STUDY PROTOCOL

Project Title: Precision Vaccine Promotion in Underserved Populations

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TABLE OF CONTENTS

STUDY TEAM ROSTER

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13. Hubert H Humphrey Comprehensive Health Center, 5850 S Main St, Los Angeles, 90003
14. La Puente Health Center, 15930 Central Avenue, La Puente, 91744
15. LAC+USC Medical Center, 2051 Marengo Street , Los Angeles, 90033
16. Lake Los Angeles Community Clinic, 16921 E. Avenue O, Lake Los Angeles, 93591
17. Littlerock Community Clinic, 8201 Pearblossom Highway, Littlerock, 93543
18. Long Beach Comprehensive Health Center, 1333 Chestnut Blvd, Long Beach, 90813
19. Martin Luther King, Jr. Outpatient Center, 1670 E. 120th Street, Los Angeles, 90059
20. Mid-Valley Comprehensive Health Center, 7515 Van Nuys Blvd, Van Nuys, 91405
21. North East Health Center, 3303 N Broadway, St. 200, Los Angeles, 90031
22. Olive View-UCLA Medical Center, 14445 Olive View Dr., Sylmar, 91342
23. Rancho Los Amigos National Rehabilitation Center, 7601 Imperial Highway, Downey, 90242
24. San Fernando Health Center, 1212 Pico Street, San Fernando, 91340
25. South Valley Health Center, 38350 40Th St E, Palmdale, 93552
26. Torrance Health Center, 711 Del Amo Blvd., Torrance, 90502
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PRÉCIS

Study Title

Precision Vaccine Promotion in Underserved Populations

Objectives

This will be a randomized clinical trial (RCT) to test the impact of text message innovations on receipt of influenza vaccination during the 2022-23 season.

Design

Interventions will be assigned randomly in a 2 x 2 factorial design to all patients eligible for vaccines, including a "standard of care" control group that will receive the standard DHS campaign message.

Interventions and Duration

The intervention period will include a 6-month flu season from 2022 –2023. This pilot study will be embedded as one arm of a larger trial. We will simultaneously test, using a comparative effectiveness trial design, the effect of the following 3 interventions, all compared to standard text messages: 1) Enhanced texting (with a callback by a trained call-center staff member to schedule a vaccine visit if the patient presses "1" in response to the text 2) Enhanced Bidirectional texting with a texting response from a trained call-center staff member who will help the patient schedule a vaccine visit through a series of back-and-forth texts 3) Provision of transportation information with information within the text messages that highlight to patients that MediCal will pay for transportation to a vaccine visit (Pilot arm).

Outcome Measures

Our primary outcome is the end of season influenza vaccination status based on California's statewide vaccine registry (CAIR2). Secondary outcomes include vaccination intentions as measured by patients' contact with appointment systems, scheduled vaccination appointments (and missed appointments), and influenza hospitalizations among patients that are eligible to receive vaccinations.

1. STUDY OBJECTIVES

1.1 Primary Objectives

The primary objectives are to 1) *Conduct a Retrospective analysis of influenza and COVID-19 Messaging Strategies and Social Determinants of Non-Compliance.* Between 2019 and 2021, DHS conducted a series of campaigns related to COVID and influenza vaccines with the objective of increasing community trust with geographically and demographically targeted advertisements. The 2021 campaign messages also adopted "Flu shot reserved for you" language that was found to be comparatively effective in Milkman et al., 2021.[1] We will also investigate disparities between the UCLA and DHS populations, *2) Develop Targeted Vaccination Promotion Approaches that Apply Principles of Behavioral Economics.* We will use the results of Aim 1 to craft messages that (a) are consistent with evidence-based behavioral principles, and (b) promote "sludge reduction" mechanisms. These may include personalized messages about the easiest ways for patients to obtain free vaccinations - pharmacies closer to patients' homes and free transportation to healthcare facilities that have not been promoted at DHS in the past. Based on the retrospective analysis, we will vary the messenger identity and message content and tailor to specific subgroups. Additionally, we will use this time period to engage other large public service delivery systems that might participate in a proposal for a future multisystem RCT, *3) Conduct a Randomized Controlled Trial of Message Candidates in 2022-2023 Flu Season.* The new messaging will be added to an ongoing RCT being conducted at DHS in a factorial design. The original study, limited to use of the patient portal to deliver messages, will be augmented with our approach and interventions, which will also incorporate paper mail, text messages, and call centers.

