## TRIPOD Checklist: Prediction Model Development

| Section                  | Item | Checklist description                                                                                                      | Reported on Page Number/Line Number | Reported on Section/Paragraph |
|--------------------------|------|---------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------|
| **Title and abstract**   |      |                                                                                                                                 |                                    |                              |
| 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. |                                    |                              |
| **Introduction**         |      |                                                                                                                                 |                                    |                              |
| 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.         |                                    |                              |
| **Methods**              |      |                                                                                                                                 |                                    |                              |
| 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.                                                                               |                                    |                              |
| Component          | Section | Description                                                                                                                                                                                                 |
|--------------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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.                                                                                                                                                  |
| Results            | 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.                                                                                                                                           |
| Discussion         | 18      | Discuss any limitations of the study (such as nonrepresentative sample, few events per predictor, missing data).                                                                                           |
|                    | 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.                                                                                                                     |
| Other 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.                                                                                                                               |
