

Supplementary material

Contents

1	Simulation settings	1
1.1	Base-case scenario	2
1.2	Deviations from base-case	2
1.3	Risk modeling	2
1.4	Approaches to individualize benefit predictions	3
2	Adaptive model selection frequencies	19
3	Discrimination and calibration for benefit	22
4	Strong relative treatment effect	26
5	Treatment interactions	26

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,

$$\begin{aligned}x_1, \dots, x_4 &\sim N(0, 1) \\x_5, \dots, x_8 &\sim B(1, 0.2)\end{aligned}$$

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

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

where

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

For treated patients, outcomes are generated from:

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

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 β 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, β_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

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

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:

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

We predict absolute benefit from

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

1.4.4 Restricted cubic splines

Finally, we drop the linearity assumption and predict absolute benefit using smoothing with restricted cubic splines with 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

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

and 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
1	absent	4,250	0.75	absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.00	1.00	0.00	0	0.00	0.00
2	absent	4,250	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.00	1.00	0.00	0	0.00	-0.01
3	absent	4,250	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.00	1.00	0.00	0	0.00	-0.02
4	absent	4,250	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.00	1.00	0.00	0	0.00	0.01
5	absent	4,250	0.65	absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.00	1.00	0.00	0	0.00	0.00
6	absent	4,250	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.00	1.00	0.00	0	0.00	-0.01
7	absent	4,250	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.00	1.00	0.00	0	0.00	-0.02
8	absent	4,250	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.00	1.00	0.00	0	0.00	0.01
9	absent	4,250	0.85	absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.00	1.00	0.00	0	0.00	0.00
10	absent	4,250	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.00	1.00	0.00	0	0.00	-0.01
11	absent	4,250	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.00	1.00	0.00	0	0.00	-0.02
12	absent	4,250	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.00	1.00	0.00	0	0.00	0.01
13	absent	1,063	0.75	absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.00	1.00	0.00	0	0.00	0.00
14	absent	1,063	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.00	1.00	0.00	0	0.00	-0.01
15	absent	1,063	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.00	1.00	0.00	0	0.00	-0.02
16	absent	1,063	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.00	1.00	0.00	0	0.00	0.01
17	absent	1,063	0.65	absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.00	1.00	0.00	0	0.00	0.00
18	absent	1,063	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.00	1.00	0.00	0	0.00	-0.01
19	absent	1,063	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.00	1.00	0.00	0	0.00	-0.02
20	absent	1,063	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.00	1.00	0.00	0	0.00	0.01
21	absent	1,063	0.85	absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.00	1.00	0.00	0	0.00	0.00
22	absent	1,063	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.00	1.00	0.00	0	0.00	-0.01
23	absent	1,063	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.00	1.00	0.00	0	0.00	-0.02
24	absent	1,063	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.00	1.00	0.00	0	0.00	0.01
25	absent	17,000	0.75	absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.00	1.00	0.00	0	0.00	0.00
26	absent	17,000	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.00	1.00	0.00	0	0.00	-0.01
27	absent	17,000	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.00	1.00	0.00	0	0.00	-0.02
28	absent	17,000	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.00	1.00	0.00	0	0.00	0.01
29	absent	17,000	0.65	absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.00	1.00	0.00	0	0.00	0.00
30	absent	17,000	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.00	1.00	0.00	0	0.00	-0.01
31	absent	17,000	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.00	1.00	0.00	0	0.00	-0.02
32	absent	17,000	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.00	1.00	0.00	0	0.00	0.01
33	absent	17,000	0.85	absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.00	1.00	0.00	0	0.00	0.00
34	absent	17,000	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.00	1.00	0.00	0	0.00	-0.01
35	absent	17,000	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.00	1.00	0.00	0	0.00	-0.02
36	absent	17,000	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.00	1.00	0.00	0	0.00	0.01
37	absent	4,250	0.75	absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.06	0.95	0.00	0	0.00	0.00
38	absent	4,250	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.06	0.95	0.00	0	0.00	-0.01
39	absent	4,250	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.06	0.95	0.00	0	0.00	-0.02
40	absent	4,250	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.06	0.95	0.00	0	0.00	0.01
41	absent	4,250	0.65	absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-0.08	0.93	0.00	0	0.00	0.00

8	177	absent	17,000	0.85		absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-3.95	1.00	-0.06	-5	0.00	0.00
	178	absent	17,000	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-3.95	1.00	-0.06	-5	0.00	-0.01	
	179	absent	17,000	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-3.95	1.00	-0.06	-5	0.00	-0.02	
	180	absent	17,000	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-3.95	1.00	-0.06	-5	0.00	0.01	
	181	absent	4,250	0.75		absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	2.49	4.21	0.54	0	0.00	0.00
	182	absent	4,250	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	2.49	4.21	0.54	0	0.00	-0.01	
	183	absent	4,250	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	2.49	4.21	0.54	0	0.00	-0.02	
	184	absent	4,250	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	2.49	4.21	0.54	0	0.00	0.01	
	185	absent	4,250	0.65		absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.15	3.32	0.38	0	0.00	0.00
	186	absent	4,250	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.15	3.32	0.38	0	0.00	-0.01	
	187	absent	4,250	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.15	3.32	0.38	0	0.00	-0.02	
	188	absent	4,250	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.15	3.32	0.38	0	0.00	0.01	
	189	absent	4,250	0.85		absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.74	4.10	0.55	0	0.00	0.00
	190	absent	4,250	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.74	4.10	0.55	0	0.00	-0.01	
	191	absent	4,250	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.74	4.10	0.55	0	0.00	-0.02	
	192	absent	4,250	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.74	4.10	0.55	0	0.00	0.01	
	193	absent	1,063	0.75		absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	2.49	4.21	0.54	0	0.00	0.00
	194	absent	1,063	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	2.49	4.21	0.54	0	0.00	-0.01	
	195	absent	1,063	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	2.49	4.21	0.54	0	0.00	-0.02	
	196	absent	1,063	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	2.49	4.21	0.54	0	0.00	0.01	
	197	absent	1,063	0.65		absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.15	3.32	0.38	0	0.00	0.00
	198	absent	1,063	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.15	3.32	0.38	0	0.00	-0.01	
	199	absent	1,063	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.15	3.32	0.38	0	0.00	-0.02	
	200	absent	1,063	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.15	3.32	0.38	0	0.00	0.01	
	201	absent	1,063	0.85		absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.74	4.10	0.55	0	0.00	0.00
	202	absent	1,063	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.74	4.10	0.55	0	0.00	-0.01	
	203	absent	1,063	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.74	4.10	0.55	0	0.00	-0.02	
	204	absent	1,063	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.74	4.10	0.55	0	0.00	0.01	
	205	absent	17,000	0.75		absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	2.49	4.21	0.54	0	0.00	0.00
	206	absent	17,000	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	2.49	4.21	0.54	0	0.00	-0.01	
	207	absent	17,000	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	2.49	4.21	0.54	0	0.00	-0.02	
	208	absent	17,000	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	2.49	4.21	0.54	0	0.00	0.01	
	209	absent	17,000	0.65		absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.15	3.32	0.38	0	0.00	0.00
	210	absent	17,000	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.15	3.32	0.38	0	0.00	-0.01	
	211	absent	17,000	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.15	3.32	0.38	0	0.00	-0.02	
	212	absent	17,000	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.15	3.32	0.38	0	0.00	0.01	
	213	absent	17,000	0.85		absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.74	4.10	0.55	0	0.00	0.00
	214	absent	17,000	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.74	4.10	0.55	0	0.00	-0.01	
	215	absent	17,000	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.74	4.10	0.55	0	0.00	-0.02	
	216	absent	17,000	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.74	4.10	0.55	0	0.00	0.01	
	217	moderate	4,250	0.75		absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.22	1.00	0.00	0	0.03	0.03
	218	moderate	4,250	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.22	1.00	0.00	0	0.03	0.02	
	219	moderate	4,250	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.22	1.00	0.00	0	0.03	0.02	
	220	moderate	4,250	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.22	1.00	0.00	0	0.03	0.04	
	221	moderate	4,250	0.65		absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-0.22	1.00	0.00	0	0.03	0.03

