TRIPOD Checklist: Prediction Model Development and Validation

Table 1. Report a list of items to be included in a study to develop or validate a multivariable predictive model for diagnosis or prognosis

Section/Topic	Item	Checklist Description	Reported on Page Number/Line Number	Reported on Section /Paragraph
Title and abstract				
Title	1	Identify the study as developing and/or validating a multivariable prediction model, the target population, and the outcome to be predicted.	Page1/Line3-4	Title/Paragraph1
Abstract	2	Provide a summary of objectives, study design, setting, participants, sample size, predictors, outcome, statistical analysis, results, and conclusions	Page2/Line35-66	Abstract/Paragraph1-4
Introduction				
Background and objectives	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	Page3-4/Line74-109	Introduction/Paragraph1-2
	3b	Specify the objectives, including whether the study describes the development or validation of the model or both	Page4/Line110-116	Introduction/Paragraph3
Methods				
Source of data	4a	Describe the study design or source of data (e.g., randomized trial, cohort, or registry data), separately for the development and validation data sets, if applicable.	Page4-5/Line124-138	Methods/Paragraph2-3
	4b	Specify the key study dates, including start of accrual; end of accrual; and, if applicable, end of follow-up.	Page4/Line128-130	Methods/Paragraph2
Participants	5a	Specify key elements of the study setting (e.g., primary care, secondary care, general population) including number and location of centres.	Page4/Line128-130	Methods/Paragraph2
	5b	Describe eligibility criteria for participants.	Page4/Line128-130	Methods/Paragraph2
	5c	Give details of treatments received, if relevant.	Page4/Line120-121	Methods/Paragraph1
Outcome	6a	Clearly define the outcome that is predicted by the prediction model, including how and when assessed.	Page5/Line146-162	Methods/Paragraph4-5

	6b	Report any actions to blind assessment of the outcome to be predicted.	Page5/Line155-162	Methods/Paragraph5
Predictors	7a	Clearly define all predictors used in developing or validating the multivariable prediction model, including how and when they were measured.	Page5/Line146-162	Methods/Paragraph4-5
	7b	Report any actions to blind assessment of predictors for the outcome and other predictors.	Page5/Line155-162	Methods/Paragraph5
Sample size	8	Explain how the study size was arrived at.	Page4/Line128-130	Methods/Paragraph2
Missing data	9	Describe how missing data were handled (e.g., complete-case analysis, single imputation, multiple imputation) with details of any imputation method.	N/A.	Bioinformatics analysis was performed on the clinical information of all enrolled patients.
Statistical analysis methods	10a	Describe how predictors were handled in the analyses.	Page6/Line183-190	Methods/Paragraph8
	10b	Specify type of model, all model-building procedures (including any predictor selection), and method for internal validation.	Page6/Line183-190	Methods/Paragraph8
	10c	Specify all measures used to assess model performance and, if relevant, to compare multiple models.	Page6/Line183-190	Methods/Paragraph8
Risk groups	11	Provide details on how risk groups were created, if done.	Page5/Line152-154	Methods/Paragraph4
Results				
Participants	12a	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. A diagram may be helpful.	Page4/Line120-121	Methods/Paragraph1
	12b	Describe the characteristics of the participants (basic demographics, clinical features, available predictors), including the number of participants with missing data for predictors and outcome.	Page7/Line207-209	Results/Paragraph2
Model development	13a	Specify the number of participants and outcome events in each analysis.	Page7/Line207-209	Results/Paragraph2
	13b	If done, report the unadjusted association between each candidate predictor and outcome.	Page7/Line207-209	Results/Paragraph2
Model specification	14a	Present the full prediction model to allow predictions for individuals (i.e., all regression coefficients, and model intercept or baseline survival at a given time point).	Page7/Line214-224	Results/Paragraph2
	14b	Explain how to use the prediction model.	Page7/Line220-224	Results/Paragraph2
Model performance	15	Report performance measures (with CIs) for the prediction model.	Page7/Line210-214	Results/Paragraph2
Discussion				
Limitations	16	Discuss any limitations of the study (such as nonrepresentative sample, few events per predictor, missing data)	Page11/Line365-371	Discussion/Paragraph8
Interpretation	17a	For validation, discuss the results with reference to performance in thedevelopment data, and any other validation data	Page10/Line320-332	Discussion/Paragraph4
	17b	Give an overall interpretation of the results, considering objectives, limitations, results from similar studies, and other relevant evidence	Page10/Line330-332	Discussion/Paragraph4

Implications	18	Discuss the potential clinical use of the model and implications for future research	Page11-12/Line371-374	Discussion/Paragraph8
Other information				
Supplementary information	19	Provide information about the availability of supplementary resources, such as study protocol, Web calculator, and data sets	Page5/Line146-148	Methods/Paragraph4
Funding	20	Give the source of funding and the role of the funders for the present study	Page12/Line380-382	Acknowledgments/Paragraph2

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*As the checklist was provided upon initial submission, the page number/line number reported may be changed due to copyediting and may not be referable in the published version. In this case, the section/paragraph may be used as an alternative reference.