

COVID-GRAM: A Clinical Risk Score to Predict Development of COVID-19 **Critical Illness**

How do you identify which patients are likely to develop critical illness at the time they are admitted to the hospital?

POPULATION

- **Retrospective** cohort
- 575 Chinese hospitals



Cases reported from:



N = 1590
RT-PCR (+) cases

Cohort characteristics:

57.3%
male

48.9 yo
mean age

25.1%
≥1 pre-existing
condition

71.0%
abnormal
chest CT

CLINICAL COURSE

On hospital admission:

98.5% **1.5%**
Mild CAP Severe CAP

CAP: Defined by the American Thoracic Society Guidelines

Critical illness:



*defined as admission to the ICU, invasive ventilation, or death.

Overall mortality: **3.2%**

RISK SCORE PREDICTORS

10 statistically significant predictors identified



CXR/CT
abnormality



Number of
comorbidities



Neutrophil-to-
lymphocyte ratio



Cancer
history



LDH



Age



Dyspnea



Hemoptysis



Unconsciousness



Direct
bilirubin

Predictors supported by other studies

COVID-GRAM calculator:

- 10 predictors
- Weighted by strength of effect (by *logistic regression*)

Validation:

- Validation cohort (n=710) showed AUC (~accuracy) of 0.88.
- This matched internal validation

Versus CURB-65*:

- For COVID patient, CURB-6 AUC = 0.75.
- COVID-GRAM thus has higher predictive value for severity of pneumonia.

*CURB-6 in paper

LIMITATIONS

- Limited external validity outside of China
- Data was collected early in the pandemic
- Small sample size for risk score construction

CONCLUSION

COVID-GRAM, the web-based calculator developed from these results, may be able to **predict** which patients progress to **critical illness** in order to optimize care.



Access COVID-GRAM online