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	0.48	1.78	0.14	0	0.03	0.02
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	0.48	1.78	0.14	0	0.03	0.02
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	0.48	1.78	0.14	0	0.03	0.04
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	-0.09	1.35	0.07	0	0.02	0.02
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	-0.09	1.35	0.07	0	0.02	0.02
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	-0.09	1.35	0.07	0	0.02	0.02
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	-0.09	1.35	0.07	0	0.02	0.03
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	0.17	1.56	0.11	0	0.03	0.03
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	0.17	1.56	0.11	0	0.03	0.02
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	0.17	1.56	0.11	0	0.03	0.02
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	0.17	1.56	0.11	0	0.03	0.04
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	0.48	1.78	0.14	0	0.03	0.03
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	0.48	1.78	0.14	0	0.03	0.02
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	0.48	1.78	0.14	0	0.03	0.02
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	0.48	1.78	0.14	0	0.03	0.04
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	-0.09	1.35	0.07	0	0.02	0.02
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	-0.09	1.35	0.07	0	0.02	0.02
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	-0.09	1.35	0.07	0	0.02	0.02
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	-0.09	1.35	0.07	0	0.02	0.03
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	0.17	1.56	0.11	0	0.03	0.03
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	0.17	1.56	0.11	0	0.03	0.02
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	0.17	1.56	0.11	0	0.03	0.02
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	0.17	1.56	0.11	0	0.03	0.04
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	0.48	1.78	0.14	0	0.03	0.03
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	0.48	1.78	0.14	0	0.03	0.02
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	0.48	1.78	0.14	0	0.03	0.02
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	0.48	1.78	0.14	0	0.03	0.04
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	-0.09	1.35	0.07	0	0.02	0.02
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	-0.09	1.35	0.07	0	0.02	0.02
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	-0.09	1.35	0.07	0	0.02	0.02
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	-0.09	1.35	0.07	0	0.02	0.03
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	-0.69	1.00	0.00	0	0.08	0.08
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	-0.69	1.00	0.00	0	0.08	0.06
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	-0.69	1.00	0.00	0	0.08	0.06
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	-0.69	1.00	0.00	0	0.08	0.10
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	-0.69	1.00	0.00	0	0.09	0.09
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	-0.69	1.00	0.00	0	0.09	0.07
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	-0.69	1.00	0.00	0	0.09	0.07
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	-0.69	1.00	0.00	0	0.09	0.11
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	-0.69	1.00	0.00	0	0.07	0.07
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	-0.69	1.00	0.00	0	0.07	0.05
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	-0.69	1.00	0.00	0	0.07	0.05
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	-0.69	1.00	0.00	0	0.07	0.09
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	-0.69	1.00	0.00	0	0.08	0.08
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	-0.69	1.00	0.00	0	0.08	0.06

537	high	17,000	0.85		absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.84	0.78	0.00	0	0.07	0.07
538	high	17,000	0.85		moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.84	0.78	0.00	0	0.07	0.05
539	high	17,000	0.85		strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.84	0.78	0.00	0	0.07	0.05
540	high	17,000	0.85		negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.84	0.78	0.00	0	0.07	0.09
541	high	4,250	0.75		absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-5.48	1.00	-0.01	-5	0.08	0.08
542	high	4,250	0.75		moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-5.48	1.00	-0.01	-5	0.08	0.06
543	high	4,250	0.75		strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-5.48	1.00	-0.01	-5	0.08	0.06
544	high	4,250	0.75		negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-5.48	1.00	-0.01	-5	0.08	0.10
545	high	4,250	0.65		absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-5.46	1.00	-0.02	-5	0.09	0.09
546	high	4,250	0.65		moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-5.46	1.00	-0.02	-5	0.09	0.07
547	high	4,250	0.65		strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-5.46	1.00	-0.02	-5	0.09	0.07
548	high	4,250	0.65		negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-5.46	1.00	-0.02	-5	0.09	0.11
549	high	4,250	0.85		absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-5.35	1.00	-0.02	-5	0.07	0.07
550	high	4,250	0.85		moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-5.35	1.00	-0.02	-5	0.07	0.05
551	high	4,250	0.85		strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-5.35	1.00	-0.02	-5	0.07	0.05
552	high	4,250	0.85		negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-5.35	1.00	-0.02	-5	0.07	0.09
553	high	1,063	0.75		absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-5.48	1.00	-0.01	-5	0.08	0.08
554	high	1,063	0.75		moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-5.48	1.00	-0.01	-5	0.08	0.06
555	high	1,063	0.75		strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-5.48	1.00	-0.01	-5	0.08	0.06
556	high	1,063	0.75		negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-5.48	1.00	-0.01	-5	0.08	0.10
557	high	1,063	0.65		absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-5.46	1.00	-0.02	-5	0.09	0.09
558	high	1,063	0.65		moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-5.46	1.00	-0.02	-5	0.09	0.07
559	high	1,063	0.65		strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-5.46	1.00	-0.02	-5	0.09	0.07
560	high	1,063	0.65		negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-5.46	1.00	-0.02	-5	0.09	0.11
561	high	1,063	0.85		absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-5.35	1.00	-0.02	-5	0.07	0.07
562	high	1,063	0.85		moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-5.35	1.00	-0.02	-5	0.07	0.05
563	high	1,063	0.85		strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-5.35	1.00	-0.02	-5	0.07	0.05
564	high	1,063	0.85		negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-5.35	1.00	-0.02	-5	0.07	0.09
565	high	17,000	0.75		absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-5.48	1.00	-0.01	-5	0.08	0.08
566	high	17,000	0.75		moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-5.48	1.00	-0.01	-5	0.08	0.06
567	high	17,000	0.75		strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-5.48	1.00	-0.01	-5	0.08	0.06
568	high	17,000	0.75		negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-5.48	1.00	-0.01	-5	0.08	0.10
569	high	17,000	0.65		absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-5.46	1.00	-0.02	-5	0.09	0.09
570	high	17,000	0.65		moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-5.46	1.00	-0.02	-5	0.09	0.07
571	high	17,000	0.65		strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-5.46	1.00	-0.02	-5	0.09	0.07
572	high	17,000	0.65		negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-5.46	1.00	-0.02	-5	0.09	0.11
573	high	17,000	0.85		absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-5.35	1.00	-0.02	-5	0.07	0.07
574	high	17,000	0.85		moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-5.35	1.00	-0.02	-5	0.07	0.05
575	high	17,000	0.85		strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-5.35	1.00	-0.02	-5	0.07	0.05
576	high	17,000	0.85		negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-5.35	1.00	-0.02	-5	0.07	0.09
577	high	4,250	0.75		absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.86	1.00	-0.05	-5	0.08	0.08
578	high	4,250	0.75		moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.86	1.00	-0.05	-5	0.08	0.06
579	high	4,250	0.75		strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.86	1.00	-0.05	-5	0.08	0.06
580	high	4,250	0.75		negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.86	1.00	-0.05	-5	0.08	0.10
581	high	4,250	0.65		absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.84	1.00	-0.06	-5	0.09	0.09

