



Environmental Scan - Version 2.0

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May 10, 2022

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PANDEMIC Promising Practices

At this time, the University of Florida PANDEMIC 2113 Program (Program to Address National Disparities in Ethnic and Minority Impact from COVID-19) has selected ten Promising Practices that focus on the equitable distribution and administration of COVID-19 and Influenza vaccines; they are described in Figure 1.

Figure 1: Ten PANDEMIC Promising Practices



The selected Promising Practices address factors at multiple levels, including the environmental, community and clinical, interpersonal, and individual levels. These Promising Practices have been implemented across all the sites of the program (Figure 2). Site selection criteria information can be found on Appendix 1.

Figure 2. Project areas served by PANDEMIC institutions



Table 1 describes the Promising Practices by level of intervention.

Table 1. PANDEMIC Initiatives

Levels of Intervention	Promising practice
Environmental	
HealthStreet	1
Incentives	10
Ethnic and racial minoritized populations	1, 2 and 3
Community /clinical	
Farmers	6
LGBTQ+ community	6
Pregnant Persons	6
Our Community Our Health	8
Mobile Health Vehicles	1 and 3
Arts in Medicine Programs	7
Emergency Department Initiative	TBA
Interpersonal	
Partner with local partners (CBOs and Agencies)	1, 5, 6, 7 and 8
Individual	
Survey of Perceptions	4
Social media	7
Focus groups	4

To be consistent with the principle of *balance of power* guiding our program and to attend to the changing and unique needs of the communities we are serving, we are always encouraging sites and communities within those sites to suggest new Promising Practices for the program. We have designed a form for this purpose which is included in Appendix 2.

Implementation Framework

The HealthStreet Model and The Strategic Partnership framework were used to guide the implementation of the selected Promising Practices. Each of these frameworks will be explained in detail in the following section. The framework guiding the selected Promising Practices is presented in Table 2.

Table 2. Frameworks guiding the PANDEMIC Promising Practices

Framework	Promising practice
HealthStreet Model	1, 3, 4, 5, 6, 8 and 10
Strategic partnership framework	1, 2, 3, 4, 5, 6, 7, 8, 9 and 10

The HealthStreet Model

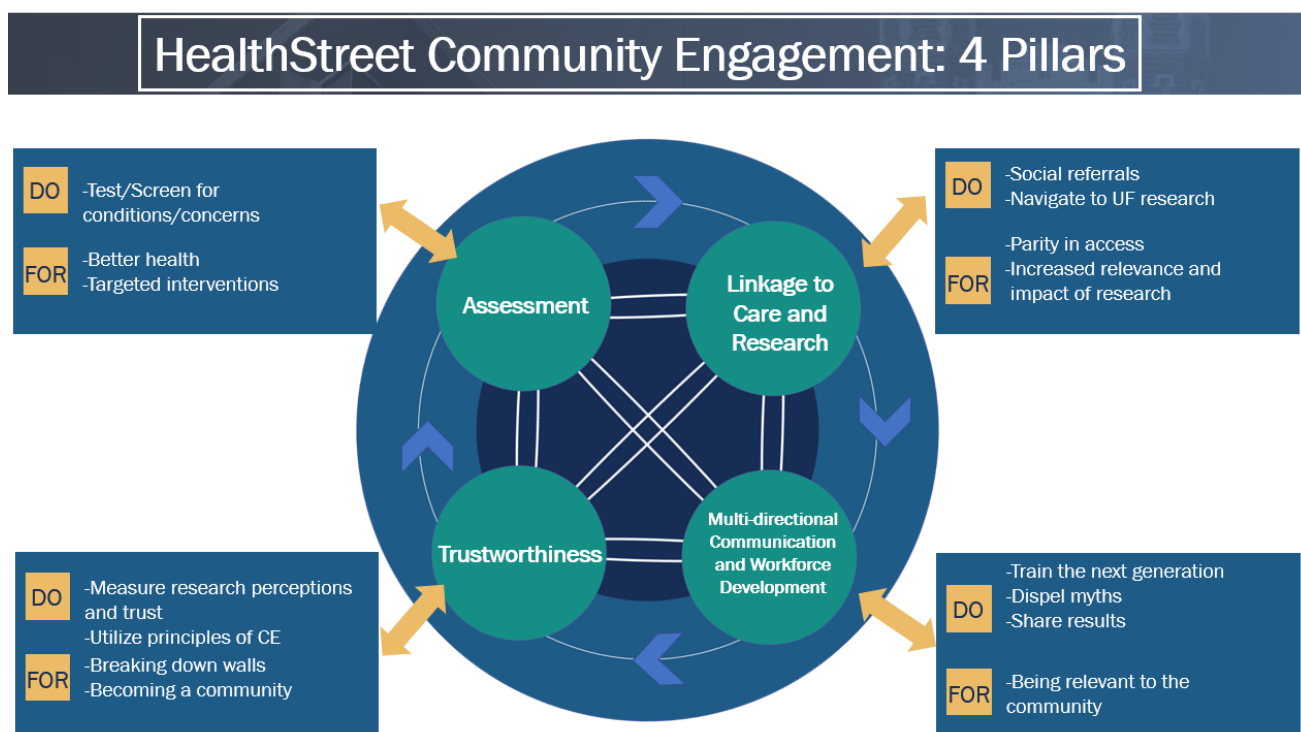
The **HealthStreet Model** is a peer-reviewed and sustainable community engagement model with a mission to reduce disparities and improve the health of our community by bridging gaps in health care and health research. Trust is a central value of this model, that is promoted by maintaining a sustainable and long-lasting presence in the community. The HealthStreet model is built on a framework of four pillars (*Figure 3*): (i) The **assessment of needs and concerns** from community members themselves, (ii) The **linkage of community members to medical and social services and opportunities to participate in research** based on their needs and concerns, (iii) The fostering of **multidirectional communication** and (iv) and the **building of trust**.

Community Health Workers (CHW) are the backbone of the UF HealthStreet model, who interact on a daily basis with members from underserved communities to assess their needs, understand their perceptions of research and trust in research, and offer tailored medical and social service referrals. CHWs can effectively deliver health information and education, help people better manage chronic illnesses, increase screening and diagnosis, shorten time from diagnosis to treatment, and improve access to care. To date, the UF HealthStreet cohort is 12,700 people; 60% of whom are minoritized or underserved communities.

Every one of our subrecipients is a Clinical and Translational Science Award Hub funded by NCATS, which facilitates the implementation of the proposed strategies, because of the wealth of resources and infrastructure available. Our CHWs and other trusted community partners have strong ties to their communities. They leverage existing local channels that facilitate the understanding of local challenges and opportunities and influence decision-making processes

in the community. These channels include community and faith leaders, teachers, sports and youth clubs, neighborhood organizations, and online communities and networks.

Figure 3: HealthStreet 4 Pillars



Establishing trust and being trustworthy is accomplished through assessing people's needs and concerns, providing them relevant referrals, and disseminating information that is culturally relevant and appropriate for their health literacy skills. We are also providing up-to-date science-based information to help community members make informed decisions about getting vaccinated for COVID-19, Influenza or other communicable diseases. Dissemination of health information is achieved through social media and Our Community, Our Health (OCOH) -- a national town hall that facilitates multidirectional communication between community members and researchers. UF HealthStreet also participates in and organizes health and wellness events and promotes the training and participation of community members in activities that increase the understanding of social inequalities through the C.A.M.E.O program.

The Strategic Partnership Framework

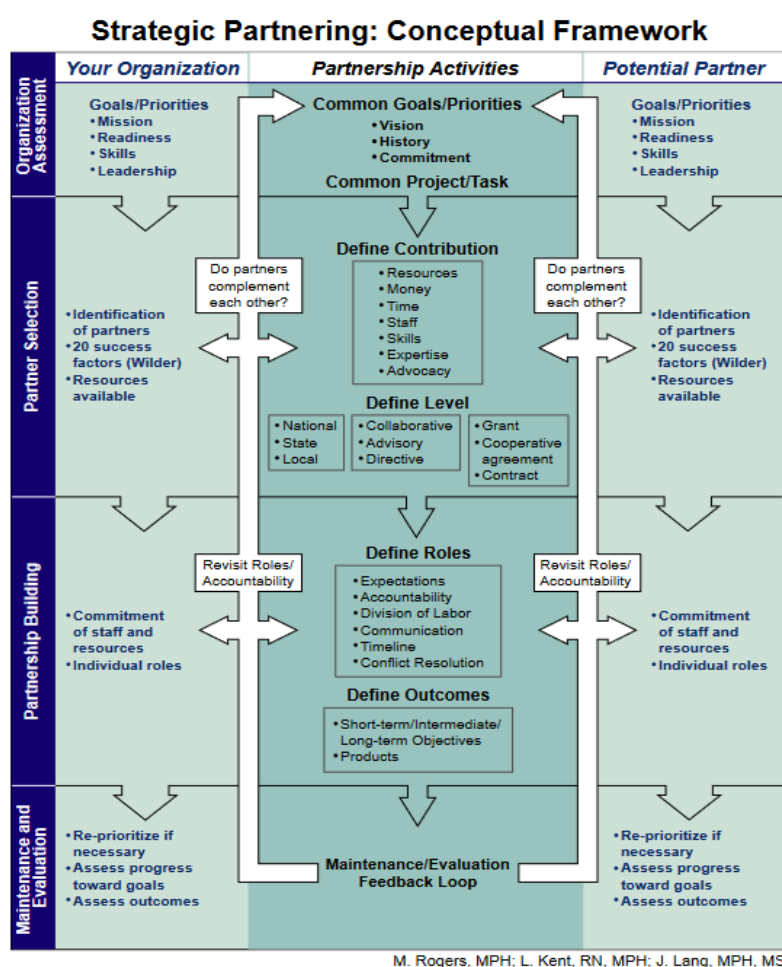
The ten PANDEMIC Promising Practices were selected with the understanding that effective promotion of vaccination and reduction of health disparities requires academic and community-based expertise and involvement from a variety of disciplines and stakeholders. During decades of partnership with the community and other stakeholders we have learned that public health interventions are most successful and sustainable when those interventions align with goals of strategic partners. In addition, strategic partnerships increase the number of advocates and broaden the audience that can be reached. Although this framework is intended to guide the process of forming strategic partnerships in public health, it is also appropriate when a well-established partnership exists. The roles and goals may need to be revisited and reevaluated for the development of a new project.

The PANDEMIC program leverages existing networks (Clinical and Translational Science Award - CTSA hubs and the Cooperative Extension Programs – CEP) to increase the participation of diverse racial and ethnic minority populations and underserved populations based on other socio-demographic and social determinants of health. Historically, the CTSA hubs and CEP have developed programs and public health interventions that prioritize the inclusion of underserved and disenfranchised populations. The assembled team has had decades of experience working with communities, community advisory boards, stakeholders, and investigators. These efforts have shaped research being conducted in communities, contributed to obtaining funding for issues that align with stakeholder priorities, promoted the delivery of interventions, shaped policy, and created and refined diagnostic and other structured instruments for assessment of health outcomes. The CEP regularly convenes local program advisory committees to determine areas of concern and discuss, test, and refine strategies for appropriate interventions to address those concerns.

For the PANDEMIC program, our networks continue to share their expertise and resources with existing strategic partners and invite new partners as the pandemic evolves and new needs are identified. For example, for Promising Practices2 --Promoting Health Equity Through the Cooperative Extension County Educator Model-- our sites have extensive experience working with county agents over decades, and have been and will continue to be involved in developing COVID-19 control initiatives together with these partners. For Promising Practice 3 – Bringing Services and Vaccines to People Where They Are -- our activities integrate the HealthStreet model and the Strategic Partnership Framework with the aim to mobilize community health workers to underserved areas through Mobile Health Vehicles.

After conducting OCOH meetings with all partners to discuss the purpose, approaches, activities, and deliverables of the PANDEMIC program, and evaluating the existing literature we have been able to refine the initiatives originally proposed. New strategic partnerships have developed as a result of our extensive communication with the community. Specifically, we have been approached by the YMCA, UF Health Emergency Departments, and the ARC Group Home to promote COVID-19 testing and vaccinations for the communities they serve. Partnership activities within the Strategic Partnership Framework will be continuously evaluated for existent and new partners and updated as new priorities and opportunities are presented (Fig 4).

Figure 4. Phases of the Strategic Partnership Framework



Rogers M, Kent L, Lang. Strategic Partnering: A Guide to the Conceptual Framework. Available at https://www.cdc.gov/dhdspl/programs/spha/roadmap/docs/strategic-partnering-conceptual-framework_ac.pdf

Promising Practice 1: Building Trust Through the HealthStreet Community Engagement Model

What is it? The HealthStreet Model is a community engagement model built on community health workers who assess, link, share knowledge and perceptions and build trust in the community. It directly begins with the individual, but also partners with agencies, providers, and organizations to ensure the input of community members. For the PANDEMIC program, we are leveraging existing local channels that facilitate the understanding of challenges and opportunities and influence decision-making processes in the community, such as community and faith leaders, teachers, sports and youth clubs, and online communities and networks. We are assessing people's needs and concerns related to the COVID-19 and Influenza vaccines, giving them relevant referrals, and disseminating culturally relevant and health literate information to answer their questions. We are also providing up-to-date science-based information to help community members make informed decisions about getting vaccinated for COVID-19 or Influenza. We track all efforts of this program.

Who? Community Health Workers at all sites (University of California - Davis, Washington University, University of Missouri, University of Kentucky, University of Minnesota, Montefiore Medical Center/Einstein – The Bronx, Florida State University, and University of Florida)

Evidence from the literature supporting this Promising Practice:

Successful vaccine roll-out will only be achieved by ensuring effective community engagement, building local vaccine acceptability and confidence, and overcoming cultural, socioeconomic, and political barriers that lead to mistrust and hinder uptake of vaccines.¹ Bidirectional interactions comprise the foundation of Community Engagement (CE), which requires trusted partnerships that sustain communication through a series of activities and goals.² The nimble responses to the pandemic substantiate the need for CE programs to maintain the infrastructure necessary to achieve the primary goals of improving health within and across communities and localities as well as expanding research participation of community members.² Bottom-up approaches start with the community to identify problems, get the community involved in iterative conversations to develop solutions for their problems, and engage them in the performance of research. Multi-directional commitment, flexibility, and power sharing are keys to success. These collaborative approaches have resulted in greater increases in child immunizations and HIV testing of women.³ A rapid evidence synthesis of 32 studies during other epidemics and outbreaks suggest that community engagement may be specifically appropriate and needed for complex contexts, such as humanitarian settings serving migrants or urban informal settlements. Community engagement is also needed to

address more complex situations, such as settings dealing with both COVID-19 and risk of hunger or for supporting already overburdened health system.⁴

The HealthStreet model has been successful at giving over 30,000 referrals to community members, linking people to medical and social services such as food pantries, dental care, mental health visits and others. CHWs perform blood pressure checks on all members and listen to health concerns every day, then act upon them. In addition, due to the increased rate of overdose from opioids, they have been distributing Narcan to communities at risk.

1. Burgess RA, Osborne RH, Yongabi KA, Greenhalgh T, Gurdasani D, Kang G, Falade AG, Odone A, Busse R, Martin-Moreno JM, Reicher S, McKee M. The COVID-19 vaccines rush: participatory community engagement matters more than ever. *Lancet*. 2021 Jan 2;397(10268):8-10. doi: 10.1016/S0140-6736(20)32642-8. Epub 2020 Dec 10. PMID: 33308484; PMCID: PMC7832461.
2. Eder MM, Millay TA, Cottler LB. A compendium of community engagement responses to the COVID-19 pandemic. *J Clin Transl Sci*. 2021 Jun 14;5(1): e133. doi: 10.1017/cts.2021.800. PMID: 34367677; PMCID: PMC8326670
3. Karris MY, Dubé K, Moore AA. What lessons it might teach us? Community engagement in HIV research. *Curr Opin HIV AIDS*. 2020 Mar;15(2):142-149. doi: 10.1097/COH.0000000000000605. PMID: 31895141; PMCID: PMC7374765.
4. Gilmore B, Ndejjo R, Tchetchia A, de Claro V, Mago E, Diallo AA, Lopes C, Bhattacharyya S. Community engagement for COVID-19 prevention and control: a rapid evidence synthesis. *BMJ Glob Health*. 2020 Oct;5(10): e003188. DOI: 10.1136/bmjgh-2020-003188 PMID: 33051285; PMCID: PMC7554411.

The HealthStreet Need Assessment Questionnaire and additional studies supporting Promising Practice 1 are included in Appendix 3 and Appendix 4, respectively.

Promising Practice 2: Promoting Health Equity Through the Cooperative Extension County Educator Model

What is it? The Cooperative Extension System (CES) is a federal, state, and county partnership that operates through the nation's Land-Grant University System. CES is the translational science arm for all Land Grant Universities with a mission to extend the knowledge of the campus to the residents of the state. Each state has one or more Land-Grant universities, and the CES has long-standing relationships with traditionally rural and agricultural communities. For Promising Practice 2, we have included several Cooperative Extension state systems in our PANDEMIC grant.

CES is a nationwide organization with an office in or near most of the 3,000 counties in the United States. County Extension Agents are locally-based educators who assess and respond to community needs such as providing direct education to consumers, connecting communities and community members to resources, and building community's capacity to address local health needs. For the PANDEMIC program, we are leveraging CES infrastructure, such as community relationships and existing educational programs, to strengthen COVID-19 vaccination efforts among traditionally agricultural and rural communities across the country, with a special emphasis on racial and ethnic minority populations. Ten Extension District Immunization Leads in Florida are helping to collaborate with existing program events or creating new events through faith-based (or other) partnerships to promote whole health education including preventive actions like vaccination. CES works with HealthStreet or other providers as needed to have COVID-19, Influenza, Shingles, Pneumonia vaccines available at these events. Additionally, farmworker safety events which can include immunization along with sun safety programming will continue to be organized.

Who: University of Florida, with support from Florida State University. Other states CES systems are participating with their CTSA partner: University of California - Davis, Washington University, University of Missouri, University of Kentucky, University of Minnesota, Montefiore Medical Center/Einstein – The Bronx

Evidence from the literature supporting this Promising Practice:

Evidence regarding the role and needs of County Extension Agents and agricultural communities during the COVID-19 pandemic suggest that there was a disconnect between the experiences of farmers/employers and farmworkers in relation to COVID-19 prevention at the worksite, including the implementation of public health control measures, such as social distancing, and conflicting guidelines between local, state, and federal authorities.¹ Elements of

success of COVID-19 control included rapid personalized communication with a wide range of agricultural stake-holders, an actively engaged External Advisory Board, the development of industry-specific resources and information, recurring and iterative engagement with stakeholders as new COVID-19 information emerged and resources were developed.¹

Studies examining prior vaccine interventions among agricultural communities highlight the need to look for partners outside of the traditional health care setting to reach underserved populations.² The studies also highlight the need to explore ways to support mental health issues among extension workers and the communities they serve, as they commonly are among the first responders to farm workers and their families and sometimes provide mental health first aid for depression, anxiety, chronic fatigue, and suicide.³ Studies focused on agricultural communities emphasized that vaccine uptake interventions are generally not theory-based interventions. Cultural adaptations, if adopted, have insufficient in-depth understanding of the population's cultural characteristics.⁴ Analyses of the COVID-19 literature for this group suggests that there is an urgent need for a comprehensive national strategy that includes access to care and paid sick leave for migrant workers and their families.⁵ Pandemic-related changes to primary care delivery should be considered permanent solutions to decrease health disparities in this population group (e.g., mobile vaccination clinics, regular education programs with community workers).^{5,6} Genomic surveillance within the networks of migrant farmworkers has been proposed as a key strategy to mitigate the impact of the pandemic in this population group and examine the spread of new variants.⁶

1. Riden HE, Schilli K, Pinkerton KE. Rapid Response to COVID-19 in Agriculture: A Model for Future Crises. *J Agromedicine*. 2020 Oct;25(4):392-395. doi: 10.1080/1059924X.2020.1815618. Epub 2020 Sep 8. PMID: 32896229.
2. Furgurson KF, Sandberg JC, Hsu FC, Mora DC, Quandt SA, Arcury TA. HPV Knowledge and Vaccine Initiation Among Mexican-Born Farmworkers in North Carolina. *Health Promot Pract*. 2019 May;20(3):445-454. doi: 10.1177/1524839918764671. Epub 2018 Mar 29. PMID: 29597873; PMCID: PMC6237648.
3. Sampson S, Mazur J, Israel G, Galindo S, Ward C. Competing Roles and Expectations: Preliminary Data from an Agricultural Extension Survey on COVID-19 Impacts. *J Agromedicine*. 2020 Oct;25(4):396-401. doi: 10.1080/1059924X.2020.1815619. Epub 2020 Sep 18. PMID: 32945240.
4. Chan A, Brown B, Sepulveda E, Teran-Clayton L. Evaluation of fotonovela to increase human papillomavirus vaccine knowledge, attitudes, and intentions in a low-income Hispanic community. *BMC Res Notes*. 2015 Oct 29;8:615. doi: 10.1186/s13104-015-1609-7. PMID: 26514184; PMCID: PMC4625467.
5. Mora AM, Lewnard JA, Kogut K, Rauch SA, Hernandez S, Wong MP, Huen K, Chang C, Jewell NP, Holland N, Harris E, Cuevas M, Eskenazi B; CHAMACOS-Project-19 Study Team. Risk Factors Associated With SARS-CoV-2 Infection Among Farmworkers

in Monterey County, California. JAMA Netw Open. 2021 Sep 1;4(9):e2124116. doi: 10.1001/jamanetworkopen.2021.24116. PMID: 34524438; PMCID: PMC8444020.

