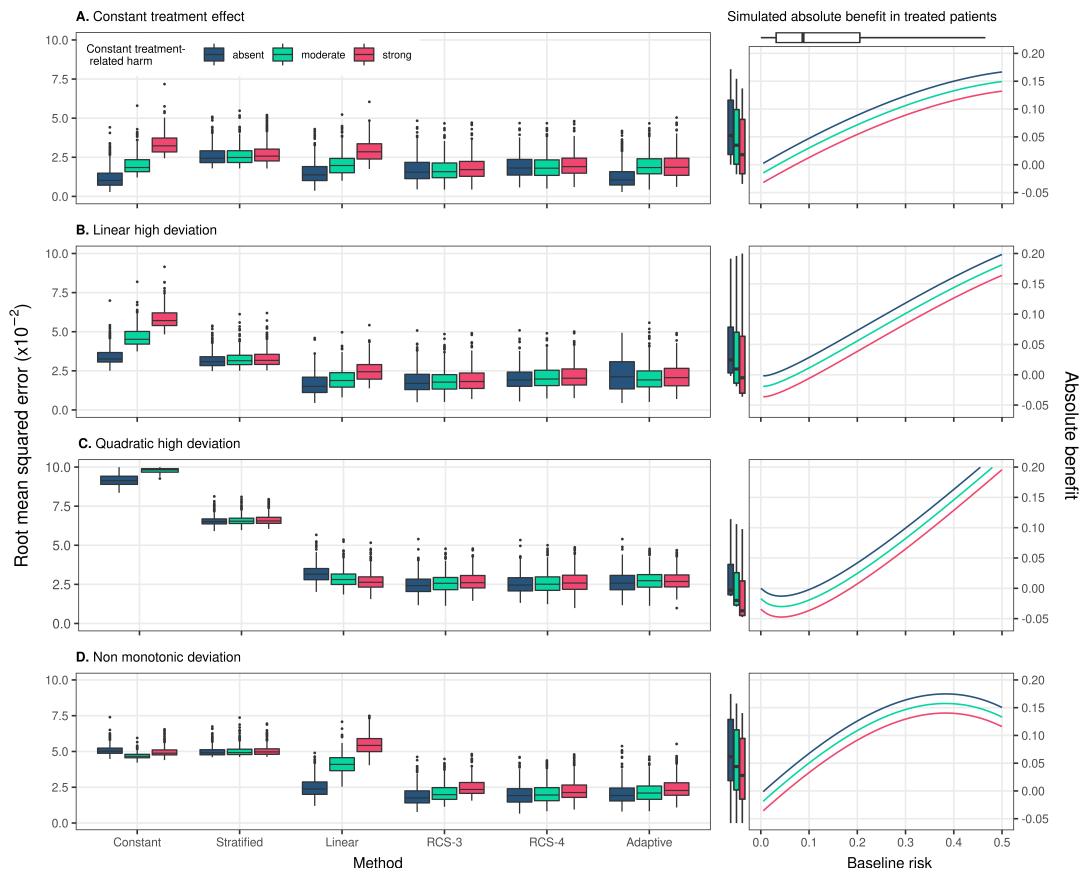


Figure S10: RMSE of the considered methods across 500 replications calculated in a simulated sample of size 500,000. AUC is 0.85 rather than in Figure S8.

## 5 Treatment interactions

We carried out a smaller set of simulations, in which we assumed true treatment-covariate interactions. Sample size was set to 4,250 and the AUC of the true prediction model was set to 0.75. The following scenarios were considered: 1) 4 true weak positive interactions ( $OR_{t_x=1}/OR_{t_x=0} = 0.83$ ); 2) 4 strong positive interactions ( $OR_{t_x=1}/OR_{t_x=0} = 0.61$ ); 3) 2 weak and 2 strong positive interactions; 4) 4 weak negative interactions ( $OR_{t_x=1}/OR_{t_x=0} = 1.17$ ); 5) 4 strong negative interactions ( $OR_{t_x=1}/OR_{t_x=0} = 1.39$ ); 6) 2 weak and 2 strong negative interactions; 7) combined positive and negative strong interactions. We also considered constant treatment-related harms applied on the absolute scale to all treated patients. The exact settings were: 1) absent treatment-related harms; 2) moderate treatment-related harms, defined as 25% of the average true benefit of the scenario without treatment-related harms; 3) strong treatment-related harms defined as 50% of the true average benefit of the scenario without treatment-related harms; 4) negative treatment-related harms (benefit), defined as an absolute risk reduction for treated patients of 50% of the true average benefit of the scenario without treatment-related harms. The exact settings can be found in Table S2.

