

TRIPOD Checklist: Prediction Model Development

Comparison of machine learning models for predicting in-hospital Glasgow Coma Scale improvement after surgery in patients with severe traumatic brain injury

Section/Topic	Item	Checklist Item	Page/Details
Title and abstract	1	Identify the study as developing and/or validating a multivariable prediction model, the target population, and the outcome to be predicted.	1
Title and abstract	2	Provide a summary of objectives, study design, setting, participants, sample size, predictors, outcome, statistical analysis, results, and conclusions.	2-3
Introduction	3a	Explain the medical context (including whether diagnostic or prognostic) and rationale for developing or validating the multivariable prediction model, including references to existing models.	3-5
Introduction	3b	Specify the objectives, including whether the study describes the development or validation of the model or both.	5
Methods	4a	Describe the study design or source of data, separately for the development and validation data sets, if applicable.	5
Methods	4b	Specify the key study dates, including start of accrual; end of accrual; and, if applicable, end of follow-up.	5
Methods	5a	Specify key elements of the study setting, including number and location of centres.	5
Methods	5b	Describe eligibility criteria for participants.	5
Methods	5c	Give details of treatments received, if relevant.	5-6
Methods	6a	Clearly define the outcome that is predicted by the prediction model, including how and when assessed.	7
Methods	6b	Report any actions to blind assessment of the outcome to be predicted.	NA
Methods	7a	Clearly define all predictors used in developing or validating the multivariable prediction model, including how and when they were measured.	6-7
Methods	7b	Report any actions to blind assessment of predictors for the outcome and other predictors.	NA
Methods	8	Explain how the study size was arrived at.	5, 7
Methods	9	Describe how missing data were handled, with details of any imputation method.	7
Methods	10a	Describe how predictors were handled in the analyses.	7-9
Methods	10b	Specify type of model, all model-building procedures, including any predictor selection, and method for internal validation.	8-9
Methods	10d	Specify all measures used to assess model performance and, if relevant, to compare multiple models.	9-13, 21-26
Methods	11	Provide details on how risk groups were created, if done.	NA
Results	13a	Describe the flow of participants through the study, including the number of participants with and without the outcome and, if applicable, a summary of the follow-up time.	9
Results	13b	Describe the characteristics of the participants, including basic demographics, clinical features, available predictors, and the number of participants with missing data for predictors and outcome.	9-10, 24-25
Results	14a	Specify the number of participants and outcome events in each analysis.	9
Results	14b	If done, report the unadjusted association between each candidate predictor and outcome.	9-10, 24-25
Results	15a	Present the full prediction model to allow predictions for individuals. For the RF model, key implementation details and parameters were reported; the complete tree structure/formula was not provided.	Partially reported: 8-9
Results	15b	Explain how to use the prediction model. The model output was described as the probability of in-hospital GCS improvement; it was not presented as a ready-to-use clinical tool pending external validation.	Partially reported: 8-9, 15-17
Results	16	Report performance measures, preferably with confidence intervals, for the prediction model.	10-13, 21-23, 26 (without CI)
Discussion	18	Discuss any limitations of the study, such as nonrepresentative sample, few events per predictor, and missing data.	15-17
Discussion	19b	Give an overall interpretation of the results, considering objectives, limitations, results from similar studies, and other relevant evidence.	13-17
Discussion	20	Discuss the potential clinical use of the model and implications for future research.	15-17
Other information	21	Provide information about the availability of supplementary resources, such as study protocol, Web calculator, and data sets.	20
Other information	22	Give the source of funding and the role of the funders for the present study.	1

Abbreviations: NA, not applicable; NR, not reported; RF, random forest; CI, confidence interval.