Increasing COVID-19 Vaccine Uptake

A Four-Step Framework to Promote Access, Acceptance, and Equity
Table of Contents

Executive Summary ................................................................................. 3

Introduction: Bringing Precision to the COVID-19 Vaccine Rollout .......... 5

Roadmap: Translating Data and Insights into Action .......................... 7

   Step 1: Explore vaccination coverage to identify communities
   with less than 70% of the eligible population vaccinated with
   at least one dose, and prioritize geographies and subpopulations
   with low coverage for further investigation ........................................ 7
   
   Step 1.1: Map vaccination coverage ...................................................... 8
   
   Step 1.2: Explore vaccination coverage among
   sociodemographic or high risk groups .................................................. 8

   Step 2: Diagnose community level vaccination challenges
   by using the COVID-19 Vaccination Data Toolkit ............................... 11
   
   Step 2.1: Map vaccine hesitancy and acceptance ................................ 12
   
   Step 2.2: Map access ............................................................................. 15

   Step 3: Engage with community stakeholders to address identified challenges
   ——————————————————— ................................................................. 18
   
   Step 3.1: Map community-based organizations .................................... 18
   
   Step 3.2: Engage around key barriers identified
   in Step 2 and design solutions ............................................................. 19

   Step 4: Implement, monitor and evaluate impact:
   Is vaccination uptake improving? ......................................................... 23

Appendix .............................................................................................. 24

COVID-19 Vaccination Data Toolkit ......................................................... 25

   Focus: COVID-19 Vaccination ............................................................ 26

   Focus: COVID-19 and Vulnerability .................................................... 29

Developed by Surgo Ventures and Resolve to Save Lives, an initiative of Vital Strategies
This is a dynamic, “living” document updated as the COVID-19 pandemic evolves
in the United States. Feedback and suggestions can be sent to covid19@surgoventures.org.
EXECUTIVE SUMMARY

To contain the pandemic and stop the spread of COVID-19, the United States needs to reach rapid, widespread vaccination coverage. By July 4th, President Joe Biden aims to have 70% of U.S. adults receive at least one dose of COVID-19 vaccine. Achieving this goal with scarce time and resources depends on identifying which communities are falling behind, and why, to mount a proactive, precise response.

This framework aims to help decision-makers reach and then move beyond the July 4th goal, working towards having at least 70% of the entire vaccine-eligible population receive at least one dose.

State and local decision makers can leverage existing, granular data and build community partnerships to reach people who have not yet been vaccinated against COVID-19. Local mapping and analysis over time can provide a dynamic picture and give direction to where to target tailored interventions and how to build those interventions to effectively increase vaccine uptake. This guide provides a framework for identifying and mapping the most useful data sources onto learnings from community engagement to continuously build context-specific interventions and evaluate your success. It involves a four-step process:

1. **Map** vaccination coverage to identify communities with less than 70% of the eligible population vaccinated with at least one dose

2. **Diagnose** community challenges to vaccination coverage

3. **Engage** with community stakeholders to address identified challenges

4. **Implement, monitor, and evaluate** impact on vaccine uptake and adapt solutions
COVID-19 VACCINATION IMPROVEMENT FRAMEWORK AT-A-GLANCE

1. Identify communities of focus
   - Map vaccination coverage to identify communities with less than 70% of the eligible population vaccinated with at least one dose.

2. Explore which challenges are faced and why
   - Diagnose community challenges to vaccination coverage.

3. Contextualize barriers and design localized solutions through community engagement
   - Engage with community stakeholders to address identified challenges.

4. Implement, monitor, and evaluate solutions
   - Implement, monitor, and evaluate impact on vaccine uptake and adapt solutions.

Use the COVID-19 Vaccination Data Toolkit and Community Engagement to identify key access and demand barriers including:

- Awareness and knowledge of vaccine
- Beliefs around vaccine
- Intention to get vaccine
- Schedule and access appointment(s)
Introduction: Bringing Precision to the COVID-19 Vaccine Rollout

Despite increased supply of COVID-19 vaccines, there continue to be disparities in vaccination coverage across communities.

As of late May, 12% of Americans say they still want to ‘wait and see’ about getting a COVID-19 vaccine, while 7% say they will get vaccinated “only if required” and 13% will “definitely not” get a vaccine. The 12% of respondents that will ‘wait and see’ are disproportionately aged 18–29 years old and either Black or Latinx/Hispanic adults (KFF). Historically marginalized groups—including non-white groups, rural populations and communities that are economically or socially disadvantaged—have lower COVID-19 vaccination coverage (CDC, CDC). These disparities in vaccination coverage may have more to do with access than demand—for example, nearly one-third of unvaccinated Latinx individuals want to get vaccinated but face barriers to accessing vaccines (KFF).