2. BACKGROUND AND RATIONALE

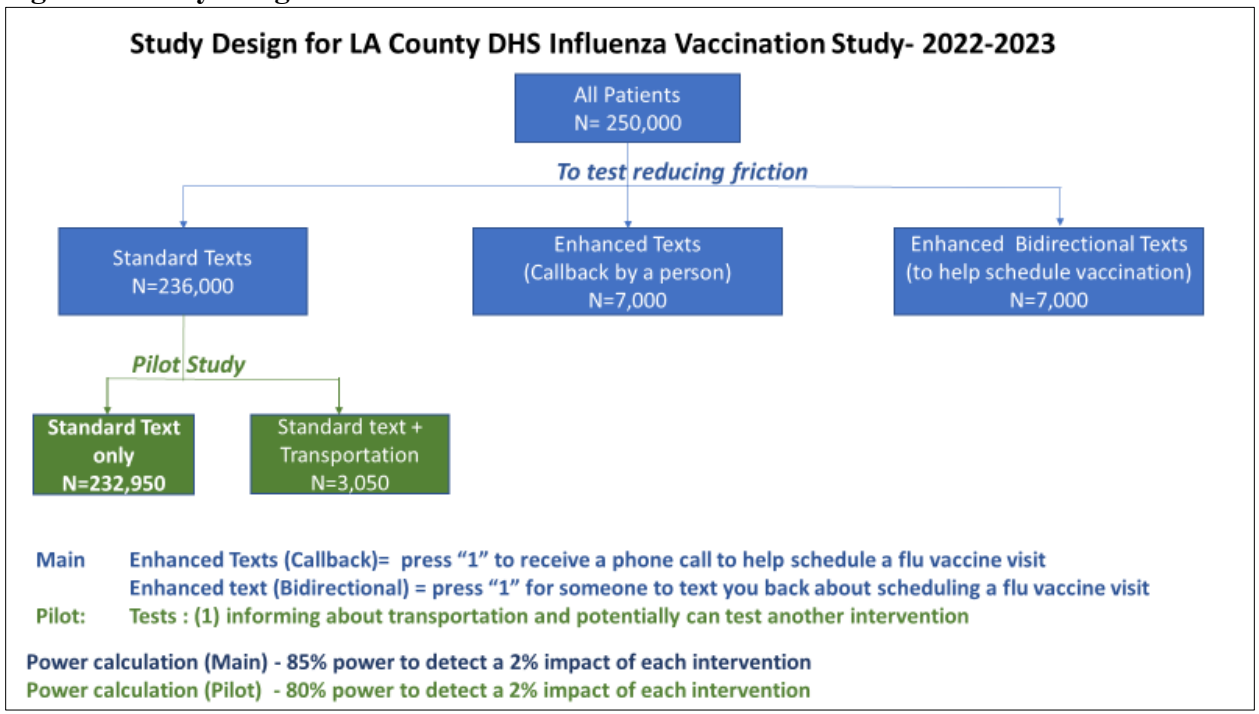
2.1 Background on Condition, Disease, or Other Primary Study Focus

Compliance with influenza and COVID-19 vaccinations is a critical public health issue, and underserved populations are vulnerable to community spread and frequently have more adverse outcomes. "Mega-studies" of insured populations with a history of vaccination may not be representative of heterogeneous groups of uninsured and underinsured patients. Reasons for noncompliance are multifactorial: well-meaning policies related to increasing vaccine accessibility may not be widely understood or disseminated, employer-based incentives and mandates may not be applicable, and issues related to communication, trust, and safety remain challenges and vary among different communities. This study will be the first large-scale randomized controlled trial testing personalized behavioral interventions in an underserved population. The Los Angeles County Department of Health Services (LACDHS) eligible population is as large as prior "Mega-studies", though substantially less adherent to vaccination (currently 31.2% at LACDHS vs. 42% in Milkman et al.,) with a comparatively large proportion of Hispanic and Black patients.

3. STUDY DESIGN

See Figure 1 for study design of the larger randomized controlled trial. The pilot arm (this study) is illustrated in green.

