TRIPOD Checklist: Prediction Model Development and Validation

Section	Item		Checklist description	Reported on Page Number/Line Number	Reported on Section/Paragraph
Title and abstract					
Title	1	D;V	Identify the study as developing and/or validating a multivariable prediction model, the target population, and the outcome to be predicted.	PAGE 1, LINE 1	title
Abstract	2	D;V	Provide a summary of objectives, study design, setting, participants, sample size, predictors, outcome, statistical analysis, results, and conclusions.	PAGE 2, LINE 24-42	abstract
Introduction					
Background and objectives	3a	D;V	Explain the medical context (including whether diagnostic or prognostic) and rationale for developing or validating the multivariable prediction model, including references to existing models.	PAGE 2, LINE 24-26	background, para 2
	3b	D;V	Specify the objectives, including whether the study describes the development or validation of the model or both.	PAGE 2, LINE 27-28	background, para 2
Methods					
Source of data	4a	D;V	Describe the study design or source of data (e.g., randomized trial, cohort, or registry data), separately for the development and validation data sets, ifapplicable.	PAGE 4-5, LINE 67-78	method, para 1
	4b	D;V	Specify the key study dates, including start of accrual; end of accrual; and, if applicable, end of follow-up.	NA.	ve any supplementary f ile.
Participants	5a	D;V	Specify key elements of the study setting (e.g., primary care, secondary care, general population) including number and location of centres.	NA.	This study does not ha ve any supplementary f ile.
	5b	D;V	Describe eligibility criteria for participants.	NA.	ve any supplementary f ile.
	5c	D;V	Give details of treatments received, if relevant.	NA.	This study does not ha ve any supplementary f
Outcome	6a	D;V	Clearly define the outcome that is predicted by the prediction model, including how and when assessed.	PAGE 5, LINE 93-98; PAGE 5-7, LINE 100-142	method, para 5; result, para 1-4
	6b	D;V	Report any actions to blind assessment of the outcome to be predicted.	NA.	ve any supplementary f ile.
Predictors	7a	D;V	Clearly define all predictors used in developing or validating the multivariable prediction model, including how and when they were measured.	PAGE 3-5, LINE 68-78; PAGE 5-7, LINE 100-142	method, para 1; result, para 1-4
	7b	D;V	Report any actions to blind assessment of predictors for the outcome and other predictors.	NA.	ve any supplementary f ile.
Sample size	8	D;V	Explain how the study size was arrived at.	PAGE 3-5, LINE 67-78	method, para 1

Missing data	9	D;V	Describe how missing data were handled (e.g., complete-case analysis, single imputation, multiple imputation) with details of any imputation method.	NA.	This study does not have any supplementary file.
Statistical analysis methods	10a	D	Describe how predictors were handled in the analyses.	PAGE 8, LINE 181-183	discussion,para 4
	10b	D	Specify type of model, all model-building procedures (including any predictor selection), and method for internal validation.	PAGE 8, LINE 183-184	discussion,para 4; method, para 1;
	10c	V	For validation, describe how the predictions were calculated.	PAGE 2, LINE 56-59; PAGE 4, LINE 72-78	abstract;
	10d	D;V	Specify all measures used to assess model performance and, if relevant, to compare multiple models.	NA.	ve any supplementary file.
	10e	V	Describe any model updating (e.g., recalibration) arising from the validation, if done.	NA.	ve any supplementary file.
Risk groups	11	D;V	Provide details on how risk groups were created, if done.	NA.	This study does not need risk groups.
Development vs. validation	12	V	For validation, identify any differences from the development data in setting, eligibility criteria, outcome, and predictors.	PAGE 5-7, LINE 100-142	result, para 1-4
Results					
Participants	13a	D;V	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.	NA.	This study does not have any supplementary file.
	13b	D;V	Describe the characteristics of the participants (basic demographics, clinical features, available predictors), including the number of participants with missing data for predictors and outcome.	NA.	This study does not have any supplementary file.
	13c	V	For validation, show a comparison with the development data of the distribution of important variables (demographics, predictors and outcome).	NA.	This study does not have any supplementary file.
Model development	14a	D	Specify the number of participants and outcome events in each analysis.	PAGE 7-9, LINE 144-184	discussion,para 1-4
	14b	D	If done, report the unadjusted association between each candidate predictor and outcome.	PAGE 7-9, LINE 144-184	discussion,para 1-4
Model specification	15a	D	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).	NA.	This study does not have any supplementary file.
	15b	D	Explain how to the use the prediction model.	PAGE 7-9, LINE 144-184	discussion,para 1-4
Model performance	16	D;V	Report performance measures (with CIs) for the prediction model.	NA.	This study does not have any supplementary file.
Model-updating	17	V	If done, report the results from any model updating (i.e., model specification, model performance).	NA.	ve any supplementary file.
Discussion					
Limitations	18	D;V	Discuss any limitations of the study (such as nonrepresentative sample, few events per predictor, missing data).	PAGE 9, LINE 181-183	discussion, para 4

Interpretation	19a	V	For validation, discuss the results with reference to performance in the development data, and any other validation data.	PAGE 7-9, LINE 144-184	discussion,para 1-4
	19b	D;V	Give an overall interpretation of the results, considering objectives, limitations, and results from similar studies, and other relevant evidence.	PAGE 7-9, LINE 144-184	discussion,para 1-4
Implications	20	D;V	Discuss the potential clinical use of the model and implications for future research.	PAGE 9, LINE 183-184	discussion,para 4
Other information					
Supplementary information	21	D;V	Provide information about the availability of supplementary resources, such as study protocol, Web calculator, and data sets.	NA.	This study does not have any supplementary file.
Funding	22	D;V	Give the source of funding and the role of the funders for the present study.	PAGE 9, LINE 186-187	funding

* Items relevant only to the development of a prediction model are denoted by D, items relating solely to a validation of a prediction model are denoted by V, and items relating to both are denoted D;V. We recommend using the TRIPOD Checklist in conjunction with the TRIPOD Explanation and Elaboration document.

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