ora journey through the disorderly world of diagnostic and prognostic models for covid19

maastricht zoom meeting

diagnostic and prognostic models:

- support clinical decision-making for individual patients

- combining and giving appropriate weights to several inputs (signs, symptoms, lab tests)

if done right, could improve care and reduce costs:

help allocate scare resources

general population:

- who should shield

- who should be prioritized for vaccination

diagnosis:

- who needs to undergo further diagnostic work-up

- speed up CT interpretation

prognosis: who do we admit to the ICU

Poor prediction models can make things worse.

miscalibration can make a mmodel clinically harmful;

that is having a net benefit lower than that of either classifying all patients

as positive or classifying all patients as negative

review methods:

systematic search: pubmed, embase arxiv, medrxiv, biorxiv

- measurement procedures might vary between patients

outcome:

was the outcome determined appropriately

was a pre-specified or standard outcome definition used

were predictors excluded from the outcome definition

was the outcome defined and determined in a similar way for all participants

was the outcome determined without knowledge of predictor information

was the time interval between predictor assessment and outcome determination appropriate

analysis:

were there a reasonable number of participants with the outcome

were continuous and categorical predictors handled appropriately

were all enrolled participants included in the analysis

were participants with missing data handled appropriately

was selection of predictors based on univariable analysis avoided

were complexities in the data (e.g. censoring, competing risks, sampling of control participants) accounted for appropriately

were relevant model performances measures evaluated appropriately

were model overfitting and optimism in model performance accounted for

do predictors and their assigned weights in the final model correspond to the results from the reported multivariable analysis

IMPORTANT

what about the "time" at which patients were controlled?

you dont have the same symptoms throughout the disease....

in a diagnostics study: too much time between predictor and outcome:

in the case of an epidemics, you might become infected in the mean time!

in this review, 22% papers were not properly evaluated

out of 169 studies.

performance metrics

cutpoint si arbitrary, AUCs and 95CIs are better

what about model calibration? plot flexible curve: observed probability of mortality vs expected probability of mortality

should PLOT predicted probabilities overall

https://docs.healthcare.ai/

Probast: analyze risk of bias of models?