## 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.                                                                                                                                                                                                                 | 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 2-3/line 20-46                | Abstract/Para 1-4              |
| 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.                                                                                                                                                                             | Page 4/line 50-64                  | Introduction/Para 1-3         |
|                          | 3b   | Specify the objectives, including whether the study describes the development or validation of the model or both.                                                                                                                                                                                                                                         | Page 4/line 64-69                  | Introduction/Para 3           |
| 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.                                                                                                                                                                                        | Page 5/line 73-78                  | Methods/Para 1                |
|                          | 4b   | Specify the key study dates, including start of accrual; end of accrual; and, if applicable, end of follow-up.                                                                                                                                                                                                                                                                                    | NA (all the data were from the TQC Program) | Methods/Para 1                |
| Participants             | 5a   | Specify key elements of the study setting (e.g., primary care, secondary care, general population) including number and location of centres.                                                                                                                                                                                                                                   | N/A (all the data were from the TQC Program) | Methods/Para 1                |
|                          | 5b   | Describe eligibility criteria for participants.                                                                                                                                                                                                                                                                                                    | N/A (all the data were from the TQC Program) | Methods/Para 1                |
|                          | 5c   | Give details of treatments received, if relevant.                                                                                                                                                                                                                                                                                             | N/A (all the data were from the TQC Program) | Methods/Para 1                |
| Outcome                  | 6a   | Clearly define the outcome that is predicted by the prediction model, including how and when assessed.                                                                                                                                                                                                                                   | Page 5/line 80-82                  | Methods/Para 3                |
|                          | 6b   | Report any actions to blind assessment of the outcome to be predicted.                                                                                                                                                                                                                                                                       | N/A (all the data were from the TQC Program) | Methods/Para 3                |
| Predictors               | 7a   | Clearly define all predictors used in developing or validating the multivariable prediction model, including how and when they were measured.                                                                                                                                                                                                     | Page 5/line 76-78| 80-83 | Methods/Para 1-2               |
|                          | 7b   | Report any actions to blind assessment of predictors for the outcome and other predictors.                                                                                                                                                                                                                                                   | N/A (all the data were from the TQC Program) | Methods/Para 1                |
| Sample size              | 8    | Explain how the study size was arrived at.                                                                                                                                                                                                                                                                                                   | Page 5/line 74-76                  | Methods/Para 1                |
| Topic                                      | Section | Description                                                                                           | Page | Method/ Para |
|-------------------------------------------|---------|-------------------------------------------------------------------------------------------------------|------|--------------|
| Missing data                              | 9       | Describe how missing data were handled (e.g., complete-case analysis, single imputation, multiple     | 5/74 | 1            |
|                                           |         | imputation) with details of any imputation method.                                                    |      |              |
| Statistical analysis methods              | 10a     | Describe how predictors were handled in the analyses.                                                 | 5/92 | 3            |
|                                           | 10b     | Specify type of model, all model-building procedures (including any predictor selection), and method   | 5/88 | 3            |
|                                           |         | for internal validation.                                                                             |      |              |
|                                           | 10d     | Specify all measures used to assess model performance and, if relevant, to compare multiple models.  | 6/98 | 3            |
| Risk groups                               | 11      | Provide details on how risk groups were created, if done.                                             | 6/96 | 3            |
| Results                                   |         |                                                                                                       |      |              |
| Participants                              | 13a     | Describe the flow of participants through the study, including the number of participants with and     | 7/117| 1            |
|                                           |         | 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     | 8/149| 4            |
|                                           |         | 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.                              | 8/151| 4 and tab l n | 1 |
|                                           | 14b     | If done, report the unadjusted association between each candidate predictor and outcome.                | 10/185| 6            |
| Model specification                       | 15a     | Present the full prediction model to allow predictions for individuals (i.e., all regression         | 9/160| 4            |
|                                           |         | coefficients, and model intercept or baseline survival at a given time point).                        |      |              |
|                                           | 15b     | Explain how to use the prediction model.                                                               | 9/165| 5            |
| Model performance                         | 16      | Report performance measures (with CIs) for the prediction model.                                       | 10/182| 5            |
| Discussion                                | 18      | Discuss any limitations of the study (such as nonrepresentative sample, few events per predictor,     | 13/250| 3            |
|                                           |         | missing data).                                                                                       |      |              |
| Interpretation                            | 19b     | Give an overall interpretation of the results, considering objectives, limitations, and results from   | 12/244| 3            |
|                                           |         | similar studies, and other relevant evidence.                                                         |      |              |
| Implications                              | 20      | Discuss the potential clinical use of the model and implications for future research.                 | 13/259| 3            |
| Other information                         | 21      | Provide information about the availability of supplementary resources, such as study protocol, Web    | 8/149| 4            |
|                                           |         | calculator, and data sets.                                                                            |      |              |
| Funding                                   | 22      | Give the source of funding and the role of the funders for the present study.                         | 13/267| 3            |

3-2
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*As the checklist was provided upon initial submission, the page number/line number reported may be changed due to copyediting and may not be referable in the published version. In this case, the section/paragraph may be used as an alternative reference.