Table S2: Scenario settings of the entire simulation study.

Analysis ID					Baseline risk								True treatment effect					Benefit		
Scenario	Base	N	AUC	Treatment-related harm	b0	b1	b2	b3	b4	b5	b6	b7	b8	g0	g1	g2	g5	g6	Before harms	After harms
649	interaction	4,250	0.75	absent moderate-positive strong-positive negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	-0.19	-0.19	-0.19	-0.19	0.10	0.10
650	interaction	4,250	0.75		-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	-0.19	-0.19	-0.19	-0.19	0.10	0.07
651	interaction	4,250	0.75		-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	-0.19	-0.19	-0.19	-0.19	0.10	0.05
652	interaction	4,250	0.75		-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	-0.19	-0.19	-0.19	-0.19	0.10	0.12
653	interaction	4,250	0.75	absent moderate-positive strong-positive negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	-0.19	-0.49	-0.19	-0.49	0.10	0.10
654	interaction	4,250	0.75		-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	-0.19	-0.49	-0.19	-0.49	0.10	0.08
655	interaction	4,250	0.75		-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	-0.19	-0.49	-0.19	-0.49	0.10	0.05
656	interaction	4,250	0.75		-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	-0.19	-0.49	-0.19	-0.49	0.10	0.13
657	interaction	4,250	0.75	absent moderate-positive strong-positive negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	-0.49	-0.49	-0.49	-0.49	0.11	0.11
658	interaction	4,250	0.75		-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	-0.49	-0.49	-0.49	-0.49	0.11	0.08
659	interaction	4,250	0.75		-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	-0.49	-0.49	-0.49	-0.49	0.11	0.06
660	interaction	4,250	0.75		-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	-0.49	-0.49	-0.49	-0.49	0.11	0.14
661	interaction	4,250	0.75	absent moderate-positive strong-positive negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	0.16	0.16	0.16	0.16	0.06	0.06
662	interaction	4,250	0.75		-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	0.16	0.16	0.16	0.16	0.06	0.05
663	interaction	4,250	0.75		-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	0.16	0.16	0.16	0.16	0.06	0.03
664	interaction	4,250	0.75		-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	0.16	0.16	0.16	0.16	0.06	0.08
665	interaction	4,250	0.75	absent moderate-positive strong-positive negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	0.16	0.33	0.16	0.33	0.05	0.05
666	interaction	4,250	0.75		-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	0.16	0.33	0.16	0.33	0.05	0.04
667	interaction	4,250	0.75		-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	0.16	0.33	0.16	0.33	0.05	0.03
668	interaction	4,250	0.75		-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	0.16	0.33	0.16	0.33	0.05	0.06
669	interaction	4,250	0.75	absent moderate-positive strong-positive negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	0.33	0.33	0.33	0.33	0.04	0.04
670	interaction	4,250	0.75		-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	0.33	0.33	0.33	0.33	0.04	0.03
671	interaction	4,250	0.75		-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	0.33	0.33	0.33	0.33	0.04	0.02
672	interaction	4,250	0.75		-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	0.33	0.33	0.33	0.33	0.04	0.05
673	interaction	4,250	0.75	absent moderate-positive strong-positive negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	-0.49	0.33	-0.49	0.33	0.08	0.08
674	interaction	4,250	0.75		-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	-0.49	0.33	-0.49	0.33	0.08	0.06
675	interaction	4,250	0.75		-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	-0.49	0.33	-0.49	0.33	0.08	0.04
676	interaction	4,250	0.75		-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.69	-0.49	0.33	-0.49	0.33	0.08	0.10

