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RESEARCH

A social media microinfluencer intervention to reduce coronavirus disease 2019 vaccine hesitancy in underserved Tennessee communities: A protocol paper

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ABSTRACT

Background: Central to effective public health policy and practice is the trust between the population served and the governmental body leading health efforts, but that trust has eroded in the years preceding the pandemic. Vaccine hesitancy among adults is also a growing concern across the United States. Recent data suggest that the trustworthiness of information about the coronavirus 2019 (COVID-19) vaccine was a larger concern than the vaccine's adverse effects or risks.

Objective: This study aims to describe the methods used to create a public health microinfluencer social media vaccine confidence campaign for the COVID-19 vaccine in underserved Tennessee communities. A secondary objective is to describe how the Social-Ecological Model (SEM) and Social Cognitive Theory may address vaccine hesitancy using community pharmacies.

Methods: In late 2020, 50 independent community pharmacies in underserved communities across Tennessee were involved in a public health project with the State of Tennessee Department of Health and the University of Tennessee Health Science Center College of Pharmacy. The project involved a 3-pronged, pharmacy-based COVID-19 vaccination outreach project, including (1) social media messaging (i.e., microinfluencer approach), (2) community partner collaboration, and (3) in-pharmacy promotion. Quantitative and qualitative data will assess the quality and effectiveness of the program. Social media outcomes will also be assessed to measure the impact of the microinfluencer social media training.

Results: Project implementation is planned for 6 months (January 2021 to June 2021) after an initial month of planning by the research team (December 2020) and preceding several months of assessment (July 2021 and beyond).

Conclusions: Novel, theory-based approaches will be necessary to improve vaccine confidence. One approach to promoting public health, derived from the SEM, may be to use trusted microinfluencers on social media platforms, such as local community pharmacists and community leaders.

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Background

Central to effective public health policy and practice is the trust between the population served and the governmental body leading health efforts.^{1,2} This concept is of critical importance before and during public health emergencies, such as the coronavirus 2019 (COVID-19) pandemic. However, the foundational trust between the public and government has eroded in the years preceding the pandemic.³ Currently, only 42% of Americans feel that the government is doing a good job in “effectively handling threats to public health,” with only 11% believing that the government was doing a “very good” job.³

The growing vaccine hesitancy epidemic of the past decade is one salient example of such trust erosion.⁴ Formally defined by the Strategic Advisory Group of Experts on Immunization, a working group within the World Health Organization, vaccine hesitancy is the “delay in acceptance or refusal of vaccination despite the availability of vaccination services.”⁴ Vaccine hesitancy is complex and context-specific, varying across time, place, and vaccine. Factors such as complacency, convenience, and confidence may influence vaccine hesitancy, and the consequences are often serious. For instance, there has been an overall 30% rise in measles cases globally over the past decade, including in the United States.⁵

Vaccine hesitancy among adults is also a growing concern across the United States. Nationwide assessment of seasonal influenza vaccination rates over the past 5 years suggests that annual acceptance is low and that a range of non-health care-related factors may mediate this behavior.^{6,7} Similarly, data from 2020 show that adults at high risk of invasive pneumococcal disease are not regularly vaccinated against this disease after being deemed high risk, again with several social determinants associated with higher and lower odds of vaccination.^{8,9}

Considering these observations and the inability to achieve national vaccine-related goals, novel approaches to promote vaccine confidence are needed. These approaches will need to consider how health-system factors (e.g., access, provider recommendations), community factors (e.g., social norms, socioeconomics), and the influence of media and political coverage of COVID-19 have affected individual- and group-level vaccine attitudes. For example, a recent survey found that the trustworthiness of information about the COVID-19 vaccine was a larger concern than the vaccine’s adverse effects or risks.¹⁰ Trustworthiness, in particular, represented the largest negative shift in vaccine perceptions, with the respondents holding less trust in the reliability of vaccine information than they did in the 6 months previously.¹⁰ As a whole, the United States holds one of the lowest vaccine acceptance rates worldwide at 57%.¹¹

