TRIPOD Checklist: Prediction Model Development

| Section                  | Item | Checklist description                                                                                                                                   | Reported on Page Number/Line Number | Reported on Section/Paragraph |
|--------------------------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|------------------------------|
| **Title and abstract**   | 1    | Identify the study as developing and/or validating a multivariable prediction model, the target population, and the outcome to be predicted.             | Page 1/Line 1-2                   | Title                        |
| **Abstract**             | 2    | Provide a summary of objectives, study design, setting, participants, sample size, predictors, outcome, statistical analysis, results, and conclusions. | Page 2/Line 1-22                  | Abstract                      |
| **Introduction**         | 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. | Page 3/Line 7-22                  | Introduction                  |
|                          | 3b   | Specify the objectives, including whether the study describes the development or validation of the model or both.                                     | Page 4/Line 7-22                  | Introduction                  |
| **Methods**              | 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. | Page 5/Line 6-11                  | Methods/Paragraph 1           |
|                          | 4b   | Specify the key study dates, including start of accrual; end of accrual; and, if applicable, end of follow-up.                                         | Page 5/Line 8-9                   | Methods/Paragraph 1           |
| **Participants**         | 5a   | Specify key elements of the study setting (e.g., primary care, secondary care, general population) including number and location of centres.         | Page 5/Line 8-10                  | Methods/Paragraph 1           |
|                          | 5b   | Describe eligibility criteria for participants.                                                                                                        | Page 5/Line 11-16                 | Methods/Paragraph 1           |
|                          | 5c   | Give details of treatments received, if relevant.                                                                                                     | N/A                               |                              |
| **Outcome**              | 6a   | Clearly define the outcome that is predicted by the prediction model, including how and when assessed.                                                | Page 6/Line 12-13                 | Methods/Paragraph 2           |
|                          | 6b   | Report any actions to blind assessment of the outcome to be predicted.                                                                               | Page 5/Line 13-16                 | Methods/Paragraph 1           |
| **Predictors**           | 7a   | Clearly define all predictors used in developing or validating the multivariable prediction model, including how and when they were measured.         | Page 6/Line 1-12                  | Methods/Paragraph 2           |
|                          | 7b   | Report any actions to blind assessment of predictors for the outcome and other predictors.                                                            | Page 6/Line 10-13                 | Methods/Paragraph 2           |
| **Sample size**          | 8    | Explain how the study size was arrived at.                                                                                                             | Page 5/Line 8-11                  | Methods/Paragraph 1           |
| Missing data | 9 | Describe how missing data were handled (e.g., complete-case analysis, single imputation, multiple imputation) with details of any imputation method. | Page 5/Line 13-16 | Methods/Paragraph 1 |
|---|---|---|---|---|
| Statistical analysis methods | 10a | Describe how predictors were handled in the analyses. | Page 6/Line 17-22 | Methods/Paragraph 3 |
| | 10b | Specify type of model, all model-building procedures (including any predictor selection), and method for internal validation. | Page 6/Line 16-22 Page 7/Line 1-10 | Methods/Paragraph 3 |
| | 10d | Specify all measures used to assess model performance and, if relevant, to compare multiple models. | Page 6/Line 22 | Methods/Paragraph 3 |
| Risk groups | 11 | Provide details on how risk groups were created, if done. | N/A |

### Results

| 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. | Page 8/Line 14-19 | Results/Paragraph 1 |
|---|---|---|---|---|
| | 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. | Page 8/Line 17-22 Page 9/Line 1-3 | Results/Paragraph 1 |
| Model development | 14a | Specify the number of participants and outcome events in each analysis. | Page 8/Line 14-20 | Results/Paragraph 1 |
| | 14b | If done, report the unadjusted association between each candidate predictor and outcome. | N/A |
| 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). | Page 9/Line 21-22 Page 10/Line 1-12 | Results/Paragraph 3 |
| | 15b | Explain how to the use the prediction model. | Page 10/Line 12-16 | Results/Paragraph 3 |
| Model performance | 16 | Report performance measures (with CIs) for the prediction model. | Page 10/Line 1-10 | Results/Paragraph 3 |

### Discussion

| Limitations | 18 | Discuss any limitations of the study (such as nonrepresentative sample, few events per predictor, missing data). | Page 16/Line 7-17 | Discussion/Paragraph 5 |
|---|---|---|---|---|
| Interpretation | 19b | Give an overall interpretation of the results, considering objectives, limitations, and results from similar studies, and other relevant evidence. | Page 12/Line 14-22 Page 13/Line 1-22 | Discussion/Paragraph 1 |
| Implications | 20 | Discuss the potential clinical use of the model and implications for future research. | Page 15/Line 18-21 | Discussion/Paragraph 4 |

### Other information

| Supplementary information | 21 | Provide information about the availability of supplementary resources, such as study protocol, Web calculator, and data sets. | Page 17/Line 5-6 | Data availability/Paragraph 1 |
|---|---|---|---|---|
| Funding | 22 | Give the source of funding and the role of the funders for the present study. | Page 17/Line 14-15 | Funding