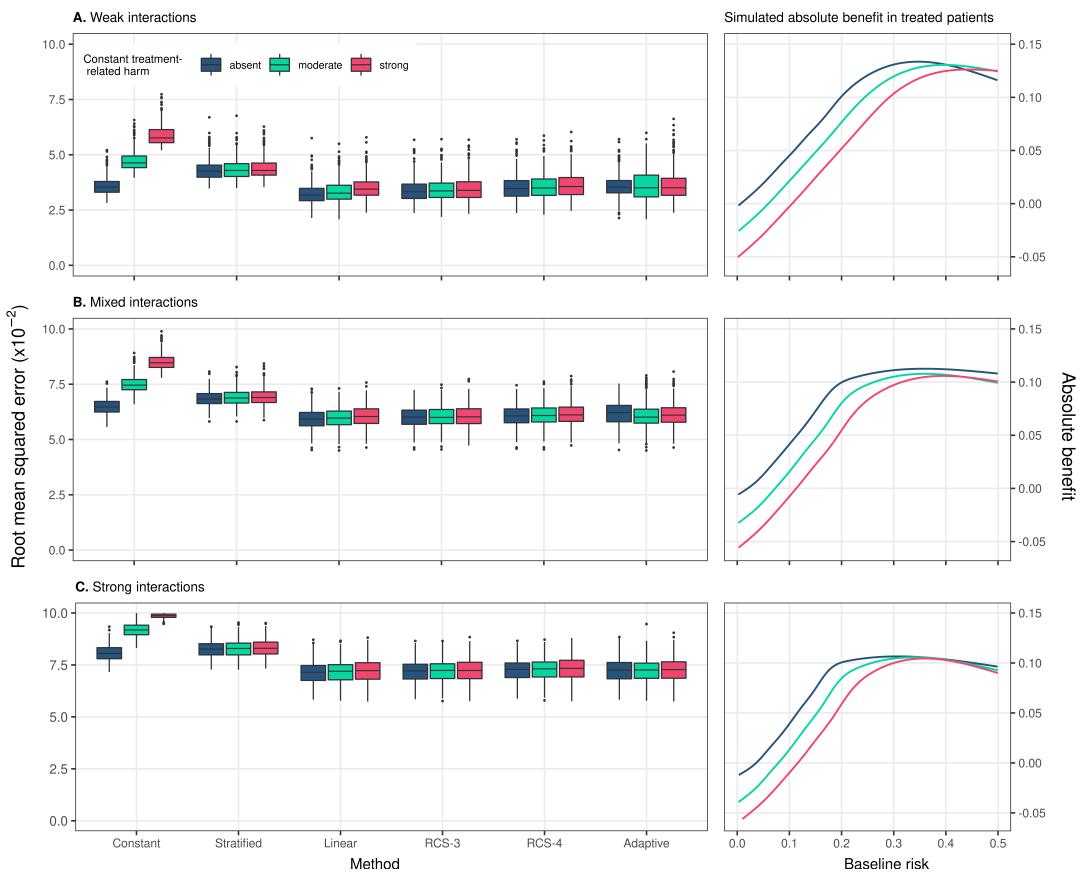


Figure S11: RMSE of the considered methods across 500 replications calculated in a simulated sample of size 500,000 where treatment-covariate interactions all favoring treatment were considered.

