A Translational Case Study of a Multisite COVID-19 Public Health Intervention Across Sequenced Research Trials: Embedding Implementation in a Community Engagement Phased Framework

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Through a COVID-19 public health intervention implemented across sequenced research trials, we present a community engagement phased framework that embeds intervention implementation: (1) consultation and preparation, (2) collaboration and implementation, and (3) partnership and sustainment. Intervention effects included mitigation of psychological distress and a 0.28 increase in the Latinx population tested for SARS-CoV-2. We summarize community engagement activities and implementation strategies that took place across the trials to illustrate the value of the framework for public health practice and research. (*Am J Public Health*. 2024;114(S5):S396–S401. https://doi.org/10.2105/AJPH.2024.307669)

INTERVENTION AND IMPLEMENTATION

We illustrate the application of a Community Engagement (CE) framework with a COVID-19 public health intervention implemented in 2-sequenced trials funded by the National Institutes of Health's Rapid Acceleration of Diagnostics–Underserved Populations (RADx-UP).[1] The overarching goal of the NIH-funded intervention trials was to contribute to the scientific literature on public health interventions aiming to mitigate health disparities experienced by the Latinx population, with a focus on increasing SARS-CoV-2 testing. Latinxs are individuals with common heritage from Latin American countries.[2,3] Community-engaged public health interventions were vital to reach *all* segments of the population, inclusive of racial and ethnic minorities, who fared worse than non-Latinx White individuals in COVID-19 infections and their health consequences in the United States and in Oregon.[4,5]

We use a translational case study approach[6] to examine the evolution of an intervention aimed to increase SARS-CoV-2 testing and COVID-19 preventive behaviors among Latinx populations in Oregon, from its development, implementation in the community, and revision across research trials. The proposed CE framework is operative alongside existing CE theories,[7] evaluation models, and empirical work to operationalize CE activities.[8] Although the scientific literature on CE and intervention implementation has grown, and intersections between them exist, to our knowledge, there is no published framework that integrates implementation across the entire spectrum of CE. We address this gap with an introductory illustration of how CE can be integrated with intervention

implementation phases[9] and discrete implementation strategies[10] that are empirically linked with implementation success.

PLACE, TIME, AND PERSONS

The foci of the public health intervention delivered in trials 1 and 2 were: (1) on-site SARS-CoV-2 testing, and (2) a health promotion intervention, *Promotores de Salud* ("health promoters") that comprised culturally and trauma-informed community outreach prior to testing events, as well as COVID-19 health education promoting social distancing, mask wearing, hand washing, repeated testing, and vaccination during testing events. *Promotores* drawn from local communities conducted outreach—building relationships and advertising events—and delivered the intervention.[11]

Trial 1 included the development, implementation, and cluster randomized trial evaluation of the intervention offered in 36 testing sites that were geographically dispersed across the state, encompassing urban, rural, and frontier areas. Sites were geolocated to be in high-density Latinx population regions[12] and randomized to intervention versus comparator study arms prior to trial 1 enrollment, which began in February 2021 and continued through August 2022. Trial 2 evaluated the comparative effectiveness on engagement in SARS-CoV-2 testing between 2 types of intervention site-events: (1) trial 1 geolocated sites, versus (2) site-events identified by community or governmental organizations (e.g., Mexican Consulate, Oregon Health Authority). Trial 2 commenced in September 2021 and completed enrollment in April 2023. Importantly, the public health guidance was updated to prioritize vaccination as a leading COVID-19 prevention strategy because vaccinations were already available.

PURPOSE

To advance public health intervention research to mitigate health disparities, such as the disproportionate COVID-19 cases among the Latinx population, this article highlights the value of integrating Implementation Science phased-frameworks and strategies in community-engaged public health practice and research with a translational perspective.

EVALUATION AND ADVERSE EFFECTS

Across trials 1 and 2, 6,106 individuals were tested and 974 individuals received the intervention. Results of trial 1 attest to the effectiveness of outreach to the Latinx population. Relative to comparator sites, 3.8 times more Latinx individuals attended testing events at intervention sites, representing a 0.28 increase in the proportion of the Latinx population tested.[13] The *Promotores de Salud* intervention did not significantly increase COVID-19 preventive behaviors. However, accounting for baseline distress, participants who received the intervention reported lower psychological distress at follow-up than individuals who did not ($d = 0.15$).[14] This is notable because psychological distress was heightened during the pandemic and contributed to worse COVID-19 prognoses. Evaluation of trial 2 (under review) suggested that geolocated sites had more tests collected in the context of longer drive times ($d = .23$) and had more tests in communities with higher density Latinx population ($d = 0.29$) than partner-located sites. To date there have been no adverse events.

