

Supplementary Figures

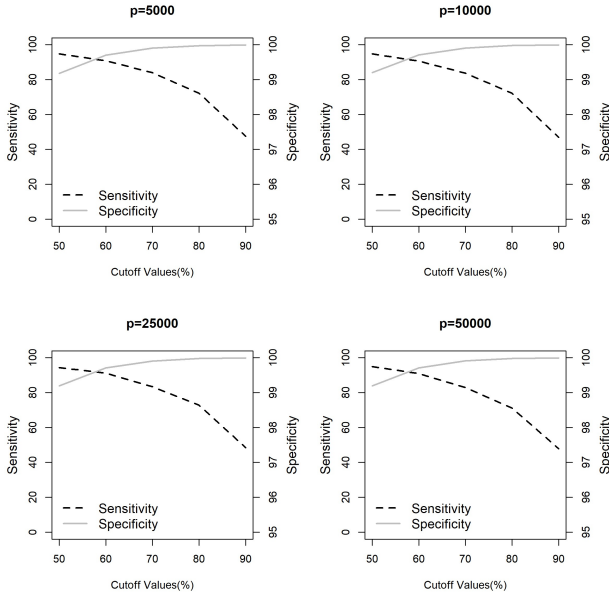


Fig. 1. Sensitivity (dashed line) and specificity (solid line) of *Rare-Screening* at different cutoff thresholds when $n = 400$ for different numbers of predictors

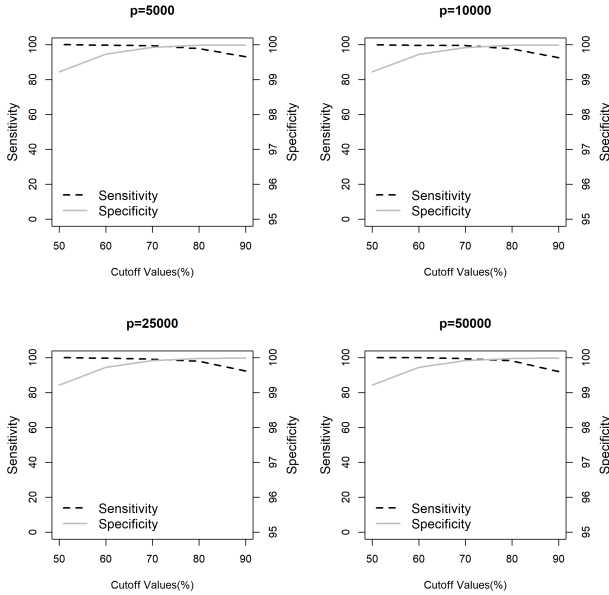


Fig. 2. Sensitivity (dashed line) and specificity (solid line) of *Rare-Screening* at different cutoff thresholds when $n = 750$ for different numbers of predictors

Supplementary Table 1. Comparison of Specificity between Rare-Screening, Firth-tt (at different cutoffs), FDR, and Bonferroni methods for 1% event rate.

Predictor no.	Rare-Screening	Firth-tt (30)	Firth-tt (50)	FDR	Bonferroni
(70)					
For sample size 1000 (1% event rate)					
5000	0.998	0.999	0.999	1.000	1.000
10000	0.999	0.999	0.999	1.000	1.000
25000	0.999	0.999	0.999	1.000	1.000
50000	0.999	1.000	0.999	1.000	1.000
For sample size 1500 (1% event rate)					
5000	0.999	0.999	0.999	1.000	1.000
10000	0.999	0.999	0.999	1.000	1.000
25000	0.999	0.999	0.999	1.000	1.000
50000	0.999	0.999	0.999	1.000	1.000
For sample size 2000 (1% event rate)					
5000	0.999	0.999	0.999	1.000	1.000
10000	0.999	0.999	0.999	1.000	1.000
25000	0.999	0.999	0.999	1.000	1.000
50000	0.999	0.999	0.999	1.000	1.000

Supplementary Table 2. Comparison of Accuracy between Rare-Screening, Firth-tt (at different cutoffs), FDR, and Bonferroni methods at 1% event rate.

Predictor no.	Rare-Screening	Firth-tt (30)	Firth-tt (50)	FDR	Bonferroni
(70)					
For sample size 1000 (10 events)					
5000	0.999	0.998	0.999	0.998	0.998
10000	0.999	0.998	0.999	0.998	0.998
25000	0.999	0.998	0.999	0.999	0.999
50000	0.999	0.998	0.999	0.999	0.999
For sample size 1500 (15 events)					
5000	0.999	0.999	1.000	0.999	0.999
10000	0.999	0.998	0.999	0.999	0.999
25000	0.999	0.998	0.999	0.999	0.999
50000	0.999	0.998	0.999	0.999	0.999
For sample size 2000 (20 events)					
5000	1.000	0.999	1.000	0.999	1.000
10000	0.999	0.998	0.999	0.999	1.000
25000	0.999	0.998	0.999	0.999	1.000
50000	0.999	0.998	0.999	0.999	1.000

Supplementary Table 3. Comparison of Precision between Rare-Screening, Firth-tt (at different cutoffs), FDR, and Bonferroni methods at 1% event rate.