To increase vaccination coverage, particularly in historically marginalized communities, we need to deploy a precision approach, addressing key beliefs and barriers to getting vaccinated in communities and subpopulations of concern.

It is important to understand where pockets of under-vaccination are located, which challenges (demand, access or both) are faced, and what tailored solutions can address barriers and mitigate inequities. Tailored solutions are best informed by engagement with communities and local organizations.
LEVERAGE COVID-19 VACCINATION DATA TOOLKIT

The framework leverages local data and a toolkit of existing data resources (see Appendix for additional information).

The Data Toolkit can help decision-makers understand current vaccination demand, attitudes and access barriers to inform and tailor community engagement strategies to design solutions. By helping to fill gaps in existing knowledge, these data can augment locally available data for more effective measurement and evaluation of vaccination strategies.

INCORPORATE KEY EXPERTISE THROUGH MULTI-SECTOR ENGAGEMENT

Answering the question ‘how can I increase equitable coverage in my jurisdiction?’ based on both data and community ground-truthing requires a multi-sectoral approach, guided by diverse public health teams.

You will want to bring together representatives from the vaccine operations, epidemiology/mapping, communications and community engagement teams within your department or partner organizations and familiarize them with the four steps outlined in this framework. You may also consider partnering with a community advisory board or trusted community leaders, particularly to help with step 3 of this guidance. Using this four-step guide, work together as a team to develop hypotheses around where and why coverage may be stagnating, design and implement interventions to overcome identified barriers and monitor whether equitable coverage is improving over time.
**STEP 1**

Explore Vaccination Coverage to Identify Communities with Less Than 70% of the Eligible Population Vaccinated with at Least One Dose, and Prioritize Geographies and Subpopulations with Low Coverage for Further Investigation

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Suggested Target</th>
<th>Source</th>
<th>Geo Precision</th>
<th>Update Frequency Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of eligible population with at least one dose (initiated)</td>
<td>≥70% ¹</td>
<td>CDC</td>
<td>County</td>
<td>Daily (Dashboard)</td>
</tr>
<tr>
<td>Percentage of eligible population with at least one dose (initiated)</td>
<td></td>
<td>Public Health Immunization Registry</td>
<td>Census Tract</td>
<td>Weekly (Geocoded/Mapped)</td>
</tr>
</tbody>
</table>

¹ The suggested target was initially set per the Biden administration target to reach 70% coverage among adults by July 4, 2021. Ultimately, the goal is to achieve the highest coverage possible across all communities and therefore the target includes all eligible persons.

**INDICATOR(S) FOR STEP 1**
**Step 1.1**  
**Map Vaccination Coverage**

Map vaccination coverage (percentage of population with at least one dose) at the most granular geographic scale possible, such as census tracts (Figure 1). Vaccination coverage data may be available across several geographic units, including zip codes; however, county-or census tract-level data are recommended for convenient layering and analysis with other datasets in the COVID-19 Vaccination Data Toolkit. Areas with lowest vaccination coverage may be prioritized for furthering investigation in steps 2–4. Identifying areas of strength (i.e. those that are closer to or have already achieved high coverage) and weakness (i.e. those with the lowest or least equitable coverage) can help guide reallocation of resources to communities in need. Data should be tracked over time to evaluate progress and trends (step 4).

**Step 1.2**  
**Explore Vaccination Coverage Among Sociodemographic or High Risk Groups**

Equitable rollout means prioritizing access for the most marginalized population subgroups. Estimates of vaccination coverage stratified by sociodemographic characteristics are crucial to ensuring that all groups have access to vaccines and help tailoring vaccine campaigns to specific subgroups if needed. To uncover and quantify disparities, coverage estimates should be stratified and visualized over time by the dimensions of equity relevant to the community (See North Carolina Department of Health and Human Services. Vaccine map). It is important to explore multiple dimensions such as stratification by race/ethnicity, age, health and equity indices or populations at high risk for exposure to COVID-19 (Table 1). Local context should inform the most relevant dimensions. Two key indicators to track for each subgroup are:

- Vaccination coverage by subgroup
- The proportion of vaccines administered per subgroup relative to share of population
# Table 1. Monitoring COVID-19 Vaccination by Different Dimensions of Equity