Community Engagement and Implementation Phased-Framework

Drawing on the *Clinical and Translational Clinical Science Awards*' CE continuum,[15] we present a framework to examine the trials within three sequenced phases: (1) community consultation and involvement, (2) collaboration with community, and (3) partnership with community (see Figure 1). CE is defined as "the process of working collaboratively with groups of people who are affiliated by geographic proximity, special interest, or similar situations with respect to issues affecting their well-being".[15] The roles and relationships of community groups with implementation research teams progress from limited consultations as a starting point in a continuum (phase 1), to partnerships with shared leadership and decision making as a goal (phase 3); collaborative relationships with two-way communication and mutual benefits are a pivotal link between them (phase 2).

The framework postulates that each CE phase can align closely with both intervention *implementation phases*[9] and corresponding *implementation strategies*.[10] Moreover, each subsequent phase signifies progress in both CE and intervention implementation relative to the prior phase (see Figure 1). Illustratively, initial consultation with community groups corresponds to initial *exploration* and *preparation* for intervention development, with implementation strategies such as *planning* and *information sharing* (phase 1). Community consultation evolves into collaborations, as intervention progresses to *initial adoption (implementation)* with implementation

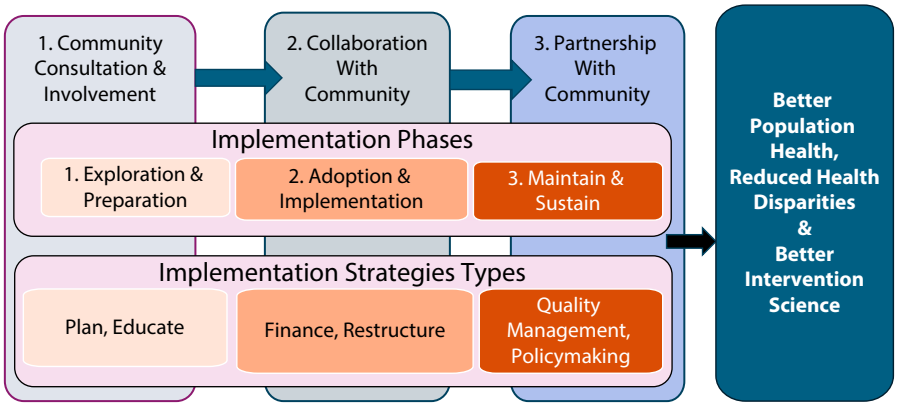

FIGURE 1— **Three-phase Community Engagement Framework Integrating Intervention Implementation**

strategies such as *restructuring* of workflows (phase 2). In collaborations or partnerships with community, interventions are more likely to enter *maintenance* and *long-term sustainment* (phase 3) with implementation strategies such as *adjustment of the financing* of the intervention, *quality management,* and *attending to policy contexts*.[10]

Community Engagement and Implementation

Consistent with phase 1, during trial 1, preparation included the formation of teams specializing in community engagement and implementation science. A multidisciplinary environment representing biological, behavioral, public health, and data sciences energized scientific investigators and staff. Initial consultation and involvement with community across state, regional and local levels was expedited by the COVID-19 health crisis; working groups including researchers, community groups, and stakeholders, quickly coalesced. Community advisories were also formed. Notably, there was robust representation of individuals who belong to - and with expertise of - Latinx populations. Hence, it was possible to expedite input from community members to make research and intervention materials, inclusive of *promotores de salud*, culturally and linguistically appropriate, as well as to optimize community sites to reach Latinx populations following initial geolocation. With accelerated funding, implementation timetables for intervention development and initial implementation were expedited, thus exploration and preparation implementation phases were abbreviated. (See Box 1 for illustrative CE activities, implementation strategies, and challenges).

Consistent with transitioning to phase 2, ongoing communication and coordination of the SARS-CoV-2 testing events at local community sites took place among research implementers, state and regional health departments, community groups, and stakeholders. The implementation team and the Oregon Health Authority procured contracts to offer testing, vaccination, and COVID-19 health promotion to specific populations in the state, outside of these research trials. Collaboration shaped trial 2's comparative effectiveness design. Ongoing consultation with the community advisory, state health officials, and community-based organizations resulted in the production of the most current and appropriate health guidance during each stage of the pandemic, inclusive of prioritization of vaccinations when they became available. Updating recommendations also facilitated ongoing cultural and linguistic responsiveness in health promotion messaging. Notably, Latinx staff and Latinx subject matter expertise were maintained despite overall workflow changes and staff turnover.