Emerging evidence on vaccine confidence points to communication as a key facilitator to vaccine acceptance. Adults who were surveyed about what types of messaging would make them more likely to pursue COVID-19 vaccination included hearing from those they trust that the vaccine has no or few adverse effects and that it is both safe and effective.¹² Of note, it is the medium of vaccine information that seems to matter and, to a lesser extent, the message. For example, rural Americans are least willing to get a COVID-19 vaccine compared with their urban and suburban counterparts, but 86% of rural Americans say that they trust their health care provider, whereas only 66% and 64% trust the Centers for Disease Control and Prevention or their local public health department, respectively.¹³

Given the accessibility of the community pharmacist, convenience of location and hours of operation, and pharmacists living and leading in the communities they serve, these community pharmacy settings represent an underused public health resource in both health messaging and care delivery.¹⁴ These organizations are well networked in their hometowns, with 58% of community pharmacy owners being members of their Chamber of Commerce, 50% providing \$4000 or more in monetary support for community organi-

zations, and 10% considering themselves as friends of their mayor.¹⁴

Thus, the primary objective of this research is to describe the methods used in creating a public health microinfluencer social media vaccine confidence campaign for the COVID-19 vaccine in underserved Tennessee communities. A secondary objective is to describe how the SEM and Social Cognitive Theory (SCT) may be used to reduce vaccine hesitancy using community pharmacies.

Methods

Study overview

In partnership with the State of [REMOVED] Department of Health (TDOH), the University of Tennessee launched a 3-pronged, pharmacy-based COVID-19 vaccination outreach project, including: (1) social media messaging (i.e., microinfluencer approach), (2) community partner collaboration, and (3) in-pharmacy promotion.

Given the complex nature of vaccine hesitancy and its determinants, 2 theories were selected to underpin the project: the Social-Ecological Model (SEM) and Social Cognitive Theory.⁴ These theories were selected because of their wide use in understanding vaccine behavior and intentions.^{15,16} SEM has been used to study a multitude of public health topics, including the H1N1 influenza vaccine, childhood obesity, and violence prevention, because of its ability to capture influencers on both groups of individuals as well as the individual themselves¹⁵ (Figure 1). SCT also uses a social lens from which to view vaccine-seeking behaviors but focuses specifically on how observing others’ beliefs and behaviors influences decisions.¹⁷ This is a critical lens, as vaccine-seeking behaviors can often be highly dependent on the actions and beliefs of the community around the individual rather than their access to knowledge or information.¹⁸

Microinfluencer social media campaign

Microinfluencer is a recently coined marketing term whose origins are based on the rise of social media. These everyday people may be more effective at public health messaging in a way seen in traditional product marketing. This is critical because a key medium used in disseminating antivaccination messages has been social media.¹⁹ Similarly, a growing body of evidence suggests that social media may also effectively promote public health messages, such as those about vaccinations.²⁰⁻²⁴ Like its use in product marketing, social media may augment an advertising campaign because it creates a message with bidirectional interaction in an individual’s daily life. Firms increasingly use these microinfluencers with whom their target audience can easily identify to promote their products because of their more robust understanding of user preferences and characteristics. Unlike endorsements by celebrities and key public figures (i.e., macroinfluencers), these microinfluencers are viewed by social media users to be more authentic, and a member of one’s geographic or social community, and their lives felt to be more real and likely to be similar to one’s own.²⁵

Given the emerging evidence base on vaccine hesitancy and its relation to trust between patients and governmental bodies, institutions, health care providers, and communities,

