

# TRIPOD Checklist: Prediction Model Development

| Section/Topic                | Item | Checklist Item                                                                                                                                                                                        | Page                      |
|------------------------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>Title and abstract</b>    |      |                                                                                                                                                                                                       |                           |
| Title                        | 1    | Identify the study as developing and/or validating a multivariable prediction model, the target population, and the outcome to be predicted.                                                          | 1                         |
| Abstract                     | 2    | Provide a summary of objectives, study design, setting, participants, sample size, predictors, outcome, statistical analysis, results, and conclusions.                                               | 2                         |
| <b>Introduction</b>          |      |                                                                                                                                                                                                       |                           |
| 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.      | 3-4                       |
|                              | 3b   | Specify the objectives, including whether the study describes the development or validation of the model or both.                                                                                     | 3-4                       |
| <b>Methods</b>               |      |                                                                                                                                                                                                       |                           |
| 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.                               | 30-35                     |
|                              | 4b   | Specify the key study dates, including start of accrual; end of accrual; and, if applicable, end of follow-up.                                                                                        | 30-35                     |
| Participants                 | 5a   | Specify key elements of the study setting (e.g., primary care, secondary care, general population) including number and location of centres.                                                          | 30-35                     |
|                              | 5b   | Describe eligibility criteria for participants.                                                                                                                                                       | 5-6 + 30-35               |
|                              | 5c   | Give details of treatments received, if relevant.                                                                                                                                                     | 5-6 + 30-35 + Suppl Files |
| Outcome                      | 6a   | Clearly define the outcome that is predicted by the prediction model, including how and when assessed.                                                                                                | 5-6 + 35                  |
|                              | 6b   | Report any actions to blind assessment of the outcome to be predicted.                                                                                                                                | 5-6 + 35                  |
| Predictors                   | 7a   | Clearly define all predictors used in developing or validating the multivariable prediction model, including how and when they were measured.                                                         | 30-35 + suppl Files       |
|                              | 7b   | Report any actions to blind assessment of predictors for the outcome and other predictors.                                                                                                            | 5-6 + 30-35 + Suppl Files |
| Sample size                  | 8    | Explain how the study size was arrived at.                                                                                                                                                            | 5-6                       |
| Missing data                 | 9    | Describe how missing data were handled (e.g., complete-case analysis, single imputation, multiple imputation) with details of any imputation method.                                                  | 36                        |
| Statistical analysis methods | 10a  | Describe how predictors were handled in the analyses.                                                                                                                                                 | 30 - 36                   |
|                              | 10b  | Specify type of model, all model-building procedures (including any predictor selection), and method for internal validation.                                                                         | 35-38                     |
|                              | 10d  | Specify all measures used to assess model performance and, if relevant, to compare multiple models.                                                                                                   | 37-38                     |
| Risk groups                  | 11   | Provide details on how risk groups were created, if done.                                                                                                                                             | 38-39                     |
| <b>Results</b>               |      |                                                                                                                                                                                                       |                           |
| Participants                 | 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. A diagram may be helpful. | 5-6 + Sup                 |
|                              | 13b  | Describe the characteristics of the participants (basic demographics, clinical features, available predictors), including the number of participants with missing data for predictors and outcome.    | 5-6 + Fig1 + Sup          |
| Model development            | 14a  | Specify the number of participants and outcome events in each analysis.                                                                                                                               | 5 + Fig 1 + Fig 6         |
|                              | 14b  | If done, report the unadjusted association between each candidate predictor and outcome.                                                                                                              | NA                        |
| Model specification          | 15a  | 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).                           | 6-12                      |
|                              | 15b  | Explain how to use the prediction model.                                                                                                                                                              | 6-12                      |
| Model performance            | 16   | Report performance measures (with CIs) for the prediction model.                                                                                                                                      | 5 + 11                    |
| <b>Discussion</b>            |      |                                                                                                                                                                                                       |                           |
| Limitations                  | 18   | Discuss any limitations of the study (such as nonrepresentative sample, few events per predictor, missing data).                                                                                      | 19                        |
| Interpretation               | 19b  | Give an overall interpretation of the results, considering objectives, limitations, and results from similar studies, and other relevant evidence.                                                    | 20                        |
| Implications                 | 20   | Discuss the potential clinical use of the model and implications for future research.                                                                                                                 | 13- 20                    |
| <b>Other information</b>     |      |                                                                                                                                                                                                       |                           |
| Supplementary information    | 21   | Provide information about the availability of supplementary resources, such as study protocol, Web calculator, and data sets.                                                                         | 16 + 40                   |
| Funding                      | 22   | Give the source of funding and the role of the funders for the present study.                                                                                                                         | 40                        |