Figure 1. Study design



4. SELECTION AND ENROLLMENT OF PARTICIPANTS

4.1 Inclusion Criteria

All patients over six months old that are members of an LACDHS managed care plan and have had contact with the health system in the past 2 years are eligible for LACDHS vaccination campaigns. In 2022, this includes over 273,000 patients.

4.2 Exclusion Criteria

The exclusion criterion is a patient age of < 6 months, as babies less than 6 months are not eligible for influenza vaccination. We will also exclude individuals who have already received their flu vaccination this season.

4.3 Study Enrollment Procedures

Randomized Controlled Trial. None of the proposed intervention strategies place patients at any additional risk of adverse outcomes, above and beyond the risks associated with routine immunization. Influenza vaccine is recommended by the Advisory Committee on Immunization Practices (ACIP) for the patient population included in this study and administration of these vaccinations is part of the routine practice of immunization delivery. Therefore, verbal agreement to administer vaccines (at the patient's medical office/clinic) will constitute their consent for vaccination, as is the accepted procedure for the administration of all routine vaccinations. As with all vaccinations offered in a doctor's office, patients are free to refuse vaccination.

For the randomized controlled trial, we will be requesting a waiver of consent. Our rationale is based on our contention that we meet the conditions as set forth in 45 CFR 46.116, subpart D, which asks that the researchers meet the following criteria: 1) the research involves no more than minimal risk to the subjects; 2) the waiver or alteration will not adversely affect the rights and welfare of the subjects; 3) the research could not practicably be carried out without the waiver or alteration; and 4) whenever appropriate, the subjects will be provided with additional pertinent information after participation. Further, all patients in the RCT will be within the covered entity of LACDHS. Regarding subject notification, given the intervention's focus on practice change and the anticipated very large number of patients from selected practices (tens of thousands), while we will update participating practices on the results of the intervention, we will not contact individual patients to notify them of the results. However, results will be made publicly available through presentations, publication, and other dissemination efforts.

5. STUDY INTERVENTIONS

5.1 Interventions, Administration, and Duration

Text messages will begin to be sent at the beginning of the 2022 flu season. We will randomly spread out the calls throughout the day and week in order to minimize unnecessary overload for the call center when patients text back a "1" response that they would like a

call or text message to help them. We can do this by randomizing patients into batches so that there is no systematic time-of-day or day-of-week for any patients. We will send up to 3 reminders this flu season.

Control arm: Standard Texts (n=232,950). Patient randomized to this study arm will receive up to 3 text messages, reminding them about the importance of influenza vaccination. The messages themselves are shown below. The standard texts will include a clinic call back number and patient portal self-scheduling for patients to schedule their influenza vaccines. The direct scheduling texts includes a direct number to an agent that can help schedule and answer questions on the phone in real time. The texts with a direct number to schedule will link a specified phone number to call and schedule. This number would be answered by a central agent quickly and a patient could schedule their flu shot at any clinic site. This specific phone number would not go through the multiple option menus a patient would normally experience when calling their clinic.

Intervention arm: Standard Texts with Transportation (n=3,050). The standard texts with transportation includes phone number for patients to reserve transportation to a vaccination appointment based on Medi-Cal health plan transportation resources.

Prepped Text Messages for DHS Flu Campaign 2022 - 2023

Standard Text:
#PCMH#: #FirstName#, your flu shot is ready! Call your clinic at #ExternalRefNo# or visit the LA Health Portal at http://bit.ly/BookFluShot if you want this shot held for you.

Standard Texts (+ Transportation)
#PCMH#: #FirstName#, your flu shot is ready! Call your clinic at #ExternalRefNo# or visit the LA Health Portal at http://bit.ly/BookFluShot if you want this shot held for you. You can call #Health Plan Phone Number# to schedule a free ride your flu shot through #Health Plan Name#

Examples (Transportation)

- **Standard Texts (+ Transportation) - LA Care**
  #PCMH#: #FirstName#, your flu shot is ready! Call your clinic at #ExternalRefNo# or visit the LA Health Portal at http://bit.ly/BookFluShot if you want this shot held for you. You can call 888-839-9909 to schedule a free ride for your flu shot through your LA Care health plan.
- **Standard Texts (+ Transportation) - Health Net**
  #PCMH#: #FirstName#, your flu shot is ready! Call your clinic at #ExternalRefNo# or visit the LA Health Portal at http://bit.ly/BookFluShot if you want this shot held for you can call 855-253-6863 to schedule a free ride for your flu shot through your Health Net health plan.