6. Knights F, Carter J, Deal A, Crawshaw AF, Hayward SE, Jones L, Hargreaves S. Impact of COVID-19 on migrants' access to primary care and implications for vaccine roll-out: a national qualitative study. Br J Gen Pract. 2021 Jul 29;71(709):e583-e595. doi: 10.3399/BJGP.2021.0028. PMID: 33875420; PMCID: PMC8216266.

Additional studies supporting Promising Practice 2 are included in Appendix 5.

Promising Practice 3: Bringing Services and Vaccines to People Where They Are

What is it? This innovative practice combines the Cooperative Extension County Educator Model and the Community Health Workers (CHW) model to improve COVID-19 and Influenza vaccination uptake in underserved areas across all sites by using a Mobile Health Vehicle. We believe this initiative has helped overcome structural (e.g., access to vaccination) and individual (e.g., deconstruct misinformation through engagement sessions led by CHW) barriers and accelerate the vaccination uptake among communities that have lower rates of vaccination or face difficulties accessing the vaccines. For the PANDEMIC program, we are working with existing strategic partnerships and have initiated the program at all sites to get closer to the communities we serve. This new initiative is especially creative to build trust through the most trusted of partners—CHWs and Extension agents.

Who: All PANDEMIC sites.

Evidence from the literature supporting this Promising Practice:

A growing body of research supports mobile health clinics and vehicles as valuable and cost-effective models to deliver health care interventions, including vaccinations.¹ The main strength of mobile health vehicles (MHVs) is the ability to provide adequate, quick, and quality healthcare services for underserved populations in remote areas where health care facilities are not available or for communities who have no access to conventional healthcare services. During the COVID-19 pandemic, the need for testing and vaccine delivery highlighted the need for relocatable clinics with enhanced infection control.^{2,3} The available literature suggests that MHVs can offer safe and effective community health services, including COVID-19 vaccination.³ This resource combined with the expertise and unique strengths of Community Health Workers (CHW) has the potential to address significant barriers for vaccination. The existent evidence suggests that during the COVID-19 pandemic, CHWs functioned as effective bridges between the community and health services, particularly among low-income communities.⁴ CHWs efficiently delivered public health information to ameliorate the effect of misinformation, attended the communication needs of minoritized communities and promoted vaccination.⁴⁻⁵ Combining the Cooperative Extension County Educator Model and the Community Health Workers (CHW) model might synergistically provide increased benefits compared to either model alone.

1. Krol DM, Redlener M, Shapiro A, Wajnberg A. A mobile medical care approach targeting underserved populations in post-Hurricane Katrina Mississippi. *J Health Care Poor Underserved*. 2007 May;18(2):331-40. doi: 10.1353/hpu.2007.0038. PMID: 17483561.

2. Baker DR, Cadet K, Mani S. COVID-19 Testing and Social Determinants of Health Among Disadvantaged Baltimore Neighborhoods: A Community Mobile Health Clinic Outreach Model. *Popul Health Manag.* 2021 Dec;24(6):657-663. doi: 10.1089/pop.2021.0066. Epub 2021 May 24. PMID: 34030489.
3. Petrova E, Farinholt T, Joshi TP, Moreno H, Al Mohajer M, Patel SM, Petrosino J, Anandasabapathy S. A Community-Based Management of COVID-19 in a Mobile Container Unit. *Vaccines (Basel).* 2021 Nov 19;9(11):1362. doi: 10.3390/vaccines9111362. PMID: 34835293; PMCID: PMC8624920.
4. Portillo EM, Vasquez D, Brown LD. Promoting Hispanic Immigrant Health via Community Health Workers and Motivational Interviewing. *Int Q Community Health Educ.* 2020 Oct;41(1):3-6. doi: 10.1177/0272684X19896731. Epub 2020 Jan 10. PMID: 31924133; PMCID: PMC7347455.
5. Mayfield-Johnson S, Smith DO, Crosby SA, Haywood CG, Castillo J, Bryant-Williams D, Jay K, Seguinot M, Smith T, Moore N, Wennerstrom A. Insights on COVID-19 From Community Health Worker State Leaders. *J Ambul Care Manage.* 2020 Oct/Dec;43(4):268-277. doi: 10.1097/JAC.0000000000000351. PMID: 32858726; PMCID: PMC7461725.

Additional studies supporting Promising Practice 3 are included in Appendix 6

Promising Practice 4: Listening to the Community

What is it? This practice promotes a bidirectional communication with the communities we serve through multiple activities, including the *Survey of Perceptions* and *The Qualitative Needs Assessment*. These activities allow us to update and adjust our practices based on the feedback we get from our communities. The *Survey of Perceptions* helps collecting current information regarding the people's perceptions about COVID-19 vaccination and barriers for getting the vaccine. The survey includes multiple choice and open-ended questions that allow us to understand differences across sites and local perceptions that need to be addressed within the current Promising Practices. The survey is also helping plan new Promising Practices as the pandemic evolves. As of April 13, 2022, the PANDEMIC program has collected information for 4,985 participants.

In addition, the Florida Cooperative Extension County Educator model includes District Immunization Leads, consisting of two to three County Extension Agents from each geographic district of the state extension system, as well as a lead from Florida A&M University. These District Leads assist with recruiting participants and data collection to provide an ongoing *Qualitative Needs Assessment* to complement our surveillance surveys. Promising Practice 4 employs focus groups or interviews with two populations: 1) County Extension Agents, to discuss the views of the populations they serve, the gaps and concerns regarding COVID-19 and other adult immunizations within their communities, and how to better reach their audiences to improve health engagement and immunization rates; and 2) community members themselves, to understand their views on preventive health, with an emphasis on COVID-19 and immunization, as well as desired programs or resources to facilitate increased immunization rates among traditional rural and agricultural communities, especially racial and ethnic minority populations in those communities. Results from these analyses feed directly into Practices 2 and 3 among others as applicable. Florida is also assisting the Cooperative Extension services at University of California - Davis, University of Missouri, University of Kentucky, University of Minnesota, Cornell University with focus group data collection from their Cooperative Extension agents.

Who? All PANDEMIC sites.

Evidence from the literature supporting this Promising Practice:

Needs assessment is an essential part of Cooperative Extension¹ and any community engagement process for health². Qualitative data collection and analysis allows in-depth exploration of participant thoughts, feelings, motivations, and desires with the ability of researchers to probe a small number of people for further clarity in a conversational style³.

Interpretive qualitative analysis that we are undertaking here aims to understand the reasons behind participants' subjective meanings and motivate short-term interventions rather than critically examine the power structures in place influencing human experiences^{3, 4}, though that lens is ultimately necessary in alleviating health disparities in the long-run⁵. Ultimately, listening to the community and hearing their needs and concerns directly supports long-term partnerships for improved public health by building trust, especially when the data collection turns into visible actions for the communities^{6, 7}.

1. Garst BA, McCawley PF. Solving Problems, Ensuring Relevance, and Facilitating Change: The Evolution of Needs Assessment Within Cooperative Extension. *Journal of Human Sciences and Extension*. 2015;3(2).
2. Rifkin SB, Muller F, Bichmann W. Primary health care: on measuring participation. *Soc Sci Med*. 1988;26(9):931-40. doi: 10.1016/0277-9536(88)90413-3. PMID: 3388072
3. Willis JW, Jost M, Nilakanta R. *Foundations of Qualitative Research: Interpretive and Critical Approaches*. SAGE; 2007.
4. Denzin NK. Critical Qualitative Inquiry. *Qualitative Inquiry*. 2017;23(1):8-16. doi:10.1177/1077800416681864
5. Volpe VV, Dawson DN, Rahal D, Wiley KC, Vesslee S. Bringing psychological science to bear on racial health disparities: The promise of centering Black health through a critical race framework. *Translational Issues in Psychological Science*. 2019;5(4):302-314. doi:10.1037/tps0000205
6. Newman PA. Towards a science of community engagement. *Lancet*. 2006 Jan 28;367(9507):302. doi: 10.1016/S0140-6736(06)68067-7. PMID: 16443036.
7. O'Mara-Eves A, Brunton G, McDaid D, Oliver S, Kavanagh J, Jamal F, Matosevic T, Harden A, Thomas J. *Community engagement to reduce inequalities in health: a systematic review, meta-analysis and economic analysis*. Southampton (UK): NIHR Journals Library; 2013 Nov. PMID: 25642563.

Figure 5. Survey of Perceptions Questionnaire - Our Community Our Health Questionnaire

SURVEY OF PERCEPTIONS

PARTICIPANT ID: Automatically assigned by Qualtrics



Staff ID: _____ Date: ____/____/____ Time (am/pm): ____:____

Outreach Location: _____ Outreach ZIP Code: _____

Project Site:

- | | |
|---|---|
| ☐ Florida State University | ☐ University of Minnesota |
| ☐ Montefiore/ Einstein/ The Bronx | ☐ University of Missouri |
| ☐ University of California-Davis | ☐ Washington University |
| ☐ University of Florida | ☐ Other (SPECIFY) _____ |
| ☐ University of Kentucky | |

NOTE: ASK PARTICIPANTS ALL THE QUESTIONS. Thank you for sharing your opinions with us. This survey will take us no more than about 7 minutes.

1. State where you live: _____
2. The zip code where you live is (5-DIGIT ZIP CODE): _____
3. Your gender is (SELECT ONE):

☐ Male	☐ Non-binary/third gender
☐ Female	☐ Trans
4. Your ethnicity is (SELECT ONE):

☐ Hispanic or Latino(a)	☐ Non-Hispanic or Latino(a)
---	---
5. Your age is: _____
6. Which racial or ethnic group best describes you? (SELECT ONE)

☐ African American or Black	☐ Native Hawaiian or Other Pacific	☐ Other (SPECIFY) _____
☐ American Indian or Alaska Native	☐ Islander	
☐ Asian	☐ White	
7. What have you heard about why people in your area ARE getting vaccinated for COVID-19? (SELECT ALL THAT APPLY)

☐ Vaccines are important/ people believe in vaccines	☐ School/ Work/ Travel Mandates
☐ Fear of getting COVID/ wanting to be safe	☐ To reduce spread of COVID
☐ Other (SPECIFY): _____	
8. What have you heard about why people in your area ARE NOT getting vaccinated for COVID-19? (SELECT ALL THAT APPLY)

☐ They don't know why	☐ They do not like people telling them what to do
☐ A personal choice	☐ It does not seem to work
☐ Afraid of vaccine side effects	☐ Political beliefs
☐ There is a lot of misinformation	☐ Religious beliefs
☐ Too busy	☐ Worried about what is put into vaccine (microchip, COVID)
☐ Other (SPECIFY): _____	

SURVEY OF PERCEPTIONS

PARTICIPANT ID: Automatically assigned by Qualtrics

9. What are people doing in your area instead of getting vaccinated to avoid getting COVID-19? (SELECT ALL THAT APPLY)

- ☐ COVID-19 testing
- ☐ Generally trying to stay healthy (e.g. taking vitamins, exercising, eating healthy)
- ☐ They don't know or am unaware
- ☐ Other _____
- ☐ Nothing
- ☐ Social distancing
- ☐ Staying at home
- ☐ Wearing masks

10. Who do you trust most to give you information about vaccinations? (SELECT ONE)

- ☐ CDC, FDA, or other government agencies
- ☐ Co-workers
- ☐ Doctor or other healthcare provider(s)
- ☐ Family member(s)
- ☐ Friend(s)
- ☐ Other(s) (SPECIFY) _____
- ☐ News
- ☐ Nobody (only trust myself)
- ☐ Religious leader(s)
- ☐ Scientists and researchers

11. Did you receive either 1 dose of Johnson & Johnson (J&J) vaccine or 2 doses of Moderna or Pfizer?

- ☐ No (SKIP TO 12)
- ☐ Yes

11a. (IF YES TO 9a) Have you received the booster? If no, why not? (RECORD WORD FOR WORD)

- ☐ No
- ☐ Yes

(IF NO, SPECIFY REASON):

12. There are several different viewpoints on vaccination, and we would like to know which one describes you the best (SELECT ONE):

- ☐ I got vaccinated as soon as I could
- ☐ I am a person who waits to do something until I see what happens with others
- ☐ I worry about the vaccine making me sick and not being able to work or do things that I normally do
- ☐ I do not trust the system
- ☐ I am skeptical about the whole COVID-19 pandemic

13. If you had to convince someone to get the COVID-19 vaccination, what would you say or do?

14. Please advise us about something you think we really need to know so we can end the pandemic. Your advice is very important.

Thanks a lot for sharing your thoughts today!

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Promising Practice 5: Creating Coalitions with Trusted Neighborhood Partners

What is it? Partnerships with neighborhood and community organizations serving communities who have been largely affected by the COVID-19 pandemic is an essential strategy of the PANDEMIC program. Our current partnership with neighborhood and community organizations that traditionally have served diverse communities, such as the YMCA and the ARC Group Home, has maximized our capacity to address COVID-19 related health disparities and increase vaccination rates for specific population groups. The YMCA is a leading nonprofit with a history of empowering people at every stage of their life. For this initiative, the PANDEMIC team has been approached by this organization to develop a strategic plan to bring COVID-19 vaccinations to the local YMCAs in Florida. The ARC Group Home is a community-based organization that provides services, support, and advocacy to individuals with developmental disabilities. As part of this initiative, COVID-19 vaccination and education has been provided to home residents, staff, family members and neighbors served under the ARC group home. These initiatives have been implemented in Florida and will be expanded to all sites.

Who? UF site is beginning this initiative and other sites will join later.

Evidence from the literature supporting these Practices:

YMCAs have a wide array of health promotion interventions/programs, particularly related to diet and exercise.¹⁻³ They are also a popular site for health promotion. They have also been previously used as a site for conducting health research. In a recent article published by D'Augustino et al (2021), the authors conducted retrospective analysis of deidentified SARS-CoV-2 cases reported by YMCA day camps in 6 counties (Chatham, Durham, Johnston, Lee, Orange, Wake) over 147 days.⁴ Results indicated that SARS-CoV-2 primary case attack rate was 0.6% (17/3030), and secondary case transmission rate was 0.07% (2/3011), indicating that YMCAs can be relatively safe venues for in-person recreational activities, provided that appropriate precaution measures are in place.⁴ Previously, YMCAs have been used as community-based testing and vaccination sites for hepatitis vaccination (A, B or A/B) in Richmond District YMCA, San Francisco.⁵ YMCAs also offer free childcare during vaccination appointments for parents and caregivers as an incentive for getting the COVID-19 vaccine.⁶

With regards to the populations served by the ARC Group Home, there are few studies examining interventions to improve vaccination rates for COVID-19 among people with disabilities, focused on disparities, vaccine hesitancy and accessibility barriers among disabled individuals. All these factors limit the ability of these individuals from these groups from getting

the COVID-19 vaccine. Many studies failed to correctly define 'disability'. Some were categorized as mental conditions. The results of the available studies are inconsistent showing that compared with adults without a disability, those with a disability had a lower likelihood of having received COVID-19 vaccination, despite being less likely to report hesitancy about getting vaccinated.⁷ Unvaccinated adults with disabilities were more likely than were those without a disability to report thinking that the vaccine is important for protection, indicating that there might be potential for increasing vaccination coverage in this group. The study shows the need to address the barriers to COVID-19 vaccination for people with disabilities. On the other hand, vaccination rates were shown to be higher among individuals with mental disabilities living in long-term care home than among individuals in the community,^{8,9} indicating that a focus on this setting may have an impact on vaccination uptake. Overall, the studies available suggest that reducing barriers to scheduling and making vaccination sites more accessible might improve vaccination rates among persons with disabilities.

1. Neudorf B, Hughes C, Ellis C, Neudorf R, Weston Z, Middleton L. Evaluating the YMCA Move for Health Program in Individuals With Osteoarthritis and Assessing Maintenance During the COVID-19 Pandemic. *J Aging Phys Act*. 2021 Sep 25:1-12. doi: 10.1123/japa.2021-0217. Epub ahead of print. PMID: 34564068.
2. Schumacher MM, McNiel P. The Impact of Livestrong® at the YMCA for Cancer Survivors. *Oncol Nurs Forum*. 2018 Nov 1;45(6):717-725. doi: 10.1188/18.ONF.717-725. PMID: 30339155.
3. Adams R, Hebert CJ, Mcvey L, Williams R. Implementation of the YMCA Diabetes Prevention Program throughout an Integrated Health System: A Translational Study. *Perm J*. 2016 Fall;20(4):15-241. doi: 10.7812/TPP/15-241. PMID: 27828773; PMCID: PMC5101095.
4. D'Agostino EM, Armstrong SC, Humphreys L, Coffman S, Sinclair G, Permar SR, Akinboyo IC. Symptomatic SARS-CoV-2 Transmission in Youth and Staff Attending Day Camps. *Pediatrics*. 2021 Apr;147(4):e2020042416. doi: 10.1542/peds.2020-042416. Epub 2021 Feb 3. PMID: 33536332.
5. Zola J, Fu P, Pine A, Su J, Sue E, So S. Three for Life: Protecting adult Asian/Pacific Islanders through hepatitis testing and vaccination. In the 2005 National Viral Hepatitis Prevention Conference 2005 Dec 9.
6. Bizel G, Putcha LS, Sharma S. COVID-19 vaccination performance analysis for the United States and India. *Socrates Journal of Interdisciplinary Social Studies*, 2021, Year 7, Volume 13. Available from: https://www.researchgate.net/profile/Gulhan_Bizel/publication/356920411_COVID-19_Vaccination_Performance_Analysis_for_the_United_States_and_India/links/61ba454c63bbd9324295fdec/COVID-19-Vaccination-Performance-Analysis-for-the-United-States-and-India.pdf

7. Ryerson AB, Rice CE, Hung MC, Patel SA, Weeks JD, Kriss JL, Peacock G, Lu PJ, Asif AF, Jackson HL, Singleton JA. Disparities in COVID-19 Vaccination Status, Intent, and Perceived Access for Noninstitutionalized Adults, by Disability Status - National Immunization Survey Adult COVID Module, United States, May 30-June 26, 2021. *MMWR Morb Mortal Wkly Rep.* 2021 Oct 1;70(39):1365-1371. doi: 10.15585/mmwr.mm7039a2. PMID: 34591826; PMCID: PMC8486390.
8. Drum, C.E. & Ditsch, J. (2021). COVID-19 Vaccine & Disability Survey: Vaccine Hesitancy Among Adults with Disabilities. Rockville, MD: American Association on Health and Disability. 2021 May. Available from: <http://www.advancingstates.org/hcbs/article/covid-19-vaccine-disability-survey-vaccine-hesitancy-among-adults-disabilities>.
9. Weinstein O, Krieger I, Cohen AD, Tzur Bitan D. COVID-19 vaccination among individuals with autism spectrum disorder: A population-based study. *Res Autism Spectr Disord.* 2021 Nov; 89:101865. doi: 10.1016/j.rasd.2021.101865. Epub 2021 Sep 17. PMID: 34548878; PMCID: PMC8445801.

Promising Practice 6: Implementing Subgroup Specific Education Campaigns

What is it? This practice aims to address vaccination information needs of specific population groups, such as pregnant persons, people from racial and ethnic minority groups, or people who are medically underserved. In partnership with organizations and institutions serving these communities, PANDEMIC is designing and delivering culturally appropriate, effective, and updated scientific information regarding the COVID-19 vaccine and other vaccines. The development of education campaigns is supported by the Health Literacy Media team, which provides training to the teams at each site and contribute to the development of strategies relevant for the targeted groups.

