Study Title: Improving Influenza Vaccination Delivery Across a Health System by the Electronic Health Records Patient Portal RCT 5

Initial IRB Approval: 12/20/2017

RCT 5 IRB Approval: 8/18/2022

Clinical Trials Registration: NCT05525494

Statistical Analysis

Primary Analysis

We hypothesize that patients receiving text R/R messages will have higher influenza vaccination rates than portal R/R messages and no R/R; we hypothesize patients receiving the pre-commitment prompt will have higher influenza vaccination rates than standard portal R/R messages and no R/R; and we hypothesize that patients receiving pre-commitment prompts will have higher influenza vaccination rates than no prompts. Primary outcomes (patient receipt of flu vaccine) are binary; our main explanatory variable will be an indicator for the receipt of any portal-based R/R or prompt.

The primary outcome will be the patient's end of flu season vaccination status. Intervention effects will be assessed using mixed effects log-binomial models. Models will contain terms for messaging modality (text v. portal v. none), pre-appointment reminders (sent v. not sent), and, for the portal intervention arm, a pre-commitment prompt (sent v. not sent; this is not included in the text-based arm). Models will adjust for patient characteristics, including age, sex, race/ethnicity, primary language, primary insurer, and prior year vaccination status. Practice random effects will be used to account for clustering of patients by primary care practice. Primary assessment will involve performing model contrasts, and a significance level of 0.017 will be used (3-fold Bonferroni correction of 0.05). To evaluate the combined effect of interventions, we will fit a second model introducing interactions between messaging modality and the other two intervention terms. These analyses will use a significance level of 0.05. Intervention effects will be summarized in terms of risk ratios and 95% confidence intervals.

For RCT #5, individual patients who opt out of text messages will be excluded from the final analysis. In addition, if practices do not send pre-appointment reminders via text, for the pre-appointment analysis the patients from the practice will be excluded from the final analysis. In addition, non-portal users will be excluded from the final analyses.

Secondary Analysis

Secondary analyses will include evaluation of effect modification by patient characteristics. Effect heterogeneity will be evaluated by introducing interaction terms into the primary model specification. All secondary analyses will use a significance level of 0.05. All analyses will be performed using SAS v. 9.4 (SAS Institute Inc., Cary, NC).