<table>
<thead>
<tr>
<th>Equity Dimension</th>
<th>Why It’s Important</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urbanicity</strong></td>
<td>Tracking data along geographic lines will help provide an enterprise-wide view of the consistency with which vaccination equity principles are being adhered to, while simultaneously reflecting the differing prioritization guidelines, public health resources and demographics.</td>
</tr>
<tr>
<td><strong>Race/Ethnicity</strong></td>
<td>Racial and ethnic marginalized groups have been disproportionately impacted by COVID-19 with higher infection rates and worse health outcomes than white Americans. Communities of color consistently have low adult vaccination rates, and have received a smaller share of COVID-19 vaccinations relative to the share of the general population.</td>
</tr>
</tbody>
</table>
| **Age**          | Older adults:  
|                  | - Are more likely to experience severe COVID-19 illness.  
|                  | - May have more difficulty scheduling vaccinations through digital channels (e.g., online appointment systems). |
| **Health and Equity Indices** | Health and equity indices help preemptively target outreach efforts and align resources to the most vulnerable populations where vulnerability is defined as how well a community handles the repercussions of potential negative effects by external stressors such as the COVID-19 outbreak. |
| **High-Risk Populations** | These groups are among the most vulnerable populations to the COVID-19 pandemic due to the greater potential for more severe or fatal outcomes if infected and higher likelihoods of being unable to conveniently access appropriate medical care. |
| **COVID-19 Hotspots** | Increasing vaccination efforts can help stop the spread of COVID-19. |

Source: Adapted from Kaiser Permanente Vaccine Equity Toolkit
Increasing COVID-19 Vaccine Uptake: A Four-Step Framework to Promote Access, Acceptance, and Equity

Figure 2. Vulnerable Zip Codes in Austin, Texas Have Also Had the Lowest COVID-19 Vaccine Coverage Rates

Graphics that show trends over time can be used to assess whether the proportion of vaccines administered each week meets or exceeds the proportion of population in groups where you are seeking to boost vaccination coverage. Mapping vaccine coverage alongside different equity dimensions can help uncover areas of concern (Figure 2) and monitor for progress towards increasing vaccination administration in specific populations (Figure 3).

Figure 3. COVID-19 Vaccination Coverage by Race and Ethnicity Over Time
Diagnose Community-Level Vaccination Challenges by Using the COVID-19 Vaccination Data Toolkit

Now that you have identified communities with lower vaccination coverage and/or inequities in vaccination coverage, use the COVID-19 Vaccination Data Toolkit and conversations with community stakeholders to explore the challenges faced and their causes.

One way to categorize challenges is in terms of demand for vaccines and access to vaccines (Figure 4). Demand challenges are related to the knowledge, awareness and beliefs that drive people’s intention to get a COVID-19 vaccine. These are shaped by available COVID-19 vaccine information, community norms, perception of vaccine safety and efficacy, and trust in the health care system. Understanding demand barriers can inform the content of messaging and which channels and messengers are more likely trusted. Engaging existing equity or racial justice advisory councils or other advisory boards in this mapping can help contextualize data within a community.

Access challenges include structural and environmental factors that limit an individual’s ability to receive a COVID-19 vaccine, such as lack of transportation to vaccination sites, lack of vaccination information in languages other than English, or limited digital literacy or internet access. Working with community members to identify key barriers and disparities in access across communities and population subgroups is necessary to target the right resources to areas in need.

Figure 4. The COVID-19 Vaccine Knowledge-Intention-Action Continuum
Step 2.1
Map Vaccine Hesitancy and Acceptance

Mapping vaccine hesitancy and acceptance indicators overlapped with vaccination coverage can visually show areas with low coverage that face demand concerns (Figure 5). Four sources of information on vaccine hesitancy and acceptance from the Data Toolkit are the Household Pulse Survey, Surgo vaccine personas (and tool), Surgo CVAC, and CMU Delphi/Facebook survey. More detailed information about each resource is included in the Appendix.

The Household Pulse Survey provides biweekly estimates of the proportion of people who are hesitant or strongly hesitant to receive a COVID-19 vaccine, and the CMU Delphi/Facebook Symptom Survey measures COVID-19 vaccine acceptance as the proportion of individuals who either have already received a COVID-19 vaccine or would definitely or probably choose to receive one if it were offered to them today. While these data can signal levels of demand, the Surgo Ventures vaccine personas help you focus on the most pressing concerns in a community by providing insight into motivations for vaccine hesitancy. Understanding which vaccine personas—which are based on likelihood of getting vaccinated as well as barriers to and beliefs about COVID-19 vaccination—are most prevalent in your area makes it possible to tailor solutions to the local context (figure 5). These data are updated on a monthly basis to understand shifts in demand and which types of people are persuadable over time (see step 4). Decision-makers can also use the COVID-19 Vaccine Persona tool, a rapid, six-question survey, to determine the breakdown of these personas at a local level alongside additional community engagement efforts (see step 3).