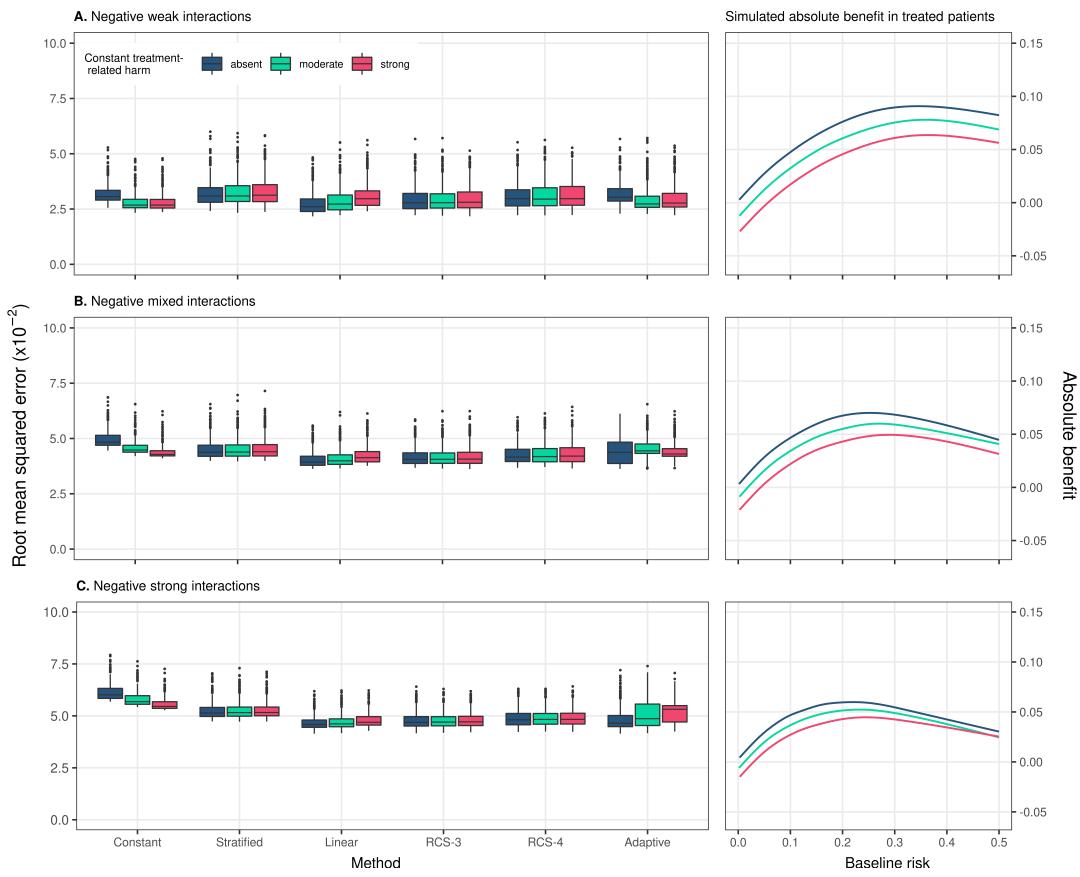


Figure S12: RMSE of the considered methods across 500 replications calculated in a simulated sample of size 500,000 where treatment-covariate interactions all favoring the control were considered.