582	high	4,250	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.84	1.00	-0.06	-5	0.09	0.07
583	high	4,250	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.84	1.00	-0.06	-5	0.09	0.07
584	high	4,250	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.84	1.00	-0.06	-5	0.09	0.11
585	high	4,250	0.85	absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.51	1.00	-0.06	-5	0.07	0.07
586	high	4,250	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.51	1.00	-0.06	-5	0.07	0.05
587	high	4,250	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.51	1.00	-0.06	-5	0.07	0.05
588	high	4,250	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.51	1.00	-0.06	-5	0.07	0.09
589	high	1,063	0.75	absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.86	1.00	-0.05	-5	0.08	0.08
590	high	1,063	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.86	1.00	-0.05	-5	0.08	0.06
591	high	1,063	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.86	1.00	-0.05	-5	0.08	0.06
592	high	1,063	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.86	1.00	-0.05	-5	0.08	0.10
593	high	1,063	0.65	absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.84	1.00	-0.06	-5	0.09	0.09
594	high	1,063	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.84	1.00	-0.06	-5	0.09	0.07
595	high	1,063	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.84	1.00	-0.06	-5	0.09	0.07
596	high	1,063	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.84	1.00	-0.06	-5	0.09	0.11
597	high	1,063	0.85	absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.51	1.00	-0.06	-5	0.07	0.07
598	high	1,063	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.51	1.00	-0.06	-5	0.07	0.05
599	high	1,063	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.51	1.00	-0.06	-5	0.07	0.05
600	high	1,063	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.51	1.00	-0.06	-5	0.07	0.09
601	high	17,000	0.75	absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.86	1.00	-0.05	-5	0.08	0.08
602	high	17,000	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.86	1.00	-0.05	-5	0.08	0.06
603	high	17,000	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.86	1.00	-0.05	-5	0.08	0.06
604	high	17,000	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-4.86	1.00	-0.05	-5	0.08	0.10
605	high	17,000	0.65	absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.84	1.00	-0.06	-5	0.09	0.09
606	high	17,000	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.84	1.00	-0.06	-5	0.09	0.07
607	high	17,000	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.84	1.00	-0.06	-5	0.09	0.07
608	high	17,000	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-4.84	1.00	-0.06	-5	0.09	0.11
609	high	17,000	0.85	absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.51	1.00	-0.06	-5	0.07	0.07
610	high	17,000	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.51	1.00	-0.06	-5	0.07	0.05
611	high	17,000	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.51	1.00	-0.06	-5	0.07	0.05
612	high	17,000	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-4.51	1.00	-0.06	-5	0.07	0.09
613	high	4,250	0.75	absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.08	2.03	0.21	0	0.08	0.08
614	high	4,250	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.08	2.03	0.21	0	0.08	0.06
615	high	4,250	0.75	strong-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.08	2.03	0.21	0	0.08	0.06
616	high	4,250	0.75	negative	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.08	2.03	0.21	0	0.08	0.10
617	high	4,250	0.65	absent	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.79	2.76	0.32	0	0.09	0.09
618	high	4,250	0.65	moderate-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.79	2.76	0.32	0	0.09	0.07
619	high	4,250	0.65	strong-positive	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.79	2.76	0.32	0	0.09	0.07
620	high	4,250	0.65	negative	-1.63	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.79	2.76	0.32	0	0.09	0.11
621	high	4,250	0.85	absent	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.62	1.57	0.14	0	0.07	0.07
622	high	4,250	0.85	moderate-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.62	1.57	0.14	0	0.07	0.05
623	high	4,250	0.85	strong-positive	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.62	1.57	0.14	0	0.07	0.05
624	high	4,250	0.85	negative	-2.70	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-0.62	1.57	0.14	0	0.07	0.09
625	high	1,063	0.75	absent	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.08	2.03	0.21	0	0.08	0.08
626	high	1,063	0.75	moderate-positive	-2.08	0.49	0.49	0.49	0.49	0.49	0.49	0.49	-0.08	2.03	0.21	0	0.08	0.06

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	-0.08	2.03	0.21	0	0.08	0.06
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	-0.08	2.03	0.21	0	0.08	0.10
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	0.79	2.76	0.32	0	0.09	0.09
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	0.79	2.76	0.32	0	0.09	0.07
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	0.79	2.76	0.32	0	0.09	0.07
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	0.79	2.76	0.32	0	0.09	0.11
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	-0.62	1.57	0.14	0	0.07	0.07
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	-0.62	1.57	0.14	0	0.07	0.05
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	-0.62	1.57	0.14	0	0.07	0.05
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	-0.62	1.57	0.14	0	0.07	0.09
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	-0.08	2.03	0.21	0	0.08	0.08
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	-0.08	2.03	0.21	0	0.08	0.06
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	-0.08	2.03	0.21	0	0.08	0.06
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	-0.08	2.03	0.21	0	0.08	0.10
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	0.79	2.76	0.32	0	0.09	0.09
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	0.79	2.76	0.32	0	0.09	0.07
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	0.79	2.76	0.32	0	0.09	0.07
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	0.79	2.76	0.32	0	0.09	0.11
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	-0.62	1.57	0.14	0	0.07	0.07
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	-0.62	1.57	0.14	0	0.07	0.05
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	-0.62	1.57	0.14	0	0.07	0.05
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	-0.62	1.57	0.14	0	0.07	0.09