Figure 5. The 5 COVID-19 Vaccine Personas (U.S.)

The Surgo CVAC tool can help you understand underlying challenges, such as where access to information is limited, whereas additional data from the CMU Delphi/Facebook Symptom Survey (updated daily) provide insight into perceived vaccination barriers. Combining this contextual and real-time data can inform additional messaging needs and selection of communication channels for optimal delivery. Together, resources from the Data Toolkit serve as a starting point to engage community-based organizations (see step 3). Insights from these data can help prioritize interventions, but outreach to and partnership with community organizations and leaders are crucial to creating effective interventions fine-tuned to your local context.
THEORETICAL CASE STUDY

Operationalizing Step 2.1 to Understand Demand in Alabama

In Alabama, financial cost, time expenditure and general skepticism about COVID-19 are key barriers to vaccination (the Watchful, Cost-Anxious, and COVID Skeptics are the most common non-vaccinated personas). Using this information, a local health department in a high-hesitancy county might develop messaging emphasizing that vaccines are free, investigate time pressures impeding uptake, and explore ways to make vaccination the default choice by placing vaccination sites in convenient locations. Utilizing other resources from the Data Toolkit can provide more granular information about community context. For example, according to the CVAC, Chilton County is one of the top 10 counties of highest concern in Alabama for health care accessibility barriers due to cost and lack of access to information. Messaging resources can be targeted to areas of concern by identifying census tracts with the highest proportion of underinsured residents and information can be shared through trusted community networks (e.g., community health centers, social support programming, town halls) to bridge the information gap and address key concerns among the unvaccinated.

Figure 7. An In-Depth Look into a High-Hesitancy County: Chilton County, Alabama

CHILTON COUNTY, ALABAMA COVID-19 VACCINE COVERAGE INDEX (CVAC) PROFILE

- COVID-19 Vaccine Coverage Index
- Historic Undervaccination
- Sociodemographic Barriers
  - Lack of Access to Information
  - Socio-economically Disadvantaged
- Resource-Constrained Healthcare System
- Healthcare Accessibility Barriers
  - Barriers due to Cost
  - Barriers due to Transportation
- Irregular Care Seeking Behavior

PROPORTION OF UNDERINSURED BY CENSUS TRACTS IN CHILTON COUNTY, ALABAMA

Source: Surgo Ventures, CMU/Facebook, and PolicyMap—derived from ACS 5-year estimates.
### Table 2. Understand Community-Level Demand

<table>
<thead>
<tr>
<th>Key Question</th>
<th>Indicator</th>
<th>Source</th>
<th>Geo Precision</th>
<th>Update Frequency Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>What percentage of the population is vaccine hesitant?</td>
<td>Hesitancy &lt;br&gt; Proportion of individuals indicating they are hesitant (will probably get a vaccine, are unsure, or will probably not get a vaccine) or are strongly hesitant (will definitely not get a vaccine)</td>
<td>ASPE, from Census Household Pulse Survey</td>
<td>County, Public Use Microdata Areas (PUMA)</td>
<td>Biweekly/As available</td>
</tr>
<tr>
<td>What percentage of the population is accepting of the COVID-19 vaccine?</td>
<td>Acceptance &lt;br&gt; Proportion of people who either have already received a COVID-19 vaccine or would probably choose to receive one if it were offered to them today</td>
<td>CMU/Facebook</td>
<td>County</td>
<td>Biweekly</td>
</tr>
<tr>
<td>Does the population have access to information on vaccinations?</td>
<td>Lack of access to information subtheme score &lt;br&gt; - Proportion of households without an internet connection &lt;br&gt; - Proportion of households without a smartphone &lt;br&gt; - Proportion of limited English-speaking households</td>
<td>Surgo Ventures, CVAC</td>
<td>County</td>
<td>Static, infrequent</td>
</tr>
<tr>
<td></td>
<td>Proportion of individuals that experienced or perceived the following barriers: &lt;br&gt; - Information not available in my native language</td>
<td>ACS (American Community Survey) 5-year estimates</td>
<td>Census Tract</td>
<td>Yearly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Surgo Ventures, &lt;br&gt;CMU/Facebook</td>
<td>State, County (coming soon)</td>
<td>Monthly</td>
</tr>
<tr>
<td></td>
<td>Which types of people should community leaders target to increase vaccine uptake?</td>
<td>Relative size/proportion of each COVID-19 Vaccine persona</td>
<td>Surgo Ventures, &lt;br&gt;CMU/Facebook</td>
<td>State, County (coming soon)</td>
</tr>
<tr>
<td></td>
<td>Proportion of individuals that experienced or perceived the following barriers: &lt;br&gt; - Concerns about cost &lt;br&gt; - Not having time &lt;br&gt; - No one to provide childcare</td>
<td>Surgo Ventures, &lt;br&gt;CMU/Facebook</td>
<td>State, County (coming soon)</td>
<td>Monthly</td>
</tr>
<tr>
<td></td>
<td>Health care accessibility barriers due to cost subtheme score: &lt;br&gt; - Lack of access to health care insurance</td>
<td>Surgo Ventures, CVAC</td>
<td>County</td>
<td>Static, infrequent</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ACS (American Community Survey) 5-year estimates</td>
<td>Census Tract</td>
<td>Yearly</td>
</tr>
</tbody>
</table>
Step 2.2
Map Access