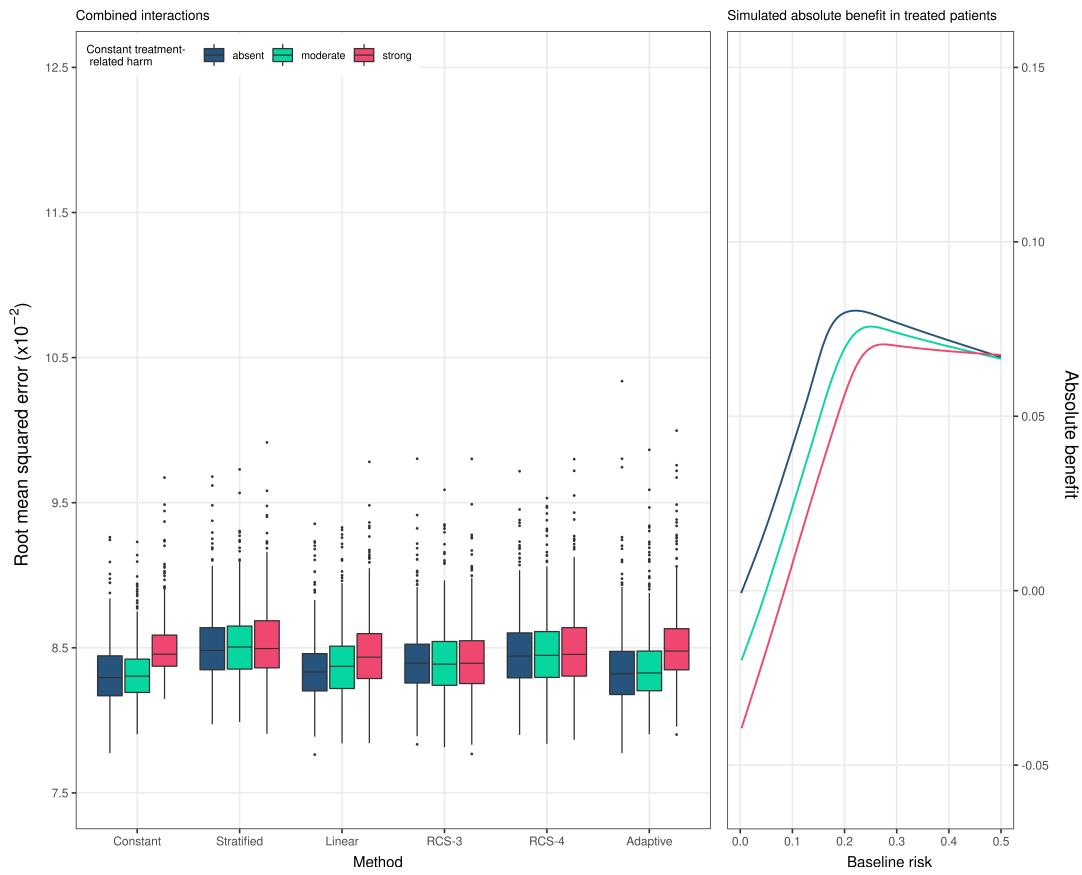


Figure S13: RMSE of the considered methods across 500 replications calculated in a simulated sample of size 500,000 where treatment-covariate interactions 2 favoring treatment and 2 favoring the control were considered.

## 6 Empirical illustration

$$P(\text{outcome} = 1 | X = x) = \text{expit}(lp(x)), \quad (4)$$

where

$$\begin{aligned} lp(x) = & \beta_0 + \beta_1 \text{age} + \beta_2 I(\text{Killip} = II) + \beta_3 I(\text{Killip} = III) + \\ & \beta_4 I(\text{Killip} = IV) + \beta_5 \text{ceil}(\text{sysbp}, 120) + \beta_6 \text{pulse} + \\ & \beta_7 \max(\text{pulse} - 50, 0) + \beta_8 I(\text{pmi} = yes) + \\ & \beta_9 I(\text{miloc} = \text{Anterior}) + \beta_{10} I(\text{miloc} = \text{Other}) + \\ & \gamma \times \text{treatment} \end{aligned} \quad (5)$$

