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.	Page1/Line3	Title
Abstract	2	D;V	Provide a summary of objectives, study design, setting, participants, sample size, predictors, outcome, statistical analysis, results, and conclusions.	Page1/Line25-33 Page2/Line1-24	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.	Page2/Line32-33 Page3/Line1-12 Page3/Line17-19 Page3/Line29-33 Page4/Line1-10	Introduction/Para1 Introduction/Para2 Introduction/para4
	3b	D;V	Specify the objectives, including whether the study describes the development or validation of the model or both.	Page4/Line18-21	Introduction/Para6
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.	Page4/Line31-33 Page5/Line6-14	Method/Para1 Method/Para2
	4b	D;V	Specify the key study dates, including start of accrual; end of accrual; and, if applicable, end of follow-up.	-	
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.	-	
	5b	D;V	Describe eligibility criteria for participants.	Page4/Line33 Page5/Line1-2 Page5/Line7-10	Method/Para1 Method/Para2
	5c	D;V	Give details of treatments received, if relevant.	-	
Outcome	6a	D;V	Clearly define the outcome that is predicted by the prediction model, including how and when assessed.	Page7/Line17-21	Method/Para7
	6b	D;V	Report any actions to blind assessment of the outcome to be predicted.	-	
Predictors	7a	D;V	Clearly define all predictors used in developing or validating the multivariable prediction model, including how and when they were measured.	-	
	7b	D;V	Report any actions to blind assessment of predictors for the outcome and other predictors.	-	
Sample size	8	D;V	Explain how the study size was arrived at.	-	

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.	-	
Statistical analysis methods	10a	D	Describe how predictors were handled in the analyses.	-	
	10b	D	Specify type of model, all model- building procedures (including any predictor selection) , and method for internal validation.	Page6/Line20-31 Page7/Line3-13 Page7/Line17-25	Method/Para5 Method/para6-7
	10c	V	For validation, describe how the predictions were calculated.	-	
	10d	D;V	Specify all measures used to assess model performance and, if relevant, to compare multiple models.	-	
	10e	V	Describe any model updating (e. g. , recalibration) arising from the validation, if done.	-	
Risk groups	11	D;V	Provide details on how risk groups were created, if done.	-	
Development vs. validation	12	V	For validation, identify any differences from the development data in setting, eligibility criteria, outcome, and predictors.	-	
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.	-	
	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.		
	13c	V	For validation, show a comparison with the development data of the distribution of important variables (demographics, predictors and outcome) .	-	
Model development	14a	D	Specify the number of participants and outcome events in each analysis.	Page10/Line2-9	Result/Para2
	14b	D	If done, report the unadjusted association between each candidate predictor and outcome.	-	
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) .	Page10/Line22-24 Page11/Line1-3	Result/Para3
	15b	D	Explain how to the use the prediction model.	-	
Model performance	16	D;V	Report performance measures (with CIs) for the prediction model.	-	
Model- updating	17	V	If done, report the results from any model updating (i. e. , model specification, model performance) .	-	
Discussion					
Limitations	18	D;V	Discuss any limitations of the study (such as nonrepresentative sample, few events per predictor, missing data) .	-	-

Interpretation	19a	V	For validation, discuss the results with reference to performance in the development data, and any other validation data.	-	
	19b	D;V	Give an overall interpretation of the results, considering objectives, limitations, and results from similar studies, and other relevant evidence.	Page14/Line27-33 Page15/Line1-33 Page16/Line1-33 Page17/Line1-16	Discussion/Para4-9
Implications	20	D;V	Discuss the potential clinical use of the model and implications for future research.	-	
Other information					
Supplementary information	21	D;V	Provide information about the availability of supplementary resources, such as study protocol, Web calculator, and data sets.	-	-
Funding	22	D;V	Give the source of funding and the role of the funders for the present study.	Page17/Line29-31	Acknowledgments

* 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.

Updated on August 13, 2021