## 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.                                                                                | Page1, Lines2-4,                   | Title                        |
| Abstract                       | 2    | Provide a summary of objectives, study design, setting, participants, sample size, predictors, outcome, statistical analysis, results, and conclusions.                                                                     | Page2-3, Lines39-72                | Abstract                     |
| **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.                             | Pages3-5, Lines 75-145             | Introduction, Paragraph 1-4  |
|                               | 3b   | Specify the objectives, including whether the study describes the development or validation of the model or both.                                                                                                       | Page2, Lines 43-45, Page5, Lines 140-145 | Abstract, Paragraph 2, Introduction, Paragraph 4 |
| **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.                                                   | Page2, Lines 43-45, Page6, Lines 160-165 | Abstract, Paragraph 2, Methods, Paragraph 1 |
|                               | 4b   | Specify the key study dates, including start of accrual; end of accrual; and, if applicable, end of follow-up.                                                                                                         | Page 6, Lines 160-165              | 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 6, Lines 160-165              | Methods, Paragraph 1         |
|                               | 5b   | Describe eligibility criteria for participants.                                                                                                                                                                         | Page 6, Lines 169-174              | Methods, Paragraph 1         |
|                               | 5c   | Give details of treatments received, if relevant.                                                                                                                                                                       | N/A                                | N/A                          |
| Outcome                       | 6a   | Clearly define the outcome that is predicted by the prediction model, including how and when assessed.                                                                                                             | N/A                                | N/A                          |
|                               | 6b   | Report any actions to blind assessment of the outcome to be predicted.                                                                                                                                                 | N/A                                | N/A                          |
| Predictors                    | 7a   | Clearly define all predictors used in developing or validating the multivariable prediction model, including how and when they were measured.                                                                       | Page 6, Lines 174-181              | Methods, Paragraph 1         |
|                               | 7b   | Report any actions to blind assessment of predictors for the outcome and other predictors.                                                                                                                            | N/A                                | N/A                          |
| Sample size                   | 8    | Explain how the study size was arrived at.                                                                                                                                                                             | Page 6, Lines 160-162              | Methods, Paragraph 1         |
| Section                                                                 | Requirement                                                                 | Page/Line/Paragraph Numbers                                                                 |
|------------------------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Missing data                                                           | Describe how missing data were handled (e.g., complete-case analysis, single imputation, multiple imputation) with details of any imputation method. | N/A                                                                                      |
| Statistical analysis methods                                          | Describe how predictors were handled in the analyses.                       | Page 6-7, Lines 174-213                                                                   |
| Statistical analysis methods                                          | Specify type of model, all model-building procedures (including any predictor selection), and method for internal validation. | Page 7, Lines 194-213                                                                   |
| Statistical analysis methods                                          | Specify all measures used to assess model performance and, if relevant, to compare multiple models. | Page 7, Lines 194-213                                                                   |
| Risk groups                                                            | Provide details on how risk groups were created, if done.                    | N/A                                                                                      |
| Results                                                                |                                                                             |                                                                                          |
| Participants                                                           | 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 2, Lines 43-45 Page 6, Lines 160-165                                                 |
| Participants                                                           | 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, Lines 254-260                                                                   |
| Model development                                                      | Specify the number of participants and outcome events in each analysis.      | Page 2, Lines 43-45                                                                     |
| Model development                                                      | If done, report the unadjusted association between each candidate predictor and outcome. | N/A                                                                                      |
| Model specification                                                    | 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 8-9, Lines 268-324                                                                  |
| Model specification                                                    | Explain how to use the prediction model.                                    | Page 8-9, Lines 268-324                                                                  |
| Model performance                                                      | Report performance measures (with CIs) for the prediction model.             | Page 9, Lines 326-330                                                                   |
| Discussion                                                             |                                                                             |                                                                                          |
| Limitations                                                            | Discuss any limitations of the study (such as nonrepresentative sample, few events per predictor, missing data). | Page 12-13, Lines 466-490                                                               |
| Interpretation                                                         | Give an overall interpretation of the results, considering objectives, limitations, and results from similar studies, and other relevant evidence. | Page 11-12, Lines 407-465                                                               |
| Implications                                                           | Discuss the potential clinical use of the model and implications for future research. | Page 11, Lines 389-393                                                                  |
| Other information                                                      |                                                                             |                                                                                          |
| Supplementary information                                              | Provide information about the availability of supplementary resources, such as study protocol, Web calculator, and data sets. | N/A, Page 13, Lines 507                                                                  |
| Funding                                                                | Give the source of funding and the role of the funders for the present study. | Page 13, Lines 351; The Acknowledgments                                                  |
