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
- 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% Mild CAP
- 1.5% Severe CAP

CAP: Defined by the American Thoracic Society Guidelines

**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-65 AUC = 0.75.
- COVID-GRAM thus has higher predictive value for severity of pneumonia.

**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.


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