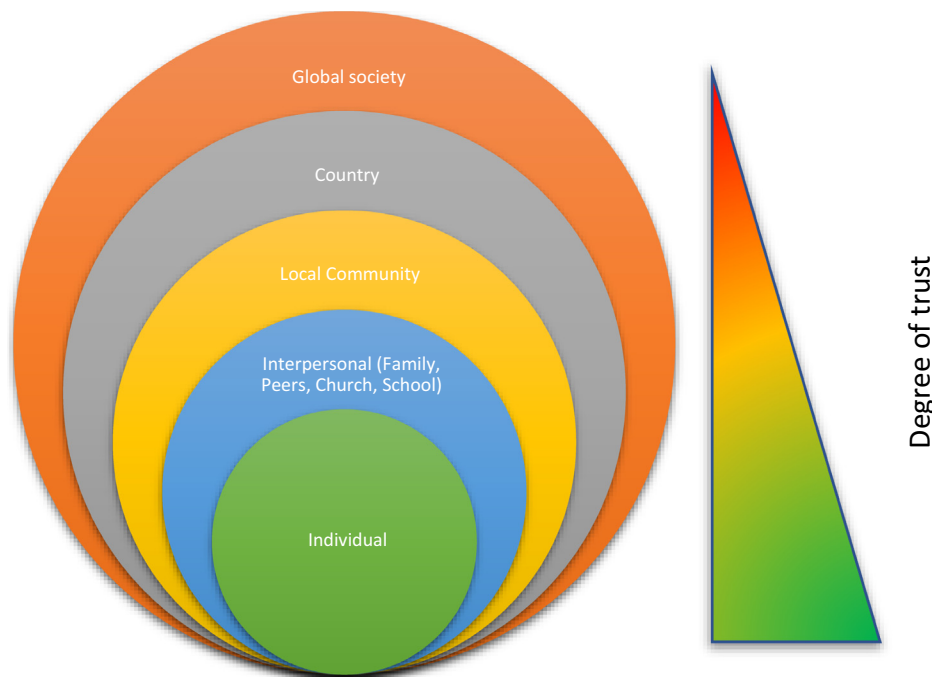


Figure 1. Social-Ecological Model of vaccine confidence and individual trust.

one sees an incrementally declining trustworthiness at each stage away from the individual patient.^{1,3,4} This arm of the project will involve community pharmacy social media vaccine promotion. Community pharmacies will identify a champion who will undergo an online social media marketing certificate course. Subsequently, pharmacies will use their existing or develop new social media platform presence to promote pharmacy-originated positive vaccine messages in a manner consistent culturally with the community they serve (as opposed to curated by the University).

SEM provides a means for understanding the mechanism by which microinfluencers may make use of trusted connections within a patient's social circle (e.g., friends, family, peers), especially when overall trust in larger collections of individuals (e.g., country, society) is waning (Figure 1).¹⁵ The SEM has been used extensively in the field of public health,^{26,27} and specifically in predicting uptake of the H1N1 influenza vaccine in 2009.²⁸ It posits that the interplay between individual, social, and cultural contexts across varying levels can be used to characterize complementary and dynamic interactions between each component. With this context, a microinfluencer intervention aimed at the interpersonal level may more robustly influence knowledge, beliefs, and attitudes.

Community leader outreach and partnership

To further facilitate the interpersonal influence of provaccination messaging, the research team will facilitate pharmacist–influential community member outreach. Pharmacists will partner with trusted community leaders (e.g., religious, business, or other influential community leaders in their local area) who are willing to collaborate with the College and a local pharmacy in promoting the benefit of vaccination. The purpose of this arm of the project will be to expand and

amplify local provaccination messaging to trusted, non–health care community leaders.

Techniques for pharmacist outreach to these community leaders will be rooted in SCT. They will be delivered using a variety of techniques, including social media, based on feedback or guidance provided by each community leader during planned recruitment luncheons or meetings.^{17,29} SCT is a learning-based theory common in education and applicable to patients in this context in that individuals both learn new behaviors and are prompted to engage in previously learned behaviors by observing others model a given behavior.²⁹ Therefore, this intervention arm will be targeted at the SCT construct of “observational learning.” By observing the community leader receiving and promoting a COVID-19 vaccine (both across their social media presence and in normal interactions within the community), an individual may be further encouraged to become vaccinated.

