Comparing five comorbidity indices to predict mortality in chronic kidney disease: a retrospective cohort study

Eric McArthur MSc1, Sarah E Bota BA1, Manish M Sood MD MSc1,2, Gihad E Nesrallah MD3,4, S Joseph Kim MD PhD 1,5, Amit X Garg MD PhD 1,3,6,7, Stephanie N Dixon PhD1,7
Table S1. Transparent reporting of a multivariable prediction model for individual prognosis or diagnosis (TRIPOD) checklist

| Section/Topic          | Item | Checklist Item                                                                 | Page |
|-----------------------|------|--------------------------------------------------------------------------------|------|
| **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. | 1    |
| Abstract              | 2    | Provide a summary of objectives, study design, setting, participants, sample size, predictors, outcome, statistical analysis, results, and conclusions. | 2    |
| **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. | 4, 5 |
|                       | 3b   | Specify the objectives, including whether the study describes the development or validation of the model or both. | 5    |
| **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. | 5    |
|                       | 4b   | Specify the key study dates, including start of accrual; end of accrual; and, if applicable, end of follow-up. | 6    |
| Participants          | 5a   | Specify key elements of the study setting (e.g., primary care, secondary care, general population) including number and location of centres. | 6    |
|                       | 5b   | Describe eligibility criteria for participants. | 7    |
|                       | 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. | 6, 7 |
|                       | 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. | 7    |
|                       | 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. | 7    |
| Missing data          | 9    | Describe how missing data were handled (e.g., complete-case analysis, single imputation, multiple imputation) with details of any imputation method. | 8    |
| Statistical analysis methods | 10c  | For validation, describe how the predictions were calculated. | 8    |
|                       | 10d  | Specify all measures used to assess model performance and, if relevant, to compare multiple models. | 8    |
|                       | 10e  | Describe any model updating (e.g., recalibration) arising from the | -    |
| Risk groups | 11 Provide details on how risk groups were created, if done. | 8 |
| Development vs. validation | 12 For validation, identify any differences from the development data in setting, eligibility criteria, outcome, and predictors. | 10, 11 |

### 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. | 9, Figure 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. | 9, Table 1 |
| | 13c For validation, show a comparison with the development data of the distribution of important variables (demographics, predictors and outcome). | 10, 11 |
| Model performance | 16 Report performance measures (with CIs) for the prediction model. | 9, Table 2 |
| Model-updating | 17 If done, report the results from any model updating (i.e., model specification, model performance). | - |

### Discussion

| Limitations | 18 Discuss any limitations of the study (such as nonrepresentative sample, few events per predictor, missing data). | 12 |
| Interpretation | 19a For validation, discuss the results with reference to performance in the development data, and any other validation data. | 10, 11 |
| | 19b Give an overall interpretation of the results, considering objectives, limitations, results from similar studies, and other relevant evidence. | 12, 13 |
| Implications | 20 Discuss the potential clinical use of the model and implications for future research. | 13, 14 |

### Other information

| Supplementary information | 21 Provide information about the availability of supplementary resources, such as study protocol, Web calculator, and data sets. | 15 |
| Funding | 22 Give the source of funding and the role of the funders for the present study. | 15 |
Table S2. Median (interquartile range) c-statistics in the derivation sample

| Comorbidity index                      | Kidney transplant recipient | Maintenance Dialysis | Low eGFR        |
|----------------------------------------|----------------------------|----------------------|-----------------|
| Charlson comorbidity index             | 0.59 (0.57-0.61)           | 0.61 (0.60-0.61)     | 0.63 (0.63-0.64) |
| ESRD-modified Charlson comorbidity index | 0.60 (0.58-0.61)           | 0.63 (0.62-0.63)     | 0.63 (0.63-0.64) |
| Johns Hopkins’ ADG score               | 0.57 (0.56-0.60)           | 0.64 (0.64-0.64)     | 0.66 (0.65-0.66) |
| Elixhauser score                       | 0.56 (0.54-0.58)           | 0.62 (0.62-0.62)     | 0.63 (0.63-0.63) |
| Wright-Khan index                      | 0.63 (0.61-0.65)           | 0.63 (0.63-0.63)     | 0.64 (0.64-0.64) |