2 Adaptive model selection frequencies

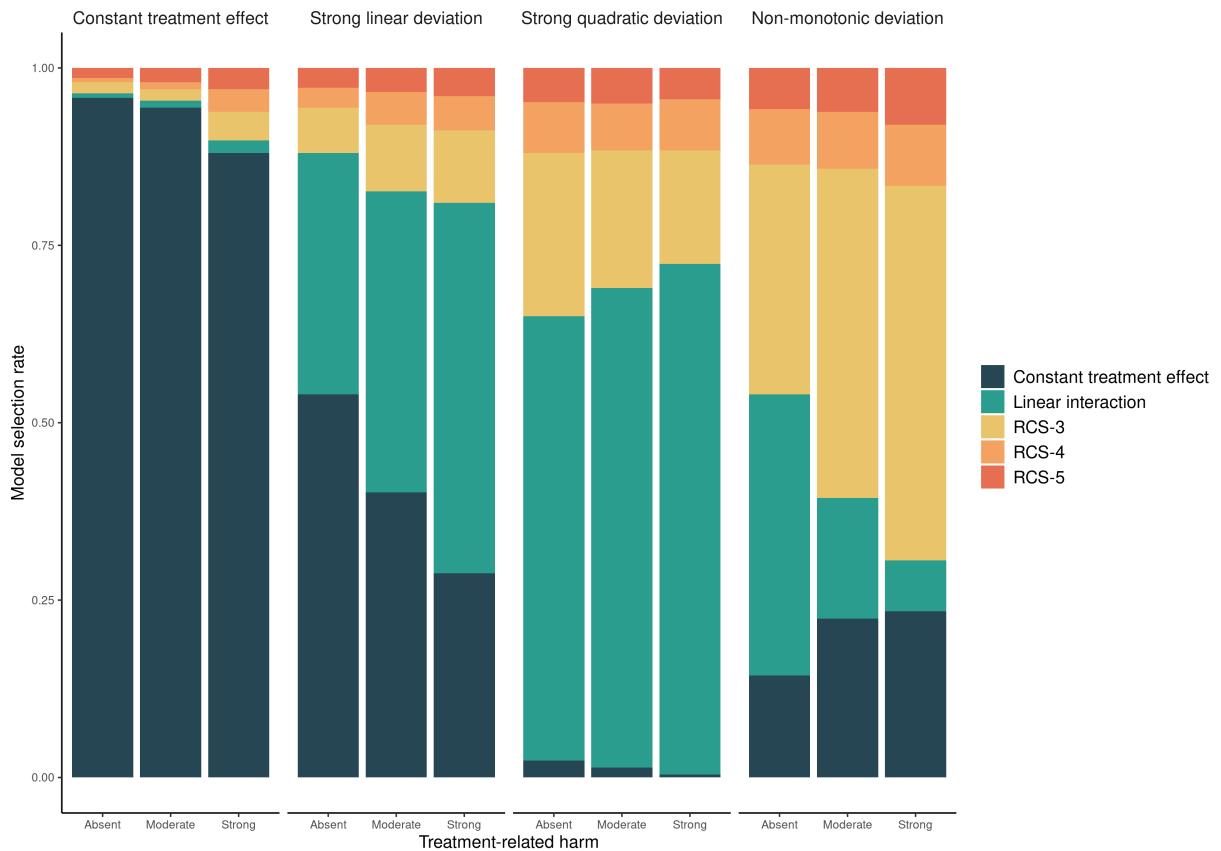


Figure S1: Model selection frequencies of the adaptive approach based on Akaike's Information Criterion across 500 replications. The scenario with the true constant relative treatment effect (first panel) had a true prediction AUC of 0.75 and sample size of 4,250.

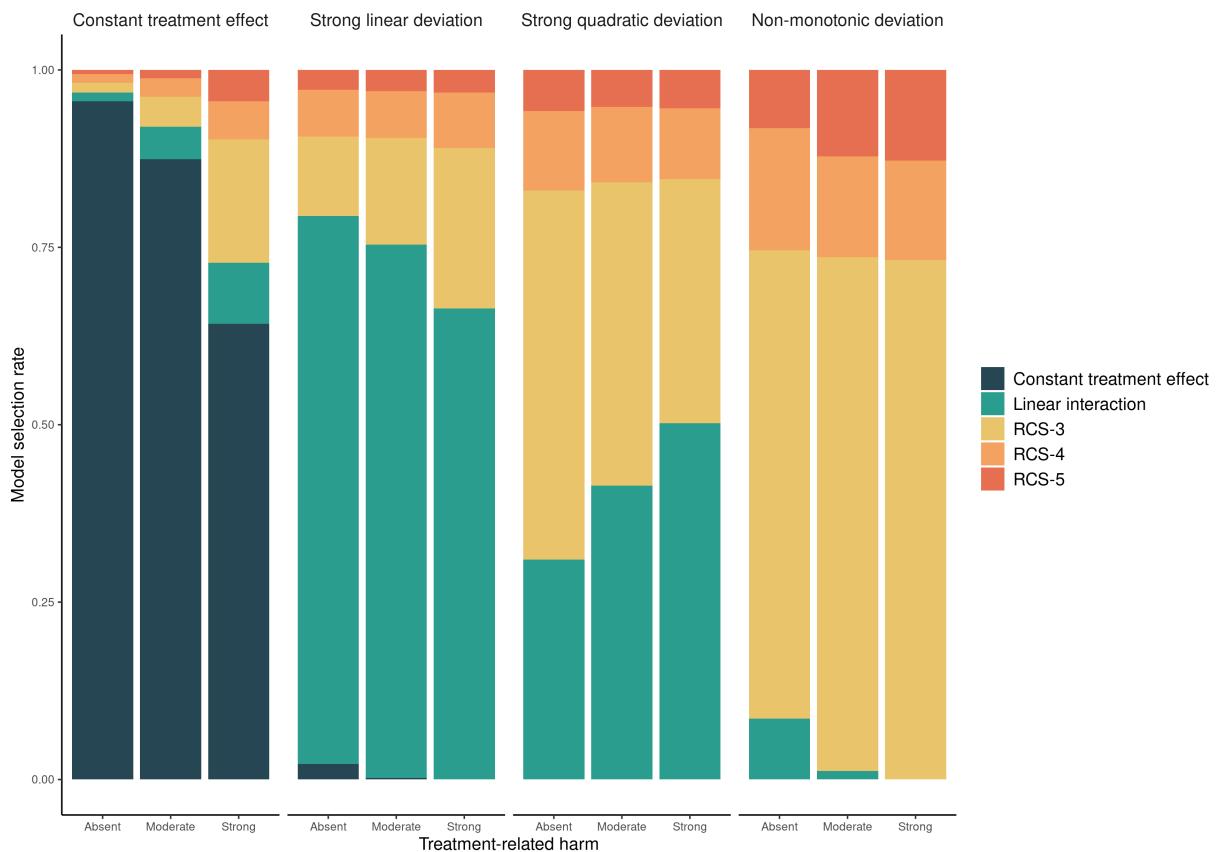


Figure S2: Model selection frequencies of the adaptive approach based on Akaike's Information Criterion across 500 replications. Sample size is 17,000 rather than 4,250 in Figure S1