Who? University of Florida (and other sites as interested and able)

Evidence from the literature supporting this practice:

Studies among racial-ethnic minorities

Most COVID studies published during the early stages of the pandemic provide a baseline to better assess how variations in vaccine effectiveness, acceptance, and implementation impact re-emergence of COVID-19 hotspots. For specific population subgroups in ethnic enclaves the studies suggest microtargeting as an effective strategy.¹ Trusted messengers are pointed out as an important tool to help with racial-ethnic minorities,^{1,2} especially when the group itself can give input regarding the needs of their community versus providing a rubber stamp for campaigns that have already been developed. Community-based interventions can be used because of shared engagement and shared power.^{2,3} Church-based intervention has also the potential to set the tone and design the message based on what is best in their community.⁴ Other than that, a trusted health care provider recommendation seems to have a huge impact on those populations willingness to be vaccinated.⁵ Inaccessibility (ex. Fatiguing sign-up process, inability to schedule appointments), lack of accommodations (ex. lack of transportation, employment benefits/parameters limiting, lack of insurance) and systemic racism (ex. implicit bias from previous medical treatment affects future health-seeking behavior) continued to be mentioned as significant barriers to vaccine uptake by racial-ethnic minority groups.⁶⁻⁸ Easy access to vaccines, the continuous monitoring of conditions and perceptions unique to each group, and the implementation of strategies that acknowledge previous historical mistreatment and practices and recognize cultural values that promote the vaccine have the potential to overcome some of the most common barriers identified by racial-ethnic minorities.⁶⁻¹⁰

1. Carson SL, Casillas A, Castellon-Lopez Y, Mansfield LN, Morris D, Barron J, Ntekume E, Landovitz R, Vassar SD, Norris KC, Dubinett SM, Garrison NA, Brown AF. COVID-19 Vaccine Decision-making Factors in Racial and Ethnic Minority Communities in Los Angeles, California. *JAMA Netw Open*. 2021 Sep 1;4(9):e2127582. doi: 10.1001/jamanetworkopen.2021.27582. PMID: 34591103; PMCID: PMC8485164.
2. Strully KW, Harrison TM, Pardo TA, Carleo-Evangelist J. Strategies to Address COVID-19 Vaccine Hesitancy and Mitigate Health Disparities in Minority Populations. *Front Public Health*. 2021 Apr 23;9:645268. doi: 10.3389/fpubh.2021.645268. PMID: 33968884; PMCID: PMC8102721.
3. Njoku A, Joseph M, Felix R. Changing the Narrative: Structural Barriers and Racial and Ethnic Inequities in COVID-19 Vaccination. *Int J Environ Res Public Health*. 2021 Sep 20;18(18):9904. doi: 10.3390/ijerph18189904. PMID: 34574827; PMCID: PMC8470519.
4. Evans A, Webster J, Flores G. Partnering With the Faith-Based Community to Address Disparities in COVID-19 Vaccination Rates and Outcomes Among US Black and Latino Populations. *JAMA*. 2021 Aug 17;326(7):609-610. doi: 10.1001/jama.2021.12652. PMID: 34402817.
5. Opel DJ, Lo B, Peek ME. Addressing Mistrust About COVID-19 Vaccines Among Patients of Color. *Ann Intern Med*. 2021 May;174(5):698-700. doi: 10.7326/M21-0055. Epub 2021 Feb 9. PMID: 33556271; PMCID: PMC7888025.
6. Abdul-Mutakabbir JC, Casey S, Jews V, King A, Simmons K, Hogue MD, Belliard JC, Peverini R, Veltman J. A three-tiered approach to address barriers to COVID-19 vaccine delivery in the Black community. *Lancet Glob Health*. 2021 Jun;9(6):e749-e750. doi: 10.1016/S2214-109X(21)00099-1. Epub 2021 Mar 10. PMID: 33713634; PMCID: PMC7946412.
7. Laurencin CT. Addressing Justified Vaccine Hesitancy in the Black Community. *J Racial Ethn Health Disparities*. 2021 Jun;8(3):543-546. doi: 10.1007/s40615-021-01025-4. Epub 2021 Mar 30. PMID: 33783755; PMCID: PMC8009077.
8. Woko C, Siegel L, Hornik R. An Investigation of Low COVID-19 Vaccination Intentions among Black Americans: The Role of Behavioral Beliefs and Trust in COVID-19 Information Sources. *J Health Commun*. 2020 Oct 2;25(10):819-826. doi: 10.1080/10810730.2020.1864521. PMID: 33719874.
9. Momplaisir F, Haynes N, Nkwihoreze H, Nelson M, Werner RM, Jemmott J. Understanding Drivers of Coronavirus Disease 2019 Vaccine Hesitancy Among Blacks. *Clin Infect Dis*. 2021 Nov 16;73(10):1784-1789. doi: 10.1093/cid/ciab102. PMID: 33560346; PMCID: PMC7929035.
10. Haroz EE, Kemp CG, O'Keefe VM, Pocock K, Wilson DR, Christensen L, Walls M, Barlow A, Hammitt L. Nurturing Innovation at the Roots: The Success of COVID-19 Vaccination in American Indian and Alaska Native Communities. *Am J Public Health*. 2022 Mar;112(3):383-387. doi: 10.2105/AJPH.2021.306635. PMID: 35196058; PMCID: PMC8887173.

Studies among pregnant persons

Our overview highlights the need of making COVID-19 vaccines as accessible as possible, as increasing accessibility yielded significant change. Many studies utilized educational interventions, but the source and context of this education made a huge difference in the interventions' effectiveness. Educational intervention from doctors had greater influence on vaccination rate than intervention from nurses⁴. However, pregnant persons were more receptive to theoretically based educational messages and messages provided by health care personnel (e.g., obstetricians or nurses) than to general text messages. The length and context of educational intervention may also play a role in this difference⁵. The educational intervention during a childbirth class, with subjects being able to address their concerns regarding the vaccine has showed an increased vaccine uptake too⁶.

1. CDC. (2022, March 3). Center for Disease Control and Prevention. Retrieved from cdc.gov: https://www.cdc.gov/coronavirus/2019-ncov/vaccines/recommendations/pregnancy.html#anchor_1628692520287
2. Zambrano LD, E. S. (2020). Update: Characteristics of Symptomatic Women of Reproductive Age with Laboratory-Confirmed SARS-CoV-2 Infection by Pregnancy Status — United States, January 22–October 3, 2020. *Morbidity and Mortality Weekly Report*.
3. ipkind HS, Vazquez-Benitez G, DeSilva M, et al. Receipt of COVID-19 Vaccine During Pregnancy and Preterm or Small-for-Gestational-Age at Birth — Eight Integrated Health Care Organizations, United States, December 15, 2020–July 22, 2021. *MMWR Morb Mortal Wkly Rep* 2022;71:26–30. DOI: <http://dx.doi.org/10.15585/mmwr.mm7101e1>
4. Giduthuri JG, Purohit V, Maire N, Kudale A, Utzinger J, Schindler C, Weiss MG. Influenza vaccination of pregnant women: Engaging clinicians to reduce missed opportunities for vaccination. *Vaccine*. 2019 Mar 28;37(14):1910-1917. doi: 10.1016/j.vaccine.2019.02.035. Epub 2019 Mar 1. PMID: 30827735.
5. Goodman K, Mossad SB, Taksler GB, Emery J, Schramm S, Rothberg MB. Impact of Video Education on Influenza Vaccination in Pregnancy. *J Reprod Med*. 2015 Nov-Dec;60(11-12):471-9. PMID: 26775454; PMCID: PMC4827704.
6. Costantino C, Mazzucco W, Bonaccorso N, Cimino L, Conforto A, Sciortino M, Catalano G, D'Anna MR, Maiorana A, Venezia R, Corsello G, Vitale F. Educational Interventions on Pregnancy Vaccinations during Childbirth Classes Improves Vaccine Coverages among Pregnant Women in Palermo's Province. *Vaccines (Basel)*. 2021 Dec 8;9(12):1455. doi: 10.3390/vaccines9121455. PMID: 34960202; PMCID: PMC8707644.

Evidence from the literature supporting this practice in other specific groups is included in Appendix 7.

Promising Practice 7: Connecting with Communities through Media Campaigns

What is it? As part of this practice, PANDEMIC sites are strengthening partnerships with media experts and arts and culture-based organizations to promote COVID-19 vaccine confidence and uptake. For example, the University of Florida site is developing a guide for other sites interested in this practice according to the CDC Field Guide sponsored by Jill Sonke (UF). This practice is pairing arts stakeholders with Community Health Workers and the Mobile Health Vehicle to meet people where they are. The UF site started with campus visits with specific themes and topics, and is continuing expanding to communities across the country, with a focus on rural areas and other communities with high hesitancy rates.

Who: University of Florida (and other sites when available)

Evidence from the literature supporting this Practice:

The spread of misinformation through social media and other media channels represents a considerable barrier to COVID-19 vaccine promotion. Communicating scientific information to the public requires the implementation of innovative media strategies and interdisciplinary work. Public health has a strong, successful relationship with the arts to promote health education in the US.¹ Health promotion efforts require concerted participation of multiple actors in the society, including artist, who usually can communicate in a more effective way with the community.² Artists and culture-bearers can connect with people in ways that resonate more deeply than traditional public health communication. A review of over 3,000 studies conducted by the World Health Organization identified a major role for the arts in the prevention of diseases, promotion of health, and management and treatment of illness across the lifespan and emphasized the need of promoting arts engagement at the individual, local and national levels; and supporting cross-sectoral collaboration.³ Specifically for COVID-19, the design and promotion of comedy, cartoons, songs, murals and textile designs with prevention messages translated public health information on COVID-19 in ways that connected emotionally, created social awareness and improved public understanding. However, some art expressions also promoted fear and misinformation regarding COVID-19 prevention and vaccination, and their role in vaccine hesitancy should be further examined.⁴

1. Evans WD, French J. Demand Creation for COVID-19 Vaccination: Overcoming Vaccine Hesitancy through Social Marketing. *Vaccines* (Basel). 2021 Apr 1;9(4):319. doi: 10.3390/vaccines9040319. PMID: 33915695; PMCID: PMC8065583.

2. Sonke J, Rodríguez L, Valerio-Shewmaker MA. Toward a Culture of Health in the United States: Introducing the *HPP* Arts in Public Health Supplement. *Health Promot Pract*. 2021 May;22(1_suppl):5S-7S. doi: 10.1177/15248399211002512. PMID: 33942648
3. Galea S. The Arts and Public Health: Changing the Conversation on Health. *Health Promot Pract*. 2021 May;22(1_suppl):8S-11S. doi: 10.1177/1524839921996341. PMID: 33942637.
4. Fancourt D, Finn S. What is the evidence on the role of the arts in improving health and well-being? A scoping review [Internet]. Copenhagen: WHO Regional Office for Europe; 2019. PMID: 32091683.
5. de-Graft Aikins A, Akoi-Jackson B. Colonial Virus: COVID-19, creative arts and public health communication in Ghana. *Ghana Med J*. 2020 Dec;54(4 Suppl):86-96. doi: 10.4314/gmj.v54i4s.13. PMID: 33976446; PMCID: PMC8087360.

Promising Practice 8: Opening Communication Channels Through National Virtual Town Hall Meetings (OCOH)

What is it? The Our Community, Our Health (OCOH) town hall meetings bring diverse communities together across the nation, virtually, to foster ongoing conversations among health researchers and community members. Each event includes remote participation via livestream, chat and social media. During these one-hour, virtual discussions with researchers, experts and community members, participants are invited to discuss health topics, and current research findings; a moderator solicits questions through Zoom chat. This encourages a mutual understanding of health research and its impact as well as the latest treatments and interventions. Since July 2021, we have conducted 8 OCOH Town Halls addressing multiple topics related to new developments of the COVID-19 pandemic (e.g., new variants) vaccination misinformation, vaccine safety, vaccine among specific population groups and treatments as well as where they can be obtained.

Who: All PANDEMIC sites

Evidence from the literature supporting this Practice:

Vaccine hesitancy poses a challenge for global vaccine initiatives and public health experts have needed to get creative to break through the noise to disseminate facts. Town halls and community partnerships can help reduce vaccine hesitancy and build trust with minority communities.¹ Town halls help people who are hesitant and just needed opportunities for more information from people they trusted.^{1,2} They are known to be a great way to connect and answer questions from diverse audiences. With the COVID-19 pandemic, public health and medical experts have leveraged the tool to combat misinformation and boost vaccine confidence.² The development of the town hall from start to finish is a very community-engaged process, community leaders can help reach a diverse population, advise on content, support marketing promotions and be a trusted voice for each target audience.³ Community leaders and medical professionals can help open dialogue, build trust and rapport, and inform target audiences how to best protect themselves during the pandemic.³

1. Berry SD, Johnson KS, Myles L, Herndon L, Montoya A, Fashaw S, Gifford D. Lessons learned from frontline skilled nursing facility staff regarding COVID-19 vaccine hesitancy. *J Am Geriatr Soc.* 2021 May;69(5):1140-1146. doi: 10.1111/jgs.17136. Epub 2021 Mar 26. PMID: 33764497; PMCID: PMC8183564.
2. Pandey K, Parreñas RS, Sabio GS. Essential and Expendable: Migrant Domestic Workers and the COVID-19 Pandemic. *Am Behav Sci.* 2021 Sep;65(10):1287–301. doi: 10.1177/00027642211000396. PMCID: PMC7969853.

3. Eder MM, Millay TA, Cottler LB. A compendium of community engagement responses to the COVID-19 pandemic. *J Clin Transl Sci*. 2021 Jun 14;5(1):e133. doi: 10.1017/cts.2021.800. PMID: 34367677; PMCID: PMC8326670.

Promising Practice 9: Providing Concierge Linkage for Vaccinations through EHR

What is it? Electronic Health Records (EHR) and other resources strengthened during the COVID-19 pandemic to properly document immunizations and communicate with patients are utilized to rollout the vaccine among unvaccinated individuals as part of this promising practice. Patients from specific subgroups who experience a higher risk of COVID-19 complications will be identified using EHR records and invited to receive the vaccine.

Who? Washington University and Florida State University

Evidence from the literature supporting this practice:

Increasing COVID-19 vaccine uptake among individuals with the intention to get vaccinated, but experiencing barriers such as forgetfulness, cost, or procrastination, could be achieved by developing behavioral interventions that remove immediate barriers and modify behaviors in a predictable way. Results of two new sequential randomized controlled trials (RCTs) provide evidence that nudging people to get vaccinated using reminders can improve the uptake of COVID-19 vaccine by 3.57% with a first reminder and by 1.06% with a second reminder within a designated vaccination site. Combining reminders with behaviorally informed messaging (e.g., video-based information intervention designed to address vaccine hesitancy) did not increase the effect.¹ Additionally, only 10% of patients did not keep or show up for their first-dose appointment, and approximately 90% of participants who received the first dose at the designated vaccination site scheduled their second dose.¹ The authors suggest that reminders leverage psychological ownership, making people feel that a dose of the vaccine belongs to them.¹ In addition, a recent review of interventions to increase COVID-19 vaccination uptake indicated that making vaccination mandatory could have a negative impact.² Similarly, results of two RCTs aiming to increase influenza vaccination in a primary care visit³ or at a pharmacy⁴ showed an increase on vaccination rates by 5% and 2% if text messages were sent prior to a primary care visit or a pharmacy visit. The most impactful interventions reminded patients twice to get their flu shot at their upcoming visit and indicated it was reserved for them.³

1. Dai H, Saccardo S, Han MA, Roh L, Raja N, Vangala S, Modi H, Pandya S, Sloyan M, Croymans DM. Behavioural nudges increase COVID-19 vaccinations. *Nature*. 2021 Sep;597(7876):404-409. doi: 10.1038/s41586-021-03843-2. Epub 2021 Aug 2. PMID: 34340242; PMCID: PMC8443442.
2. Batteux E, Mills F, Jones LF, Symons C, Weston D. The Effectiveness of Interventions for Increasing COVID-19 Vaccine Uptake: A Systematic Review. *Vaccines (Basel)*. 2022 Mar 3;10(3):386. doi: 10.3390/vaccines10030386. PMID: 35335020; PMCID: PMC8949230.

3. Milkman KL, Patel MS, Gandhi L, Graci HN, Gromet DM, Ho H, Kay JS, Lee TW, Akinola M, Beshears J, Bogard JE, Buitenheim A, Chabris CF, Chapman GB, Choi JJ, Dai H, Fox CR, Goren A, Hilchey MD, Hmurovic J, John LK, Karlan D, Kim M, Laibson D, Lamberton C, Madrian BC, Meyer MN, Modanu M, Nam J, Rogers T, Rondina R, Saccardo S, Shermohammed M, Soman D, Sparks J, Warren C, Weber M, Berman R, Evans CN, Snider CK, Tsukayama E, Van den Bulte C, Volpp KG, Duckworth AL. A megastudy of text-based nudges encouraging patients to get vaccinated at an upcoming doctor's appointment. *Proc Natl Acad Sci U S A*. 2021 May 18;118(20):e2101165118. doi: 10.1073/pnas.2101165118. PMID: 33926993; PMCID: PMC8157982.
4. Milkman KL, Gandhi L, Patel MS, Graci HN, Gromet DM, Ho H, Kay JS, Lee TW, Rothschild J, Bogard JE, Brody I, Chabris CF, Chang E, Chapman GB, Dannals JE, Goldstein NJ, Goren A, Herschfield H, Hirsch A, Hmurovic J, Horn S, Karlan DS, Kristal AS, Lamberton C, Meyer MN, Oakes AH, Schweitzer ME, Shermohammed M, Talloen J, Warren C, Whillans A, Yadav KN, Zlatev JJ, Berman R, Evans CN, Ladhania R, Ludwig J, Mazar N, Mullainathan S, Snider CK, Spiess J, Tsukayama E, Ungar L, Van den Bulte C, Volpp KG, Duckworth AL. A 680,000-person megastudy of nudges to encourage vaccination in pharmacies. *Proc Natl Acad Sci U S A*. 2022 Feb 8;119(6):e2115126119. doi: 10.1073/pnas.2115126119. PMID: 35105809; PMCID: PMC8833156.

Promising Practice 10: Utilizing Novel Incentive Campaigns

What is it? PANDEMIC sites have implemented innovative incentive campaigns to meet the COVID-19 vaccination goals of each site. The incentives aim to provide our communities with additional resources and services that not only can alleviate some of the financial difficulties they face, but also might help to remove vaccination barriers (e.g., childcare, monetary incentives, etc.).

Who? University of Florida (and other sites as interested and able)

Evidence from the literature supporting this practice:

Use of incentives for increasing vaccination remains a sensitive subject that requires further study. Evidence from trials examining the use of monetary incentives to increase vaccination rates is limited and the few studies available suggest a positive effect for human papillomavirus vaccine¹ or hepatitis B vaccine among individuals who inject or use drugs and are using services or receiving treatment.^{2,3} Specifically for COVID-19, a RCT conducted in Sweden in 2021 showed that relative to behavioral nudges, monetary incentives (\$24) increased the COVID-19 vaccine uptake by 4%.⁴ On the other hand, evidence from observational studies investigating the extent to which incentive programs (e.g., announcements of cash drawings or vaccine lotteries) increased vaccination rates in states where these programs were implemented compared to “control” states showed a minor effect.^{5,6} All together the evidence suggest that incentives that pay with certainty may be more effective than lottery programs, and that incentives programs should be implemented together with other interventions that facilitate access to vaccines.

1. Mantzari E, Vogt F, Marteau TM. Financial incentives for increasing uptake of HPV vaccinations: a randomized controlled trial. *Health Psychol.* 2015 Feb;34(2):160-71. doi: 10.1037/hea0000088. Epub 2014 Aug 18. PMID: 25133822; PMCID: PMC4312136.
2. Weaver T, Metrebian N, Hellier J, Pilling S, Charles V, Little N, Poovendran D, Mitcheson L, Ryan F, Bowden-Jones O, Dunn J, Glasper A, Finch E, Strang J. Use of contingency management incentives to improve completion of hepatitis B vaccination in people undergoing treatment for heroin dependence: a cluster randomised trial. *Lancet.* 2014 Jul 12;384(9938):153-63. doi: 10.1016/S0140-6736(14)60196-3. Epub 2014 Apr 8. PMID: 24725468.
3. Bowman S, Grau LE, Singer M, Scott G, Heimer R. Factors associated with hepatitis B vaccine series completion in a randomized trial for injection drug users reached through syringe exchange programs in three US cities. *BMC Public Health.* 2014 Aug 9;14:820. doi: 10.1186/1471-2458-14-820. PMID: 25107530; PMCID: PMC4138371.

4. Campos-Mercade P, Meier AN, Schneider FH, Meier S, Pope D, Wengström E. Monetary incentives increase COVID-19 vaccinations. *Science*. 2021 Nov 12;374(6569):879-882. doi: 10.1126/science.abm0475. Epub 2021 Oct 7. PMID: 34618594.
5. Walkey AJ, Law A, Bosch NA. Lottery-Based Incentive in Ohio and COVID-19 Vaccination Rates. *JAMA*. 2021 Aug 24;326(8):766-767. doi: 10.1001/jama.2021.11048. PMID: 34213530; PMCID: PMC8385592.
6. Acharya B, Dhakal C. Implementation of State Vaccine Incentive Lottery Programs and Uptake of COVID-19 Vaccinations in the United States. *JAMA Netw Open*. 2021 Dec 1;4(12):e2138238. doi: 10.1001/jamanetworkopen.2021.38238. PMID: 34882179; PMCID: PMC8662369.

Appendix 1: PANDEMIC – Site Selection Criteria

Impacted Communities (ICs)

During the early planning stages of PANDEMIC, the program leveraged the agreement of the CTSA hubs and each of their existing Community Engagement (CE) programs with their Community Health Workers, and the agreement of all Cooperative Extension Regions (which includes Extension Agents in nearly every county in the US and territory). This brings to the PANDEMIC program enormous strengths in precision public health, team science, implementation science, and informatics to facilitate community-driven ideas to achieve innovative community engagement strategies focused on COVID-19. The 60 CTSA hubs and the Extension Program, distinctly consolidated into 76-- those that were funded as Land Grant Universities/ Institutions in either 1862 or 1890-- are located all across the US and its territories. Many of the programs are co-located. These areas are ethnically and culturally diverse, both urban and rural, in the stroke belt, hit by the opioid and water crises, the STD epidemic, natural disasters (fires, hurricanes, tornadoes, etc.), flu, others and now COVID-19. The 60 hubs and Cooperative Extension Programs are in areas at highest risk for clusters of infection, including nursing homes and other congregate housing and meatpacking plants. The Extension Agents and Community Engagement (CE) programs engage with specific populations that have endured systemic inequality for decades where one mile separates those who live and those who die; where life expectancy is determined by zip code. These CE programs and Extension Agents serve all populations in their community, including the deaf and hard of hearing communities, Native American tribes, rural communities, African American, Hispanic, Marshallese, Hmong, Bosnian, Haitian, Asian, PLWHIVA, LGBTQ, immigrant and many other populations.

PANDEMIC operates in seven states of the US. In order to identify the needs and vulnerabilities of Impacted Communities (ICs) throughout the US, the PANDEMIC program utilized the most recent data from the CDC's Social Vulnerability Index (SVI), which integrates 15 US Census variables to determine at-risk areas. Historically, evidence has shown that a particular community's response, recovery and resilience to emergencies, including COVID-19, is influenced by a variety of population characteristics measured by the following SVI domains: 1) socioeconomic status, including income, poverty, employment, and education; 2) household composition and disability, including age, single parenting, and disability; 3) minority status and language, including race, ethnicity, and English-language proficiency; and 4) housing and transportation, including housing structure, crowding, and vehicle access. Based on a community's percentile rankings in these measures, the SVI assigns an overall summary ranking variable for each community.

The PANDEMIC Program Leaders reviewed SVI scores at both the county and Census tract level for every community to be reached with national and local messages. The CTSA sites work with counties they are in and adjacent to, focusing on specific counties in greatest need. Our Network of CTSA hubs and Extension Agents, who already have working knowledge of their communities' needs and disparities, have facilitated drawing the geographic boundaries to document PANDEMIC's reach. Geographical boundaries have also been determined using the data on vulnerabilities.