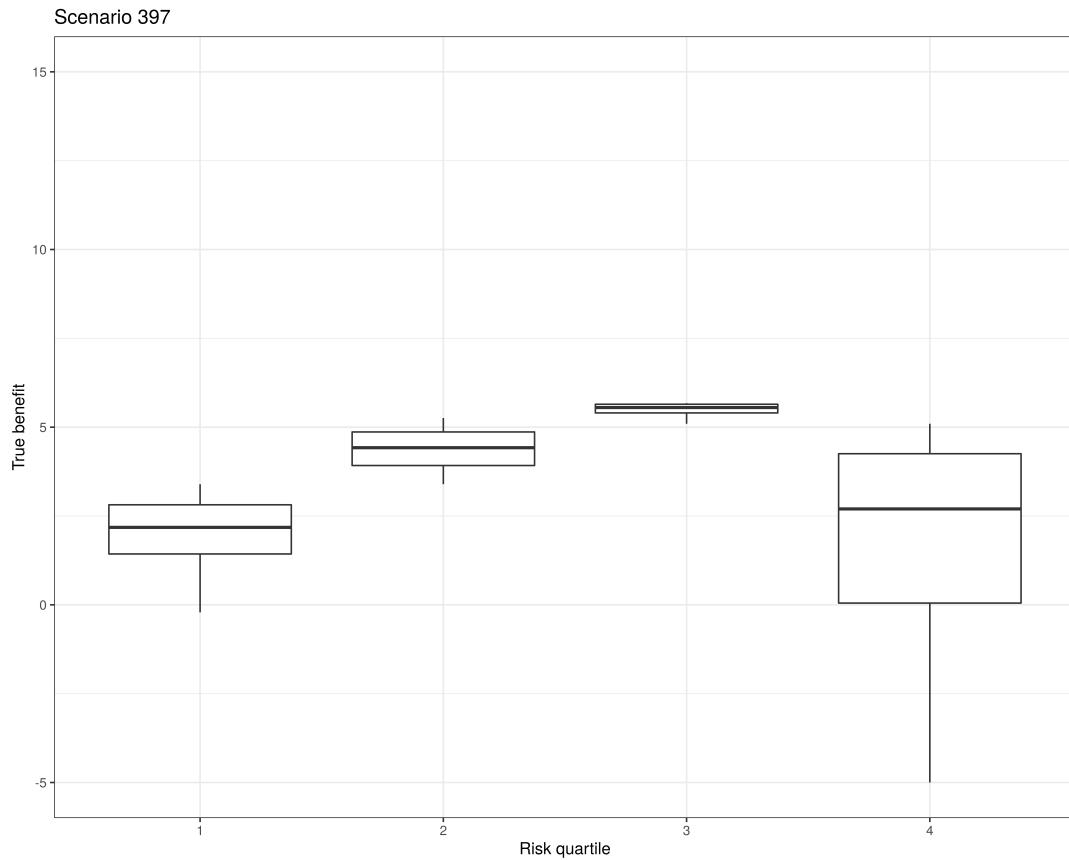
and  $\text{expit}(x) = \frac{e^x}{1+e^x}$

Table S3: Coefficients of the prediction model for 30-day mortality, based on the data from GUSTO-I trial.

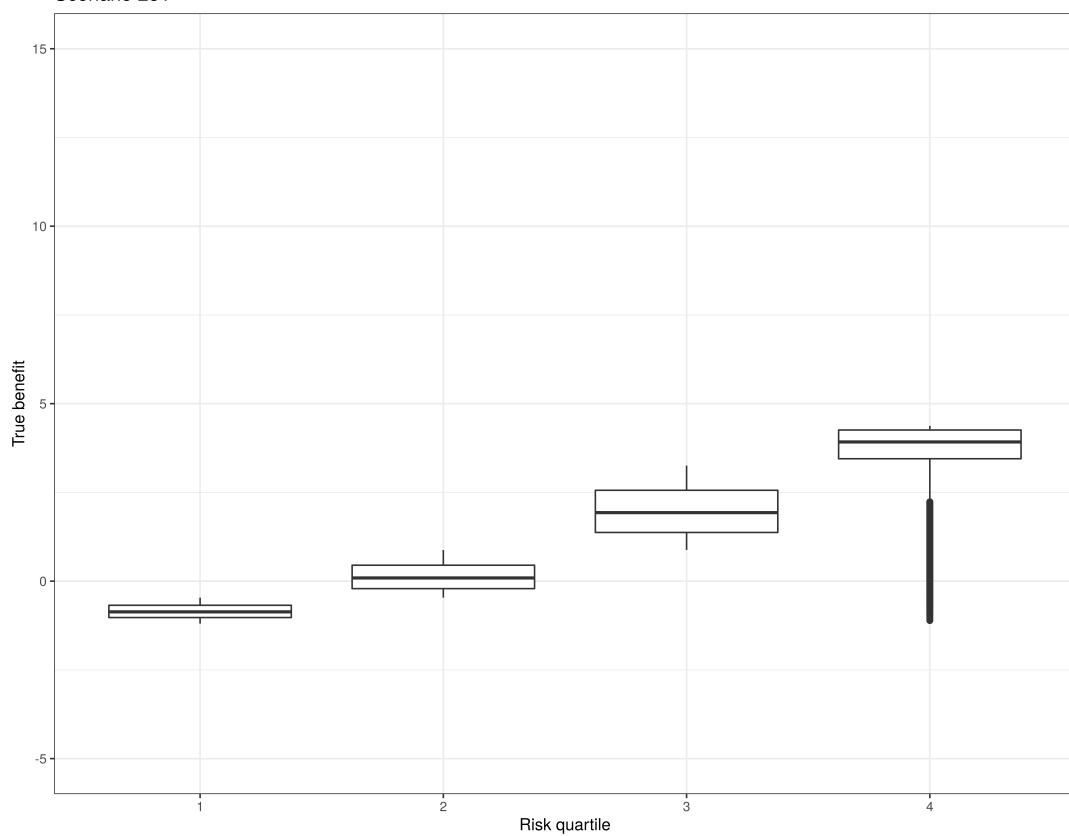
Variable	Estimate	stderror	zvalue	pvalue
Intercept	-3.020	0.797	-3.788	0.000
Age	-0.208	0.053	-3.935	0.000
Killip class = II	0.077	0.002	31.280	0.000
Killip class = III	0.614	0.059	10.423	0.000
Killip class = IV	1.161	0.121	9.566	0.000
Systolic blood pressure	1.921	0.162	11.872	0.000
Pulse rate (1)	-0.039	0.002	-20.332	0.000
Pulse rate (2)	-0.024	0.016	-1.521	0.128
Previous MI (yes)	0.043	0.016	2.675	0.007
MI location (Other)	0.447	0.056	7.964	0.000
MI location (Anterior)	0.286	0.135	2.126	0.033
Treatment	0.543	0.051	10.625	0.000

