The Adelaide Score – using a machine learning tool to predict discharge and reduce length of stay

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Introduction: Timely, safe discharge is critical to relieving access block and ambulance ramping, yet discharge decisions remain subjective and may involve inefficiencies in electronic medical record utilisation.
Aims: To derive and validate the Adelaide Score, a machine-learning measure of readiness for discharge, evaluate its prospective implementation, and quantify the impact of unplanned withdrawal of this and related digital tools.
Methods: We undertook (1) retrospective cohort of inpatients to train and validate models predicting discharge within 48 hours; (2) a single-centre before–after implementation study across multiple surgical and medical teams; and (3) a four-hospital pre–post withdrawal study of multiple digital interventions including the Adelaide Score. Primary outcome was length of stay; secondary outcomes included 7-day readmission and bed-day costs, analysed with parametric, non-parametric and health-economic methods.
Results: Among 8,826 surgical patients (42,572 ward-round timepoints), the random-forest Adelaide Score predicted discharge within 12 hours with accuracy 0.85 and AUC 0.84.
Implementation in 2,968 admissions reduced median length of stay from 3.1 to 2.9 days and 7-day readmissions from 7.1% to 5.0%, yielding projected annual savings of ≈$9.6M AUD. Withdrawal across 2,097 admissions increased median stay from 1.7 to 2.0 days.
Conclusions and Relevance: The Adelaide Score is an accurate, scalable AI tool that improves discharge efficiency and readmissions, while interruption of this score and related services worsens performance and increases costs.

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