**Supplementary material**

**Appendix 1: Reporting of individual TRIPOD items**

At pre-print, only 5 TRIPOD items were reported in more than 75% of the studies assessed (items 5a, 10e, 11, 18 and 19b, see supplementary table S2), being those relating to key elements in study setting, the methodology used for model updating (where relevant), methodology used to form risk groups, overall interpretation of the results, and discussing limitations of the study. In the published manuscript, 6 items were reported in at least 75% of studies, with an additional study reporting item 3b (“Specify the objectives, including whether the study describes the development or validation of the model or both.”) at publication. Items 10e (“Describe any model updating (e.g., recalibration) arising from the validation, if done.”) and 11 (“Provide details on how risk groups were created, if done.”) were the best reported, being included or not applicable in all pre-print and published manuscripts (see figure 4).

In contrast, item 2, which relates to the abstract (“Provide a summary of objectives, study design, setting, participants, sample size, predictors, outcome, statistical analysis, results, and conclusions.”) was not fully reported in any study, at either pre-print or publication. Nine items from the TRIPOD checklist were reported in less than 20% (fewer than 3 studies) of either the published or pre-print manuscripts (see supplementary table S2).

The most notable change~~s~~ in reporting between pre-print and publication was for item 20 (“Discuss the potential clinical use of the model and implications for future research.”), which increased from being reported in only 6 of the 19 (32%) pre-prints to 12 (63%) published manuscripts. A list of all items (and their meanings) that are reported less frequently in the publications than in the pre-prints are given in supplementary table S3. These items include details on how predictors were measured and reporting of the full model equation.

**Appendix 2: Assessment of open peer review**

Of the 19 studies, open peer review was available for only 5 manuscripts [13-17]. Of these, we were only able to obtain full peer review comments from 4/5 of the papers, as the first round of peer review for one paper was initially completed at another journal that was not operating a transparent peer review system [17].

Three of the papers underwent 2 rounds of peer review (two reviewers each round), while the remaining 2 papers had only one round of review before acceptance (with 2 or 3 reviewers). Reviewers’ names were withheld for 2/5 studies, so reviewer background could not be assessed. Of the remaining 3 papers, 2 included reviews conducted by medical statisticians, and the remaining had 1 clinical review with the other reviewer’s name withheld. The TRIPOD checklist was explicitly mentioned in just 1/5 peer review comments, at any round of review.

Much of the additional information requested by reviewers, however, was associated with reporting items included in the TRIPOD checklist, despite not being named as such. While most items were requested for just one paper, the following additions were requested to be made in more than one of the manuscripts: key study dates (item 4b, requested in 2/5 manuscripts); details of predictors (item 7a, requested in 2/5 manuscripts); details on model building (item 10b, requested in 2/5 manuscripts); discussion of limitations (item 18, requested in 2/5 manuscripts); and discussion of potential clinical use (item 20, requested in 2/5 manuscripts). The median adherence score of the five pre-prints for which open peer review was available was 50% (min-max: 27 to 61%). The peer reviewers (including editor’s comments) asked for a median of 4 TRIPOD items (min-max: 2 to 8). The median adherence score after peer review and publication was 58% (min-max: 27 to 64%). Peer review reports were not available for any studies where adherence to specific items reduced from pre-print to publication; there was no evidence of requests from reviewers to remove any information pertaining to any TRIPOD items from the manuscripts.