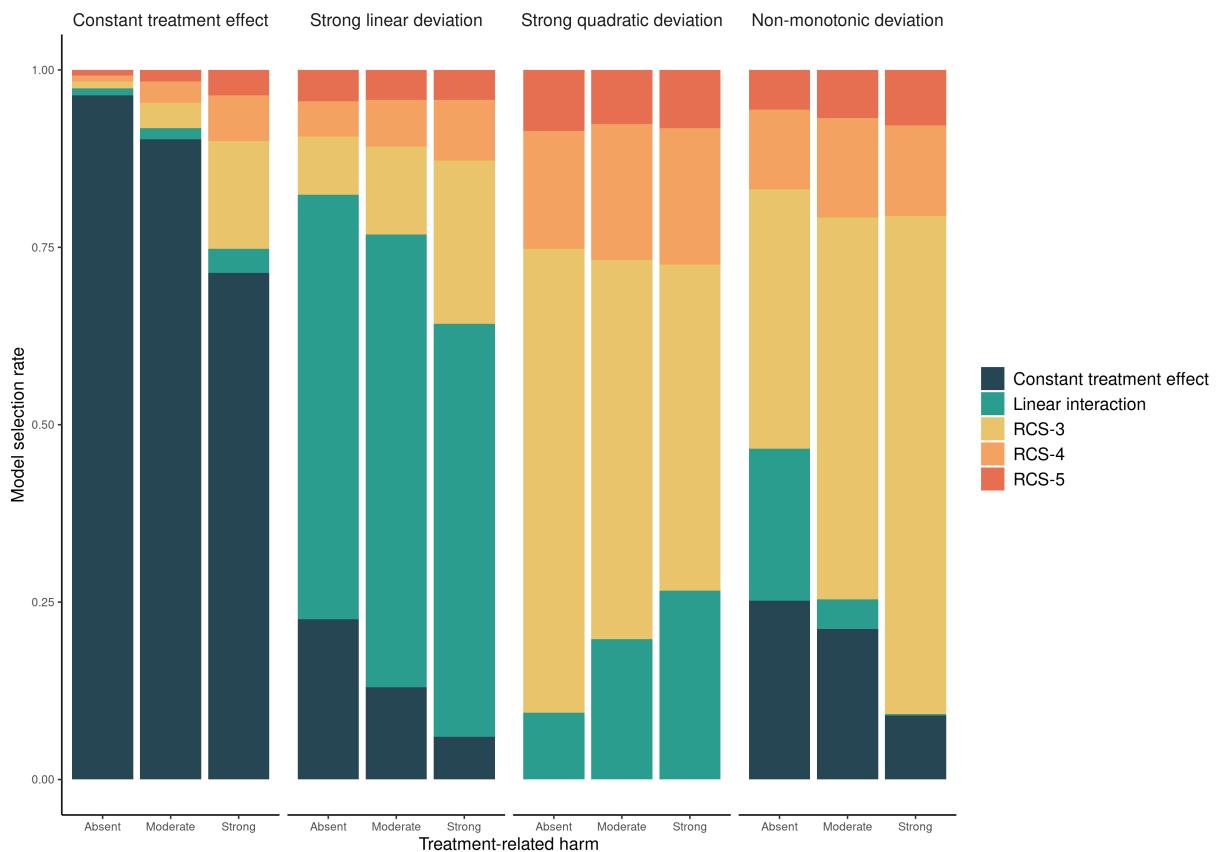


Figure S3: Model selection frequencies of the adaptive approach based on Akaike's Information Criterion across 500 replications. AUC is 0.85 rather than 0.75 in Figure S1

3 Discrimination and calibration for benefit

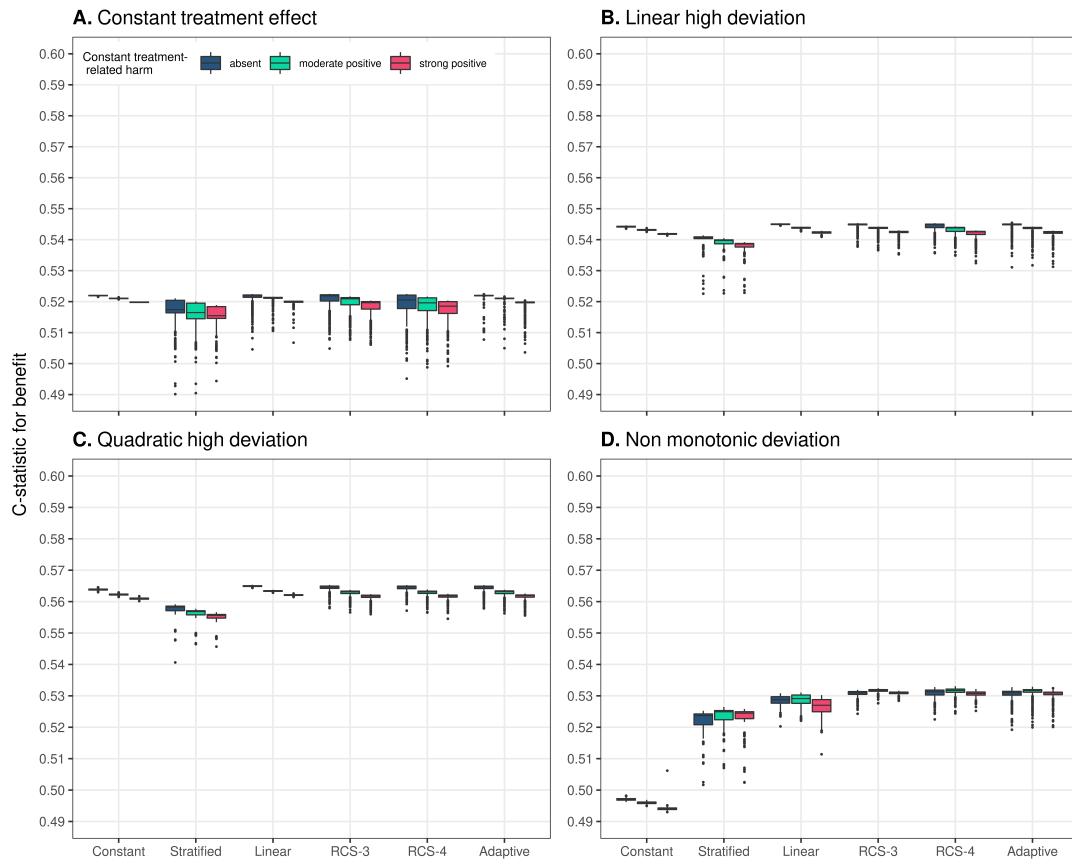


Figure S4: Discrimination for benefit of the considered methods across 500 replications calculated in a simulated sample of size 500,000. True prediction AUC of 0.75 and sample size of 17,000