## 7 Plausible scenario settings

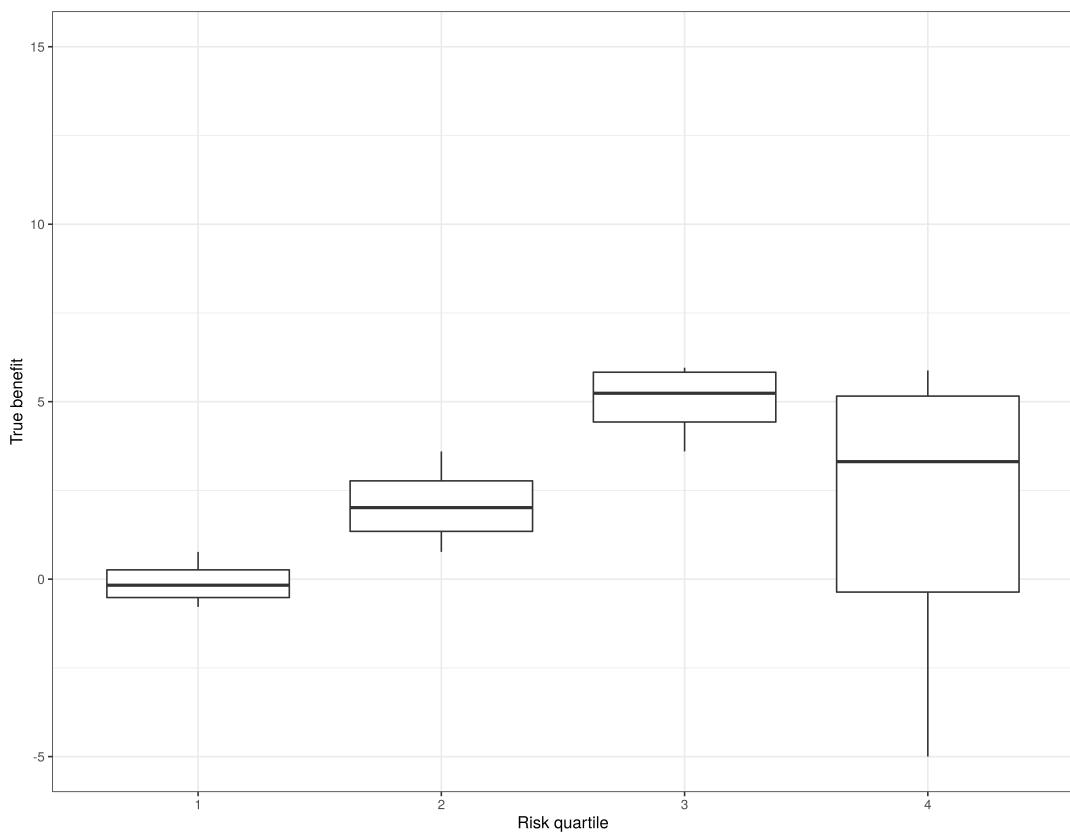
In this section we present specific scenarios from our simulation settings in which evolution of benefit followed similar patterns to (REF!!). In this case patients were stratified into risk quarters based on their true baseline risk. Within each risk quarter we constructed boxplots of true benefit.