Map access indicators to identify which areas face access barriers and why. Data Toolkit resources can be used to map infrastructure (e.g., vaccination sites, low health care capacity), accessibility barriers (e.g., lack of transport, internet access or appointments at convenient times), and equity dimensions. Prioritize areas with fewer vaccination sites and more accessibility barriers by engaging with community stakeholders from those areas to create the most effective response to increase access (see step 3) (table 3).

Step 2.2.1
Map Infrastructure

Mapping vaccination sites (i.e. GISCorps, local health department) and assessment of underlying health care system resources available via the CVAC can help identify which areas are vaccination deserts and whether or not current use of resources is underperforming, meeting, or exceeding community-level health care system capacity. Layered with vaccination data and additional community engagement insights (see step 3), this type of mapping can inform the strategic reallocation of resources to areas in need. Interpretation of the length of time for travel or distance to vaccination sites will vary depending on the community—rural areas will likely have a higher average distance and time threshold compared to urban areas.

Table 3. Understand Access Challenges: Infrastructure

<table>
<thead>
<tr>
<th>Key Question</th>
<th>Indicator</th>
<th>Source</th>
<th>Geo Precision</th>
<th>Recommended Update Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are there enough vaccination sites?</td>
<td>Vaccination sites per capita; ranked</td>
<td>GISCorps, Public Health Immunization Registry</td>
<td>County, Census Tract</td>
<td>Biweekly</td>
</tr>
<tr>
<td></td>
<td>Average distance to vaccination sites; ranked, evaluated based on local context</td>
<td>Surgo Ventures CVAC, County</td>
<td></td>
<td>Static, infrequent</td>
</tr>
<tr>
<td>Does the health care system have the capacity to support vaccination sites?</td>
<td>Low health care system capacity subtheme score</td>
<td>Surgo Ventures CVAC, County</td>
<td></td>
<td>Static, infrequent</td>
</tr>
<tr>
<td></td>
<td>Low health care system strength subtheme score</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Step 2.2.2**  
**Map Accessibility Barriers**

Mapping real-time and contextual data around accessibility barriers, including ability to schedule and get to vaccine appointments, can help identify which type of resources and strategies are needed and in which areas to facilitate access to COVID-19 vaccines.

### Table 4. Understand Access Challenges: Key barriers

<table>
<thead>
<tr>
<th>Key Question</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What percentage of people are experiencing or perceiving barriers?</strong></td>
</tr>
<tr>
<td>Proportion of individuals that experienced barriers in accessing a vaccine</td>
</tr>
<tr>
<td>Proportion of individuals that perceived barriers to accessing a vaccine</td>
</tr>
<tr>
<td><strong>What are the key barriers to scheduling an appointment?</strong></td>
</tr>
<tr>
<td>Proportion of individuals that experienced or perceived the following barriers:</td>
</tr>
<tr>
<td>No appointments available</td>
</tr>
<tr>
<td>Available appointment times did not work</td>
</tr>
<tr>
<td>Website or phone line technical difficulties</td>
</tr>
<tr>
<td>Unable to provide required documents</td>
</tr>
<tr>
<td>Limited access to phone or internet</td>
</tr>
<tr>
<td>Difficult to get time away from work or school</td>
</tr>
<tr>
<td>No one to provide childcare while getting vaccine</td>
</tr>
<tr>
<td>Information not available in local language</td>
</tr>
<tr>
<td>Could not get preferred type of vaccine</td>
</tr>
<tr>
<td><strong>Lack of access to information subtheme score</strong></td>
</tr>
<tr>
<td>Proportion of households without internet connection</td>
</tr>
<tr>
<td>Proportion of households without a smartphone</td>
</tr>
<tr>
<td>Proportion of limited English-speaking households</td>
</tr>
<tr>
<td><strong>Can individuals easily get to vaccination sites?</strong></td>
</tr>
<tr>
<td>Proportion of individuals that experienced or perceived the following barriers:</td>
</tr>
<tr>
<td>Difficulty getting to site</td>
</tr>
<tr>
<td>No vaccine clinics close by</td>
</tr>
<tr>
<td>Health care accessibility barriers due to transportation subtheme score</td>
</tr>
<tr>
<td>Households without vehicle ownership</td>
</tr>
</tbody>
</table>