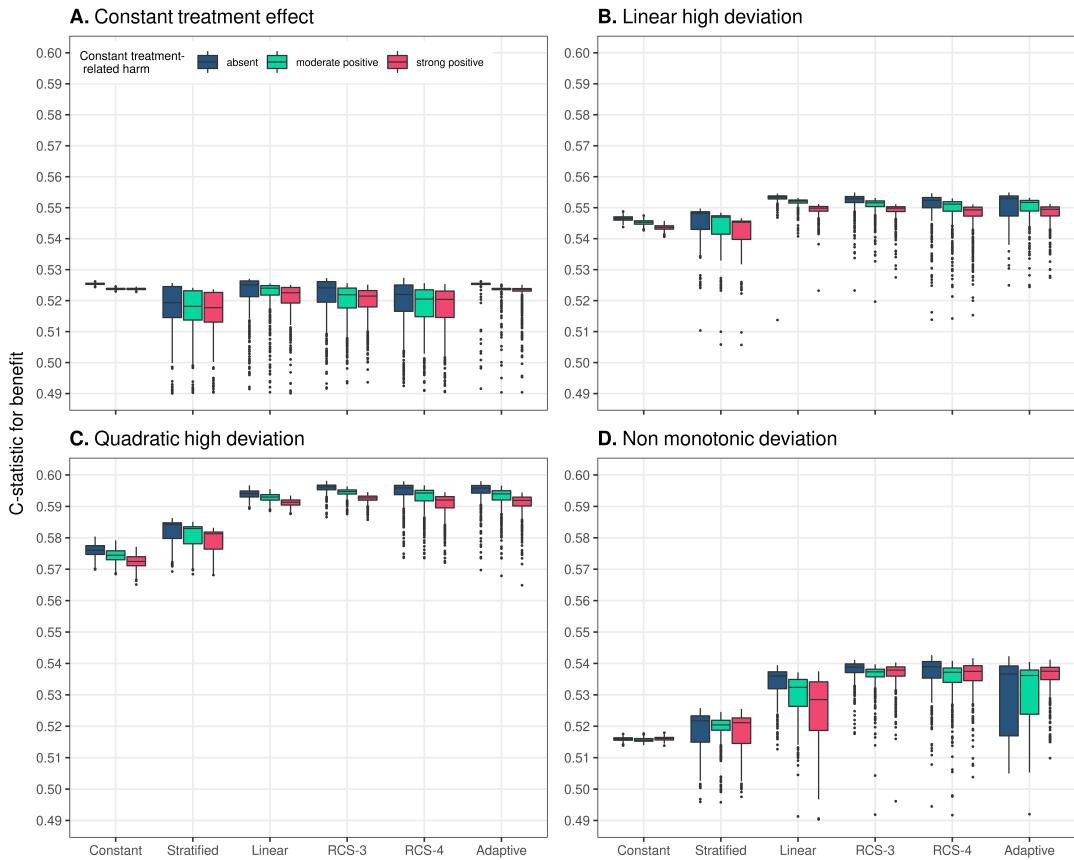


Figure S5: Discrimination for benefit of the considered methods across 500 replications calculated in a simulated sample of size 500,000. True prediction AUC of 0.85 and sample size of 4,250

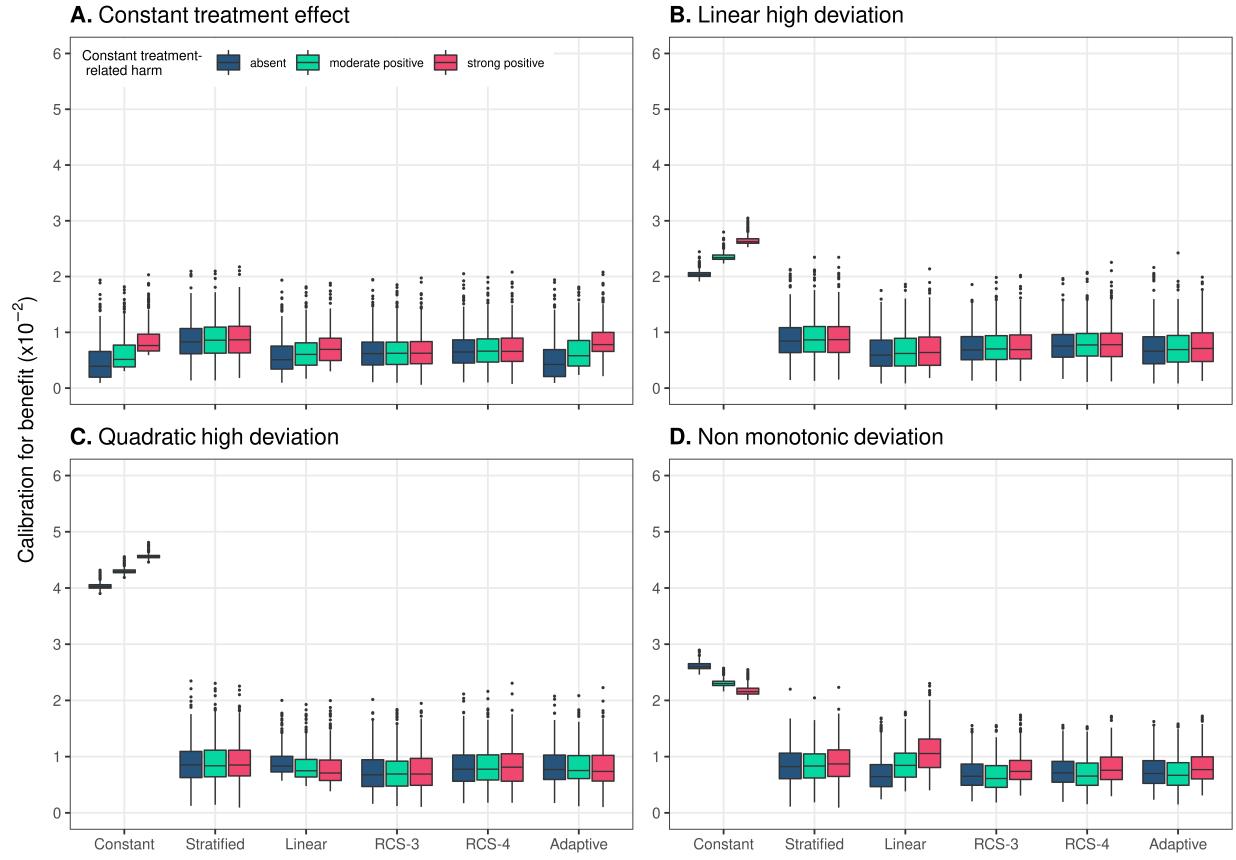


Figure S6: Calibration for benefit of the considered methods across 500 replications calculated in a simulated sample of size 500,000. True prediction AUC of 0.75 and sample size of 17,000

