

Category : **Outcome scores**

A230 - Development of an algorithm for predicting mortality in pre-hospital patients encountered by a physician-staffed helicopter emergency medical service system

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Introduction:

Severity of illness scoring systems are in use in the intensive care unit setting and enable estimation for quality assurance purposes [1, 2], but similar tools are lacking in the prehospital emergency medicine setting. Using a national helicopter emergency medical services (HEMS) database, we developed an algorithm for predicting mortality in patients treated by physician-staffed HEMS units, suitable for real-life scenarios.

Methods:

We performed a retrospective observational register-based cohort study of patients treated by all five Finnish HEMS units between 2012 and 2019. We analyzed the relationship between 30-day mortality and physiological, patient-related, and circumstantial variables and performed derivation of the multivariable models for each combination of missing variables. Data were imputed using multiple imputation by chained equations. We used Least Absolute Shrinkage and Selection Operator to select the variables for each model and pooled the results using Rubin's rule. The models were combined into an algorithm to allow risk estimation tool that accounts for missing variables.

Results:

28,373 of the 36,633 patients encountered were included of whom 8,611 died before 30 days. 11 variables (systolic blood pressure, heart rate, oxygen saturation, GCS, sex, age, vehicle type, mission located in medical facility, cardiac rhythm, delay from emergency call to HEMS arrival, and dispatch code) were included. The algorithm had an area under the receiver operating characteristic (AUROC) curve of 0.932 (95% CI, 0.929 to 0.935), Brier score of 0.091, calibration intercept of -0.002 (95% CI, -0.041 to 0.038), and slope of 0.996 (95% CI, 0.974 to 1.018).

Conclusion:

We present a novel severity of illness algorithm to be used in patients encountered by the HEMS that may aid in future quality improvement of HEMS and facilitate comparison between units.

References:

1. Vincent JL et al. Crit Care 14:207, 2010.
2. Bouch DC et al. Continuing Education in Anaesthesia Critical Care & Pain 8:181-185, 2018.