More Granular Data: Risk Factors and Vulnerability

Growing literature suggests that the COVID-19 pandemic, like other emergencies, has disproportionately influenced members of minority communities across the US. Throughout the pandemic, increased exposure to conditions conducive to disease development has contributed to both disparities in health and access to care. In particular, experts cite poverty, low-wage employment, and chronic stress to be significant determinants of COVID-19 disparities, all of which disproportionately affect racial and ethnic minorities. Education levels, unemployment, insurance coverage, household composition, and access to medical treatment vary widely and directly increase exposure to disease diffusion in multiple domains, making SVI scores relevant to assess COVID-19 vulnerability for both ICs and Highly Impacted Communities (HICs).

In addition to structural inequalities, a number of health conditions that disproportionately affect minority populations has been identified as closely related to COVID-19 disease severity. Among 5,700 patients hospitalized for COVID-19 in New York City, 94% had a chronic health condition, with hypertension, obesity, and diabetes the most common. In addition to being diagnosed for these underlying health conditions at higher rates than non-Hispanic whites, minority populations more often experience a greater burden of disease, increased difficulty with disease management, and more disease-related complications. It is likely that these conditions and their underlying health disparities further contribute to substantial racial variation of COVID-19 severity and adverse outcomes. Inadequate COVID-19 testing has contributed to significant inequities in diagnostic capacity in low-income areas; assessing difficulty getting tested (both with and without a doctor's order) has been documented in our communities. In a number of states, both the proportion of total cases who report being Black and the proportion of total COVID-19 fatalities that are Black far exceed the proportion of the total population that is Black. Alarmingly, these ratios are over two-fold in more than 10 states. In other states, the data simply does not exist to document the disparity.

Highly Impacted Communities (HICs): Process for Selection and Description

While many communities across this country have been significantly impacted by inequities, we have chosen our six HICs in consultation with PANDEMIC partners and stakeholders: investigators, a number of CTSA hubs, Cooperative Extension Program Leaders, Community Advisory Board (CAB) members, infectious disease experts, and Health Literacy Media. Considerations included representation of a diverse range of populations (including minority, immigrant, and rural communities), social vulnerability index levels, and the ability to align and standardize data. One of the most important criteria in choosing sites is our existing relationships and long-term collaboration with the partners, which allows us to immediately launch the PANDEMIC effort. To this point, as previously noted, in just a few days we were able to assemble the eight sites in seven states, as well as the very large and diverse national team of trusted academic and community partners. They were interested in joining this initiative because they are currently actively working with state, local and regional partners on COVID-19 efforts from standing up testing sites to conducting listening sessions to understand community needs.

Social Vulnerability Index rankings selected for Highly Impacted Communities

*Flag: Value in the 90 th percentile		Sacramento County, CA	Beltrami County, MN	St. Louis City County, MO	Taylor County, FL	Bronx County, NY	Fayette County, KY
Socioeconomic status	% of persons below poverty	15.8	18.5	24.2*	19.3	29.1*	14.2
	Unemployment rate (%)	7.4	7.7	8.3	5.5	10.5*	3.3
	Per capita income	\$31,311	\$24,781	\$28,478	\$19,492	\$20,850	\$35,466
	% of persons without HS diploma	12.6	8.7	13.1	18.9	28.0*	9.1
Household composition & disability	% of persons aged 65 and older	13.4	15.2	12.6	21.0*	12.1	13.9
	% of persons younger than 17	24.0	25.2	19.7	19.7	25.1	21.0
	% of persons with disability	12.1	13.5	15.4	19.5*	14.8	9.2
	% of single-parent HH	10.2	12.2*	11.3	27.7*	19.1*	33.7*
Minority status & language	% minority	54.8*	27.8	56.8*	27.7	90.7*	29.3
	% who speak English "less than well"	6.6*	0.2	1.9	4.6	15.8*	5.2
Housing type & transportation	% of housing with 10+ units	13.1*	9.3	18.1*	0.8	68.1*	18.5*
	% of mobile homes	2.3	10.8	0.4	36.5*	0.1	1.4

	% of housing with more people than rooms	4.9*	2.4	1.7	1.2	12.3*	4.6*
	% of households with no vehicle	7.0	7.7	20.3*	11.0	58.5*	7.9
	% of persons in institutionalized group quarters	1.6	4.8	3.3	11.46*	2.9	1.2
Overall SVI Score (0-1.0)		0.7338	0.7771	0.7796	0.9515	0.9927	0.6642

In addition to US Census variables and SVIs for these counties, as well as national data on COVID-19 cases and deaths, risk factors and existing disparities are well articulated in the Robert Wood Johnson County Rankings. However, these data woefully reflect the magnitude of food insecurity, poverty, unemployment, depression and other poor health resulting from this pandemic. Based on the criteria, we selected the counties shown in the table: Sacramento County, California; Beltrami County, Minnesota; St. Louis City County, Missouri; Broward County, Florida; and Bronx County, New York. Their level of social vulnerability is also depicted and the number of COVID-19 cases is shown. As noted previously, social vulnerability is predictive of COVID-19 exposure and poor consequences from exposure because these are the persons who tend to be critical workers (farmers, service industry workers, LPNs) with poor access to healthcare.

COVID-19 Data for PANDEMIC Highly Impacted Communities (as of 5-8-2020)

COVID-19	Sacramento County, CA	Beltrami County, MN	St. Louis City County, MO	Taylor County, FL	Bronx County, NY	Fayette County, KY
# of confirmed cases	1,160	6	1,474	63	40,148	356
# of confirmed deaths	50	0	85	3	3,122	19
case fatality rate/100k	4.31	0	5.77	4.76	7.78	5.33

Sacramento County, CA. With an estimated 1.5 million residents, Sacramento County is the eighth largest county in the state of California. Over 54% of residents are minorities (16.9% Asian, 9.8% Black or African American), a significant immigrant population lives in this county accounting for 6.6% speaking English “less than well”—both values in the 90th percentile and considered flags for social vulnerability. Additionally, 13.1% of residents live in housing structures with 10 or more units, and 4.9% of occupied housing units have more people than rooms, raising crowding concerns. Sacramento currently ranks 11th out of 58 counties in California for positive COVID-19 cases (1,160) and 9th for confirmed COVID-19 deaths (50). Dr. Aguilar-Gaxiola has been spearheading the UC-Davis work in this area for decades; he has been a significant contributor to the CLAS guidelines as well as the CTSA/CDC Principles of Community Engagement.

Beltrami County, MN. Beltrami County is a rural county (67.1% rural) in northern Minnesota with an estimated 46,847 residents. The county includes portions of the Red Lake Indian Reservation and Leech Lake Indian Reservation; over 22% of the population is Native American. Individuals with other tribal affiliations (e.g., White Earth Nation, Chippewa Tribe) are among the approximately 9,000 Native Americans residing in Beltrami County. In addition to a significant number of residents living in single-parent households (12.2%, in 90th percentile), Beltrami also ranks 83rd worst out of 87 counties in Minnesota for health outcomes. According to a new report from the Kaiser Family Foundation, 34% of American Indian/Alaska Native adults are at higher risk of serious illness if infected with COVID-19—a higher proportion than any other racial or ethnic group. While most media focus has been on the Navajo Nation, the PANDEMIC project has engaged members of numerous tribes, nations and Native American community organizations in Bemidji, the Beltrami County seat (Ho-Chunk, Menominee, Mohican, Oneida, Odawa, Potawatomi, and Sioux), and ultimately extend messaging into tribal communities across northern Minnesota and throughout the upper Midwest. Dr. Milton “Mickey” Eder is leading this initiative; he and the team have worked together for years.

St. Louis City County, MO. The city of St. Louis, with an estimated 302,838 residents, is the 4th largest county in Missouri by population size and ranks 1st for county population density (4,826.7 residents/square mile). Over 24% of its population is below poverty level, 18.1% live in housing structures with 10+ units, and 20.3% of households do not have access to a vehicle—all values in the 90th percentile, and flags for social vulnerability. Additionally, 56.8% of residents are minorities, including 45.6% Black or African American and 44.3% Hispanic (independent of race status). St. Louis has the highest population of Bosnians outside of Europe, coming to the city during the genocide in the 1990s. With 1,408 confirmed COVID-19 cases and 85 deaths, St. Louis City currently has the 2nd highest number of cases and fatalities in Missouri, second only to the much more populated neighboring St. Louis County. Drs. Cottler, Striley and O’Leary began HealthStreet, the CE model utilized in this proposal, when they were at Washington University; Dr. O’Leary collaborates with Dr. Powderly, head of Infectious Diseases and PI of the Wash U CTSA hub.

Taylor County, FL. With a total population of 21,815 residents, they have 19.3% of persons living below poverty with the per capita income of 19,492. 21% of their population is 65 years old or older with 19.5% of persons living with a disability and 27.7% single-parent households. Taylor County also has 11.46% of persons living in institutionalized group quarters due to the presence of a county jail with an overall Social Vulnerability Index of 0.9515. The number of healthcare providers is lower in this county than other counties in the state and due to a lot of manufacturing occurring in this county, air pollution is a large health concern. Although the work of UF and FSU may not focus on this county, it provides valuable insight into the composition of similar rural counties in North Central Florida.

Bronx County, NY. With 1.4 million citizens, the Bronx is both New York City's poorest borough and its first to have a majority of its population from minority backgrounds, primarily Latino (55%) and African American (43%). The 16th Congressional District, in South Bronx, is the poorest in the US by poverty rate, median income, and proportion of children living below poverty. According to the US Census Bureau, the Bronx is also the nation's poorest urban county. With values in the 90th percentile as shown in the table for poverty, unemployment, poor educational attainment, single-parent households, minority status, low English proficiency, multi-unit housing structures and units with more people than rooms, and no access to a vehicle, Bronx County has the highest SVI score of the five HICs at 0.9927 (out of 1), suggesting significant social vulnerability. In NYC, the epicenter of the national COVID-19 pandemic, the Bronx has the highest rate of confirmed cases of the five boroughs, 2,729/100,000 population. Citywide, Black individuals represent 24% of the population, but 30% of COVID deaths. Dr. Strelnick leads this effort; he has been a co-investigator with others in the PANDEMIC project. He has long-standing partnerships in this community.

Fayette County, KY. With Lexington being the second-largest city in the state, Fayette County is the second most populous county in Kentucky with nearly 322,000 residents. Fayette County has 33.7% single-parent households with 18.5% of housing with 10 or more units and 4.6% of housing with more people than rooms with an overall Social Vulnerability Index of 0.6642. Although early on in the pandemic, Black individuals in Fayette County have already been disproportionately affected by COVID-19. Dr. Gia Mudd-Martin is leading effort at this site, as part of the Appalachian Translational Research Network through CTSA, with Promotoras focusing on Spanish-speaking populations.

Each of our sites has reported on their community's response to the pandemic and work with their state Department of Health. Nearly all sites have a member institution belonging to the ASPPH (Association of Schools and Programs in Public Health) and as such are involved helping with testing, contact tracing, and sharing of knowledge. All of the CTSA hubs are working with their institution's Chief of Infectious Diseases; in many cases, that person is the PI of the hub. Additionally, knowing that much of the risk factor data published is out of date, the UF HealthStreet program launched the ReConnect Campaign to stay in touch with their +12,000 members via phone, asking questions about people's perceptions about COVID-19, loneliness, anxiety, health concerns and community needs. Over 3000 members have completed a phone interview in just a few weeks; when asked an open-ended, unprompted question about what they are concerned about, members reported COVID-19 most frequently. Black individuals have been more likely than non-African Americans to report hypertension, food insecurity, and high levels of loneliness and stress since COVID-19.

Relevant Experience with Partnerships

The PANDEMIC Network is as diverse demographically as it is geographically; the project chose leaders who have previously collaborated with each other and who are moving quickly with thousands of partners in their communities to begin to mitigate the impact of COVID-19 in community engaged research, teaching and extension efforts. Through our well-established national networks, we are continuously working *with and for* Impacted Communities (ICs). Many of the historical efforts relevant to this proposal are highlighted below.

Since its founding in 1914, the US **Cooperative Extension Program** (CEP) extends the research of US land grant universities into the community with unparalleled longevity and reach: county offices with agents who serve all 3000+ counties in the nation. CEP is divided into five regions; four geographic - North Central, Southern, Northeastern, and Western; and one comprising all the institutions from the 1890s to address disparities in particular. Each region has a main site chosen for its strength in leadership and relationship with health extension. CEP is based on community engagement; local program advisory committees determine areas of concern as well as discuss, test, and refine strategies for appropriate interventions to address those concerns. Extension focuses on health and social issues among vulnerable populations such as food security, farm worker safety, and financial well-being.

CEP outreach is supported by federal, state, and county partnerships. At the core, university faculty serve as state extension specialists, discipline experts working with county-based agents who facilitate the sharing of expertise locally and regionally. In addition, a national Extension Committee on Organization and Policy (ECOP) supports CEP's response to emerging needs and spreading of best practices, especially in rural communities. In 2014, ECOP concluded that Extension should focus on revolutionizing health in the way it previously revolutionized agriculture, through USDA's Supplemental Nutrition Assistance Program Education (SNAP-Ed). Several workgroups are addressing health literacy, health insurance, chronic disease, and youth development, while universities develop new specialists focused on health and wellness. Collaborations with CTSA programs leverage the community and clinical expertise of these entities by facilitating collaboration with vulnerable communities to increase the reach of evidence-based solutions for health disparities.

In 2009, the CTSA established the **Community Engagement Resource Development Workgroup**, which subsequently received an American Reinvestment and Recovery Act supplemental grant across 5 CTSA sites and 2 community-focused national organizations. The purpose of this grant was to develop procedures to increase community participation in research, build the capacity of CHWs to expand their role in research by increasing the rigor of health evaluation metrics in the field, and establish a sustainable network, the **Sentinel**

Network, to provide ongoing, real-time assessments of top health and neighborhood needs, concerns, and research perceptions. The data would then be shared with local communities to increase the representativeness and relevance of research by facilitating community participation.

The Sentinel Network was built on the community engagement program, **HealthStreet**, founded when the PI (Cottler) was at Washington University in St. Louis. HealthStreet is described as our first PANDEMIC Initiative; it is person-centered to assess, link, share knowledge and perceptions and build trust. It directly begins with the individual, but also partners with agencies, providers, and organizations to ensure the input of community members and not inadvertently privilege the perceptions of community leaders and service providers. Three of the Sentinel Network sites are among our chosen HICs: St. Louis, the Bronx, and Sacramento County. Each implemented the CHW outreach and assessment model successfully to address clinical trial participation and pertinent health and social service needs in response to community needs. Sentinel Network Part II integrated medical, social service and research referrals based on community members assessed health needs and concerns and added the University of Florida site to include a higher concentration of rural and older populations. CHWs have proven effective in reaching minority and vulnerable populations with health information and interventions; many are calling for their use in this pandemic.

Made up of members from a robust network of CTSA institutions, **Partners for the Advancement of Community Engaged Research (PACER)** is a Special Interest Group of the Association for Clinical and Translational Science (ACTS); it brings together community and academic researchers on a monthly video conference to explore topics and issues important to community engagement. We mobilize CTSA activities by sharing best practices and subsequently collaborative activities result from meetings of these national community engagement experts. Drs. Cottler and Eder are the chairs of PACER. Each hub has representation on PACER. Many of our partners were co-authors of the Second Edition of the CDC Principles of Community Engagement.

As described above, PANDEMIC's chosen HICs include six priority sites (eight sites total) in which to disseminate information that uses the National CLAS Standards to mitigate the impact of COVID-19 on racial and ethnic minority, rural and socially vulnerable communities. The work conducted in these sites serves as exemplars for effective strategies for dissemination. As noted, these sites all have important reasons for their inclusion, including diverse populations, medium to very high social vulnerability ratings and all have histories of active research and community-based partners working for health equity.

Appendix 2: PANDEMIC – Proposal for a CDC 2113 Initiative

Proposing Site _____
Date _____



Proposal for a CDC 2113 Initiative

Activity	Response
Initiative (e.g.: to compare incentives for vaccinations at different rates—none, \$10, \$25, \$50)	
Theoretical Framework (broadly or specifically)	
Hypothesis	
Methods/Protocol: (what comparisons will be made, how will you get the sample, who will be needed to obtain the data)	
Sample size (your site, other sites—what sites?)	
Budget (how much of your site budget will you use? With specifics.)	
Other sites you would like to involve	
Timeline	

send to Linda Cottler lbcottler@ufl.edu and Carolina Rosales luz.rosales@ufl.edu

Appendix 3- HealthStreet Health Needs Assessment-S

33. Signed Consent:

1=No 5=Yes

33a. If no, reason for no consent :

1=Not interested

2=Not enough time

3=other (specify) _____

4=Ineligible (specify) _____

33bc. Access to Medical Record:

1=No 5=Yes

1a. Date of Contact: ____/____/____
M M D D Y Y Y Y

1b. Time: ____:____
(24 HR CLOCK)

2a. Staff Name: _____ 2b. Staff ID: ____

3. Referral Source:

1=Friend/Relative

2=Brochure

3=Radio/TV

4=CHW/Community Outreach

5=Newspaper

6=Walk-in

7=MD/clinic

11=Health Fair

12=Social Media

13=Website

9=Other _____

5. Closest Intersection _____ & _____
(list alphabetically)

6. Location ZIP Code: _____

7. Location Type: _____ 7a. Location Code: ____

8. GPS Coordinates: ____ . ____ / - ____ . ____

9. What gender do you identify as? 1=Male 2=Female 3=Transgender 4=Non-binary/third gender 9= Refused

10. Are you Hispanic or Latino? 1=No 5=Yes

11. Race/ethnicity:

1=American Indian/Alaskan Native

3=Asian

4=Black or African-American

6=Native Hawaiian/ Pacific Islander

7=White

8= Biracial, Multi-Racial

9=Other _____

12. First Name: _____

13. Last Name: _____

14. Age: ____ 15. DOB: ____/____/____
M M D D Y Y Y Y

35. Street Address: _____ 35a. Apt: _____

36. City: _____ 37. State: _____ 16. ZIP: ____
(of Residence)

38. Phone - Cell: (____) ____ - ____

38a. Phone - Other: (____) ____ - ____

40. Email: _____

17. What are your top three health concerns?

17a. _____
CODE

17b. _____
CODE

17c. _____
CODE

17d. What do you think is the most important concern for your neighborhood?

CODE

18. Have you ever been in a health research study? 1=No 5=Yes 8=Not Sure

There are many types of health studies. Would you volunteer for a health research study:	No	Yes
19. that only asked questions about your health?	1	5
20. if researchers wanted to see your medical records?	1	5
21. if you had to give a blood sample?	1	5
22. if you were asked to give a sample for genetic analysis?	1	5
24. if you might have to take medicine?	1	5
27. Would you participate in a study if you didn't get paid?	1	5
29. How interested are you in being in a research study? 5=Definitely 3=Maybe 1=Not At All		

1 2 3 4 5 6 7 8 9
10

Not at all

Completely

On a scale of 1 to 10, where 1 is 'Not at All' and 10 is 'Completely'			
29a. how much do you trust RESEARCH?	___	98aa. how lonely do you feel?	___
29b. how much do you trust RESEARCHERS?	___	98ab. how stressed are you?	___

43. Last grade completed: ___ 44. Are you employed? 1=No 5=Yes

49. Height: ___ ft ___ in 49a. Weight: ___ lbs 49b. BMI (calculate): _____

52. Have you had a physical or a check up in the last 12 months? 1=No 5=Yes

51a. Have you seen a doctor for any other reason in the last 12 months? 1=No 5=Yes

52a. Have you been to a dentist in the last 12 months? 1=No 5=Yes

53. Do you have any type of medical insurance? 1=No 5=Yes

53d. Would you say that your health in general is excellent, good, fair, or poor?

1=Excellent 2=Good 3=Fair 4=Poor

47. How many children do you have? _____

46. How many people currently live with you? _____ TOTAL NUMBER

46b. What are their ages (START WITH THE YOUNGEST) _____,
_____, _____, _____, _____,

47b. Have there been times in the last 12 months when you did not have enough money to buy food that you or your family needed?
1=No 5=Yes

Have you ever been told you had, or have you ever had a problem with...?	N	Y	Have you ever been told you had, or have you ever had a problem with...?	N	Y
65h. High blood pressure	1	5	63_0. Digestive health	1	5

58_0. Brain, spine or nervous system	1	5	61_0. Dental health	1	5
68b. Anxiety	1	5	64_0. Hearing	1	5
68e. Depression	1	5	72_0. Sleep	1	5
67g. HIV/AIDS	1	5	73_0. Vision	1	5
65l. Heart disease	1	5	60. Cancer	1	5
62_0. Any diabetes	1	5	a) Types: _____		
55_0. Arthritis	1	5	b) _____		
69_0. Any muscle or bone pain	1	5	c) _____		
59a. Asthma	1	5	d) In what year were you last diagnosed? _____ were you last diagnosed _____		
			d) In what year were you last diagnosed _____		
66_0. Any kidney problem	1	5	e) In what year were you last treated for any cancer? _____ ☐ NO TX		

	N	Y
81. a) FOR MEN: In the last 30 days, have you had more than 4 drinks like beer, wine, or liquor in a single day?	1	5
b) FOR WOMEN: In the last 30 days, have you had more than 3 drinks like beer, wine, or liquor in a single day?		5
	1	

(IF YES FOR LT, ASK L30 DAYS. IF NO FOR LT, SKIP TO THE NEXT QUES) LT: Lifetime Use L30 days: Used in last 30 days	LT		L30 days		
	N	Y	If LT yes,	N	Y
92. Have you ever smoked cigarettes?	1	5	92a. In the last 30 days?	1	5
92c. Have you ever used e-cigarettes or a vaping device?	1	5	92ca. In the last 30 days?	1	5
84. Have you ever used marijuana?	1	5	84a. In the last 30 days?	1	5
84b. Has marijuana ever been prescribed for you?	1	5	84ba. In the last 30 days?	1	5
84c. Have you ever used Kratom?	1	5	84ca. In the last 30 days?	1	5
83. Have you ever used cocaine or crack?	1	5	83a. In the last 30 days?	1	5
85. Have you ever used heroin?	1	5	85a. In the last 30 days?	1	5
86. Have you ever used speed or amphetamines?	1	5	86a. In the last 30 days?	1	5
87. Have you ever used prescription pain medication like Vicodin, Oxycodone, Codeine, Demerol, Morphine, Percocet, Hydrocodone, or any others?	1	5	87a. In the last 30 days?	1	5

92i. Have you gambled, bet, bought a lottery ticket or used slot machines in the last 12 months? 1=No 5=Yes

92j. If yes, have you had a problem with gambling in the last 12 months? 1=No 5=Yes

We would like to ask you some questions about COVID-19 pandemic and your viewpoints on vaccinations.