5.2 Handling of Study Interventions

As we will send up to 3 text messages during the flu season, we will search the EHR for whether or not the patient received an influenza vaccination this season. If yes, the patients will be dropped form the denominator of patients needing a text message reminder. We will search the EHR prior to each of the text message rounds. Review of medical records is needed in order to obtain the information about (a) influenza vaccination dates this upcoming season, and (b) address (in order to group patients into households as described above. We will review the EHR prior to each round of text messages to see if patients had received an influenza this season.

5.3 Adherence Assessment

In order to ensure that the study interventions are being reliably delivered we will implement a series of test messages to the study team to ensure fidelity of the messages to the study design and DHS communication quality standards prior to RCT implementation Study staff will conduct assessments regularly during the intervention to ensure that tests do not fail.

6. STUDY PROCEDURES

6.1 Schedule of Evaluations

Assessment	Screening: Baseline	Baseline, Enrollment, Randomization: (Day 1)	Intervention Start (Month 1)	Continuously Measured or monitored	Intervention End (Month 6)	Follow-up Period
Patient-level assessments						
Demographics	**X**					
Vaccination status	**X**	**X**	**X**	**X**	**X**	**X**

Scheduled vaccine appts			**X**	**X**	**X**	
Missed vaccine appts			**X**	**X**	**X**	
Influenza hospitalizations			**X**	**X**	**X**	
Adverse Events			**X**	**X**	**X**	

6.2 Description of Evaluations

6.2.1 Screening Evaluation

Consenting Procedure

For the randomized controlled trial, we will be requesting a waiver of consent. Our rationale is based on our contention that we meet the conditions as set forth in 45 CFR 46.116, subpart D, which asks that the researchers meet the following criteria: 1) the research involves no more than minimal risk to the subjects; 2) the waiver or alteration will not adversely affect the rights and welfare of the subjects; 3) the research could not practicably be carried out without the waiver or alteration; and 4) whenever appropriate, the subjects will be provided with additional pertinent information after participation. Further all patients in the RCT will be within the covered entity of LACDHS. Regarding subject notification, given the intervention's focus on practice change and the anticipated very large number of patients from selected practices (tens of thousands), while we will update participating practices on the results of the intervention, we will not contact individual patients to notify them of the results. However, results will be made publicly available through presentations, publication, and other dissemination efforts.

6.2.2 Enrollment, Baseline, and/or Randomization

Enrollment

Identification of families (i.e., households): We will group families using one of two possible methods. First, LACDHS has an identifier that ties family members together. It is called the "Family Budget Unit." We will explore this method. If it does not work, we will use another method that we have utilized successfully in the UCLA-based study from which this study is derived. We will assume that people living in the same address belong to the same family. As a secondary measure, we use a

telephone number as a linking number (i.e., if two people have the same telephone number, we assume they are from the same household).

Baseline Assessments

Vaccination status. We will assess baseline vaccination status at the beginning of the flu season as we will exclude individuals who have already received their vaccination.

Randomization

We will randomly allocate families to one of the study arms shown above and send family members the allocated text message. All family members will therefore receive the same text message. This is meant to reduce confusion among patients. For the analysis, we will randomly select one index patient per household for analysis. This follows Cochrane criteria for being included in meta-analyses. We will attempt to affiliate index patients with practices, and randomize patients (families) within these practices.

The retrospective analysis will result in a randomization and personalization template that will include placeholders and calculations for the following items: a) patient contact information, b) experimental group assignment, c) message contact dates (one per month in batches of 100 patients per day), d) randomly assigned message contact channel for each contact date (e.g. phone, portal, email, SMS), e) message templates with substitutable text, f) personalized message content for each month of messages, and g) stratification and personalization data elements identified in the retrospective analysis. These templates will be populated on premises at LACDHS with data to be retrieved by the Informatics Core staff. These randomized lists will be converted to personalized, tailored messages based on Mail Merge templates or similar DHS campaign management software. After lists and personalization have been completed, they will be approved by the research team in a final cross-check. All patients that have been vaccinated will be removed from contact lists before each wave of messages is delivered. These templated assignments may be moved from Excel to DHS Reporting Software (ELM) or other campaign management software by the Informatics Core.

