NAPCRG 52nd Annual Meeting — Abstracts of Completed Research 2024.

Submission Id: 7001

Title

Predicting Likelihood of Missed Appointments in Primary Care

Priority 1 (Research Category)

Healthcare informatics

Presenters

Bilal Abou al ardat, MD, Wen-Jan Tuan, MPH, MS, DHA, Qiushi Chen, PhD, Yifang Yan, MS

Abstract

Context

Optimizing continuity of care improves care quality, outcomes, and costs. Despite efforts to improve patient-clinician relationships, access to care, and healthcare workflows, annual rates of missed appointments (MA) in the U.S remain between 15-30%, costing $150 billion annually. Therefore, identifying appointments at risk of being missed is a crucial prevention strategy to optimize care quality, ensure continuity, and reduce costs.

Objective

To evaluate the association between patient, health system, geosocial, and environmental factors on the likelihood of MA in Family Medicine clinics.

Study design and Analysis

Retrospective, longitudinal study using electronic health records.

Setting

Family medicine clinics in an academic medical center in southcentral Pennsylvania.

Population Studied

Adult patients scheduled for in-person or telehealth visits between 01/2019-06/2023.

Intervention/Instrument

A multiclass random forest (RF) method for risk prediction was utilized. SHapley Additive exPlanations (SHAP) to identify the relative importance of factors. An 85:15, training:test split with a 10-fold cross-validation for evaluation. Sensitivity, specificity, and precision to evaluate prediction performance. Area under the receiver operating characteristic curve (AUROC) and F1 score to evaluate the model's discrimination ability.

Outcome Measures

Appointment outcome status was categorized into 1 of 3 event types: completed appointment (CA), no-show (NS), or same day cancellation (SDC), with NS and SDC representing a MA.

Results

A total of 109,328 patients with 1,118,236 appointments were included, with 77,322 (6.9%) NS and 75,545 (6.8%) SDC. Younger, sicker, underinsured/uninsured, non-English speaking, and ethnic minorities had higher rates of MA. Female patients had lower rates of NS, but higher rates of SDC. Less experienced physicians had higher rates of MA. The RF models had an AUROC of 0.87 for CA, 0.85 for NS, and 0.92 for SDC. Some features affecting appointment outcomes were the provider's experience and type, patient age, patient ethnicity, area deprivation index, home-clinic distance, number of comorbidities, usual provider of care index, insurance, and weather.

Conclusion

This study leveraged ML and EMRs to identify key factors for the risk of MA. This tool could allow personalized interventions targeting unique barriers to healthcare access.