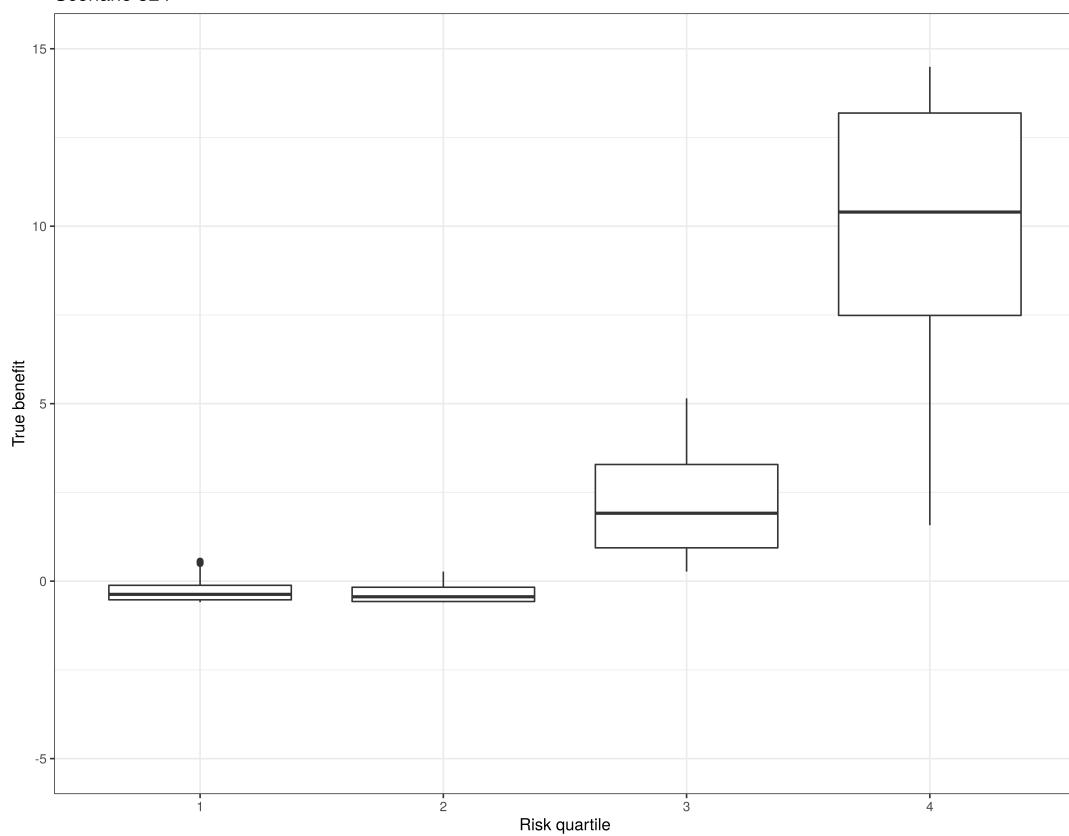
Scenario 251



Scenario 406



Scenario 324



Scenario 422

