Encouraging Overdue Healthcare Appointment Scheduling
Among Patients with Chronic Diseases

Statistical Analysis Plan

August 2, 2021

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Brief Summary

The goal of this study is to determine the most effective messages for encouraging patients with chronic conditions, who have not seen their doctor in at least one year, to return to the clinic. Study participants will receive postcards or letters encouraging them to make an appointment. Researchers will assess whether messages increase appointment scheduling (and attendance).

Study Populations

This study includes four distinct populations: 1. **Medicaid** patients (pending approval of study materials for this population), 2. Geisinger Health Plan (GHP) members who are also Geisinger patients (**patient-members**), 3. GHP **members** only, and 4. Geisinger **patients** only.

It is important to note these distinct populations because appointment scheduling data (our primary outcome) are available only for patients and patient-members. Patient and patient-member data will be analyzed together in this study. Data for members and Medicaid patients (if available) will be included as separate subsamples in the study.

Project Status

The study design is finalized, and mailers were sent to patients, patient-members, and members, but data have not yet been extracted or analyzed as of the time this document was uploaded.

A sample of Medicaid patients may also be included, pending approval of study materials for this population.

Power Analysis

At baseline, an estimated 10% of patients may schedule appointments. The study will achieve 80% power to observe about a 3.1% absolute increase (or a 31% relative increase) in scheduled appointments in any of the intervention arms, relative to the control arm, at a two-tailed $p < .05$ with $n = 1,643$ patients per arm. A primary outcome analysis compares data from the control arm to combined experimental arms. Therefore, the sample described below will allow power to detect an even smaller effect for this analysis.

Estimated Sample Sizes

Geisinger patients/patient-members, GHP members, and Medicaid patients (if approved) will be randomly assigned to 1 of 4 arms. Estimated enrollment for each subsample and arm is listed below, with intervention arms highlighted in blue:

Arm	Patients/ Patient-members	Members	Medicaid
1. Standard Outreach Postcard	1,643	2,163	~794
2. Humorous Postcard	1,643	2,163	~794
3. Physician Letter	1,643	2,163	~795
4. Control	1,643	2,163	~795
Total	**6,572**	**8,652**	**3,182**

Study Timeline

Mailers were sent to patients, patient-members, and members in late July, 2021 across 3 drop dates. Mailers from each arm were evenly divided, at random, across the dates.

If materials for Medicaid patients are approved, this subsample will receive modified versions of the mailers in late 2021 (drop dates TBD), and data will be included in analyses of secondary outcomes.

Planned Analyses

Analyses will test whether participants in any of the study arms are more likely to schedule or attend appointments relative to those in a no-contact control arm.

Primary analyses will test whether Geisinger patients or patient-members who receive mailers are more likely to schedule an appointment relative to those in the no-contact control arm.

Secondary analyses will assess the following:
- Whether patients or patient-members who receive mailers are more likely to attend an appointment that they scheduled during the study period, relative to control
- The relative efficacy of different mailers in increasing appointment scheduling
- The relative efficacy of different mailers in increasing appointment attendance
- Whether appointments occur sooner in mailer groups relative to control

Analyses will include a series of generalized linear models (GLMs) specifying a binary outcome and log-link function for scheduling and attendance, and a negative binomial distribution and log-link function—or another distribution and link function if better suited to the data—for appointment timing. All analyses will be run in R.

Planned outcomes and comparisons of interest are detailed below.

Notes about timeframes and analysis

Mailers were sent on 3 different drop dates. Timeframes listed below refer to the amount of time elapsed from the drop date for a given participant. For instance, the primary outcome timeframe is 30 days; thus, for the purposes of this study, a patient will be counted as having scheduled an appointment if there was an appointment scheduled in the 30 days following that patient's drop date.

Control participants will be separated into 3 drop date groups, each assigned to one of the three drop-date groups for the experimental arms. Each control group will be monitored for appointments during a date range that is aligned with that for its corresponding experimental group.

Outcomes

Primary outcome:

1. Patients – Appointment scheduling – 30 days – confirmatory
   a. individual mailers vs. control
   b. mailers combined vs. control

Secondary outcomes:

1. Patients – Appointment scheduling – 30 days – exploratory
   a. outreach vs. humorous vs. letter
2. Patients – Attendance at appointments scheduled within 30 days of mailers – 180 days – exploratory
   a. individual mailers vs. control

       b. mailers combined vs. control
3. Patients, Members, & Medicaid – Attendance at any appointment – 30 days – exploratory
       a. individual mailers vs. control
       b. mailers combined vs. control
       c. outreach vs. humorous vs. letter
4. Patients, Members, & Medicaid – Attendance at any appointment – 90 days – exploratory
       a. individual mailers vs. control
       b. mailers combined vs. control
       c. outreach vs. humorous vs. letter
5. Patients, Members, & Medicaid – Attendance at any appointment – 180 days – exploratory
       a. individual mailers vs. control
       b. mailers combined vs. control
       c. outreach vs. humorous vs. letter
6. Patients, Members, & Medicaid – Timing of appointment – 30 days – exploratory
       a. individual mailers vs. control
       b. mailers combined vs. control
       c. outreach vs. humorous vs. letter
7. Patients, Members, & Medicaid – Timing of appointment – 90 days – exploratory
       a. individual mailers vs. control
       b. mailers combined vs. control
       c. outreach vs. humorous vs. letter
8. Patients, Members, & Medicaid – Timing of appointment – 180 days – exploratory
       a. individual mailers vs. control
       b. mailers combined vs. control
       c. outreach vs. humorous vs. letter

Additional outcomes:
1. Patients – appointment scheduling within 14 days of mailers being sent – exploratory*
       a. outreach vs. humorous vs. letter
2. Patients – Calls to appointment scheduling – 30 days – exploratory
       a. individual mailers vs. control
       b. mailers combined vs. control
       c. outreach vs. humorous vs. letter

*Note: this analysis will inform internal operations but will not be reported in publication.