**Figure 8.** COVID-19 Vaccine Sites in Elkhart County, Indiana.

Source: Indiana Department of Health Data as of June 4, 2021
Step 2.2.3
Assess Equity in Access

As in Step 1.2, look at access through an equity lens to ensure that all population subgroups have access to vaccination sites. Identify inequities by mapping equity dimensions relevant to the context (see Table 1, Monitoring COVID-19 Vaccination by Different Dimensions of Equity) and overlaying access metrics (e.g. vaccination sites per capita, available public transport, distance to site, language accessibility). See guidance and examples to operationalize equity from the Duke Margolis Center for Health Policy report: Addressing Early Challenges in COVID-19 Vaccine Distribution.

Figure 9. Racial Inequities in COVID-19 Vaccine Access in Texas

Where COVID-19 Vaccination Sites Are In Travis and Bastrop Counties

Neighborhoods (census tracts) shaded by the percentage of non-Hispanic white residents

Notes: Texas COVID-19 Vaccine Availability Map as of Feb. 4

Source: NPR, Texas Division of Emergency Management, Data as of February 4, 2021
STEP 3
Engage with Community Stakeholders to Address Identified Challenges

Partnerships with recognized community-based organizations (CBOs), faith-based organizations, healthcare providers, and other local leaders can help further contextualize barriers, identify local areas of concern and design solutions. Using your existing network of partners and identifying community-based organizations that operate in low-coverage areas and serve subpopulations with limited access and lower demand, will allow you to identify partners to engage with in formal or informal assessments to identify that community’s key barriers and develop interventions to address those barriers.

Step 3.1
Map Community-Based Organizations

Identify CBOs for potential partnership—for example, for vaccine registration, outreach and to host vaccination events. Select partner(s) relevant to communities identified in step 1. Mapping, along with conversations with existing partner organizations can help you determine which CBOs might be best to partner with.

Potential CBOs can include, but are not limited to the following:

- Federally Qualified Health Centers (FQHC) and health care providers that specialize in specific populations like migrant workers and the LGBTQ+ community
- Community organizers, particularly housing, food, and racial justice organizations
- Social service organizations and programs e.g., providers for WIC
- Youth organizations (YMCA/YWCA)
- School organizations (PTAs/PTOs)
- Meal delivery services
- Faith-based organizations

Strategies for Identifying and Reaching Out to CBOs

Contacting organizing groups, faith-based organizations, local politicians, neighborhood associations and PTA/Os to ask them to partner in developing communications campaigns for their participants.

Contacting CBOs that work with health care access, food and housing services, leaders in community health or FQHCs, faith-based organizations, and providers for Special Supplemental Nutrition program for Women and Children (WIC) and other services and asking what they are hearing from their participants (or even leading informal focus groups) about the vaccine, what barriers are coming up and what they need in order to get vaccinated.
Step 3.2
Engage Around Key Barriers Identified in Step 2 and Design Solutions

As you prepare to reach out to potential partners, outline key questions around access and demand challenges from step 2. Engage partners on key questions, follow-up with additional community-level discussions to unpack why COVID-19 vaccine uptake is lacking (e.g. formal or informal focus group discussions), and track qualitative insights about community perceptions and barriers of concern (for formal data collection, see CDC guidance on rapid community assessments). See CDC Guidance on Engaging Community-based Organizations to be Vaccination Partners. Work with stakeholders to develop appropriate solutions drawn from the insights from step 2 and 3, active stakeholder involvement in design and evaluation, and feasibility based on resources available (budget, partner capacity, timeline).