Finally, the College will facilitate coordinated social media messaging of both the community pharmacy and community leader, with the aim being a streamlined message on vaccination that focuses on building a sense of community around COVID-19 vaccination and centered on the pre-existing trust established by both parties.

In-pharmacy vaccination promotion

Finally, traditional in-pharmacy vaccine screenings and recommendations will occur during face-to-face pharmacist–patient interactions. Importantly, pharmacists and pharmacy technicians will first undergo a prior University-developed, evidence-based vaccination communication training program. The training program directs pharmacists to deliver an evidence-based vaccine recommendation technique termed a “presumptive vaccine recommendation.”^{30–33} This technique is both assertive and linguistically restrictive and has been

shown to significantly decrease vaccine hesitancy.^{31,32,34} If vaccination hesitancy is encountered, pharmacists are to document in the patient's record and re-initiate the recommendation at a future encounter, with communication targeted to the patient's assessed "stage of change," using constructs from the transtheoretical model of change (e.g., precontemplation, contemplation, preparation, or action on vaccination recommendation acceptance).³⁵ The details of this intervention and theoretical underpinnings have been published elsewhere.³⁴

The program will aim to recruit 50 practicing pharmacists and pharmacy technicians practicing in independent pharmacies across the state of Tennessee on the basis of the expert consensus of officials at the TDOH and University faculty. Three strategies will be used: (1) hard-copy postcard mailers, (2) direct telephone calling, and (3) email (Table 1). To increase the program's reach to underserved populations, pharmacies identified were ranked on the basis of their proximity to underserved communities by cross-referencing their ZIP code and corresponding social vulnerability index (SVI) score, a measure of the degree to which a community is underserved.³⁵

To account for dropout and loss to follow-up, the research team will over-recruit during the initial enrollment phase with a goal of 100 pharmacies. On reaching the recruitment goal, a visual inspection of each pharmacy's location will be conducted by the research team to ensure adequate representation existed across the state, and the final pharmacy selection will be based on this and the SVI score (Figure 2). A final targeted email to officially enroll pharmacies in the program will then be emailed and include a link to an enrollment survey (Appendix 1). This email will include a more robust description of the program, timeline, and formal enrollment survey. This email will be followed up by a second direct telephone call if no response is received. Researchers will then manually enroll the pharmacy practice site if interest remains over the telephone call.

Evidence-based pharmacist and pharmacy technician training

Once participants are recruited and formally enrolled, all training will commence using a blended learning approach of asynchronous online training and synchronous virtual simulation techniques. Blended learning approaches have a substantial evidence base for health professionals because of their self-paced nature and focus on application.³⁶ Importantly, this approach has been tested and validated by the study team to deliver a vaccine-focused training program to student

pharmacists (owing to COVID-19).³⁴ The training program itself, termed the "Quality Recommendations in Vaccine Hesitancy" program, is an evidence-based training concept developed by College researchers that leverages multiple techniques to improve the odds of pharmacists making more assertive, vaccine-related recommendations to adult patients.³⁴

The program has 3 components: (1) online, self-paced, (2) live simulations, and (3) social media training (Figure 3). The online modules include multiple elements: (1) reviews of disease, epidemiologic, and vaccine guideline information; (2) identifying and managing hesitancy; (3) health behavior theory; (4) communication techniques; (5) online practice cases requiring step-wise problem-solving and management; and (6) social media messaging and vaccination.

Each of the first 4 modules culminates in a series of knowledge- and application-based questions to ensure that trainees are making adequate progress with content tied to the Pharmacist Patient Care Process,³⁷ a framework of evidence-based principles guiding patient encounters. For purposes of the current initiative, the content will focus on COVID-19 vaccination, most of which has already been developed by the University of Tennessee Health Science Center team. Required new content will be developed by the study team that created the original concept (JG, TH, KH).