C2. Have you ever been tested for COVID-19? 1=No 5=Yes

C2a1. Have you ever had COVID-19? 1=No 5=Yes 8= Don't Know

	No	Yes
C3a. Have you received a COVID-19 vaccine?	1 (SKIP TO C4)	5

C3b. Did you receive either 1 dose of Johnson & Johnson (J&J) vaccine or 2 doses of Moderna or Pfizer?	1 (SKIP TO C4)	5
C3c. Have you received a booster?	1	5

C4. There are several different viewpoints on vaccination, and we'd like to know which one describes you the best. (SELECT ONE)

1= I got vaccinated as soon as I could

2= I am a person who waits to do something until I see what happens with others

3= I worry about the vaccine making me sick and not being able to work or do things that I normally do

4= I do not trust the system

5= I am skeptical about the whole COVID-19 pandemic

C5. How many flu shots have you had in the last three years? 0=None 1=One 2=Two 3=Three

98. Rate each of the following statements by how much you agree with them:

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
A. There is a person I can talk to about things that are important to me.	1	2	3	4	5
B. There is a person I can rely on for practical things like doing favors for me.	1	2	3	4	5
C. In general, I am satisfied with the support I receive from people in my life.	1	2	3	4	5

NOTE: BASED ON THE RESPONSES ABOVE, DON'T FORGET TO GIVE MEDICAL AND SOCIAL SERVICE REFERRALS TO MEMBERS, AND ASK THEM IF THEY NEED ANY OTHER RESOURCES NOT MENTIONED ON THE ASSESSMENT.

95. Linked to study # _____

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ID	Initials	Date	ID	Initials	Date	ID	Initials	Date
		__/__/__			__/__/__			__/__/__

Appendix 4- Evidence in the literature supporting Promising Practice 1: Building Trust Through the HealthStreet Community Engagement Model

Burgess RA, Osborne RH, Yongabi KA, Greenhalgh T, Gurdasani D, Kang G, Falade AG, Odone A, Busse R, Martin-Moreno JM, Reicher S, McKee M. The COVID-19 vaccines rush: participatory community engagement matters more than ever. Lancet. 2021 Jan 2;397(10268):8-10. doi: 10.1016/S0140-6736(20)32642-8. Epub 2020 Dec 10. PMID: 33308484; PMCID: PMC7832461.

The authors highlight that successful vaccine roll-out will only be achieved by ensuring effective community engagement, building local vaccine acceptability and confidence, and overcoming cultural, socioeconomic, and political barriers that lead to mistrust and hinder uptake of vaccines. As an initial step, the authors propose clearly differentiating between individuals opposed to vaccination, from those who are hesitant because of limited or inaccurate health information or who have genuine concerns regarding vaccine safety or regulatory practices. Vaccine hesitancy might be another manifestation of mistrust in the government for communities that have been historically neglected, were neglected during the initial phases of the pandemic, and have little confidence that the government will protect them. These communities are being asked to trust structures, including health services, that have contributed to their experiences of discrimination, trauma, and marginalization. An analysis of the history of mass drug administration (MDA) and vertical immunization programs globally has taught us that acceptance increases as the community actively participates in the process and sufficient resources are allocated. For example, in Nigeria, a shift in polio vaccine acceptance was possible only after widespread community dialogues, which helped to foster social learning, establish equity, and generate and restore trust and participation in the program.

Dutta T, Agle J, Meyerson BE, Barnes PA, Sherwood-Laughlin C, Nicholson-Crotty J. Perceived enablers and barriers of community engagement for vaccination in India: Using socioecological analysis. PLoS One. 2021 Jun 25;16(6):e0253318. doi: 10.1371/journal.pone.0253318. PMID: 34170920; PMCID: PMC8232440.

The investigators identified a series of facilitators and barriers to community engagement in vaccination in India by reviewing vaccine policy documents and interviewing vaccine policy decision-makers. Policymakers were aware of the need for community engagement evidenced through public discourse; however, misconceptions of community engagement and subsequent lack of specific strategy posed a major barrier to the implementation of effective multilevel community engagement. Dissemination of material from the national level to the

states had a non-significant effect that was reduced by behaviors surrounding the caste-based power relations. A lack of institutionalized support to formalize relationships and incentivize vaccinations posed a barrier at the organizational level. Interpersonal rumors surrounding vaccination origin and its effects played a role that undermined effective social-behavioral change communication through social media and at the interpersonal level. These rumors were considered an inter-level socio-ecological barrier by vaccine decision makers.

Gilmore B, Ndejjo R, Tchetchia A, de Claro V, Mago E, Diallo AA, Lopes C, Bhattacharyya S. Community engagement for COVID-19 prevention and control: A rapid evidence synthesis. BMJ Glob Health. 2020 Oct;5(10):e003188. DOI: 10.1136/bmjgh-2020-003188 PMID: 33051285; PMCID: PMC7554411.

Community engagement has been considered a fundamental component of past outbreaks, such as Ebola. However, there is concern over the lack of involvement of communities and 'bottom-up' approaches used within COVID-19 responses thus far. Identifying how community engagement approaches have been used in past epidemics (o Ebola, Zika, SARS, Middle East respiratory syndrome and H1N1 since 2000) may support more robust implementation within the COVID-19 response. The authors conducted a rapid evidence review to support timely findings and they followed the methodology suggested by the Alliance for Health Policy and Systems Research. A total of 32 articles met the inclusion criteria and *six main community engagement actors were identified: local leaders, community and faith-based organizations, community groups, health facility committees, individuals and key stakeholders*. These worked on different functions: designing and planning, community entry and trust building, social and behavior change communication, risk communication, surveillance and tracing, and logistics and administration. The majority of articles were from Ebola response. Ebola had many unique considerations, including lack of trust, fear, rumors and cultural practices around burials and stigma. Fifteen engagements of local leaders, those with high levels of respect, were critical to support dismantling some of these notions and working towards prevention and control activities. The COVID-19 response may parallel Ebola in many ways, given the social spreading and potential stigma around contracting COVID-19. Implementing community-led action for COVID-19 in numerous countries or community action networks to identify and address the needs of community members, implementers, policy makers and researchers, is encouraged. Additionally, most examples were implemented in low-income countries or in high-income countries where community engagement was used to target minority populations for H1N1 and Zika. Implementers, policy makers and researchers are encouraged to share learnings from past engagement initiatives and to document ongoing engagement for COVID-19 activities. The authors concluded that community engagement may be specifically appropriate and needed for complex contexts, such as for migrants in humanitarian settings or in urban informal settlements. It is also needed to address more

complex situations, such as settings dealing with both COVID-19 and risk of hunger or supporting already overburdened health systems.

Eder MM, Millay TA, Cottler LB. A compendium of community engagement responses to the COVID-19 pandemic. J Clin Transl Sci. 2021 Jun 14;5(1):e133. doi: 10.1017/cts.2021.800. PMID: 34367677; PMCID: PMC8326670

COVID-19 has disproportionately infected populations across the US that have historically endured a myriad of health disparities, and disrupted clinical research, further reducing access to health care in under-resourced communities and challenged existing trusted partnerships. Increased susceptibility to COVID-19, along with health literacy deficiencies and inaccurate messaging about the available scientific evidence, exacerbated hospitalizations and deaths within the communities. Community engagement (CE) hub capacities for working with communities and translating knowledge into practice have been illustrated through their COVID-19 responses. This compendium is based on accounts provided by members of Partners for the Advancement of Community Engaged Research (PACER), a Special Interest Group of the Association of Clinical and Translational Science (ACTS). For the past 6 years, PACER has organized monthly meetings, bringing individuals focused on CE together. PACER has 201 members who are affiliated with 80 institutions and community organizations in 34 states. A PACER meeting conducted in April 2020 aimed to maintain and continue to build trust with and for the communities; identify current community needs and services for vulnerable populations; address loneliness, isolation, and other mental health issues; and keep research groups together during a research hiatus when programs and services were suspended. Eighteen institutions submitted written reports describing activities in relation to six themes: (1) listen to the community and respond to concerns, (2) collect data to understand the impact of COVID-19 on distinct communities and groups, (3) communicate science and address misinformation, (4) collaborate with health departments, (5) engage hubs and underrepresented populations in COVID-19 research, and (6) support our own well-being and that of others. Authors concluded that Bidirectional interactions comprise the foundation of CE, which requires trusted partnerships that sustain communication through a series of activities and goals. The nimble responses to the pandemic substantiated the need for CE programs to maintain the infrastructure necessary to achieve the primary goals of improving health within and across communities and localities as well as expanding research participation of community members.

Karris MY, Dubé K, Moore AA. What lessons it might teach us? Community engagement in HIV research. Curr Opin HIV AIDS. 2020 Mar;15(2):142-149. doi: 10.1097/COH.0000000000000605. PMID: 31895141; PMCID: PMC7374765.

Partnerships between academia and the community led to historic advances in HIV and paved the way for ongoing community engagement in research. In this study, the authors reviewed

the state of community engagement in HIV research, discussed best practices as supported by literature, explored innovations and identified ongoing gaps in knowledge. A total of 108 studies were included in the analysis and most of the studies were performed in high (44.4%) and middle income (27.8%) countries. The reasons for engagement were predominantly associated with study performance (to understand factors affecting recruitment) but also included identification of barriers and facilitators to trial participation, to inform the ethical conduct of the trial, and to develop trial tools. The authors discussed six factors related to community engagement research: 1) Room for improvement: Overall, this review revealed that the community engagement standard outlined by GPP guidelines continues to be inconsistently and incompletely applied. 2) Moving beyond top-down approaches: Power inequities due to expert knowledge and training as well as differences in circumstances often lead to top-down engagement with the community. Bottom-up approaches start with the community to identify the problem and involve the community in iterative development of solutions or approaches and engage the community in the performance of research. Ultimately the collaborative approach resulted in greater increases in child immunizations and HIV testing of women. 3) Bi-directional commitment, flexibility, and power sharing as keys to success: generates greater diversity of involvement and deeper connections between community advisors and the research team. 4) value in having difficult conversations: recognizing and addressing tensions through meaningful conversations enabled the community and the research teams to move forward with stronger dynamics and relationships. 5) Innovative approaches: to improve reach too difficult to engage populations and overcome some of the innate difficulties and improve trust and understanding in the performance. 6) Gaps in Knowledge and Key Research Priorities: Very few studies evaluate true effectiveness of academic-community partnerships in the delivery of project and public health relevant outcomes that clearly communicate the added value of these partnerships, especially to researchers, funders, and difficult to reach populations. The authors conclude that partnerships between academia and the community are capable of accomplishing tremendous positive change and greater time and attention should be placed on the development of community engagement in research.

Baltzell K, Harvard K, Hanley M, Gosling R, Chen I. What is community engagement and how can it drive malaria elimination? Case studies and stakeholder interviews. Malar J. 2019 Jul 17;18(1):245. doi: 10.1186/s12936-019-2878-8. PMID: 31315631; PMCID: PMC6637529.

Increasing complexity of identifying and treating malaria cases in low transmission settings, operational solutions are needed to increase effective delivery of interventions. Community engagement (CE) is at the forefront of this conversation given the shift toward creating local and site-specific solutions. Malaria programs often confuse CE with providing information to the community or implementing community-based interventions. This qualitative study used key informant (KI) interviews and focus group discussions (FGDs) to explore approaches to

community engagement in malaria elimination efforts as well as other sectors. Programs from eight health and development sectors, including malaria, were identified for programmatic evaluation. Specifically, the study explores community engagement perceptions and practices at three levels; from thought leaders (defined as those with expertise or leadership positions in sectors included in the study) who design CE activities, from programmatic staff who manage and implement community engagement activities, and from community members involved in community engagement interventions. Overall, ten programs with community engagement strategies from seven different health focus areas were included in the analysis: Ebola, HIV/Hepatitis C, Guinea worm, malaria, nutrition, and water, sanitation, and hygiene. Seven focus group discussions (FGDs) with 69 participants, 49 key informant interviews with program staff, and seven key informant interviews with thought leaders were conducted between October 2017 and April 2018. All participants in this study agreed that community engagement is vital for long-term success of any intervention or for uptake of new strategies to improve health. This sentiment is echoed in various global technical strategies and resolutions. However, how to operationalize community engagement at scale remains elusive and participants in this study acknowledge that the definition and execution of community engagement varies greatly. Authors conclude that evidence from the case studies overwhelmingly suggests that community engagement must be an iterative process that relies on early involvement, frequent feedback, and active participation from the community to be successful. Empowering districts and communities in planning and executing community-based interventions is necessary. Communities affected by the disease will ultimately achieve its elimination. For this to happen, the community itself must define, believe in, and commit to strategies to interrupt transmission.

Streuli S, Ibrahim N, Mohamed A, Sharma M, Esmailian M, Sezan I, Farrell C, Sawyer M, Meyer D, El-Maleh K, Thamman R, Marchetti A, Lincoln A, Courchesne E, Sahid A, Bhavnani SP. Development of a culturally and linguistically sensitive virtual reality educational platform to improve vaccine acceptance within a refugee population: the SHIFA community engagement-public health innovation programme. *BMJ Open*. 2021 Sep 14;11(9):e051184. doi: 10.1136/bmjopen-2021-051184. PMID: 34521673; PMCID: PMC8442061.

To combat misinformation, engender trust and increase health literacy, the authors developed a culturally and linguistically appropriate virtual reality (VR) vaccination education platform using community-engaged approaches within a Somali refugee community. Design Community-based participatory research (CBPR) methods including focus group discussions, interviews, and surveys were conducted with Somali community members and expert advisors to design the educational content. Co-design approaches with community input were employed in a phased approach to develop the VR storyline. 60 adult Somali refugees and seven expert advisors who specialize in healthcare, autism research, technology development and community engagement participated in this study. Somali refugees participated at the

offices of a community-based organization, Somali Family Service, in San Diego, California and online. The authors found that a CBPR approach can be effectively used for the co-design of a VR educational program. Additionally, cultural and linguistic sensitivities can be incorporated within a VR educational program and are essential factors for effective community engagement. Finally, effective VR utilization requires flexibility so that it can be used among community members with varying levels of health and technology literacy. This methodology can potentially be applicable to other populations where cultural sensitivities and language are common health education barriers.

Maertens JA, Jimenez-Zambrano AM, Albright K, Dempsey AF. Using Community Engagement to Develop a Web-Based Intervention for Latinos about the HPV Vaccine. J Health Commun. 2017 Apr;22(4):285-293. doi: 10.1080/10810730.2016.1275890. Epub 2017 Feb 22. PMID: 28276945.

This study investigated how to modify a previously developed web-based intervention that provided individually tailored information about HPV to improve its use among the Latino population. Iterative feedback from a Community Advisory Committee (CAC) was used, combined with data from focus groups, to explore the design-, technical-, and content-related modifications needed to effectively adapt an existing educational intervention about HPV vaccines, called Teen VaxScene, into a related intervention specific for the Latino community. Several themes emerged from this process, including a need for basic information about the HPV vaccine prior to more individualized information, changes to the look and feel of the intervention to make it appear less clinical, and the incorporation of information that addressed specific barriers identified by the Latino community as important that were not included in the original intervention. This feedback has helped the authors to modify the prior intervention into its current form, called CHICOS—a name chosen by our CAC to reflect the Latino population and the change of including information for both men and women.

Andrasik MP, Broder GB, Wallace SE, Chaturvedi R, Michael NL, Bock S, Beyrer C, Oseso L, Aina J, Lucas J, Wilson DR, Kublin JG, Mensah GA. Increasing Black, Indigenous and People of Color participation in clinical trials through community engagement and recruitment goal establishment. PLoS One. 2021 Oct 19;16(10):e0258858. doi: 10.1371/journal.pone.0258858. PMID: 34665829; PMCID: PMC8525736.

Recent data highlight the relative absence of Black, Indigenous and People of Color (BIPOC) communities in vaccine clinical trials and the importance of the BIPOC community engagement in infectious disease research as a critical component in efforts to increase vaccine confidence, acceptability, and uptake of future approved products. Intentional and effective community engagement methods are needed to improve BIPOC inclusion. The authors described the methods utilized for the successful enrollment of BIPOC participants in the U.S.

Government (USG)-funded COVID-19 Prevention Network (CoVPN)-sponsored vaccine efficacy trials and analyze the demographic and enrollment data across the efficacy trials to inform future efforts to ensure inclusive participation. (1) Utilization of community-based participatory research approaches to meaningfully involve communities throughout the research process - Increasing community awareness and knowledge to address and correct misperceptions, misinformation, and myths required the utilization of Community-Based Participatory Research (CBPR) approaches. (2) Stakeholder engagement and building trust - Working in partnership with institutions and organizations with whom longstanding trusting relationships have been established is a vital component of community engagement, particularly in BIPOC communities who have a long history of and contemporary experiences with institutional racism and research ethics abuses. (3) A faith initiative - a faith based advisory council was established to provide guidance and direction for community engagement efforts with faith-based groups, and to implement a national faith-focused CoVPN education program that used anti-racism, anti-homophobic, anti-transphobic, and other principles to ensure that the activities and messages reached broad audiences. (4) Communications and community influencers - The campaign focused on adults over 50 years old and Latino/a/Hispanic and Black/African American communities. It was developed using audience insights and testing gained through in-depth one-on-one interviews and surveys conducted in English and Spanish with members of the priority populations. The campaign employed a robust media mix including TV, connected TV, radio, internet audio, digital platforms and social media, as well as partnerships and sponsorships with trusted organizations such as the American Association of Retired People, BlackDoctor.org and celebrity personalities. These data illustrate that with sufficient resources, commitment and community engagement expertise, the equitable enrollment of BIPOC individuals can be achieved. What is also clear, however, is that even with robust fiscal resources and a longstanding collaborative and collective effort, the enrollment of White persons outpaces that of BIPOC communities. Without established recruitment goals that reflect the slower yet steady pace of BIPOC enrollment, the allocated enrollment slots were quickly filled, effectively blocking BIPOC persons' opportunities for participation. Rather than directing sites to slow or halt White enrollment, which presents its own operational challenges, future vaccine clinical trial efforts must include clear established goals for BIPOC enrollment from the outset of study accrual, reserving space in the trial to ensure equitable inclusion. Another approach to ensuring equity is the development of population-specific trials.

Bologna L, Stamidis KV, Paige S, Solomon R, Bisrat F, Kisanga A, Usman S, Arale A. Why Communities Should Be the Focus to Reduce Stigma Attached to COVID-19. Am J Trop Med Hyg. 2021 Jan;104(1):39-44. doi: 10.4269/ajtmh.20-1329. PMID: 33258438; PMCID: PMC7790080.

Since 1999, the CORE Group Polio Project (CGPP) has developed, refined, and deployed effective strategies to mobilize communities to improve vaccine uptake for polio (and other vaccine-preventable diseases such as measles) and conduct surveillance for infectious disease threats in high-risk, border, and hard-to-reach locations. The pandemic response is impacted by stigma in all areas of response, from health education, testing, contact tracing, and even treatment for infected individuals. The CGPP has reached back into its polio experience and is redeploying successful community engagement activities to address stigma as part of the COVID-19 response. Across country programs, community health volunteers communicate risk and behavior change at the household level by integrating health education and promotion activities with a focus on practical measures of COVID-19 prevention. Moreover, leveraging established and trusted partnerships with community networks and community leaders are providing lessons that can be adopted by the global community. The CGPP offers three overarching recommendations to curb stigma: 1) facilitating inclusive community engagement, 2) leveraging existing community networks and 3) cocreating with community leaders. The CGPP's current response to COVID-19 stigma is heavily dependent on tapping highly collaborative strategies of community partnership. Grounded in trust and inclusion, the CGPP is now using these vital strategies for its pandemic response program and will deploy these again during the rollout of a COVID-19 vaccine. In anticipation of widespread vaccine hesitancy and resistance, the project's response was defined by experiences from polio work through maintaining and building on these enduring community-centric strategies. These approaches have found success by creating a climate of resilience in communities facing overlapping challenges.

AuYoung M, Rodriguez Espinosa P, Chen WT, Juturu P, Young MT, Casillas A, Adkins-Jackson P, Hopfer S, Kissam E, Alo AK, Vargas RA, Brown AF; And the STOP COVID-19 C. A. Communications Working Group. Addressing racial/ethnic inequities in vaccine hesitancy and uptake: lessons learned from the California alliance against COVID-19. J Behav Med. 2022 Jan 22;1–14. doi: 10.1007/s10865-022-00284-8. Epub ahead of print. PMID: 35066696; PMCID: PMC8783654.

