

# A Tool to Early Predict Severe Corona Virus Disease 2019 (COVID-19) : A Multicenter Study using the Risk Nomogram in Wuhan and Guangdong, China

Jiao Gong, Jingyi Ou et al.

Clinical Infectious Diseases

<https://doi.org/10.1093/cid/ciaa443>

## Abstract

### Background

Due to no reliable risk stratification tool for severe coronavirus disease 2019 (COVID-19) patients at admission, we aimed to construct an effective model for early identification of cases at high risk of progression to severe COVID-19.

### Methods

In this retrospective three-centers study, 372 non-severe COVID-19 patients during hospitalization were followed for more than 15 days after admission. Patients who deteriorated to severe or critical COVID-19 and patients who kept non-severe state were assigned to the severe and non-severe group, respectively. Based on baseline data of the two groups, we constructed a risk prediction nomogram for severe COVID-19 and evaluate its performance.

### Results

The training cohort consisted of 189 patients, while the two independent validation cohorts consisted of 165 and 18 patients. Among all cases, 72 (19.35%) patients developed severe COVID-19. We found that old age, and higher serum lactate dehydrogenase, C-reactive protein, the coefficient of variation of red blood cell distribution width, blood urea nitrogen, direct bilirubin, lower albumin, are associated with severe COVID-19. We generated the nomogram for early identifying severe COVID-19 in the training cohort (AUC 0.912 [95% CI 0.846-0.978], sensitivity 85.71%, specificity 87.58%); in validation cohort (0.853 [0.790-0.916], 77.5%, 78.4%). The calibration curve for probability of severe COVID-19 showed optimal agreement between prediction by nomogram and actual observation. Decision curve and clinical impact curve analysis indicated that nomogram conferred high clinical net benefit.

### Conclusion

Our nomogram could help clinicians to early identify patients who will exacerbate to severe COVID-19, which will enable better centralized management and early treatment of severe patients.