

Supplemental Table 1. Minimum Sample Size Required to Develop a Multivariable Prediction

Model for a Binary Outcome using *pmsampsize* package in RStudio

	Minimum Sample Size Required	Shrinkage	Cox-Snell R ²
Candidate Predictors (n=19 parameters)			
Criteria 1 ^a	607	0.90	0.2421
Criteria 2 ^b	447	0.87	0.2421
Criteria 3 ^c	350	0.90	0.2421
Final Model Predictors (n=4 parameters)			
Criteria 1 ^a	256	0.90	0.2421
Criteria 2 ^b	189	0.87	0.2421
Criteria 3 ^c	350	0.90	0.2421

^aCriteria 1: small overfitting defined by an expected shrinkage of predictor effects by 10% or less

^bCriteria 2: small absolute difference of 0.05 in the model's apparent and adjusted R-squared value

^cCriteria 3: precise estimation (within +/- 0.05) of the average outcome risk in the population

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¹ With 19 candidate predictor parameters, we estimated we would need a minimum sample size of 607 with 213 events to meet all three sample size criteria proposed by Riley et. al(22).

With 8 predictor parameters, as in our final model, a slightly smaller sample size is required (N=350). Our sample size is sufficient to fulfill the first two criteria proposed by Riley et. al criteria.