Lack of trust in biomedical research, government, and health care systems, especially among racial/ ethnic minorities and under-resourced communities, is a longstanding issue rooted in social injustice. The COVID-19 pandemic has further highlighted existing health and socioeconomic inequities and increased the urgency for solutions to provide access to timely, culturally, and linguistically appropriate evidence-based information about COVID-19; and ultimately to promote vaccine uptake. California's statewide alliance STOP COVID-19 CA (comprising eleven sites), leverages long standing community partnerships to better understand concerns, misinformation, and address racial/ethnic inequities in vaccine hesitancy and uptake. Using data from the California CEAL Communication Working Group, the authors demonstrated the wide range of strategies, communication methods, languages, and

trusted messengers that have been effective in reaching diverse communities across the state. They discussed: (1) Community strategies and community engagement for health equity formation of STOP COVID CA communications workgroup; (2) Communication strategies across communities and regions; (3) Methods for information gathering; (4) Focus groups; (5) Outreach strategies; (6) Communication strategies; (7) Challenges and future considerations. The authors highlighted that these approaches, rooted in community engagement, are crucial for addressing inequities and responding to future public health emergencies.

Appendix 5- Evidence in the literature supporting Promising Practice

2: Promoting Health Equity Through the Cooperative Extension County Educator Model

Marquez C, Kerkhoff AD, Naso J, et al. A multi-component, community-based strategy to facilitate COVID-19 vaccine uptake among Latinx populations: From theory to practice. PLoS One. 2021 Sep 20;16(9):e0257111. doi: 10.1371/journal.pone.0257111. PMID: 34543291; PMCID: PMC8452046.

This study aimed to boost vaccination rates among an underserved Latinx population. The intervention used a community-centered vaccination strategy that included mobilization, vaccination, and “activation” components. It utilized a theory-informed approach to design the “Motivate, Vaccinate, and Activate” COVID-19 vaccination strategy. The strategy’s design was guided by the PRECEDE Model and sought to address and overcome predisposing, enabling, and reinforcing barriers to COVID-19 vaccination faced by Latinx individuals in San Francisco. The vaccine strategy prototype utilized a theory-informed approach to design a multicomponent, implementation strategy that addressed barriers to COVID-19 vaccination faced by Latinx and other community members. The authors specifically sought to reach those community members for whom the City’s high volume vaccination sites posed barriers such as a lack of transportation and “institutional mistrust”. There were 20,792 COVID-19 vaccinations administered at the neighborhood site during the 16-week evaluation period and 70.5% of those were Latinx, 14.1% white, 7.7% Asian, 2.4% Black, and 5.3% other. The most frequently reported reasons for choosing vaccination at the site were its neighborhood location (28.6%), easy and convenient scheduling (26.9%) and recommendation by someone they trusted (18.1%). Notably, 58.3% of clients reported that they were able to get vaccinated earlier because of the neighborhood vaccination site, 98.4% of clients completed both vaccine doses, and 90.7% said that they were more likely to recommend COVID-19 vaccination to family and friends after their experience; these findings did not substantially differ according to ethnicity. In conclusion, “Motivate, Vaccinate, and Activate” vaccine promotion strategy reached a high proportion of Latinx residents in San Francisco. Its success was pointed out by the authors due to generation of trusted messengers and social networks, multi-faceted and adaptable mobilization strategies, and a convenient and welcoming neighborhood vaccine site.

Johnson C, Dukes K, Sinnwell E, Culp K, Zinnel D, Corwin C. Innovative Cohort Process to Minimize COVID-19 Infection for Migrant Farmworkers During Travel to Iowa. Workplace Health Saf. 2022 Jan;70(1):17-23. doi: 10.1177/21650799211045308. PMID: 35037514.

This report describes an innovative process to address the safety of Migrant and seasonal farmworkers (MSFW) that utilized cohorting that eventually allowed for safe release to work

in the fields on a large family farm in Iowa. Upon worker departure from Mexico, the employer arranged for bus seat assignments, mask use, and hand hygiene practice during the 3-day trip to Iowa. Upon arrival at the farm, surveillance testing and low-density housing cohorting based upon travel seat assignments allowed for early identification of infected workers and appropriate quarantine as per CDC guidelines. Upon completion of isolation or quarantine as appropriate, workers were released to congregate housing and work in the fields. The authors found that compared to a migrant farmworker COVID-19 outbreak without travel pre-planning, the cohorting process produced a 3.5% positivity rate compared to an earlier season July farmworker group on the same farm with a 12.7% positivity rate. The success of this model points to the power of collaboration between farm employer, health care providers and workers to minimize worker infection and enable safe work in the fields. Increased state and federal support for MSFW protections could support infrastructure to proactively plan for prevention mechanisms to prevent the spread of known communicable disease. With support in place from the top down, employers, workers, and health care providers will be able to prioritize the management of infectious diseases and the needs of essential workers.

Corwin C, Sinnwell E, Culp K. A Mobile Primary Care Clinic Mitigates an Early COVID-19 Outbreak Among Migrant Farmworkers in Iowa. J Agromedicine. 2021 Jul;26(3):346-351. doi: 10.1080/1059924X.2021.1913272. Epub 2021 May 20. PMID: 33902394.

This study presents a case study of an early COVID-19 outbreak among migrant farmworkers in Iowa and describes the role that a nimble and responsive mobile federally qualified health center played in the successful mitigation and response to this outbreak. Early during the pandemic, the clinic adopted a new model of service delivery utilizing telemedicine primary care visits, followed by in-person visits when necessary. As the pandemic progressed, clinic staff strategized to provide increased pandemic-related support to agricultural employers and migrant farmworkers across the state. Emphasis was placed on on-site testing and education regarding social distancing, mask utilization, and hand washing. Eventually, as migrant workers were infected and became symptomatic, more complex mitigation strategies such as isolation, quarantine, and clinical follow-up were also implemented. This report described how a mobile primary care clinic developed a pandemic responsive model to provide successful mitigation of an early COVID-19 outbreak among essential and highly vulnerable migrant farmworkers.

Appendix 6- Evidence in the literature supporting Promising Practice

3: Bringing Services and Vaccines to People Where They Are

Katzman JG, Tomedi LE, Thornton K, Menking P, Stanton M, Sosa N, Harkins M, Katzman N, Liu J, Archer GRD, Arora S. Innovative COVID-19 Programs to Rapidly Serve New Mexico : Project ECHO. Public Health Rep. 2021 Jan/Feb;136(1):39-46. doi: 10.1177/0033354920969180. Epub 2020 Nov 20. PMID: 33216679; PMCID: PMC7856386.

In this paper, Katzman et al. describe Project ECHO (Extension for Community Healthcare Outcomes), a newly developed set of seven weekly COVID-19 related telementoring programs. One of them was focused on community health workers, who are identified as being critical to the diverse cultural needs of the population. Sessions were offered two times every week in both English and Spanish. The content was focused on providing COVID-19 related education to community health workers, peer navigators, and peer support workers. Topics of discussion included “Myths and Truths Around COVID-19 Testing and Treatment” and “How and When to Wear Personal Protective Equipment (PPE).” A total of 20 sessions were held for 1395 CHWs. In addition to receiving information, CHWs also identified critical gaps (for example: lack of education on long-term effects of COVID-19 and increased rates of substance use disorder; lack of training on contact tracing) in COVID-19 response in their communities and shared the concerns of community members (for example: fears about testing and ways to address misinformation from unreliable sources).

Bettampadi D, Boulton ML, Power LE, Hutton DW. Are community health workers cost-effective for childhood vaccination in India? Vaccine. 2019 May 16;37(22):2942-2951. doi: 10.1016/j.vaccine.2019.04.038. Epub 2019 Apr 19. PMID: 31010713.

In this paper, Bettampadi et al. assessed the cost effectiveness of utilizing female community health workers (FCHW) to facilitate vaccination against measles among children under 5 years of age in India from 2012-2013. Authors used Markov modeling simulation comparing a cohort of children in a village with and without the female community health workers. Vaccination rates for measles were obtained from the 2013 District Level Household and Facilities Survey 4. Results indicated that the intervention was highly cost effective at \$162/DALY averted, as compared to no FCHW intervention. Additionally, the intervention remained cost effective with the FCHW incentive increased from \$2 to \$15. The authors also recommended that the central and regional government of India consider increasing the incentives for FCHWs.

Portillo EM, Vasquez D, Brown LD. Promoting Hispanic Immigrant Health via Community Health Workers and Motivational Interviewing. Int Q Community Health Educ. 2020 Oct;41(1):3-6. doi: 10.1177/0272684X19896731. Epub 2020 Jan 10. PMID: 31924133; PMCID: PMC7347455.

In this paper, Portillo et al. describe a health promotion program called 'Healthy Fit (En Forma Saludable)' that used 3 innovations to address health disparities in El Paso, Texas through utilizing the infrastructure available via the public health department. The program primarily targets Hispanics and Latino immigrants who are 18 years or older, uninsured, or are Medicaid beneficiaries, without excluding participants with insurance. The three innovations were: community health workers (CHWs), motivational interviews, and vouchers for free preventative health services. CHWs were trained to conduct motivational interviewing and support to address ambivalence among participants regarding health behaviors and seeking health services, including vaccinations. This addressed a critical gap in service delivery as traditionally only clinical professionals are trained in MI and might not necessarily come from the same community that they serve, hence adding barriers to service utilization. The authors conclude that utilizing CHWs as the bridge between the community and health services is an effective way of increasing reach among the low-income, immigrant Hispanic community in El Paso.

Huang JJ, Francesconi M, Cooper MH, Covello A, Guo M, Gharib SD. Community health workers on a college campus: Effects on influenza vaccination. J Am Coll Health. 2018 May-Jun;66(4):317-323. doi: 10.1080/07448481.2018.1440582. Epub 2018 Apr 19. PMID: 29447623.

In this paper, Huang et al. described the impact of a campus community health worker program (HealthPALs) on undergraduate student influenza vaccination at a university in Northeast US. Undergraduate students were trained in the community health worker model to provide basic first aid in his/her dormitory, conduct health outreach, and help peers navigate the campus healthcare system. As a pilot, in 2013, HealthPALs conducted an in-person pilot community health intervention in which 2–5 HealthPALs greeted students entering the dining hall, informed them of the flu clinic, explained the benefits of vaccination, and answered students' questions. As an enhanced intervention, from 2014, HealthPALs conducted a personalized social media campaign, designed to appeal to students' community identity, in addition to in-person outreach. Results indicated that during the pilot intervention, the number of immunizations administered in intervention clinics rose 66% (Incidence Rate Ratio (IRR) = 1.66, 95% Confidence Interval (CI) [1.39–1.97]) relative to control. Additionally, during the enhanced intervention, vaccinations across dormitory clinics rose 85% (IRR = 1.85, 95% CI [1.75–1.96]) compared to university-wide control. The authors concluded that the community health worker model was highly effective at increasing influenza vaccination among college students.

Angwenyi V, Kamuya D, Mwachiro D, Marsh V, Njuguna P, Molyneux S. Working with Community Health Workers as 'volunteers' in a vaccine trial: practical and ethical

experiences and implications. Dev World Bioeth. 2013 Apr;13(1):38-47. doi: 10.1111/dewb.12015. PMID: 23521823; PMCID: PMC3662994.

In this paper, Angweni et al. discuss the practical and ethical implications of involving Community Health Workers (CHWs) as part of a community engagement strategy for a vaccine trial in rural areas of Kilifi District, Kenya. While CHWs were initially involved in a key group to share the information about the study, their involvement was later expanded to identifying potential participants for the study and disseminating study related information to potential participants. The authors mentioned that the involvement of CHWs had great benefits, for example- acceptance of the study by the community and district health officials. However, there were challenges as well. These roles overlapped with the roles of other fieldworkers who received more compensation for their work, as compared to CHWs while the latter's compensation was based on their "performance", leading to CHWs exaggerating the benefit of trials to potential participants and utilizing their social standing to influence participation. The authors concluded that the roles of CHWs in community vaccine trials need to be carefully considered and discussed along with how these roles align with other study staff and health personnel, along with providing adequate financial remuneration and training to the CHWs to perform assigned tasks.

Zaidi S, Kazi AM, Riaz A, Ali A, Najmi R, Jabeen R, Khudadad U, Sayani S. Operability, Usefulness, and Task-Technology Fit of an mHealth App for Delivering Primary Health Care Services by Community Health Workers in Underserved Areas of Pakistan and Afghanistan: Qualitative Study. J Med Internet Res. 2020 Sep 17;22(9):e18414. doi: 10.2196/18414. PMID: 32940612; PMCID: PMC7530697.

Zaidi et al. explored the perceptions of community health workers (CHWs) from underserved areas of Afghanistan and Pakistan, on the operability of the mHealth app in a community setting, usefulness of the app in the delivery of assigned maternal and childcare functions, and the task-technology fit with monitoring information systems. The authors conducted 8 focus groups with community health workers. The participants were asked questions about The Hayat app, designed to digitalize and facilitate electronic record keeping, which was evaluated to be embedded into mainstream health systems. The app had 2 components: smartphone app for data entry and web dashboard for visualization of the maternal, newborn, and child health reports. Results indicated that female community health workers had greater difficulty operating the app and requested additional training. Male CHWs reported no such difficulty. Authors recommended conducting end user experience studies before embedding apps into mainstream health systems.

Petrova E, Farinholt T, Joshi TP, Moreno H, Al Mohajer M, Patel SM, Petrosino J, Anandasabapathy S. A Community-Based Management of COVID-19 in a Mobile

Container Unit. Vaccines (Basel). 2021 Nov 19;9(11):1362. doi: 10.3390/vaccines9111362. PMID: 34835293; PMCID: PMC8624920.

This study is a proof-of-concept study to show that mobile health clinics can offer safe and effective community health. The team uses a mobile container as a community health clinic to provide COVID-19 care and samples the air and various surfaces of the pod. Through their sampling they were not able to find any evidence of viable COVID-19 particles and demonstrated the smart pod design as an innovative way to provide a location for vaccination for communities.

Pan J, A K, Liu Z, Zhang P, Xu Z, Guo X, Liu G, Xu A, Wang J, Wang X, Wang W. Factors That Impact Acceptance of COVID-19 Vaccination in Different Community-Dwelling Populations in China. Vaccines (Basel). 2022 Jan 8;10(1):91. doi: 10.3390/vaccines10010091. PMID: 35062753; PMCID: PMC8779453.

This study examined 120 neighborhoods sampled using multi-stage stratified sampling in proportion to the population size. The questionnaire was delivered in both face-to-face settings as well as online and shows interesting results that have implications for community health. With 2169 valid questionnaires, the results showed that 82.6% of respondents were willing to receive a COVID-19 vaccine if it was available in the community. There was also an increased vaccination acceptance if it was recommended by a government source, doctor, relative, or friends.

Mayfield-Johnson S, Smith DO, Crosby SA, Haywood CG, Castillo J, Bryant-Williams D, Jay K, Seguinot M, Smith T, Moore N, Wennerstrom A. Insights on COVID-19 From Community Health Worker State Leaders. J Ambul Care Manage. 2020 Oct/Dec;43(4):268-277. doi: 10.1097/JAC.0000000000000351. PMID: 32858726; PMCID: PMC7461725.

This study was a culmination of semi-structured interviews done with CHW leaders from 7 states. Within these interviews, 8 major themes were identified: CHW identity, CHW resiliency, self-care, unintended positives outcomes of COVID-19, technology, resources, stressors, and consequences of COVID-19. There was also information on how CHW work as translators, taking information from state health department websites and making it understandable for people within their communities through infographics and reframing to reflect health literacy.

Appendix 7- Evidence in the literature supporting Promising Practice 6: Implementing Subgroup Specific Education Campaigns

Additional studies among racial-ethnic subgroups

Bogart LM, Dong L, Gandhi P, Klein DJ, Smith TL, Ryan S, Ojikutu BO. COVID-19 Vaccine Intentions and Mistrust in a National Sample of Black Americans. J Natl Med Assoc. 2021 Jun 19;113(6):599–611. doi: 10.1016/j.jnma.2021.05.011. Epub ahead of print. PMID: 34158171; PMCID: PMC8214755.

In this study, 207 Black American participants completed a web-based survey in the RAND American Life Panel about COVID- 19 vaccine intentions from November to December 2020. Results revealed over 35% agreed or strongly agreed they would not get the vaccine, 40% agreed or strongly agreed they would get the vaccine, and 25% did not know. Multivariable predictors for not wanting the vaccine indicated reasons of deterrence were due to high mistrust of the vaccine (OR: 2.2, 95% CI [1.2-3.9], $p=0.007$) and the influence of subjective norms (OR: 0.6, 95% CI [0.4-0.7], $p<0.001$). The authors noted that low sample size may have impacted certain demographics and possibly generalizability of the study since this sample of participants were older on average, had a higher percentage of females, and were from the US Middle-Atlantic and Pacific regions. Despite these drawbacks, results overall highlight how vaccine-related mistrust is a multifaceted feeling among Black communities due to factors such as distrust of healthcare and providers, the government, and vaccine safety and efficacy. Future considerations should aim to establish long-term community collaborations to establish trust between these components to foster adherence to recommended health practices like vaccination.

Ferdinand KC, Nedunchezian S, Reddy TK. The COVID-19 and Influenza "Twindemic": Barriers to Influenza Vaccination and Potential Acceptance of SARS-CoV2 Vaccination in African Americans. J Natl Med Assoc. 2020 Dec;112(6):681-687. doi: 10.1016/j.jnma.2020.11.001. Epub 2020 Dec 1. PMID: 33276969.

This review investigates the nature of influenza vaccination among Black Americans in consideration for potential implications that may be seen with efforts for COVID -19 vaccination. Results reveal existing disparities in influenza vaccination among African Americans where 39% of Black adults 18 years old and older were vaccinated compared to 49% of white adults. Predictors for low vaccination rates included mistrust, high uninsurance rates, and general concerns regarding safety and efficacy. Facilitators for influenza immunization included higher age, SES and education level. Increased racial consciousness correlated with lower vaccine trust, higher perceived vaccine risk and vaccine hesitancy

whereas increased perceived racial fairness led to opposing results. Future recommendations for increasing COVID-19 vaccination should focus on overcoming barriers in the African American community through a multifaceted and robust campaign which targets three main areas: educational campaigning with evidence-based information on COVID-19, vaccine policy initiatives to gain trust, and novel measures to eliminate disparities.

Momplaisir F, Haynes N, Nkwihoreze H, Nelson M, Werner RM, Jemmott J. Understanding Drivers of Coronavirus Disease 2019 Vaccine Hesitancy Among Blacks. Clin Infect Dis. 2021 Nov 16;73(10):1784-1789. doi: 10.1093/cid/ciab102. PMID: 33560346; PMCID: PMC7929035.

COVID-19 has affected communities of color, particularly Black populations given they experience the highest rates of disease severity and mortality. Four focus groups (n=24 participants) were held with Black barbershop and salon owners living in zip codes in West Philadelphia with increased COVID-19 prevalence in July and August 2020. Attitudes, beliefs, and norms about the COVID-19 vaccine were assessed and analyzed. 89% were Black non-Hispanic and an average age of 46. They found that reasons for vaccine hesitancy included mistrust of the medical community, concerns for the fast-paced timeline of vaccine development, safety and efficacy and mistrust in the government. Factors that facilitated vaccination included recommendations from trusted providers and transparency regarding safety of the vaccine.

Privor-Dumm L, King T. Community-based Strategies to Engage Pastors Can Help Address Vaccine Hesitancy and Health Disparities in Black Communities. J Health Commun. 2020 Oct 2;25(10):827-830. doi: 10.1080/10810730.2021.1873463. PMID: 33719889.

This paper describes strategies to address vaccine hesitancy in Black communities. To approach this vaccine hesitancy, initial steps should aim to determine underlying perceptions, historical contexts, and beliefs that influence an individual's decision. The framework of approach includes using listening skills and empathetic approaches to assure individuals in the community are acknowledged. To further establish a relationship of trust, interventions should use key community messengers, such as pastors, to help in fostering community engagement and participation, especially given the important role of faith in Black communities.

Sharma M, Batra K, Batra R. A Theory-Based Analysis of COVID-19 Vaccine Hesitancy among African Americans in the United States: A Recent Evidence. Healthcare (Basel). 2021 Sep 27;9(10):1273. doi: 10.3390/healthcare9101273. PMID: 34682953; PMCID: PMC8535568.

This study investigates the recent trends in COVID-19 vaccination rates among African Americans and attempts to predict the efficacy of using the multi-theory model (MTM) of

health in imitating COVID-19 vaccination among vaccine-hesitant Blacks. 428 unvaccinated African Americans were recruited in a web-based survey using a 28-item psychometric valid questionnaire. Results showed 48% of the sample reported hesitancy for taking the COVID-19 vaccination. Individuals in the vaccine hesitant group tended to be younger compared to the vaccine non-hesitant group (40.52 years $\pm$ 15.8 vs. 46.2 years $\pm$ 17.4, $p < 0.0001$). The vaccine hesitant group had a significantly higher proportion of individuals identifying as Republican (22.1% vs. 10.0%, $p < 0.001$), living in the North-East (26.0% vs. 11.4%, $p < 0.001$) and belonging to religions other than Christianity (21.2% vs. 13.6%, $p = 0.04$). Perceived advantages were significantly higher among the vaccine non-hesitant group (9.01 $\pm$ 3.10 vs. 7.07 $\pm$ 3.60, $p < 0.001$) whereas the perceived disadvantages were higher among the vaccine hesitant group (8.36 $\pm$ 3.02 vs. 5.15 $\pm$ 3.12, $p < 0.001$). Constructs of the MTM were statistically significant between both groups, therefore the authors proposed and created a diagram of how to implement the MTM for improved behavior change for vaccine uptake using a mobile health intervention.