7. SAFETY ASSESSMENTS

7.1 Specification of Safety Parameters

There are minimal risks to participants in this study. None of the intervention strategies place patients at any additional risk of adverse outcomes, above and beyond the risks associated with routine immunization. Influenza vaccine is recommended by Advisory Committee on Immunization Practices (ACIP) for the patient population included in this study and administration of these vaccinations is part of the routine practice of immunization delivery.

Risks of immunization: Although rare, there are inherent risks to immunization with any vaccine. While the practice-based immunization efforts may increase the likelihood that patients will receive recommended vaccines, the study does not increase the risk (per vaccine) of a vaccine-related adverse event for any individual patient.

Risk of breach of confidentiality: In this study, an additional risk to subjects is the risk of a breach of confidentiality. A number of policies, procedures, and technical safeguards will be in place to ensure that there is no breach of confidentiality as a consequence of this study. These steps are outlined below in the "Protected Health Information" section. The study proposed is a minimal risk study, with a loss of confidentiality posing the greatest risk to the individual patients and participating practices, as data will be extracted from the EHR data of participating practices to provide study data for the research team. All study data will be prepared by the DHS-CTSI Informatics Core in accordance with the DHS Research Oversight Board policy. Only Limited Data Sets will be transferred for analysis purposes; compliance with the transfer process will be managed by Drs. Meeker and Abhat as DHS Co Investigator. Any links between identified data and deidentified data will be stored only on DHS premises. Patient contact lists and personalized data elements will be exclusively maintained on premises by the Informatics Core, responsible for implementing the patient assignment and personalization templates. Research data will be entered into a password-protected computer and will never be transferred to laptops or portable media.

Vaccination rates as compared to the control group. Although unlikely, it is possible that the interventions have the effect of reducing vaccine uptake; therefore, we will monitor vaccination rates in the intervention groups as compared to control group.

7.2 Methods and Timing for Assessing, Recording, and Analyzing Safety Parameters

Reports of our safety measures will be delivered to our Data Safety Monitoring Board at the cadence determined by the DSMB members (likely at 6 and 12 months post implementation).

7.3 Adverse Events

Potential adverse events include risks of side effects inherent to immunization with any vaccine. However, while the practice-based immunization efforts may increase the likelihood that patients will receive recommended vaccines, the study does not increase the risk (per vaccine) of a vaccine-related adverse event for any individual patient. Likewise, influenza vaccinations are universally recommended for all individuals greater than 6 months of age and is the standard of care. It is also possible that the interventions have the unlikely effect of reducing vaccine uptake. We will monitor vaccination rates as compared to the control group as a safety metric.

7.4 Reporting Procedures

The Principal Investigator will report any unanticipated events to the IRB as well as the Data Safety and Monitoring Board (DSMB) assembled for this study. When notified of an unanticipated event, the DSMB will convene and make a decision as to whether the study should continue. The IRB will also be notified of the DSMB's decision. *Please see detailed Data and Safety Monitoring Plan*.

7.5 Safety Monitoring

Dr. Meeker as the study Principal Investigator will be responsible for monitoring participant safety, data quality/confidentiality, and evaluating the progress of the study on a daily basis in conjunction with study staff. Oversight for this study will be conducted by the Roybal Standing Data and Safety Monitoring Board. DSMB Membership will be reviewed and approved by the NIH. Should there be any questions regarding the independence of DSMB member(s), it will be addressed and corrected, if necessary, at that time.

The DSMB will have the role/responsibility of reviewing the entire IRB-approved study protocol regarding subject safety and analysis, and participant recruitment and retention milestones. At the time of interim analysis (50% enrollment), the study team will prepare a safety report to be reviewed by the DSMB who will provide recommendations to the NIH for or against the trial's continuation, as well as any modification to the study.

8. INTERVENTION DISCONTINUATION

Following each DSMB meeting/report, the board will make recommendations to the IRB as to whether the study should continue or if changes to the protocol are necessary for continuation.

9. STATISTICAL CONSIDERATIONS

9.1 General Design Issues

Design
Randomized controlled trial

Outcome Measures
Our primary outcome is the end of season influenza vaccination status based on California's statewide vaccine registry (CAIR2). Secondary outcomes include vaccination intentions as measured by patients' contact with appointment systems, scheduled vaccination appointments (and missed appointments), and influenza hospitalizations among patients that are eligible to receive vaccinations.