In addition, to facilitate community leader self-efficacy, materials will be adapted for delivery to nonmedical personnel (i.e., pharmacy technicians) while still requiring the same level of training. The online modules will require approximately 4 hours to complete and will occur concurrently with scheduled, virtual simulation training via a web-based, video conferencing platform. The virtual simulation patient cases use simulated patients to allow pharmacists to practice improvisational techniques to overcome vaccine hesitancy (using data collected by the study team). A total of 3 simulations will be completed respectively after modules 2, 3, and 4. These simulations will consist of a 5-minute prebrief, which includes clarification of expectations and objectives, establishing a "fiction contract" with the learners, providing logistics for the technology (i.e., use of breakout rooms), and stating a commitment to the learners as well as providing the patient case for the encounter.³⁸⁻⁴⁰ The pharmacist's encounter with the simulated patient will last 5 minutes. After the encounter, the pharmacist will have another 5 minutes to document the encounter in a simulated pharmacy management system. A debrief will occur the following week to allow pharmacy faculty time to review the recorded simulated patient

Table 1
Participant recruitment methodology

Outreach method	Source	Quantity	Purpose
Email	College of Pharmacy Office of Continuing Professional Development	11,000 pharmacists and pharmacy technicians	Gauge preliminary interest; program awareness
Mailers	List of pharmacies from state board of pharmacy	~500 pharmacies	First round of recruitment
Telephone	List of pharmacies from state board of pharmacy cross-referenced with social vulnerability index scores	100 pharmacies with highest scores	Second round of recruitment
Targeted email with corresponding survey	Interested pharmacies recruited using methods above	50 pharmacies	Participant enrollment



Figure 2. Map.

encounter. The debrief will be guided by Debriefing with Good Judgement Theory.⁴¹ Participants will then debrief as a group led by College faculty.

After completing the final simulation, program participants and pharmacy-identified community leaders will be enrolled in a third-party, online social media training program (Bootcamp Digital; Cincinnati, OH). The program was selected after a comprehensive review of online social media training programs by the research team based on the amount of time required to complete (7 hours), self-paced learning approach, receipt of a nationally recognized certificate on completion, and basic learner level. In addition to the training, College-facilitated COVID-19 promotional messaging will be made available to pharmacies and community leaders on the basis of ongoing literature reviews and best practices in professional trade journals.

Project implementation

The project is planned to be implemented within 6 months (January 2021 to June 2021) after an initial month of planning by the research team (December 2020) and preceding several months of assessment (July 2021 and beyond). This coincides with the proposed COVID-19 vaccination rollout to phase 1c and beyond. Participant recruitment will take place during the first 2 months of the project. Concurrently, faculty content experts will adapt the Quality Recommendations in Vaccine Hesitancy training program³⁴ for the COVID-19 vaccine. Beginning in the third month and continuing until the end of the sixth month of the program, program rollout will occur at enrolled sites (in-pharmacy promotion, social media messaging, community leader collaboration). Once the program is launched, monthly town hall meetings will be hosted

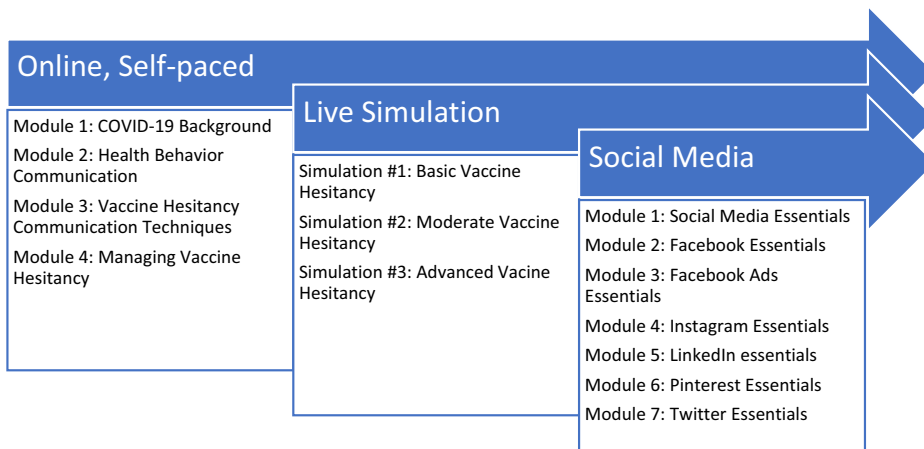


Figure 3. Theory-based coronavirus 2019 (COVID-19) vaccine confidence training program.