CASE STUDY:
Understanding Demand and Access Challenges in Wake County, North Carolina

The Wake County Human Services COVID-19 Operations unit mapped both demand and access factors to inform decisions on where to conduct outreach efforts and set up mobile vaccination clinics. The map on the top depicts vaccine hesitancy by public use microdata areas (PUMAs), as compared to vaccination coverage by census tracts. The map on the bottom depicts vaccine deserts, which are areas more than three miles away from a vaccination location. In general, the central, eastern and southern parts of the county are more hesitant, less vaccinated and have less access to vaccine providers. Acting on this information, Wake County refined communications and messaging materials, identified key local partners (primary care providers, community-based organizations, pharmacies) to allocate additional vaccine doses to, and identified specific locations (public parks, retail and grocery stores) to canvas and set up mobile vaccination clinics.

Figure 10. Prevalence of Vaccine Hesitancy and Vaccine Coverage Rates

Figure 11. Vaccine Provider Locations & Three Mile Buffer

Tips for Engaging Community Leaders

- Go where they are (physically, or virtually on their schedule).
- Be upfront about your goals—you want to better understand their experience so that you can make your programs work for them.
- Ask open-ended questions, and listen to understand (not to correct).
- Ask community leaders and members what ideas they have to address demand and access issues in their community.
- Follow up to let them know what you’ve done with their input (what programs you’re piloting or ways you want to keep them involved) and continue to ask for feedback about those programs.

Questions for Community Leaders

- What are you hearing from your [base, constituents, participants, patients, contacts] about COVID-19 vaccines in general?
- Have you heard any concerns about the vaccine? What are they?
- Have you heard about issues people are having in getting the vaccine? What issues have come up?
- What are you hearing from people who have gotten the vaccine? What has their experience been? Did they have any difficulties? What are they telling other people about it?
- What do you think I/we could do to make it easier to get vaccinated or to get people excited to be vaccinated?
<table>
<thead>
<tr>
<th>Vaccine Barrier</th>
<th>How To Address It</th>
<th>Case Studies</th>
</tr>
</thead>
</table>
| Limited knowledge and awareness of the COVID-19 vaccine | Leverage existing community health center networks serving key populations  
Develop communication material in relevant languages  
Provide frequent, regular communications through trusted and different non-digital channels (e.g., community spokespersons, radio, town halls, etc.)  
Use transparent communications materials and resources to raise awareness that the vaccine is free and provide up-to-date information on requirements (e.g., no health insurance or identification needed in most locations)  
Partner with existing community-level programs to reach and engage underserved populations (e.g., Meals on Wheels) | The State of Maryland has a GoVAX campaign to promote vaccine confidence in historically underserved communities  
In Massachusetts, GOTVax has been delivering vaccines directly to doorsteps and assisting community members with online vaccine site registration  
King County, Washington offers COVID-19 vaccine information in 17 languages on their website |
| Low trust in vaccination              | Host listening sessions with community members to understand concerns and address them  
Set up vaccination clinics in non-health care settings that are trusted and frequented by the community with trusted local providers from the same community  
Encourage community leaders to hold conversations in popular gathering places in the community  
Set expectations for vaccination experience through storytelling  
Leverage messaging from behavioral science  
Explain process through analogies to help people understand the relative level of risk of vaccination  
Emphasize the costs of not getting vaccinated (anticipated regret) to make salient the trade-offs involved  
Consider bundling vaccination with other health or social services, such as offering vaccination at a food pantry, or with blood pressure checks or other health services | Massachusetts has launched a mass media public health awareness campaign to promote vaccine efficacy and safety that focuses on communities of color and other disadvantaged populations  
In Maryland, vaccine clinics are being hosted in salons and barbershops with barbers and stylists trained as community health workers |
<table>
<thead>
<tr>
<th>Vaccine Barrier</th>
<th>How To Address It</th>
<th>Case Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual</td>
<td>Offer vaccinations at schools, workplaces, and in trusted community locations to show the community is getting vaccinated</td>
<td>NYC is providing paid leave for COVID-19 vaccinations</td>
</tr>
<tr>
<td>accessibility</td>
<td>Promote credible communication that vaccination is free and address any concerns</td>
<td>La Clinica del Pueblo in DC allows existing patients to make vaccine appointments on their website</td>
</tr>
<tr>
<td>barriers</td>
<td>Encourage employers to provide paid time off for vaccination</td>
<td>New Mexico has an online form for employers and community-based organizations to request vaccination clinics</td>
</tr>
<tr>
<td></td>
<td>Advocate for policies that waive ID requirements and limit out-of-pocket costs and the billing of the underinsured (even if costs are eventually reimbursed)</td>
<td>New Orleans has efforts to increase vaccine equity including community vaccine sites, free Ubers, and home-bound vaccination programs</td>
</tr>
<tr>
<td></td>
<td>If relevant, make the appointment process easy (e.g., offer default appointments, pre-fill in information), offer volunteers to help set up an appointment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Consider adding a “whole family” approach to offering vaccination to all eligible family members in one go to reduce the burden of multiple appointments (especially if getting two dose vaccine series)</td>
<td></td>
</tr>
<tr>
<td>Community</td>
<td>Integrate vaccination clinics within existing social support programming (e.g., WIC)</td>
<td>The Baltimore City Health Department is using mobile vaccine clinics to reach older communities of color</td>
</tr>
<tr>
<td>accessibility</td>
<td>Close transportation gaps through mobile vaccination clinics and alternate transportation models</td>
<td>New Jersey has engaged pharmacies and non-traditional locations for vaccine sites</td>
</tr>
<tr>
<td>barriers</td>
<td>Increase access to vaccines through workplace programming and other frequented, congregate community sites</td>
<td>In California, a nonprofit held an event to provide people experiencing homelessness hot showers, food, and COVID-19 vaccines</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In Oregon, an agriculture business hosted a mobile clinic for their farmworkers</td>
</tr>
</tbody>
</table>
STEP 4