Woko C, Siegel L, Hornik R. An Investigation of Low COVID-19 Vaccination Intentions among Black Americans: The Role of Behavioral Beliefs and Trust in COVID-19 Information Sources. J Health Commun. 2020 Oct 2;25(10):819-826. doi: 10.1080/10810730.2020.1864521. PMID: 33719874.

In this study a nationally representative sample of adults ($n = 1,074$) was recruited to complete surveys online or by phone. They were initially interviewed between May and June 2020, then again for a follow-up approximately 6 weeks later. The survey measured COVID -19 related beliefs, intentions, behavior and personal and demographic characteristics. 11% of the weighted sample identified as Black. Black respondents reported significantly lower vaccination intentions compared to other groups T1 ($M = 2.6$ vs. $M = 2.9$) and T2 ($M = 2.4$ vs. $M = 2.9$). Scores for vaccination beliefs were significantly lower in Black participants (2.4) compared to others ($M = 2.9$) and Black respondents had significantly more trust in mainstream media ($p = 0.006$) and social media ($p < 0.001$), and significantly lower trust in President Trump ($p < 0.001$). Findings revealed the extent of trust Black respondents have for public health officials and President Trump is not as influential in their COVID-19 vaccine beliefs as it is in other groups.

Long A, Mathew S, Alvarez KS, Smartt J, Shah M, Madden C, Perl TM, Cerise FP, Bhavan KP. Co-Created Messaging for Influenza Vaccination in a High-Risk Hispanic Community Provides Groundwork for COVID-19 Vaccine. Health Equity. 2021 May 24;5(1):345-352. doi: 10.1089/heq.2020.0132. PMID: 34084986; PMCID: PMC8170719.

This paper aimed to improve influenza vaccination through a community-led event, partnering with the Cristo Rey School in Dallas. Messaging was cocreated with student health ambassadors to promote immunization and delivered through trusted sources. Health

ambassadors were educated about the influenza virus, morbidity and mortality associated with infection, and the importance of vaccination as a preventive measure. Messaging was then cocreated by health ambassadors in English and Spanish for print and digital media outlets. This information was subsequently disseminated through trusted community sources, including the local Catholic Church, Spanish language radio, food banks and grocery stores, and the Mexican Consulate. Among Spanish language participants, the church bulletins (57.3%) and Spanish language radio (30.5%) were reported to be most effective modes of messaging versus word of mouth (32.9%) and social media (26.3%) for English-speaking participants. Sixteen percent of participants surveyed had never received an influenza vaccine before this event. Of the four no-cost influenza vaccination events administered for the 2019–2020 influenza season, the health ambassador-led one event resulting in the highest turnout, with 394 participants vaccinated over 4 h. The other three events utilized a standard health system led messaging approach, resulting in 300 cumulative participants and only 27 participants vaccinated in the event. This paper concluded that messaging and delivery with community engagement were vital components to the success of our influenza vaccine drive. Promoting health and wellness with low- and high-tech modalities and outlets was effective for this population.

Schensul JJ, Radda K, Coman E, Vazquez E. Multi-level intervention to prevent influenza infections in older low income and minority adults. *Am J Community Psychol.* 2009 Jun;43(3-4):313-29. doi: 10.1007/s10464-009-9235-y. PMID: 19387822.

This paper described a successful multi-level participatory intervention grounded in principles of individual and group empowerment and guided by social construction theory. The intervention (2005-2006) addressed known and persistent inequities in influenza vaccination among African American and Latino older adults. The overall design was a Group Randomized Controlled Trial with an embedded Dynamic Controlled Trial (a continuous feedback model). Two public senior housing buildings in Hartford, CT, were matched by size and by ethnicity. The intervention unit formed a V.I.P group with some residents. They were trained to merging scientific knowledge with resident beliefs and understandings about influenza and vaccination. The V.I.P. delivered flyers to all apartments in the intervention building, and placed posters in common areas where residents gathered. They also utilized face-to-face encounters with residents whom they knew personally as opportunities to invite them to come to fairs and vaccination clinics. The vaccination rate increased from 30.4 to 71% of respondents in the intervention building and there was a significant difference between the increase in vaccination in the control building (18%) and the intervention building (41%) ($p = .010$). This study had shown that a carefully facilitated training effort with peer educator/advocates (the V.I.P. Committee) who are representative of the target population in culture, history, residence, and language use, supported by a broad alliance of researchers, health and social service providers and housing management (the I.S.A.), could build vaccine

promotion leadership, knowledge, and action in a heretofore marginalized and unheard population.

Naifeh M, Ang S, Darden PM. Provider recommendation of HPV vaccine: How much difference does it make nationally and in Oklahoma? Journal of Investigative Medicine. 2011 59 :2 (474).

Analyses of data from adolescents aged 13-17 years in all 50 states surveyed at the 2008 National Immunization Survey-Teen (NIS-Teen) determined the prevalence of teens receiving ≥ 1 HPV vaccine (35.4% Oklahoma vs. 37.2% nationally). Almost half, 49.2%, of parents reported that their provider recommended the HPV vaccine. Provider recommendations (57.5% vs. 18.1%, $p < .001$), and receiving care in private practice vs. public (43% vs. 20%, $p < .001$), increased the percentage of teens receiving ≥ 1 HPV vaccine. Teen girls living below poverty (family income $< 75,000$) were more likely to have received ≥ 1 HPV vaccine (46.4% vs. 35.8%, $p < .05$). Hispanics were more likely to have received at least one HPV vaccine than Whites or Blacks (44.4% vs. 35% and 35.7% respectively, $p < .001$). Rates of HPV vaccination improve dramatically when providers recommend the vaccine. A more concentrated effort to increase the rate of providers recommending HPV could improve adolescent vaccination rates. [AL1]

Carson SL, Casillas A, Castellon-Lopez Y, Mansfield LN, Morris D, Barron J, Ntekume E, Landovitz R, Vassar SD, Norris KC, Dubinett SM, Garrison NA, Brown AF. COVID-19 Vaccine Decision-making Factors in Racial and Ethnic Minority Communities in Los Angeles, California. JAMA Netw Open. 2021 Sep 1;4(9):e2127582. doi: 10.1001/jamanetworkopen.2021.27582. PMID: 34591103; PMCID: PMC8485164.

This study aimed to examine factors that members of multiethnic communities at high risk for COVID-19 infection and morbidity report as contributing to vaccine decision-making. This qualitative study used community-engaged methods to conduct virtual focus groups from November 2020, to January 2021, with Los Angeles County residents. Potential participants were recruited through email, video, and telephone outreach to community partner networks. A total of 13 focus groups were conducted with 70 participants (50 [71.4%] female) who self-identified as American Indian ($n = 17$ [24.3%]), Black/African American ($n = 17$ [24.3%]), Filipino/Filipina ($n = 11$ [15.7%]), Latino/Latina ($n = 15$ [21.4%]), or Pacific Islander ($n = 10$ [14.3%]). Participants reported a number of factors that affected their vaccine decision-making, including concern for inequitable vaccine access. Participants endorsed policy recommendations and strategies to promote vaccine confidence. These results suggest that support of informed deliberation and attainment of vaccine equity will require multifaceted, multilevel policy approaches that improve COVID-19 vaccine knowledge, enhance trust, and address the complex interplay of sociocultural and structural barriers to vaccination.

Majee W, Anakwe A, Onyeaka K, Harvey IS. The Past Is so Present: Understanding COVID-19 Vaccine Hesitancy Among African American Adults Using Qualitative Data. J Racial Ethn Health Disparities. 2022 Feb 19;1–13. doi: 10.1007/s40615-022-01236-3. Epub ahead of print. PMID: 35182372; PMCID: PMC8857529.

The present study aims to explore vaccine attitudes and intentions among program participants, understand the role of an African American faith-based wellness program in COVID-19 awareness and vaccine uptake, and solicit potential solutions for this deep-rooted public health problem. Data were collected through 21 in-depth interviews among individuals involved within a community-based wellness program. Sixteen phone and five in-person interviews were conducted with church leaders, lifestyle coaches, and program participants. All interviews were audio-recorded, transcribed verbatim, and inductively and thematically analyzed by three researchers. Live Well by Faith (LWBF) acted as a trusted information source for COVID-19 resources for the AA community. Services provided by Live Well by Faith included enrolling community members for vaccines, negotiating vaccine provision to and facilitating the establishment of vaccine clinics at AA churches, and connecting community members to healthcare providers. Despite the role Live Well by Faith played, VH was a significant concern due, in part, to historical mistrust of government and pharmaceutical companies conducting unethical healthcare research among Black populations. Other factors included uncertainty about vaccination (vaccines' safety, efficacy, and necessity), social media misinformation, and political affiliation. Participants expressed the need for government to commit resources towards addressing historical factors and building trust with minority populations. Resource targeting programs such as Live Well by Faith that engage faith and community leaders in co-designed shared and culturally grounded interventions can help restore and strengthen trust in vaccines and governments and reduce vaccine hesitancy.

Additional studies among pregnant women

Stockwell MS, Westhoff C, Kharbanda EO, Vargas CY, Camargo S, Vawdrey DK, Castaño PM. Influenza vaccine text message reminders for urban, low-income pregnant women: a randomized controlled trial. Am J Public Health. 2014 Feb;104 Suppl 1(Suppl 1):e7-12. doi: 10.2105/AJPH.2013.301620.

In this paper Stockwell et al., evaluated the impact of influenza vaccine text message reminders in a low-income obstetric population. A randomized controlled trial was conducted and enrolled 1187 obstetric patients from 5 community-based clinics in New York City. The intervention group received 5 weekly text messages regarding influenza vaccination starting mid-September 2011 and 2 text message appointment reminders. Intervention and control groups received standard automated telephone appointment reminders. Women who received

the intervention were 30% more likely to be vaccinated (AOR for every month from the end of September to December ranged from 1.27 to 1.35). The subgroup of women early in the third trimester at randomization showed the greatest intervention effect (AOR = 1.88; 95% CI = 1.12, 3.15). The effects of text messaging were minimal, but still significant and should be considered as a cost-effective intervention, particularly for women in the third trimester of pregnancy.

Meharry MP, Cusson RM, Stiller R, Vázquez M. Maternal influenza vaccination: evaluation of a patient-centered pamphlet designed to increase uptake in pregnancy. *Trial Matern Child Health J.* 2014 Jul;18(5):1205-14. doi: 10.1007/s10995-013-1352-4.

This paper shows the result of a randomized control trial conducted on pregnant women (n = 135) to test the efficacy of a theoretically-based pamphlet with multi-cultural photographs intervention entitled 'Influenza in Pregnancy,' designed to increase pregnant women's knowledge, reduce barriers to maternal vaccination, and subsequently improve vaccine uptake. The study had three arms: the pamphlet; pamphlet/benefit statement (vaccinating the pregnant woman also benefits the young infant); or control. Both the pamphlet group (72.9% vaccination rate, p = .009), and the pamphlet/benefit statement group (86.1% vaccination rate, p < .001), had significantly higher influenza vaccine uptake than the control group (46.9% vaccination rate). The pamphlet significantly increased the pregnant women's perceptions of the safety and benefit of the vaccine, and the overall uptake. However, the vaccination confirmation was obtained by a mix of a RN report or self-report up until 2 months after the intervention.

Panda B, Stiller R, Panda A. Influenza vaccination during pregnancy and factors for lacking compliance with current CDC guidelines. *J Matern Fetal Neonatal Med.* 2011 Mar;24(3):402-6. doi: 10.3109/14767058.2010.497882. Epub 2010 Jul 1.

This study aimed to understand the impact of several interventions (i.e. physician education program that included reminders via e-mail, posters advertising the influenza vaccine, and availability of the vaccine at prenatal care centers during prenatal ultrasounds) to increase Influenza immunization rates. Researchers compared levels of knowledge among patients and physicians and vaccination rates in the clinics before and one-year after the interventions were implemented. Influenza vaccination rates increased from 19% to 31% , physicians were more likely to recommend the vaccine if they were aware of current CDC guidelines (OR 1.8, 1.3–2.5), provided vaccinations in their offices (OR 1.9, 1.4–2.5), and had been vaccinated against influenza themselves (OR 2.2, 1.6–2.8). This study suggests that the implemented interventions might be effective to increase patient physician discussion of the benefits of influenza vaccination among pregnant women and increase vaccination rates overall.

Goodman K, Mossad SB, Taksler GB, Emery J, Schramm S, Rothberg MB. Impact of Video Education on Influenza Vaccination in Pregnancy. J Reprod Med. Nov-Dec 2015;60(11-12):471-9. PMID: PMC4827704.

In this study 105 participants from three suburban Cleveland Clinic Health System OB/GYN offices were randomized on two groups, an intervention group who viewed the video developed by the Centers for Disease Control and Prevention, "*Protect Yourself, Protect Your Baby*", which addresses vaccination health beliefs concepts found to be predictive of vaccination; and a control group who viewed "*Put Your Hands Together*", a CDC video of the same length addressing handwashing hygiene. Vaccination rates were 28% in the intervention group and 25% in the control group ($p=0.70$). The results indicate that the vaccine video education positively influenced health beliefs regarding influenza vaccination without improving the rate of vaccination. In particular, the video improved beliefs about the safety and efficacy of the flu vaccine. In contrast, the physician's recommendation was strongly associated with both an improvement in health beliefs about the dangers of influenza and with becoming vaccinated. Those patients who reported that their physician recommended the vaccine were 4 times as likely to be vaccinated as those who did not.

Wong VWY, Fong DYT, Lok KYN, Wong JYH, Sing C, Choi AY, Yuen CYS, Tarrant M. Brief education to promote maternal influenza vaccine uptake: A randomized controlled trial. Vaccine. Oct 2016;34(44):5243-5250. doi: 10.1016/j.vaccine.2016.09.019.

The purpose of this study was to evaluate the effect of a brief education intervention on maternal influenza vaccine uptake. Pregnant women ($n=321$) in Hong Kong were randomized to receive either standard antenatal care or brief one-to-one education. The intervention group received standard care plus a 10-minute one-to-one education session that focused on four key recommendations: (i) informing the participants about vaccination recommendations; (ii) encouraging them to discuss vaccination with their antenatal care provider or general practitioner (GP); (iii) increasing accessibility of the vaccine by referral to clinics where vaccination could be obtained; and (iv) providing influenza-related information from the official government website and the website uniform resource locator. The vaccination rate was higher among participants who received brief education (21.1% vs. 10%; $p = 0.006$) than the control group, but still substantially below the Healthy People 2020 target vaccination rate (80%). Authors highlighted that there were more participants with a pre-existing chronic illness in the intervention group ($p = 0.006$) and this may explain the higher rates of vaccination uptake in this group.

Yudin MH, Mistry N, De Souza LR, Besel K, Patel V, Mejia SB, et al. Text messages for influenza vaccination among pregnant women: A randomized controlled trial. Vaccine. Feb 2017;35(5):842-848. doi: 10.1016/j.vaccine.2016.12.002.

This randomized control trial aimed to evaluate the efficacy of text message reminders in increasing influenza vaccine rates among pregnant women in Toronto. Women were randomized to an intervention (2 weekly text messages for 6 weeks) and control group. Vaccination rates in the intervention group (31%) were higher than in the control group (27%), but the difference was not significant ($p = 0.51$). Significant predictors of vaccine acceptance were being married compared to single (95% vs. 67%, $p < 0.001$), having higher household income (55% vs. 39%, $p = 0.03$) and having received the vaccine before (77% vs. 36%, $p < 0.001$). The study pointed that the messages may not have been tailored enough to lead to behavioral change and provider endorsement has been shown to be an important predictor of vaccine receipt. Perhaps a greater impact would have been observed if the messages were more personalized for each individual recipient, such as coming directly from their providers.

Maltezou HC, Koutroumanis PP, Kritikopoulou C, Theodoridou K, Katerelos P, Tsiaousi I, Rodolakis A, Loutradis D. Knowledge about influenza and adherence to the recommendations for influenza vaccination of pregnant women after an educational intervention in Greece. Hum Vaccin Immunother. 2019 Feb;15(5):1070-1074. doi: 10.1080/21645515.2019.1568158

The study evaluated knowledge about influenza and the adherence to the recommendations for influenza vaccination among pregnant women ($n=304$) following an educational intervention that included a leaflet (available upon request) with information about the complications of influenza during pregnancy and infancy and the efficacy and safety of influenza vaccine in pregnant women. The expected benefits of influenza vaccination were also presented by their obstetrician. Pregnant women also discussed with their obstetrician their concerns (if any) about vaccination. The mean knowledge score was 87% and vaccination rates were higher than in prior years (19.5% vs. <2%). Previous influenza vaccination ($OR = 3.6$; $p\text{-value} = 0.016$) and information about the need to get vaccinated ($OR = 17.8$; $p\text{-value} < 0.001$) were the strongest correlates of vaccine uptake. Reason for refusing influenza vaccination included: "Fear of adverse events" (for them or the fetus) (27%), followed by the statements "influenza vaccination is not necessary" (18.5%) and "not at risk to get influenza" (13%). The role of intensified interventions should be explored.

O'Leary ST, Narwaney KJ, Wagner NM, Kraus CR, Omer SB, Glanz JM. Efficacy of a Web-Based Intervention to Increase Uptake of Maternal Vaccines: An RCT. Am J Prev Med. 2019 Oct;57(4):e125-e133. DOI: 10.1016/j.amepre.2019.05.018

This RCT focused on four different vaccines (Influenza, Tetanus, diphtheria, and acellular pertussis) and was conducted among women in the third trimester of pregnancy in an integrated healthcare system in Colorado. Women were randomly assigned to 1 of 3 arms: website with vaccine information and interactive social media components, website with

vaccine information only, or usual care. For influenza (n=289), women in both the website with vaccine information and interactive social media components (OR=2.19, 95% CI=1.06, 4.53) and website with vaccine information only (OR=2.20, 95% CI=1.03, 4.69) arms had higher vaccine uptake than the usual care arm (proportions of women receiving the influenza vaccine were 57%, 55%, and 36%). The results suggest there is potential for such web based interventions to increase uptake of maternal vaccines. Web-based interventions have the advantage of scalability and offer a low-cost approach to deliver vaccine-related information.

Dehlinger C, Nypaver C, Whiteside J. Use of an Evidence-Based Approach to Improve Influenza Vaccination Uptake in Pregnancy. J Midwifery Womens Health. May 2021; 66(3):360-365. doi: 10.1111/jmwh.13227.

This study compared vaccinations rates from 1480 records in the 2018-to-2019 (control) season and 1487 from the 2019-to-2020 intervention season, after multiple interventions directed at patients, health care providers, and the health care system were simultaneously implemented as recommended by the Community Preventive Services Task Force. The interventions included the provision of standardized evidence-based education for patients (i.e., a one-page opt-in or opt-out vaccination consent form that, when signed, documented the patient's accepting or declining the vaccine), complementary CDC posters encouraging vaccination in the hospital rooms, and . education, periodic reminders, and a prompt via a best practice advisory that appeared in the electronic health record for the providers. The rate of Influenza vaccine was higher in the 2019-to-2020 season (63% vs 59%; p-value = .01) compared to the prior season. Authors concluded that postintervention influenza vaccination prevalence remains below the 80% goal of the Healthy People 2020 and that a strong health care provider recommendation and positive message framing regarding infant benefits seem to be two of the most influential interventions to encourage vaccination uptake

Studies among Individuals with Chronic Diseases

Summary: Most studies provided evidence on the lack of systematic outreach programs for vaccine uptake among high-risk populations, including individuals with chronic diseases. Patient advocacy groups and national scientific organizations (e.g., American Diabetes Association) might represent important allies in vaccine promotion interventions, particularly for community-based interventions. Patients under the care of multiple clinicians reported receiving conflicting recommendations from their health care providers, which highlights the importance of continuing medical education on COVID and the need to implement health education strategies in clinical settings where the opportunity to educate patients during the clinical encounter is limited given time or administrative constraints.

Costantino A, Topa M, Roncoroni L, Doneda L, Lombardo V, Stocco D, Gramegna A, Costantino C, Vecchi M, Elli L. COVID-19 Vaccine: A Survey of Hesitancy in Patients with Celiac Disease. *Vaccines (Basel)*. 2021 May 16;9(5):511. doi: 10.3390/vaccines9050511. PMID: 34065654; PMCID: PMC8156726.

Information on vaccine hesitancy plays a pivotal role in the development of an efficient vaccination campaign. In this study, the authors aimed to evaluate COVID-19 vaccine hesitancy among Italian Celiac Disease (CD) patients. The authors sent anonymous questionnaire to CD patients followed at our tertiary referral center for CD in Milan, Italy. Patients were defined as willing, hesitant and refusing. We evaluated the reasons for hesitancy/refusal and the possible determinants, calculating crude and adjusted odds ratios [AdjORs] with 95% confidence intervals [CIs]. (3) Results: the questionnaire was sent to 346 patients with a response rate of 29.8%. Twenty-six (25.2%) of the 103 respondents were hesitant, with a total refusal rate of 4.8%. The main reason was fear of adverse events related to vaccination (68.2%). Among hesitant patients, 23% declared that their opinion was influenced by their CD. The determinants positively influencing willingness to be vaccinated against COVID-19 were adherence to a GFD, perception of good knowledge about COVID-19 and its vaccines, and a positive attitude to previous vaccines (AdjOR 12.71, 95% CI 1.82-88.58, AdjOR 6.50, 95% CI 1.44-29.22, AdjOR 0.70, 95% CI 0.11-4.34, respectively). (4) Conclusions: CD patients should be vaccinated against COVID-19 and a specific campaign to address the determinants of hesitancy should be developed.