**Table S1: Summary of included studies**

| Published Paper Reference |  | Study Type | Pre-print server |
| --- | --- | --- | --- |
| Bello-Chavolla OY, Bahena-López JP, Antonio-Villa NE, et al. Predicting mortality due to SARS-CoV-2: A mechanistic score relating obesity and diabetes to COVID-19 outcomes in Mexico. J Clin Endocrinol Metab, 2020. |  | Development | medRxiv |
| Gong J, Ou J, Qiu X, et al. A Tool to Early Predict Severe Corona Virus Disease 2019 (COVID-19) A Multicenter Study using the Risk Nomogram in Wuhan and Guangdong, China. Clin Infect Dis, 2020. |  | Development and External Validation | medRxiv |
| Knight SR, Ho A, Pius R, et al, Risk stratification of patients admitted to hospital with covid-19 using the ISARIC WHO Clinical Characterisation Protocol: development and validation of the 4C Mortality Score. BMJ, 2020. 370: p. m3339. |  | Development and External Validation | medRxiv |
| Barda N, Riesel D, Akriv A, et al. Developing a COVID-19 mortality risk prediction model when individual-level data are not available. Nat Commun 11, 4439 (2020) |  | Development and External Validation | medRxiv |
| Brinati D, Campagner A, Ferrari D, et al. Detection of COVID-19 Infection from Routine Blood Exams with Machine Learning: A Feasibility Study. J Med Syst 44, 135 (2020). |  | Development | medRxiv |
| Carr E, Bendayan R, Bean D, et al. Evaluation and improvement of the National Early Warning Score (NEWS2) for COVID-19: a multi-hospital study. BMC Med 19, 23 (2021) |  | Development and External Validation | medRxiv |
| Das AK, Mishra S, Saraswathy Gopalan S. 2020. Predicting CoVID-19 community mortality risk using machine learning and development of an online prognostic tool. PeerJ 8:e10083 |  | Development | medRxiv |
| DeCaprio D, Gartner J, McCall CJ, et al. Building a COVID-19 vulnerability index. J Med Artif Intell 2020;3:15. |  | Development and External Validation | arXiv |
| Feng C, Wang L, Chen X, et al. A novel artificial intelligence-assisted triage tool to aid in the diagnosis of suspected COVID-19 pneumonia cases in fever clinics. Ann Transl Med 2021;9(3):201 |  | Development and External Validation | medRxiv |
| Huang H, Cai S, Li Y, et al. Prognostic Factors for COVID-19 Pneumonia Progression to Severe Symptoms Based on Earlier Clinical Features: A Retrospective Analysis. Front. Med 2020. 7:557453 |  | Development | medRxiv |
| Kurstjens S, van der Horst A, Herpers R, et al. Rapid identification of SARS-CoV-2-infected patients at the emergency department using routine testing. Clinical Chemistry and Laboratory Medicine 2020, 58(9), 1587-1593. |  | Development and External Validation | medRxiv |
| Martin A, Nateqi J, Gruarin S, et al. An artificial intelligence-based first-line defence against COVID-19: digitally screening citizens for risks via a chatbot. Sci Rep 10, 19012 (2020) |  | External Validation | bioRxiv |
| Pourhomayoun M, Shakibi M. Predicting mortality risk in patients with COVID-19 using machine learning to help medical decision-making. Smart Health (Amst). 2021 Apr;20:100178 |  | Development | medRxiv |
| Singh K, Valley TS, Tang S, et al. Evaluating a Widely Implemented Proprietary Deterioration Index Model among Hospitalized Patients with COVID-19. Ann Am Thorac Soc. 2021 Jul;18(7):1129-1137 |  | External Validation | medRxiv |
| Tang Z, Zhao W, Xie X, et al. Severity assessment of COVID-19 using CT image features and laboratory indices. Phys Med Biol. 2021 Jan 26;66(3):035015 |  | Development | arXiv |
| Tordjman M, Mekki A, Mali RD, et al. Pre-test probability for SARS-Cov-2-related infection score: The PARIS score. PLoS One. 2020 Dec 17;15(12):e0243342. |  | Development and External Validation | medRxiv |
| Vaid A, Somani S, Russak AJ, et al. Machine Learning to Predict Mortality and Critical Events in a Cohort of Patients With COVID-19 in New York City: Model Development and Validation. J Med Internet Res 2020;22(11):e24018 |  | Development and External Validation | medRxiv |
| Zhao B, Wei Y, Sun W, et al. Distinguishing Coronavirus Disease 2019 Patients From General Surgery Emergency Patients With the CIAAD Scale: Development and Validation of a Prediction Model Based on 822 Cases in China. Front Med (Lausanne). 2021 Apr 30;8:601941 |  | Development | medRxiv |
| Yue H, Yu Q, Liu C, et al. Machine learning-based CT radiomics method for predicting hospital stay in patients with pneumonia associated with SARS-CoV-2 infection: a multicenter study. Ann Transl Med 2020;8(14):859 |  | Development and External Validation | medRxiv |