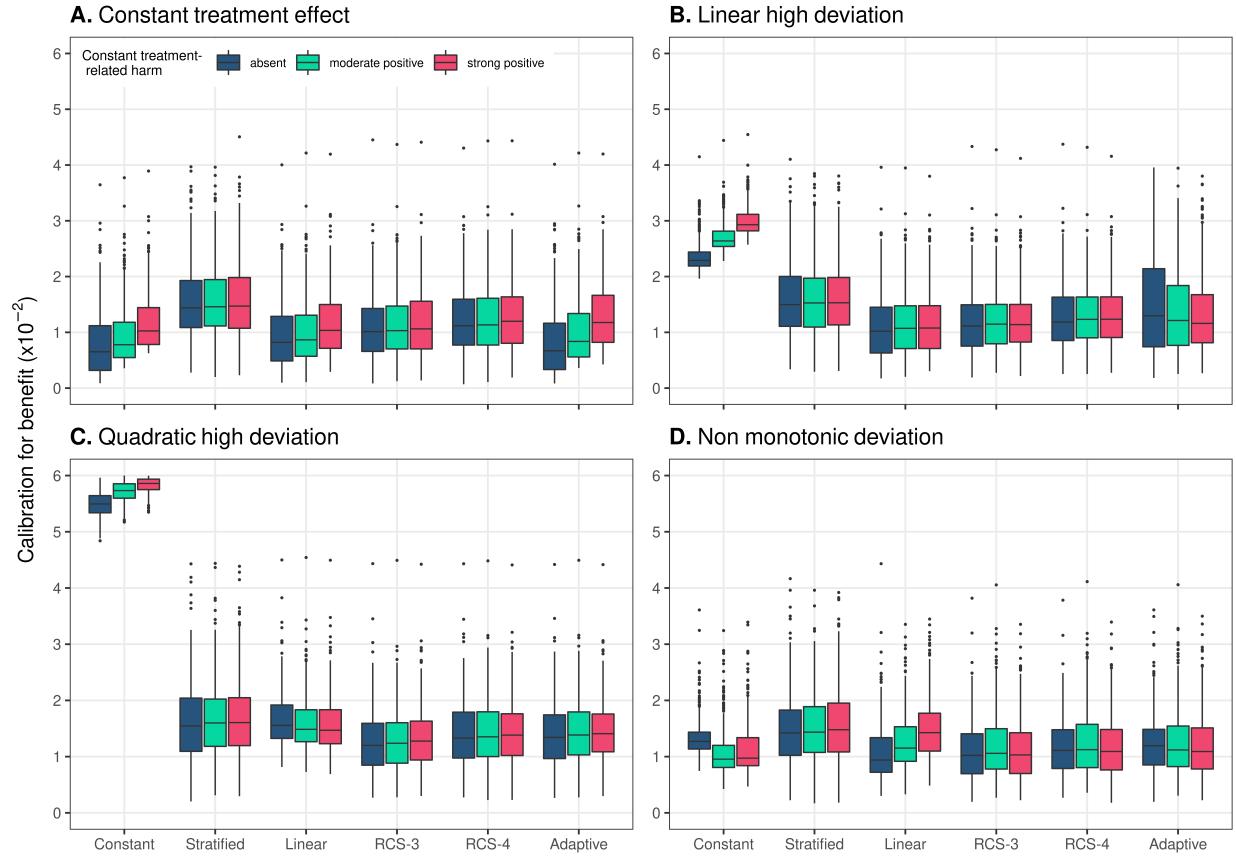


Figure S7: Calibration for benefit of the considered methods across 500 replications calculated in a simulated sample of size 500,000. True prediction AUC of 0.85 and sample size of 4,250

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/.

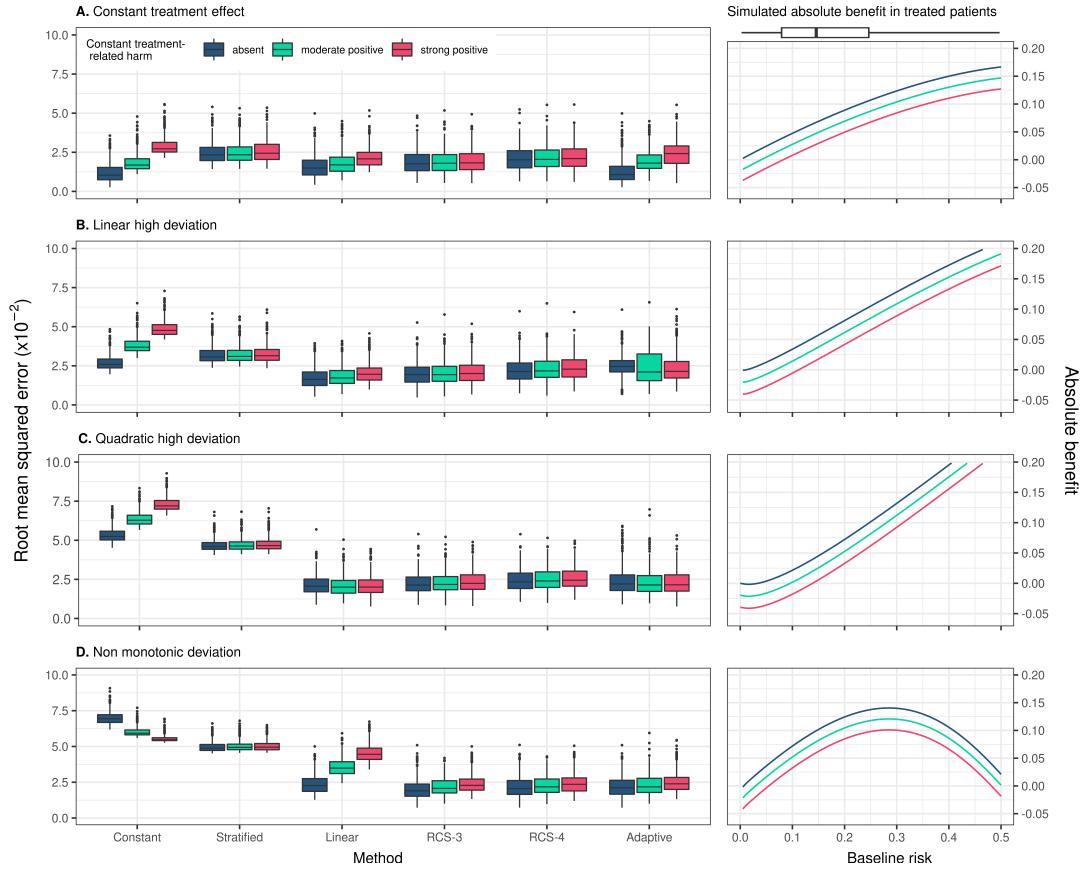


Figure S8: RMSE of the considered methods across 500 replications calculated in a simulated super-population of size 500,000. The scenario with true constant relative treatment effect (panel A) had a true prediction AUC of 0.75 and sample size of 4,250. The RMSE is also presented for strong linear (panel 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.

5 Treatment interactions

Here we present the root mean squared error of the considered methods when true interactions of the covariates with treatment are assumed. We ran our analyses on a limited set of scenarios. More specifically, true prediction AUC was set to 0.75 and sample size was set to 4,250. The simulation scenarios included 4 weak interactions ($OR_{t_x=1}/OR_{t_x=0} = 0.82$), 4 strong interactions ($OR_{t_x=1}/OR_{t_x=0} = 0.61$), and 2 weak and 2 strong interactions.

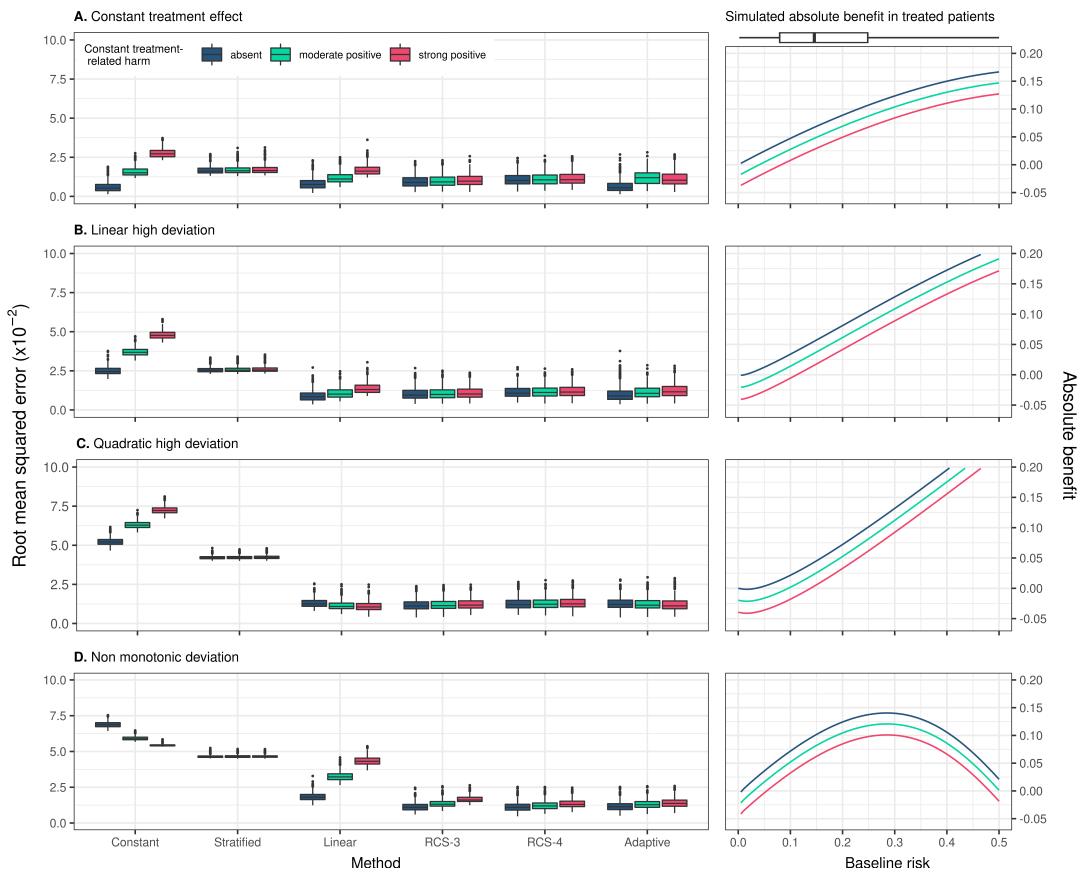


Figure S9: RMSE of the considered methods across 500 replications calculated in a simulated sample of size 500,000. Sample size is 17,000 rather than 4,250 in Figure S8.