Predictor no.	Rare-Screening (70)	Firth-tt (30)	Firth-tt (50)	FDR	Bonferroni
For sample size 1000 (10 events)					
5000	0.434	0.255	0.456	0.898	0.971
10000	0.286	0.142	0.287	0.976	0.985
25000	0.137	0.061	0.138	0.979	1.000
50000	0.075	0.032	0.074	1.000	1.000
For sample size 1500 (15 events)					
5000	0.536 7	0.296	0.567	0.947	0.980
10000	0.385	0.181	0.414	0.926	0.984
25000	0.200	0.081	0.219	0.926	0.984
50000	0.109	0.041	0.124	0.950	0.959
For sample size 2000 (20 events)					
5000	0.548	0.311	0.587	0.940	0.993
10000	0.404	0.186	0.429	0.924	0.990
25000	0.209	0.085	0.231	0.941	0.989
50000	0.121	0.046	0.133	0.936	0.991

Supplementary Table 5. Comparison of Accuracy across Rare-Screening, Firth-tt (at different cutoffs), FDR, and Bonferroni methods at 5% event rate.

Predictor no.	Rare-Screening (70)	Firth-tt (30)	Firth-tt (50)	FDR	Bonferroni
For sample size 400 (20 events)					
5000	0.998	0.999	0.999	0.999	0.999
10000	0.999	0.999	0.999	0.999	0.999
25000	0.999	0.999	0.999	0.999	0.999
50000	0.999	0.999	0.999	0.999	0.999
For sample size 500 (25 events)					
5000	0.999	0.999	0.998	0.999	0.999
10000	0.999	0.999	0.998	0.999	0.999
25000	0.999	0.999	0.998	0.999	0.999
50000	0.999	0.999	0.998	0.999	0.999
For sample size 750 (38 events)					
5000	0.999	0.999	0.998	0.999	0.999
10000	0.999	0.999	0.999	1.000	1.000
25000	0.999	0.999	0.998	1.000	1.000
50000	0.999	0.999	0.998	1.000	1.000
For sample size 1000 (50 events)					
5000	0.999	0.999	0.999	0.999	1.000
10000	0.999	0.999	0.999	1.000	1.000
25000	0.999	0.999	0.999	1.000	1.000
50000	0.999	0.999	0.999	1.000	1.000

Supplementary Table 4. Comparison of Specificity between Rare-Screening, Firth-tt (at different cutoffs), FDR, and Bonferroni methods at 5% event rate.

Predictor no.	Rare-Screening (70)	Firth-tt (30)	Firth-tt (50)	FDR	Bonferroni
For sample size 400 (20 events)					
5000	0.991	0.999	0.999	0.999	1.000
10000	0.999	0.999	0.999	0.999	0.999
25000	0.999	0.999	0.999	0.999	0.999
50000	0.999	0.999	0.999	0.999	0.999
For sample size 500 (25 events)					
5000	0.973	0.996	0.995	0.998	0.999
10000	0.977	0.997	0.995	0.999	0.999
25000	0.984	0.998	0.996	0.999	0.999
50000	0.989	0.998	0.997	1.000	1.000
For sample size 750 (38 events)					
5000	0.977	0.997	0.997	0.999	1.000
10000	0.983	0.998	0.997	0.999	1.000
25000	0.989	0.998	0.997	1.000	1.000
50000	0.994	0.998	0.998	1.000	1.000
For sample size 1000 (50 events)					
5000	0.982	0.998	0.998	1.000	1.000
10000	0.989	0.999	0.998	1.000	1.000
25000	0.994	0.999	0.998	1.000	1.000
50000	0.997	1.000	0.998	1.000	1.000

Supplementary Table 6. Comparison of Precision across Rare-Screening, Firth-tt (at different cutoffs), FDR, and Bonferroni methods at 5% event rate.

Predictor no.	Rare-Screening (70)	Firth-tt (30)	Firth-tt (50)	FDR	Bonferroni
For sample size 400 (20 events)					
5000	0.471	0.651	0.519	0.958	1.000
10000	0.303	0.501	0.355	0.980	0.990
25000	0.155	0.305	0.187	0.978	0.973
50000	0.084	0.185	0.107	0.959	0.976
For sample size 500 (25 events)					
5000	0.519	0.696	0.400	0.967	0.993
10000	0.351	0.514	0.252	0.966	0.987
25000	0.181	0.316	0.122	0.983	0.989
50000	0.097	0.188	0.063	0.985	1.000
For sample size 750 (38 events)					
5000	0.587	0.756	0.414	0.966	0.991
10000	0.392	0.582	0.256	0.971	1.000
25000	0.196	0.345	0.119	0.968	0.998
50000	0.109	0.200	0.063	0.975	0.997
For sample size 1000 (50 events)					
5000	0.564	0.714	0.403	0.940	0.994
10000	0.397	0.558	0.250	0.954	0.998
25000	0.202	0.339	0.116	0.965	0.998
50000	0.110	0.200	0.062	0.969	0.998