SCALABILITY

The sustainment of an intervention delivered across multiple state region sites focused on increasing SARS-CoV-2 testing and mitigating its spread through preventive behaviors is no longer an optimal public health goal because the end of the public health emergency shifted COVID-19 priorities. However, the intervention was sustained beyond the time and goals of trial 1 so that it would promote vaccination and evaluate community versus geolocated sites in trial 2. A third research trial was funded to promote

BOX 1— Illustrative Examples of Community Engagement Activities and of Implementation Strategies in Research Trials 1 and 2 That Correspond to Phases 1 and 2 of the Community Engagement and Intervention Implementation Phased Framework

Phase 1: Community Consultation and Involvement (Exploration & Preparation; Research Trial 1)	Phase 2: Collaboration With Community (Initial Adoption-Implementation; Research Trials 1 and 2)
Illustrative Community Engagement Activities	
• Formed Community Engagement & Implementation Science scientific teams • Hired research staff who focused on community outreach and engagement • Information regarding research trial disseminated to stakeholders and community groups • Communication initiated to outreach to community groups in Latinx community locations • Initial relationship and involvement of key community groups and stakeholders established (e.g., community-based organizations, local and state health authorities) • Community Advisories formed with diverse representation of Latinx ethnic national heritage, gender, age, state region, and expertise in research, public health, and human services with bilingual Latinx populations.	• Continuous involvement of community groups in initial adoption and further implementation of intervention (e.g., coordination of testing events, ongoing consultation with advisory boards in regularly scheduled meetings) • Collaboration, with two-way communication, with stakeholders at state, regional and local levels, to coordinate testing events in 36 sites across the state • Collaboration with stakeholders and community groups to design Research trial 2's comparative effectiveness to test select trial 1 geolocated sites versus testing locations identified by community stakeholders
Illustrative Discrete Implementation Strategies	
Planning: • Identified public health intervention sites via geomapping of high density Latinx locations and included community input prior to finalization of sites • Drafted research, and institutional review board protocols, as well as community facing materials, inclusive of community input regarding cultural and linguistic appropriateness to Latinx population. Educating: • Developed materials to disseminate information (publicize) testing events with intervention • Developed initial set of community-and research participant-facing materials focused on pandemic preventive behaviors Initiating Leadership and Relationships: • Identified individuals to manage and lead teams and community engagement, with representativeness of—and or expertise with—Latinx population • Developed relationships with individuals and organizations that would "champion" the intervention locally	• With ongoing guidance from advisory boards, continuous updating (revisions) of detailed public health emergency, while maintaining focus on preventive behaviors and cultural and linguistic responsiveness to Latinx population • Maintaining cultural and linguistic responsiveness through representation of Latinx expertise and population across different organizational levels and units while updating teams due to staff turnover • Adjusting contracts and financial agreements while maintaining representativeness of Latinx population and expertise • In Research trial 2 site locations were adjusted in a manner consistent with decreasing demand for SARS-CoV-2 testing; however, overall robust enrollment of Latinx research participants was maintained by restructuring research design and implementation workplans. • Culturally and linguistically responsive modification of COVID-19 health promotion intervention to prioritize vaccination, while maintaining focus on SARS-CoV-2 testing, and additional preventive behaviors • Ongoing implementation monitoring of health promotion intervention with team of *Promotores* (health workers) who, as a group, remained Latinx and Spanish speaking bicultural and bilingual
Illustrative Challenges	
• High investment in mitigating COVID-19 impact by community at-large resulted in high volume of input from multiple lines of communication • Balancing responsiveness of community to pandemic and input provided while maintaining fidelity to research instruments and protocols • Meeting the accelerated timelines for implementation while developing relationships with multiple community groups • Variability in levels of readiness to uptake the intervention across the multiple sites selected for activation in the trial	• Managing dynamic context of frequent updates to public health guidance and sources in tandem with the different messages and sources received by Latinx community individuals • Balancing the deimplementation of sites across Research Trials, while maintaining public health responsiveness and collaboration with community groups across all local sites

Note. SARS-CoV-2 = severe-acute-respiratory-syndrome-related coronavirus 2.

self-administered SARS-CoV-2 testing and to address the high level of psychological distress in Latinx community observed in the prior trials. Trial 3 commenced in November 2022 and is in progress.

PUBLIC HEALTH SIGNIFICANCE

The success of the intervention developed and maintained across sequenced NIH-research trials is evidenced in the significant and notable increase in SARS-CoV-2 testing and in the amelioration of psychological distress among Latinxs across multiple state regions and sites. These findings are consistent with mounting evidence of the effectiveness

of CE in reducing health disparities.[7] We introduce a phase-based framework that aligns both community engagement and intervention implementation progress in spectrums culminating in partnerships with, and sustainable interventions in, the community; we illustrate its application with a translational case study of the research trials. The two-pronged focus on community engagement and intervention implementation is a promising approach to embed community feedback and to collaborate and partner with the community to develop, implement, and sustain effective, feasible, and scalable public health interventions in community settings with high population reach, inclusive of populations with disproportionately adverse health outcomes such as Latinxs in the COVID-19 pandemic. AJPH

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

HUMAN PARTICIPANT PROTECTION

All study activities were approved by the University of Oregon institutional review board. All study participants provided written or digital informed consent.

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