by the study team to share best practices, discuss ongoing challenges, reflect on training materials, and build a sense of community across the state among independent community pharmacy owners.

Analysis

Multiple sets of quantitative and qualitative data will be used to assess the quality and effectiveness of the program, requiring multiple faculty directions and input (JG KX, KH, CPR). All involved pharmacists and pharmacy technicians will be asked to document reasons that patients gave for accepting or resisting the recommended vaccine, and a list of those reasons will be populated into REDCap at defined intervals for analysis. Pharmacy participants will complete similar survey instruments before (baseline) and after their assigned training elements, as well as a follow-up instrument 6 months after all training is completed. The survey will be based on a previously published instrument^{8,9} and include the following instruments (point of administration): (1) participants' self-efficacy (baseline, after each training element, and follow-up); (2) implementation climate (baseline); (3) participants' vaccine-related beliefs and attitudes (baseline, after each training element, and follow-up); and participants' demographics (baseline). To assess participants' performance and documentation during the simulated patient encounters, a standardized rubric has been developed and validated in a previous study.⁴⁰ Internal structure validity and interrater reliability will be calculated. All participant documentation required as part of the training will be collected and analyzed using the same rubric employed in the original pilot program. Two faculty members will rate each pharmacist's performance using the rubric. The Unified Validity framework will be used to report validity results.^{39,40} Survey data related to implementation assessment (pharmacist-provided) will be analyzed quantitatively using descriptive and inferential statistics, including across-group comparisons using chi-square tests and changes in self-efficacy using Mann-Whitney *U* and chi-square tests. Feasibility, appropriateness, and acceptability measures will be compared with data on program penetration and analyzed for correlations. For qualitative data analysis, a thematic analysis will be performed on interviews conducted by trained qualitative researcher at the University with participating pharmacies. Finally, counts of all targeted vaccines will be compared with previous years' values as well as possibly counts of vaccines given by peer pharmacies across the state. Specifically, each participating location will provide counts of their influenza vaccinations given during the defined observation period and during the exact same time frame from the previous calendar year to allow the research team to explore any correlations between influenza and COVID-19 vaccination delivery. For COVID-19, pharmacy-level counts will be provided by each pharmacy and compared against untrained locations using data provided by the state's vaccine registry.

Social media outcomes will also be assessed to measure the impact of the microinfluencer social media training. Baseline and postintervention use of social media platforms will be assessed quantitatively, including types of platforms, number of posts per month, changes in post frequency,

changes in post content, changes in followers, and changes in follower interactions. In addition, social media handles will be recorded from which to abstract user interactions (e.g., comments, posts) for qualitative thematic analysis in NVivo.

Discussion

To the authors' knowledge, this is the first study to advance a social media intervention that positions pharmacists as microinfluencers to curb COVID-19-related vaccine hesitancy. This approach is distinct from traditional, established influencer campaigns, such as celebrity endorsements or governmental authorities.¹⁹

Pharmacists are already highly trusted by the public⁴² and have served as influential leaders of their communities for well over a century. However, in an era of increased online transactions and digital presence, one might argue that their historically firm position as a community influencer has been significantly reduced. Health professionals' use of social media has lagged behind many industries, likely because they are less reliant on the need for an advertisement to maintain a customer or patient base. Unfortunately, a consequence of their slower adoption means that voices contrary to evidence-based health care (i.e., antivaccine messages) have been able to communicate a one-sided argument without substantial opposition from influential people who have content expertise and may sway public opinion. A pharmacist microinfluencer social media presence may not eliminate antivaccination messages, but what it can do is provide both sides of the argument in a logical and culturally customized manner, which gives those on social media the chance to weigh both sides of the argument as they form their opinion.

