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Title
Automated Draft Replies for Patient Messages: Learnings After One Year

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Research Question/QI topic

How do ART adoption rates differ over time, between male and female physicians, and between departments?

This study aims to examine automatic response technology (ART) adoption rates from various physicians. Adoption is defined as whether or not ART was used to draft a response. We calculate adoption rates at the monthly level by finding the percentage of messages sent using ART out of all messages sent. We want to observe the adoption rate of ART within physicians over time. This consists of determining how long it takes physicians to begin utilizing ART, as well as how frequently they use it. We also analyze the differences in ART adoption between male and female physicians, as well as between different departments.

Data and Methods

The observation window spans January 1st, 2024 through January 31st, 2025. Physicians have the option to use ART to answer patient messages, which we denote in a binary variable. We can analyze ART adoption rates over time, as well as the differences between male and female physicians and between departments. We used mixed-effects logistic regression models with the binomial ART adoption variable as the outcome and we account for variation between physicians with a random effect. There is a steep increase in ART adoption around August 2024, so we added a linear spline to account for the two different slopes.

Results

We analyzed 134,650 replies sent from 211 physicians to patients. Among them, 60.8% (N=81,848) were sent by female physicians. 55.0% (N=116) of the physicians in the study are female. On average, female providers responded to about 4.48 (SD 1.85) messages per work day, whereas male providers responded to about 4.07 (SD 1.55) messages per work day. Monthly ART adoption rates vary from 0.7% to 4.3%, with the lowest adoption rate being in March 2024 and the highest adoption rate being in January 2025. Before August, each additional month is associated with an approximate 2.93% (95% CI: 0.2%, 5.8%) increase in odds of ART adoption (coefficient: 0.029; 95% CI: 0.002, 0.056; p value = 0.036). After August, each additional month is associated with an approximate 28.5% (95% CI: 22.9%, 34.4%) increase in odds of ART adoption (coefficient: 0.251; 95% CI: 0.207, 0.296; p value < 0.01).

Significance

Results suggest that ART adoption rates are likely to improve with more exposure to the tool. Female providers are more likely to increase their ART usage over time.