9.2 Sample Size

Our power calculation suggests that we have 80% power to detect a 2% impact of each intervention.

9.3 Interim analyses and Stopping Rules

No interim analysis will be conducted on primary or secondary outcomes. The DSMB is granted full power to recommend discontinuation of the study to the consolidated IRB if safety concerns are found. The board will meet prior to each flu season RCT implementation to review patient safety and adverse events. The DSMB members will determine the cadence of future meetings and/or safety reports. Following each meeting/report, the board will make recommendations to the IRB as to whether the study should continue or if changes to the protocol are needed.

9.4 Outcomes

9.4.1 Primary outcome

End of season influenza vaccination status based on California's statewide vaccine registry (CAIR2).

9.4.2 Secondary outcomes

Vaccination intentions as measured by patients' contact with appointment systems, scheduled vaccination appointments (and missed appointments), and influenza hospitalizations among patients that are eligible to receive vaccinations.

9.5 Data Analyses

Statistical Analysis Plan

We will perform separate evaluations of the impact of the text enhancements (callback and bidirectional texting) on the one hand, and transportation messaging on the other hand. Primary outcomes will be evaluated as a test of differences between proportions vaccinated in control and treatment groups, and heterogeneity of treatment effects will separately analyze subgroups. For further analyses, we will use multivariable log-binomial regression models with vaccination status at the end of the campaign as the outcome variable. Regressions will include indicators for each intervention as fixed effects, with the standard text condition as the reference group, and potentially clinic random effects, depending on retrospective analysis results. Models will also adjust for patient age, gender, race/ethnicity, insurance, and whether the patient was vaccinated in at least one of the prior two flu seasons. Secondary analysis will include subgroup interactions with intervention indicators to assess heterogeneity of treatment effects. In exploratory analyses, we will investigate interactions between interventions, questions related to modality of message delivery, as well as whether encounter type, click rates on messages, and distance to the health care facility from the home address affect influenza vaccination rates.

In addition, we will evaluate the loss to follow-through rates (scheduling an appointment, but did not complete the appointment) by patient demographics, as distance to the health care facility from the home address).

For the evaluation of text enhancements, we will perform a 3-fold Bonferroni correction accounting for pairwise comparison of intervention arms, using a two-sided significance level of 0.017. For the evaluation of transportation messaging, we will use a two-sided significance level of 0.05. All analyses will be intention-to-treat, and will be performed using SAS v. 9.4 (SAS Institute Inc., Cary, NC).

10. DATA COLLECTION AND QUALITY ASSURANCE

10.1 Data Collection Forms

Data will be collected from LACDHS electronic medical records and CAIR2 data.

10.2 Data Management

All study data, including CAIR2 data and DHS EMR and administrative data will be prepared by the DHS-CTSI Informatics Core in accordance with the DHS Research Oversight Board policy. Dr. Abhat will submit all data requests to the DHS helpdesk, which includes verification of procedural compliance with IRB and ROB approval screening for DHS-based research. Only HIPAA-limited or deidentified data sets will be transferred for analysis purposes; compliance with the DHS secure data transfer process to UCLA

and/or USC will be managed by Dr. Abhat as DHS Principal Investigator. Any links between identified data and deidentified data will be stored only on DHS premises. Patient contact lists and personalized data elements will be exclusively maintained on premises by the Informatics Core, responsible for implementing the patient assignment and personalization templates.

10.3 Quality Assurance

Training

Staff will be trained on the permissible values present in Electronic Records, frequency of update, and expected volumes of data. All investigators and staff involved in the project have completed the Collaborative Institutional Training Initiative (CITI) online training courses related to human subject's protections. These courses fulfill all NIH requirements for human subjects training.

Quality Control Committee

The Roybal Center Executive Advisory Board will serve as the quality control committee, reviewing Data and Safety reports prior to submitting to DSMB.

