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P0082 External validation and update of prognostic models to predict poor outcomes in hospitalised adults with respiratory syncytial virus: a retrospective cohort study

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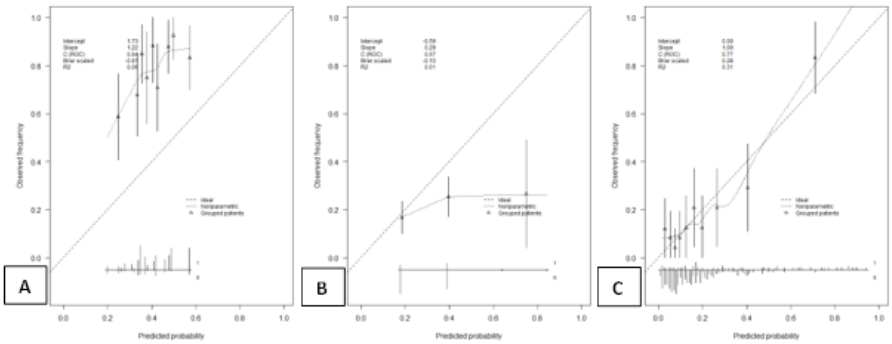
Background: Respiratory syncytial virus (RSV) causes significant morbidity and mortality due to severe respiratory tract infections (RTI), especially in infants, elderly and immunocompromised patients. For adults, there are no regularly used models to predict which patients with RSV infection have poor prognosis and may therefore benefit most from antiviral treatment. This study externally validates and updates existing prognostic models to predict poor outcome in hospitalized RSV-infected adults at the time of their initial presentation.

Materials/methods: We retrospectively identified hospitalized patients ≥18 years with an RSV (A/B) positive polymerase chain reaction on respiratory tract samples at the time of RTI diagnosis (2005-2018). The primary outcome was in-hospital death and/or Intensive Care Unit (ICU) admission. Missing values were imputed using multiple imputation. We identified two published models which we externally validated. We updated the model showing best discrimination (highest C-statistic).

Results: The validation cohort consisted of 241 patients, of whom 80% had community and 20% hospital acquired RSV-infection. Median age was 60.2 years, 56% were male and 69% immunocompromised. In total, 21% (n=51) had the primary outcome of ICU-admission (n=41) and/or in-hospital mortality (n=26). In our validation cohort, the model by Park et al.[1] had a C-statistic of 0.64 (95%CI, 0.56-0.74) and the model by Kim et al.[2] 0.57 (95%CI, 0.46-0.64). Both models show poor calibration (*Figure 1A/B*) . We updated and extended Parks model by removing bacterial coinfection for immediate applicability at presentation, replacing fever by temperature, and adding known predictors from models to predict poor outcome in influenza, leading to addition of urea and confusion (C-statistic 0.77 (95%CI, 0.70-0.86)). This extended model shows good calibration (*Figure 1C*).

Conclusions: Among hospitalized RSV-infected adults, a model including chronic pulmonary disease, lower RTI, confusion, temperature and urea, adequately predicts in-hospital death and/or ICU-admission, which might have implications for early antiviral treatment in patients with a high risk of poor outcome.

Figure 1. *Calibration plots of* ***A)*** *the original model by Park et al.(chronic pulmonary disease, lower RTI, temperature ≥38 ℃, bacterial coinfection),* ***B)*** *the original model by Kim et al. (smoking, high-dose total body irradiation, lymphopenia, high-dose ribavirin), and* ***C)*** *the final updated and extended model of Park et al.*



1. Park SY, Kim T, Jang YR, et al. *Factors predicting life-threatening infections with respiratory syncytial virus in adult patients.* **Infect Dis** 2016:47;333-40.↩

2. Kim YJ, Guthrie K, Waghmare A, et al. *Respiratory Syncytial Virus in Hematopoietic Cell Transplant Recipients: Factors Determining Progression to Lower Respiratory Tract Disease.* **J Infect Dis** 2014;209:1195-1204.↩