Baker DW, Brown T, Lee JY, Ozanich A, Liss DT, Sandler DS, Ruderman EM. A Multifaceted Intervention to Improve Influenza, Pneumococcal, and Herpes Zoster Vaccination among Patients with Rheumatoid Arthritis. *J Rheumatol*. 2016 Jun;43(6):1030-7. doi: 10.3899/jrheum.150984. Epub 2016 Apr 15. PMID: 27084914; PMCID: PMC4891262.

This paper explained the implementation of an intervention to improve and increase vaccination (Influenza, Pneumococcal, and Herpes Zoster) rates among Rheumatoid Arthritis patients (n=1255). Throughout this intervention, various strategies were employed (physician auditing and feedback, electronic reminders with linked order sets, patient outreach, and optional printed prescriptions for zoster vaccination from an external pharmacy). There were no significant changes in patients' self-reported vaccination, however rates improved for both herpes zoster and pneumococcal vaccination based on electronic medical records. The rate of zoster vaccination increased from 2.5% to 4.5% overall ($p = 0.01$). Pneumococcal vaccination rates increased from 28.7% to 45.8% ($p = 0.002$). The study suggests that it is necessary to evaluate the extent to which specialists are confident in providing vaccination education given the limited knowledge of national vaccination guidelines.

Herrett E, Williamson E, van Staa T, Ranopa M, Free C, Chadborn T, Goldacre B, Smeeth L. Text messaging reminders for influenza vaccine in primary care: a cluster randomised controlled trial (TXT4FLUJAB). *BMJ Open*. 2016 Feb 19;6(2):e010069. doi: 10.1136/bmjopen-2015-010069. PMID: 26895984; PMCID: PMC4762100.

This study assesses the impact of text-message reminders in primary care practices as a method to increase influenza vaccine uptake among patients aged 18-64 years, living with chronic conditions. The study compared vaccine uptake among patients in 156 practices that participated and were randomly chosen to compare an intervention arm using text-message reminders (n=77) with a standard care arm using their typical influenza campaign (n=79). Employing the use of text message reminders led to an increase in absolute vaccine uptake by approximately 2.62% (95% CI -0.09% to 5.33%), p=0.058. Thus, text messages to patients may improve vaccination uptake. The study has multiple limitations including a limited assessment of intervention in the control group and fidelity. Consistent with prior studies, this study showed that text messaging has a minimal but cost-effective impact in improving vaccination uptake.

Serper M, Liu CH, Blumberg EA, Burdzy AE, Veasey S, Halpern S, Lander E, Sigafus MR, Bloom RD, Dunn TB, Abt PL, Reddy KR, Mehta SJ. A pragmatic outreach pilot to understand and overcome barriers to COVID-19 vaccination in abdominal organ transplant. *Transpl Infect Dis*. 2021 Oct;23(5):e13722. doi: 10.1111/tid.13722. Epub 2021 Sep 22. PMID: 34496115.

This paper assessed COVID-19 vaccination concerns, efficacy, clinical recommendations, side effects, and barriers among solid organ transplant recipients (SOTRs) (n=103). Two specific populations of SOTR within the University of Pennsylvania Health System (UPHS) were studied: liver transplant recipients (LTRs), and kidney transplant recipients (KTRs). Potentially unvaccinated patients were randomly contacted via phone by staff at an organ transplant center. Principles of motivational-based interviews (exploring, guiding and choosing) were applied to assess vaccine concerns. Between May and June, 2021, of the 103 SOTRs, 24% reported that they would schedule a COVID-19 vaccination upon being contacted, 49% reported willingness to consider vaccination in the future, and 30% reported that they weren't willing to consider it. Follow-up calls (in July, 2021) revealed that approximately one third reported getting vaccinated. Older age and White race were associated with lower willingness, while Black race and a longer time from transplant were associated with higher willingness. Subsequent vaccination was reported to have been higher among LTRs when compared to KTRs. Lack of data on vaccine safety among transplant recipients, distrust toward the vaccine and process associated with its development, and inconsistent clinician recommendations were major barriers. Having insufficient resources or time, or lack of knowledge of how to schedule vaccination were barriers among those willing to be vaccinated.

Schulte K, Schierke H, Tamayo M, Hager L, Engehausen R, Raspe M, Hübner RH, Schlieper G, Borzikowsky C, Urbschat A, Auerswald S, Kunzendorf U, Feldkamp T. Strategies for Improving Influenza Vaccination Rates in Patients with Chronic Renal Disease. Dtsch Arztebl Int. 2019 Jun 10;116(23-24):413-419. doi: 10.3238/arztebl.2019.0413. PMID: 31366435; PMCID: PMC6683446.

Schulte et al., documented the results of two randomized controlled trials and a prospective interventional study to investigate the effect of the interventions on the vaccination rate in patients with chronic kidney disease (CKD) based on billing data. In the patient-centered RCTs, researchers sought to examine whether written vaccination appeals sent by physicians working in the renal transplantation clinic to patients who had undergone renal transplantation would increase the vaccination rates among patients living with chronic kidney disease (CKD). In the physician-centered RCT, researchers examined whether written appeals from a regional persuasion office-based nephrologists would increase the vaccination rates among patients with chronic diseases. Finally, the last study examined whether direct appeal from a health insurance fund to its members led to an increase in the vaccination rate among those with chronic renal disease. The results of the study revealed that less than half of all patients with chronic renal failure in Germany are vaccinated against influenza. Appeals sent to patients by physicians (8.3%) yielded the highest vaccination increases, followed by the appeals sent by health insurance carriers (3.2%). The study has multiple limitations, including potential contamination. The results highlight the important role of physicians in increasing vaccination rates.

Tao L, Lu M, Wang X, Han X, Li S, Wang H. The influence of a community intervention on influenza vaccination knowledge and behavior among diabetic patients. BMC Public Health. 2019 Dec 27;19(1):1747. doi: 10.1186/s12889-019-8101-6. PMID: 31881877; PMCID: PMC6935125.

This cluster randomized trial evaluated the awareness of influenza vaccine knowledge and vaccination rates among diabetic patients (n=1538) aged 35 years and older. Interventions in this study included face-to-face interviews, information about important topics of influenza and diabetes, and community atmosphere interventions (i.e., establishment of a related knowledge bulletin board in the community center of the project to provide one diabetes and influenza vaccination session for six months among diabetic patients). The study included 1538 diabetic patients 35 years and older in intervention and community settings. The study concluded that there was a statistically significant difference between before and after intervention vaccination rates (45.8% and 27.4%, $p < 0.001$) but not in awareness. Community intervention had a positive effect on influenza vaccine rates in diabetic patients. The study has multiple limitations, particularly in the description of the control populations and self-report

assessments. It is also not possible to disentangle whether the specific effect could be attributed to the face-to-face interviews vs. the community atmosphere interventions.

Williams L, Gallant AJ, Rasmussen S, Brown Nicholls LA, Cogan N, Deakin K, Young D, Flowers P. Towards intervention development to increase the uptake of COVID-19 vaccination among those at high risk: Outlining evidence-based and theoretically informed future intervention content. Br J Health Psychol. 2020 Nov;25(4):1039-1054. doi: 10.1111/bjhp.12468. Epub 2020 Sep 5. PMID: 32889759.

This research initiative employed the use of an online questionnaire to assess barriers and facilitators associated with COVID-19 vaccine uptake, and intent to receive influenza and pneumococcal vaccinations among two different study samples: older adults (n=311) and patients with chronic respiratory disease (n=216). The older adult vaccination study targeted adults aged 65 or older who lived independently. The chronic respiratory disease study sample was comprised of individuals with a chronic respiratory disease such as asthma or chronic obstructive pulmonary disease (COPD). Barriers and facilitators were assessed using constructs from the The Behaviour Change Wheel, which were later used to code to the Theoretical Domains Framework to examine behavior change techniques. The results of this research study found that 86% of research participants identified as high-risk (individuals with chronic diseases) were willing to receive a COVID-19 vaccination. The conclusions of this study suggests that vaccine uptake mass-media interventions should aim to implement behavior change techniques of information as it relates to the emotional, health, social and environmental consequences, and salience of consequences. The study underscores the value of theory-driven mixed methods in the understanding of COVID-19 vaccine acceptance.

Wang Y, Cheng M, Wang S, Wu F, Yan Q, Yang Q, Li Y, Guo X, Fu C, Shi Y, Wagner AL, Boulton ML. Vaccination coverage with the pneumococcal and influenza vaccine among persons with chronic diseases in Shanghai, China, 2017. BMC Public Health. 2020 Mar 19;20(1):359. doi: 10.1186/s12889-020-8388-3. PMID: 32188428; PMCID: PMC7081528.

The Shanghai CDC analyzed data from individuals with hypertension, diabetes, and COPD to assess pneumococcal and influenza vaccination rates. Simultaneous vaccinations can reduce hospitalization in COPD patients by 63% and overall mortality by 81%. A retrospective cohort design was used in this study of 2,531,277 individuals aged 15 years and older in Shanghai, China from January 2013 until July 2017. Only 22.8% of patients were vaccinated for pneumococcal pneumonia, and coverage was exceedingly low at 0.4%. For both vaccinations, coverage was at its highest in those aged 70-79 years old, and it was highest in rural areas. Both vaccinations were more common in patients with COPD (30.4%) than hypertension (23.5%) or diabetes (24.1%). Consistent with studies in the US, vaccination uptake increased in those with chronic conditions and older age. Low rates can be explained by a lack of awareness, and low availability of community care centers providing the vaccines.

Costantino A, Topa M, Roncoroni L, Doneda L, Lombardo V, Stocco D, Gramegna A, Costantino C, Vecchi M, Elli L. COVID-19 Vaccine: A Survey of Hesitancy in Patients with Celiac Disease. *Vaccines (Basel)*. 2021 May 16;9(5):511. doi: 10.3390/vaccines9050511. PMID: 34065654; PMCID: PMC8156726.

Information on vaccine hesitancy plays a pivotal role in the development of an efficient vaccination campaign. In this study, the authors aimed to evaluate COVID-19 vaccine hesitancy among Italian Celiac Disease (CD) patients. The authors sent anonymous questionnaire to CD patients followed at our tertiary referral center for CD in Milan, Italy. Patients were defined as willing, hesitant and refusing. We evaluated the reasons for hesitancy/refusal and the possible determinants, calculating crude and adjusted odds ratios [AdjORs] with 95% confidence intervals [CIs]. (3) Results: the questionnaire was sent to 346 patients with a response rate of 29.8%. Twenty-six (25.2%) of the 103 respondents were hesitant, with a total refusal rate of 4.8%. The main reason was fear of adverse events related to vaccination (68.2%). Among hesitant patients, 23% declared that their opinion was influenced by their CD. The determinants positively influencing willingness to be vaccinated against COVID-19 were adherence to a GFD, perception of good knowledge about COVID-19 and its vaccines, and a positive attitude to previous vaccines (AdjOR 12.71, 95% CI 1.82-88.58, AdjOR 6.50, 95% CI 1.44-29.22, AdjOR 0.70, 95% CI 0.11-4.34, respectively). (4) Conclusions: CD patients should be vaccinated against COVID-19 and a specific campaign to address the determinants of hesitancy should be developed.

Sullivan MC, Mistler C, Copenhaver MM, Wickersham JA, Ni Z, Kim RS, Shrestha R. Race, trust, and COVID-19 vaccine hesitancy in people with opioid use disorder. *Health Psychol*. 2022 Feb;41(2):115-120. doi: 10.1037/hea0001120. Epub 2021 Dec 2. PMID: 34855415.

People with opioid use disorder (OUD) are likely to face increased vulnerability to COVID-19 due to a confluence of biological and social risk factors. We sought to assess factors associated with willingness to vaccinate against COVID-19 in people with OUD. Phone surveys were conducted from May to October 2020 with participants enrolled in an urban methadone maintenance program (MMP). Participants were adults who met *DSM-5* criteria for OUD and reported injection drug use or sexual risk behavior. Participants were asked about their willingness to receive a highly or partially effective vaccine. Provider trust was assessed using the Trust in Physician scale. Multinomial regression was used to assess demographic and psychosocial factors related to vaccination willingness. 109 people were surveyed with OUD enrolled in a MMP ($M = 47$ years; 56% women; 59% White, 23% Black/African American, 14.4% Hispanic/Latinx; 1.8% other). Participants who identified as Black or African American were significantly less likely to endorse willingness to use a partially effective COVID-19 vaccine (adjusted odds ratio [aOR] = .10; 95% confidence interval (CI) [.02, .61], $p = .012$), although not necessarily less willing to receive a highly effective vaccine ($aOR = .40$; 95% CI [.09, 1.73], $p =$

.219; *n.s.*). Trust in physician was positively associated with willingness to use a partially effective vaccine (*aOR* = 1.12; 95% CI [1.02, 1.23], *p* = .017), but was not significantly associated with willingness to receive a highly effective vaccine (*aOR* = 1.07; 95% CI [.98, 1.16], *p* = .162, *n.s.*) Proactive outreach from trustworthy sources will be needed to counter vaccine hesitancy in people with OUD, especially among Black Americans with OUD. (PsycInfo Database Record (c) 2022 APA, all rights reserved).

Studies among individuals from low socio-economic status

Summary: Overall, there is not much literature on COVID-19 hesitancy among low socioeconomic individuals. Low educational status and specifically low health literacy were associated with vaccine hesitancy. Being young and female influenced vaccine acceptance. Similarly, the belief that vaccines are safe and/or effective was more important for vaccine acceptance than other socio-demographic factors. Alternative strategies to web-based or social-media interventions are needed for communities that lack access to the internet.

Bertoncello C, Ferro A, Fonzo M, Zanolello S, Napoletano G, Russo F, Baldo V, Cocchio S. Socioeconomic Determinants in Vaccine Hesitancy and Vaccine Refusal in Italy. Vaccines (Basel). 2020 Jun 5;8(2):276. doi: 10.3390/vaccines8020276. PMID: 32516936; PMCID: PMC7349972.

This study focuses on vaccine refusal and hesitancy in Italy where vaccination opportunities are equally offered from 2016-2017. A total of 3865 questionnaires were collected, and around 64% were pro-vaccine, 62% were hesitant, and 4% were anti vaccine. The study found that low parental education was associated with refusal of vaccination. Compared with mothers holding a degree, those with high-school- and primary-school-level education showed an AOR of 1.89 (95% CI: 1.23–2.93) and 3.39 (95% CI: 1.24–9.28), respectively. In a similar manner, fathers with a high-school education showed an AOR of 1.99 (95% CI: 1.27–3.11), and those with primary-school education an AOR of 2.63 (95% CI: 1.41–4.94) compared to those with the highest education level. For vaccine hesitancy, perceived economic hardship was a significant determinant (AOR ranging from 1.34 to 1.59). The lack of equally shared decision making between parents was associated with higher chances of refusal and hesitancy. It is important that initiatives target all population groups. This was not an intervention-focused study.

Longchamps C, Ducarroz S, Crouzet L, Vignier N, Pourtau L, Allaire C, Colleville AC, El Aarbaoui T, Melchior M; ECHO study group. COVID-19 vaccine hesitancy among persons living in homeless shelters in France. Vaccine. 2021 Jun 8;39(25):3315-3318. doi: 10.1016/j.vaccine.2021.05.012. Epub 2021 May 12. PMID: 34011464; PMCID:

The purpose of this study was to assess COVID-19 vaccine hesitancy among the homeless population in France to compare barriers in vaccination. A total of 235 individuals were surveyed From May to June 2021. The study found that 40.9% participants stated hesitancy toward getting the vaccine. Among those, 71.2% indicated they would not want to be vaccinated and 28.8% did not know what to answer. The factors associated with vaccine hesitancy included being a woman (OR = 2.55; 95% CI 1.40–4.74), living with a partner (OR = 2.48, 95% CI 1.17–5.41), no legal residence in France (OR = 0.51, 95% CI 0.27–0.92), and health literacy (OR = 0.38, 95% CI 0.21, 0.68). This is important as underserved or disadvantaged groups must be targeted. This was not an intervention-focused study.

Machado AA, Edwards SA, Mueller M, Saini V. Effective interventions to increase routine childhood immunization coverage in low socioeconomic status communities in developed countries: A systematic review and critical appraisal of peer-reviewed literature. Vaccine. 2021 May 21;39(22):2938-2964. doi: 10.1016/j.vaccine.2021.03.088. Epub 2021 Apr 28. PMID: 33933317.

The purpose of this systemic review article is to assess interventions that increase childhood vaccinations (Diphtheria, Tetanus, Acellular Pertussis, Inactivated Poliomyelitis, Haemophilus Influenzae Type B (DTaP-IPV-Hib); Measles, Mumps, Rubella (MMR); Varicella (Var); Pneumococcal Conjugate (PCV) and Meningococcal Conjugate (MenC)) among low socioeconomic populations across the USA, Canada, Ireland, and England. Of the 40 studies from 1990-2019, the article found that multi-component interventions (for example: outreach, appointment reminders) were effective and strongly rated (i.e. improved immunization coverage compared to either historical coverage or/and coverage in control group). These included increasing access, appointment reminders and overall communication to increase childhood immunizations among these population.

Nguyen KH, Nguyen K, Corlin L, Allen JD, Chung M. Changes in COVID-19 vaccination receipt and intention to vaccinate by socioeconomic characteristics and geographic area, United States, January 6 - March 29, 2021. Ann Med. 2021 Dec;53(1):1419-1428. doi: 10.1080/07853890.2021.1957998. PMID: 34482788; PMCID: PMC8425688.

This study assessed changes in COVID-19 vaccination attitudes in relation to sociodemographic and geographic factors as it became available to the public. There was a total of around 75,000 respondents from six waves of surveys from January to March 2021. The study found an overall increase in the intent to get vaccinated (an increase from 54.7% to 72.3% of adults), but there were still disparities and hesitancy among southeastern US young adults and low socioeconomic status individuals. Lower education and income were associated with less likelihood of definitely getting vaccinated. This is important because different demographic groups must be targeted with specific interventions to increase vaccination, especially in underserved communities.

Suryadevara M, Bonville CA, Rosenbaum PF, Domachowske JB. Influenza vaccine hesitancy in a low-income community in central New York State. Hum Vaccin Immunother. 2014;10(7):2098-103. doi: 10.4161/hv.28803. PMID: 25424822; PMCID: PMC4186041.

This study assessed influenza vaccine attitudes among a low-income community in New York State among low-income groups. Demographic data was collected including age, gender, and ethnicity. A total of 1041 participants attending a Salvation Army function during December 2012 were surveyed. The study found that 37% were already vaccinated. Of the 655 participants unimmunized, 30% stated no intent to get vaccinated. Of the 299 participants who wanted to get vaccinated but had not done so, 95% said accessibility issues were to blame. Of the 312 who stated no intent to get vaccinated, 46% attributed it to a misconception (vaccine leads to illness, is unnecessary or ineffective). After controlling for socio-demographic factors, the belief that the IV was safe and/or effective remained strongly associated with intent to receive vaccine ($p < 0.01$).

Wagner AL, Masters NB, Domek GJ, Mathew JL, Sun X, Asturias EJ, Ren J, Huang Z, Contreras-Roldan IL, Gebremeskel B, Boulton ML. Comparisons of Vaccine Hesitancy across Five Low- and Middle-Income Countries. Vaccines (Basel). 2019 Oct 18;7(4):155. doi: 10.3390/vaccines7040155. PMID: 31635270; PMCID: PMC6963484.

The purpose of this study was to assess [childhood] vaccine hesitancy among mothers in five low-income and middle-income countries. A total of 2,265 mothers from Bangladesh, China, Ethiopia, Guatemala, and India completed a survey from 2016-2018. The study found that nearly 95% of all mothers agreed that vaccines are important for their child, 93% agreed that they are effective, and 94% agreed that vaccines protect their child. Education was found to not be significantly linked with vaccine hesitancy.

Berry SD, Goldfeld KS, McConeghy K, Gifford D, Davidson HE, Han L, Syme M, Gandhi A, Mitchell SL, Harrison J, Recker A, Johnson KS, Gravenstein S, Mor V. Evaluating the Findings of the IMPACT-C Randomized Clinical Trial to Improve COVID-19 Vaccine Coverage in Skilled Nursing Facilities. JAMA Intern Med. 2022 Mar 1;182(3):324-331. doi: 10.1001/jamainternmed.2021.8067. PMID: 35099523; PMCID: PMC8804975.

The goal of this study was to determine whether a multicomponent vaccine campaign would increase vaccine rates among Skilled Nursing Facility (SNF) residents and staff. This was a cluster randomized trial with a rapid timeline (December 2020-March 2021). It included 133 SNFs in 4 health care systems across 16 states: 63 and 70 facilities in the intervention and control arms, respectively, and participants included 7496 long-stay residents (>100 days) and 17 963 staff. A Multicomponent interventions were introduced at the facility level that included: (1) educational material and electronic messaging for staff; (2) town hall meetings with frontline staff (nurses, nurse aides, dietary, housekeeping); (3) messaging from community leaders; (4) gifts (eg, T-shirts) with socially concerned messaging; (5) use of a

specialist to facilitate consent with residents' proxies; and (6) funds for additional COVID-19 testing of staff/residents. Most facilities were for-profit (95; 71.4%), and 1973 (26.3%) of residents were Black. Among residents, 82.5% (95% CI, 81.2%-83.7%) were vaccinated in the intervention arm, compared with 79.8% (95% CI, 78.5%-81.0%) in the usual care arm (marginal difference 0.8%; 95% CI, -1.9% to 3.7%). Among staff, 49.5% (95% CI, 48.4%-50.6%) were vaccinated in the intervention arm, compared with 47.9% (95% CI, 46.9%-48.9%) in usual care arm (marginal difference: -0.4%; 95% CI, -4.2% to 3.1%). There was no association of race with the outcome among residents. The authors concluded that a multicomponent vaccine campaign did not have a significant effect on vaccination rates among SNF residents or staff. Vaccination campaigns to target SNF staff will likely need to use additional approaches.