**Table S2: Items of the TRIPOD checklist reported in >75% studies, or in <20% studies at either pre-print or publication**

|  |  |  |  |
| --- | --- | --- | --- |
| **Reported in >75% studies** | | | |
| **Item** | **Description** | **% Reported** | |
| **Pre-print** | **Published** |
| 10e | Describe any model updating (e.g., recalibration) arising from the validation, if done. | 100 | 100 |
| 11 | Provide details on how risk groups were created, if done. | 100 | 100 |
| 5a | Specify key elements of the study setting (e.g., primary care, secondary care, general population) including number and location of centres. | 89.5 | 89.5 |
| 19b | Give an overall interpretation of the results, considering objectives, limitations, results from similar studies, and other relevant evidence. | 84.2 | 84.2 |
| 18 | Discuss any limitations of the study (such as nonrepresentative sample, few events per predictor, missing data) | 83.3 | 84.2 |
| 3b | Specify the objectives, including whether the study describes the development or validation of the model or both. | 73.7 | 78.9 |
| **Reported in <20% studies** | | | |
| 2 | Provide a summary of objectives, study design, setting, participants, sample size, predictors, outcome, statistical analysis, results, and conclusions. | 0 | 0 |
| 17 | If done, report the results from any model updating (i.e., model specification, model performance). | 0 | 0 |
| 5c | Give details of treatments received, if relevant. | 16.7 | 8.3 |
| 10a | Describe how predictors were handled in the analyses. | 11.8 | 11.8 |
| 10b | Specify type of model, all model-building procedures (including any predictor selection), and method for internal validation. | 11.8 | 11.8 |
| 7a | Clearly define all predictors used in developing or validating the multivariable prediction model, including how and when they were measured. | 21.1 | 15.8 |
| 7b | Report any actions to blind assessment of predictors for the outcome and other predictors. | 15.8 | 15.8 |
| 1 | Identify the study as developing and/or validating a multivariable prediction model, the target population, and the outcome to be predicted. | 15.8 | 26.3 |
| 9 | Describe how missing data were handled (e.g., complete-case analysis, single imputation, multiple imputation) with details of any imputation method. | 15.8 | 31.6 |

**Table S3: Items from the TRIPOD checklist that were reported less frequently in publication than in pre-print.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Item** | **Description** | **% Reported** | |
| **Pre-print** | **Published** |
| 5c | Give details of treatments received, if relevant. | 16. 7 | 8.3 |
| 7a | Clearly define all predictors used in developing or validating the multivariable prediction model, including how and when they were measured. | 21.1 | 15.8 |
| 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). | 31.3 | 29.4 |
| 14b | If done, report the unadjusted association between each candidate predictor and outcome. | 60.0 | 40.0 |
| 10c | For validation, describe how the predictions were calculated. | 50.0 | 41.7 |
| 6b | Report any actions to blind assessment of the outcome to be predicted. | 63.2 | 57.9 |

**Figure S1: Scatterplot assessing relationship between adherence to TRIPOD in pre-print and the overall change in adherence between the two versions**



**Figure S2: Distribution of the TRIPOD adherence % score for pre-print and published versions of the 19 included studies**



**Figure S3: Scatterplot assessing relationship between individual item adherence for pre-pre-print and published versions**