Intervention fidelity

Under Dr. Abhat's oversight, the USC CTSI research coordinator will be responsible for ensuring that both experimental procedures for delivering the correct patient the correct message at the correct time are observed. The coordinator shall complete all DHS training required to execute patient messaging and implement a series of test messages to the study team to ensure fidelity of the messages to the study design and DHS communication quality standards. It is expected that the coordinator will take responsibility for DHS campaign outreach efforts to avoid redundant messaging with any existing DHS campaigns and assurance that all patients receive control campaign content. This will require working closely with DHS clinical staff, including clinic navigators and other personnel. Drs. Meeker and Abhat will ensure that all SOPs are observed and all analysis is conducted in compliance with DHS policy.

Protocol Deviations

Our task tracking systems, JIRA and Monday.com will be used to track and document issues. Each issue will include both an assignee and a reviewer.

Monitoring

See Data and Safety Monitoring Plan.

11. PARTICIPANT RIGHTS AND CONFIDENTIALITY

11.1 Institutional Review Board (IRB) Review

The study protocol has been reviewed and approved by the University of California, Los Angeles Institutional Review Board (IRB) as the IRB of record (IRB#17-001889). USC has also agreed to rely on the UCLA IRB through the SMART IRB online reliance system (IRB # HS-22-00479).

11.2 Informed Consent Forms

Not applicable - we have received approval for a waiver of consent for the randomized trial.

11.3 Participant Confidentiality

Only HIPAA-limited or deidentified data sets will be transferred for analysis purposes; compliance with the transfer process will be managed by Dr. Abhat as DHS Principal Investigator. Any links between identified data and deidentified data will be stored only on DHS premises.

USC study personnel will connect to the Schaeffer Servers on desktop computers in locked offices at USC Schaeffer Center facilities. User accounts use 1024 bit public-private key pairs to authenticate the user; there is no password access to the servers via SSH. Users must be within the USC firewall, either hardwired to the USC network or authenticated through the USC VPN. All users have human subjects research training (either through USC CITI or NIH), as well as data protection training that is specific to our system. Unix user groups will control access to directories within these secure servers, such that only study investigators will have access to the data.

11.4 Study Discontinuation

Following each DSMB meeting/report, the board will make recommendations to the IRB as to whether the study should continue or if changes to the protocol are necessary for continuation.

12. COMMITTEES

Data Safety Monitoring Board: Oversight for this study will be conducted by the Roybal Standing Data and Safety Monitoring Board DSMB convened prior to study commencement. DSMB Membership will be reviewed and approved by the NIH. Should there be any questions regarding the independence of DSMB member(s), it will be addressed and corrected, if necessary, at that time.

The DSMB will have the role/responsibility of reviewing the entire IRB-approved study protocol regarding subject safety and analysis, and participant recruitment and retention milestones. At the time of interim analysis (50% enrollment), the study team will prepare a safety report to be reviewed by the DSMB who will provide recommendations to the NIH for or against the trial's continuation, as well as any modification to the study.

13. PUBLICATION OF RESEARCH FINDINGS

Publication of results from our research will follow the NIH Public Access Policy, which requires that we submit to the National Library of Medicine's PubMed Central an electronic version of final, peer-reviewed manuscripts upon acceptance for publication, to be made publicly available no later than 12 months after the official date of publication.

14. REFERENCES

[1] K.L. Milkman, L. Gandhi, M.S. Patel, H.N. Graci, D.M. Gromet, H. Ho, J.S. Kay, T.W. Lee, J. Rothschild, J.E. Bogard, I. Brody, C.F. Chabris, E. Chang, G.B. Chapman, J.E. Dannals, N.J. Goldstein, A. Goren, H. Hershfield, A. Hirsch, J. Hmurovic, S. Horn, D.S. Karlan, A.S. Kristal, C. Lamberton, M.N. Meyer, A.H. Oakes, M.E. Schweitzer, M. Shermohammed, J. Talloen, C. Warren, A. Whillans, K.N. Yadav, J.J. Zlatev, R. Berman, C.N. Evans, R. Ladhania, J. Ludwig, N. Mazar, S. Mullainathan, C.K. Snider, J. Spiess, E. Tsukayama, L. Ungar, C. Van den Bulte, K.G. Volpp, A.L. Duckworth, A 680,000-person megastudy of nudges to encourage vaccination in pharmacies, Proc. Natl. Acad. Sci. U. S. A. 119 (2022). https://doi.org/10.1073/pnas.2115126119.

15. SUPPLEMENTS/APPENDICES

None