

Development of a predictive score for potentially avoidable hospital readmissions for general internal medicine patients

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Abstract

BACKGROUND: Identifying patients at high risk of hospital preventable readmission is an essential step towards selecting those who might benefit from specific transitional interventions.

OBJECTIVE: Derive and validate a predictive risk score for potentially avoidable readmission (PAR) based on analysis of readmissions, with a focus on medication.

DESIGN/SETTING/PARTICIPANTS: Retrospective analysis of all hospital admissions to internal medicine wards between 2011 and 2014. Comparison between patients readmitted within 30 days and non-readmitted patients, as identified using a specially designed algorithm. Univariate and multivariate regression analyses of demographic data, clinical diagnoses, laboratory results, and the medication data of patients admitted during the first period (2011-2013), to identify factors associated with PAR. Using these, derive a predictive score with a regression coefficient-based scoring method. Subsequently, validate this score with a second cohort of patients admitted in 2013-2014. Variables were identified at hospital discharge.

RESULTS: The derivation cohort included 7,317 hospital stays. Multivariate logistic regressions found significant associations with PAR for: [adjusted OR (95% CI)] hospital length of stay > 4 days [1.3 (1.1-1.7)], admission in previous 6 months [2.3 (1.9-2.8)], heart failure [1.3 (1.0-1.7)], chronic ischemic heart disease [1.7 (1.2-2.3)], diabetes with organ damage [2.2 (1.3-3.8)], cancer [1.4 (1.0-1.9)], metastatic carcinoma [1.9 (1.3-3.0)], anemia [1.2 (1.0-1.5)], hypertension [1.3 (1.1-1.7)], arrhythmia [1.3 (1.0-1.6)], hyperkalemia [1.4 (1.0-1.7)], opioid drug prescription [1.3 (1.1-1.6)], and acute myocardial infarction [0.6 (0.4-0.9)]. The PAR-Risk Score, derived from these results, demonstrated fair discriminatory and calibration power (C-statistic = 0.699; Brier Score = 0.069). The results for the validation cohort's operating characteristics were similar (C-statistic = 0.687; Brier Score = 0.064).

CONCLUSION: This study identified routinely-available factors that were significantly associated with PAR. A predictive score was derived and internally validated.

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