

## TRIPOD Checklist: Prediction Model Development

| Section                   | Item | Checklist description                                                                                                                                                                            | Reported on Page Number/Line Number | Reported on Section/Paragraph |
|---------------------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------|
| <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.                                                     |                                     |                               |
| Abstract                  | 2    | Provide a summary of objectives, study design, setting, participants, sample size, predictors, outcome, statistical analysis, results, and conclusions.                                          |                                     |                               |
| <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. |                                     |                               |
|                           | 3b   | Specify the objectives, including whether the study describes the development or validation of the model or both.                                                                                |                                     |                               |
| <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.                          |                                     |                               |
|                           | 4b   | Specify the key study dates, including start of accrual; end of accrual; and, if applicable, end of follow-up.                                                                                   |                                     |                               |
| Participants              | 5a   | Specify key elements of the study setting (e.g., primary care, secondary care, general population) including number and location of centres.                                                     |                                     |                               |
|                           | 5b   | Describe eligibility criteria for participants.                                                                                                                                                  |                                     |                               |
|                           | 5c   | Give details of treatments received, if relevant.                                                                                                                                                |                                     |                               |
| Outcome                   | 6a   | Clearly define the outcome that is predicted by the prediction model, including how and when assessed.                                                                                           |                                     |                               |
|                           | 6b   | Report any actions to blind assessment of the outcome to be predicted.                                                                                                                           |                                     |                               |
| Predictors                | 7a   | Clearly define all predictors used in developing or validating the multivariable prediction model, including how and when they were measured.                                                    |                                     |                               |
|                           | 7b   | Report any actions to blind assessment of predictors for the outcome and other predictors.                                                                                                       |                                     |                               |
| Sample size               | 8    | Explain how the study size was arrived at.                                                                                                                                                       |                                     |                               |

|                              |     |                                                                                                                                                                                                       |  |  |
|------------------------------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Missing data                 | 9   | 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 | Describe how predictors were handled in the analyses.                                                                                                                                                 |  |  |
|                              | 10b | Specify type of model, all model-building procedures (including any predictor selection), and method for internal validation.                                                                         |  |  |
|                              | 10d | Specify all measures used to assess model performance and, if relevant, to compare multiple models.                                                                                                   |  |  |
| Risk groups                  | 11  | Provide details on how risk groups were created, if done.                                                                                                                                             |  |  |
| <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. |  |  |
|                              | 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.    |  |  |
| Model development            | 14a | Specify the number of participants and outcome events in each analysis.                                                                                                                               |  |  |
|                              | 14b | If done, report the unadjusted association between each candidate predictor and outcome.                                                                                                              |  |  |
| 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).                           |  |  |
|                              | 15b | Explain how to use the prediction model.                                                                                                                                                              |  |  |
| Model performance            | 16  | Report performance measures (with CIs) for the prediction model.                                                                                                                                      |  |  |
| <b>Discussion</b>            |     |                                                                                                                                                                                                       |  |  |
| Limitations                  | 18  | Discuss any limitations of the study (such as nonrepresentative sample, few events per predictor, missing data).                                                                                      |  |  |
| Interpretation               | 19b | Give an overall interpretation of the results, considering objectives, limitations, and results from similar studies, and other relevant evidence.                                                    |  |  |
| Implications                 | 20  | Discuss the potential clinical use of the model and implications for future research.                                                                                                                 |  |  |
| <b>Other information</b>     |     |                                                                                                                                                                                                       |  |  |
| Supplementary information    | 21  | Provide information about the availability of supplementary resources, such as study protocol, Web calculator, and data sets.                                                                         |  |  |
| Funding                      | 22  | Give the source of funding and the role of the funders for the present study.                                                                                                                         |  |  |

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