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## CONFERENCE ABSTRACT

### A Real-time Frequent Hospital Admitter Risk Stratification Model (FAM-FACE-SG score) to predict "Familiar Faces in Singapore"

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**Introduction:** Frequent hospital admitters or "familiar faces" to the healthcare system are high-cost users. Early identification of these high risk patients may allow for intervention to prevent avoidable readmissions. The LACE score is simple to use in predicting readmission risk but its usefulness is limited by availability only after hospital discharge. We aim to derive and validate an implementable real-time Frequent Admitter risk stratification tool and compare its performance with the LACE score.

**Methods:** We conducted a single centre, observational study of all adult patients admitted to a tertiary hospital in Singapore from 1 January 2013 to 31 May 2014. Possible predictive variables were identified a priori and included demographics, comorbidities, acute illness indicators, prior healthcare utilization and social determinants of health. These were extracted from electronic health records (EHR). The outcome was frequent hospital admissions, defined as three or more inpatient admissions within 12 months of discharge. Univariable analysis was used to identify candidate variables, and multivariable logistic regression to derive the model for the final risk score. 70% and 30% of the cohort were randomly apportioned for derivation and validation of the model respectively. The performance of our predictive model was compared with the LACE score using area under receiver operating characteristic (AUROC) analysis.

**Results:** 25,244 patients were included in the study, of which 4,322 patients (17.1%) met the outcome. The mean age of our cohort was 59 ( $\sigma=17$ ) years and majority was male (51.5%). 20 candidate predictors were entered into the multivariable model for backward stepwise variable selection. The final model contained 9 significant predictors (Furosemide intravenous 40 milligrams and above; Admissions in the past one year; Medifund; Frequent Emergency Department use  $\geq 3$  in the past six months; Anti-depressants in past one year; Charlson Comorbidity Index; End stage renal failure on dialysis; Subsidized ward stay; and Geriatric patient) and termed as the \*FAM-FACE-SG\* score. The strongest independent predictor was treatment with anti-depressants in the past one year (adjust odds ratio: 2.51, 95% confidence interval [CI]: 2.08-3.03). The FAM-FACE-SG score outperformed the LACE score for the prediction of frequent admission risk (AUROC of 0.839 versus 0.760). At the cut-off score of 13 (0 to 51), the FAM-FACE-SG score achieved a sensitivity of 81.6% (95% CI: 79.5% to 83.7%), specificity of 73.3% (72.2% to 74.4%) and negative predictive value of 95.2% (95% CI: 94.6% to 95.8%).

**Discussion:** We identified important predictors of frequent admission risk to derive and validate the FAM-FACE-SG score that outperformed the LACE score. Availability in real-time and early in the admission allow for implementation and potential impact to reduce unnecessary readmissions.

**Conclusion:** A validated FAM-FACE-SG risk score utilizing real-time EHR data outperformed the LACE score and has implementation potential.

**Lessons learnt:** A well-developed EHR is critical to leveraging on analytics to solve a real-world care delivery problem.

**Limitations:** Single centre study; unique variables on social determinants of health limits generalizability.

**Suggestions for future research:** Further research is needed on an external validation cohort and for impact studies after implementation of the risk score.

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**Keywords:** frequent hospital admitter; familiar faces; risk stratification; readmission

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