A small but growing literature base supports the idea of health care providers as social media influencers.¹⁹ This is critical as evidence also demonstrates that false information spreads more rapidly than truth.⁴³ In 2019, only 36% of Americans surveyed trusted the medical system to a great deal.⁴⁴ Only about half of Americans (55%) believe that scientists will act in the best interest of the public.⁴⁵ One study found that individuals hold a similar level of trust of social media influencers as they do family and friends.⁴⁶ Moreover, studies have demonstrated that social media influencer messaging and product promotion are more organic, authentic, and credible than messages purveyed by larger institutions or corporations^{47,48} There is a critical point here that health care providers and researchers should note: the public values authenticity over polish and perfection. This may present a challenge for health care research and practice where excellence is pursued to the highest degree, and authenticity may be viewed as sloppiness. It may be surmised that the public values a sterile environment for care provision but a real environment—like one's own—to build rapport and trust.

Conclusion

Public trust in major institutions has continued to wane over the past decade, creating a substantial obstacle for public health efforts, especially regarding vaccinations.

Novel, theory-based, and innovative approaches will be necessary to improve vaccine confidence. One such approach to promoting public health efforts, derived from the SEM, may be to use trusted microinfluencers on social media platforms, such as local community pharmacists and community leaders.

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Social Media microinfluencer intervention to reduce COVID-19 vaccine hesitancy

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Appendix 1

COVID19 Vaccine Training Program Enrollment Survey

I confirm my willingness to enroll in the University of Tennessee/State of Tennessee Department of Health Improving COVID-19 Vaccination for Underserved Populations Program

1. Yes, please enroll me
2. No, I do not wish to enroll at this time

Please enter the name of your pharmacy
Please enter your pharmacy's zip code.

CHAMPION IDENTIFICATION: A "Champion" is an "individual on a pharmacy team who will dedicate themselves to supporting, marketing, and driving a new service and overcoming indifference or resistance to its implementation." A requirement of participation is the identification of TWO (2) Champions at your pharmacy who will lead this project. One champion should be a pharmacist and the other should be a technician.

First Name
Last Name
Phone
Email Address
Role: Pharmacist or Technician
First Name
Last Name
Phone
Email Address
Role: Pharmacist or Technician

A program requirement is working collaboratively with an influential member of your local community (e.g., church leader, public figure) to promote the vaccination. Please describe below who in your community you would feel would make a good partner to improve vaccine acceptance among your community members.

A core component of this program is the use of social media to influence and educate your community on vaccinations. Please answer the following questions about your pharmacy's CURRENT use of Social Media:

Which social media platforms does your pharmacy have currently (select none if you do not use any social media platforms)?

1. Twitter
2. Facebook
3. Instagram
4. YouTube
5. LinkedIn
6. Other

What is your Twitter handle? (Leave blank if none)
What is your Facebook handle? (Leave blank if none)
What is your Instagram handle? (Leave blank if none)
What is your YouTube handle? (Leave blank if none)
What are your other social media platforms (List all and leave blank if none)
What is/are your other social media types and handles? (Leave blank if none)

How many posts per MONTH do you have for each of these social media accounts? (If none, please select "0")

Twitter	<input type="checkbox"/>
Instagram	<input type="checkbox"/>
Facebook	<input type="checkbox"/>
YouTube	<input type="checkbox"/>
Other 1	<input type="checkbox"/>
Other 2	<input type="checkbox"/>

How many FOLLOWERS do you have for each of these social media accounts? (If none please select "0")

Twitter	<input type="checkbox"/>
Instagram	<input type="checkbox"/>
Facebook	<input type="checkbox"/>
YouTube	<input type="checkbox"/>
Other 1	<input type="checkbox"/>
Other 2	<input type="checkbox"/>