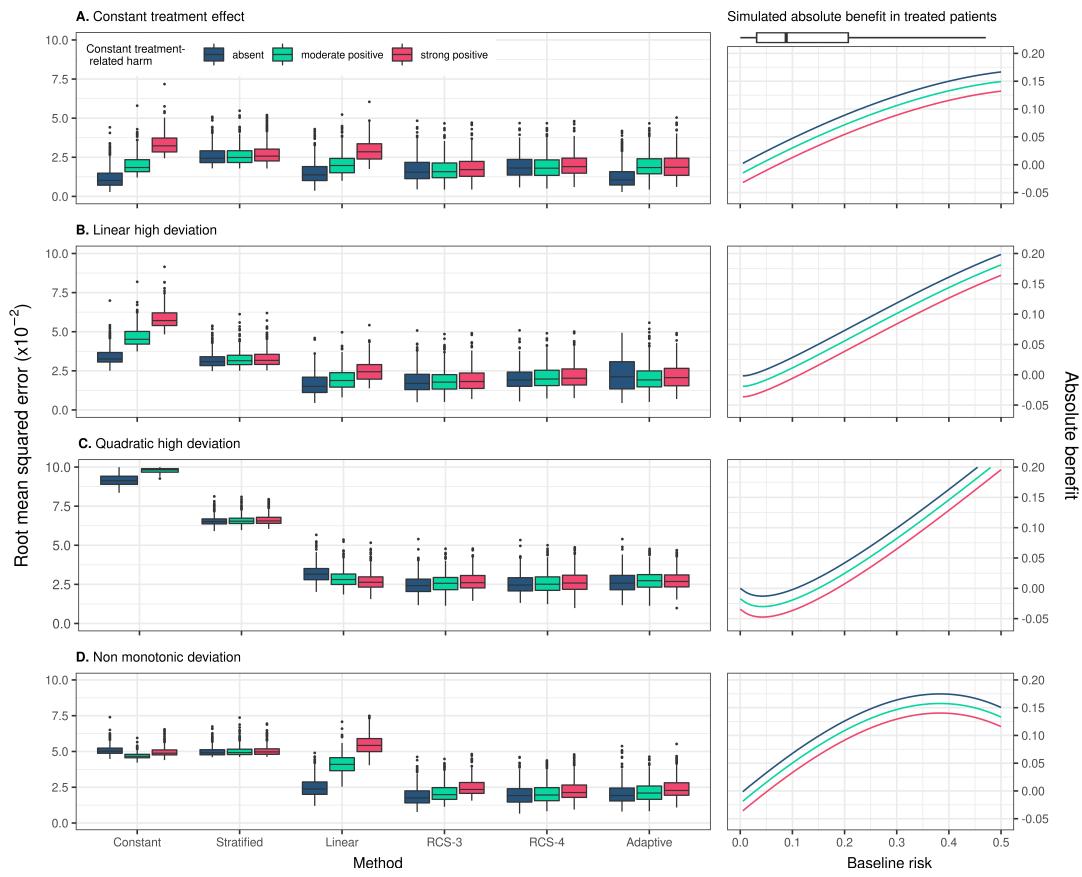


Figure S10: RMSE of the considered methods across 500 replications calculated in a simulated sample of size 500,000. AUC is 0.85 rather than in Figure S8.

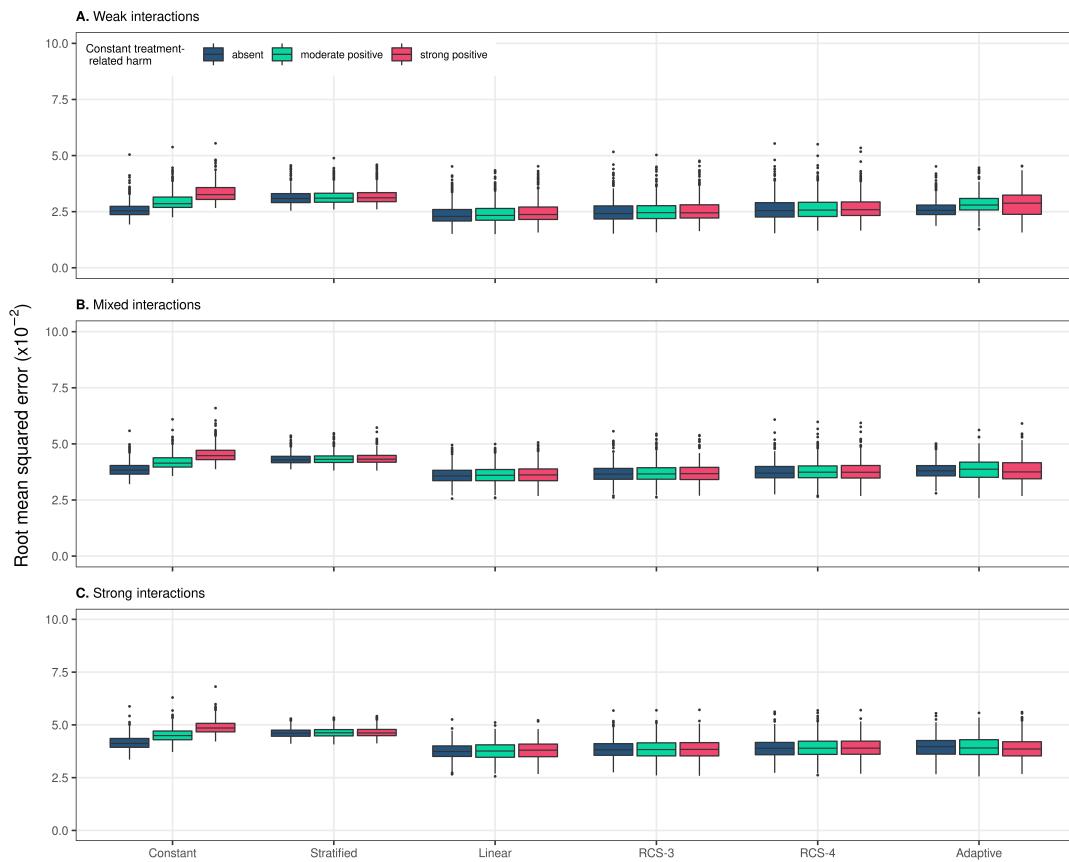


Figure S11: RMSE of the considered methods across 500 replications calculated in a simulated sample of size 500,000. AUC is 0.85 rather than in Figure S8.