



# COVID-19: Making sense of the literature

## Clinical Risk Calculator to Predict Critical Illness in COVID-19 Patients

Journal Article, Original investigation

Wenhua Liang et al. Development and Validation of a Clinical Risk Score to Predict the Occurrence of Critical Illness in Hospitalized Patients With COVID-19. *JAMA Intern Med* 2020. doi:10.1001/jamainternmed.2020.2033

### Summary

#### Methods:

- Study done at First Affiliated Hospital of Guangzhou Medical University, China.
- Epidemiological, clinical, laboratory and radiological variables from retrospective cohorts of 575 hospitals (n=1590 patients) in China was used to construct a predictive risk score (COVID-GRAM) for developing critical illness, which was defined as a composite of disease requiring admission to ICU, invasive mechanical ventilation or culminating in death.
- Data of development cohort was from laboratory-confirmed COVID-19 patients reported between 21 November 2019 and 31 January 2020. Logistic regression analysis was used to develop a score.
- Score was validated in 4 additional cohorts (n=710) of COVID-19 patients admitted in hospitals.

#### Results:

- From 72 potential predictors, 10 variables were found to be independent predictive factors and were included in the score.
- The useful predictors were chest radiographic abnormality (OR 3.39), age (OR1.03), hemoptysis (OR4.53), dyspnea (OR 1.88), unconsciousness (OR4.71), number of comorbid conditions (OR1.6), cancer history (OR4.07), neutrophil-to-lymphocyte ratio (OR1.06), lactate dehydrogenase level (OR1.002) and direct bilirubin (OR1.15).
- AUC in both development and validation cohort was 0.88
- An online risk calculator based on the above result has also been made available. (<http://118.126.104.170/>)

#### Conclusion:

- Characteristics of COVID-19 at the time of admission, as outlined in this study, can be used to predict risk of developing critical illness.

#### Appraisal:

- Strength
  - An easy-to-use risk score based on 10 common patient characteristics.
- Weakness
  - Modest sample size for risk score construction and validation
  - Data entirely from Chinese population

#### Opinion:

Only a small percentage of affected COVID patients develop severe illness. Hence a predictive score is useful for the clinician. This study puts forward a simple risk calculator for predicting development of severe illness in COVID-19 patients at the time of admission. However, the validity of the score in other populations needs to be confirmed before it can be widely used.

#### Appraisers

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