Implement, Monitor and Evaluate Impact: Is Vaccination Uptake Improving?

As you implement solutions co-created with partners in step 3, prepare to monitor their impact. This can include regular monitoring of process metrics (e.g. vaccine registrations) and key outcome indicators (e.g. vaccine coverage) to understand what is working well and where there are persistent or emerging gaps. Make a plan to assess the metrics that are most relevant to your intervention on a weekly or biweekly basis. This might be in the format of a dashboard or a less formal situation brief for your team that shows data from the previous week, newly updated data, and the week-over-week change to gauge if barriers are reduced and output measures and coverage rates improve.

Communities may also choose to consider count-based numbers in addition to proportions quantifying the number of people remaining to be vaccinated. This can further inform the prioritization of time and financial resources by geography. Targets can be set based on how many people would need to be vaccinated in what span of time to meet a specific vaccination coverage rate.

Table 6. Monitor and Evaluate Solutions

<table>
<thead>
<tr>
<th>Domain</th>
<th>Indicator (evaluated on a daily or weekly basis)</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key Process Indicators</strong></td>
<td>Number of vaccine registrations (vaccine registration rate) per priority area</td>
<td>Public Health Immunization Registry</td>
</tr>
<tr>
<td></td>
<td>Number of vaccinations per day (vaccination rate) per priority area</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Proportion of available vaccination appointments scheduled</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number of community-based partners and/or activities specifically related to COVID-19 vaccination (e.g. town halls)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number of persons initiating vaccination per population in the last 7 days</td>
<td></td>
</tr>
<tr>
<td><strong>Key Outcomes Indicators</strong></td>
<td>Vaccine coverage</td>
<td>CDC, Public Health Immunization Registry</td>
</tr>
<tr>
<td></td>
<td>Proportion of vaccines administered to priority groups (defined locally with the goal of furthering equity)</td>
<td>Public Health Immunization Registry</td>
</tr>
</tbody>
</table>
Appendix
### Table A1. COVID-19 Vaccination Data Toolkit Resources

<table>
<thead>
<tr>
<th>Tool</th>
<th>Measure</th>
<th>Use</th>
<th>Source</th>
<th>Geo Precision</th>
<th>Update Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household Pulse Survey</td>
<td>This is a measure of the population with lower COVID-19 vaccine intention.</td>
<td>Quantify community-level demand</td>
<td>ASPE, from Census Household Pulse Survey</td>
<td>County</td>
<td>Biweekly/ As available</td>
</tr>
<tr>
<td>CMU/ Facebook Survey</td>
<td>Survey measures the proportion of population that have intent or have already been vaccinated, proportion of vaccinated people who have experienced barriers and unvaccinated people who anticipate barriers to COVID-19 vaccination - both overall and by specific barrier.</td>
<td>Quantify community-level demand and key barriers</td>
<td>CMU/ Facebook, Surgo Ventures</td>
<td>County</td>
<td>Biweekly/ As available</td>
</tr>
<tr>
<td><strong>COVID-19 Vaccine Personas</strong></td>
<td>These five personas group people by their beliefs and barriers to the vaccine, to help drive barrier-specific solutions: the enthusiasts, the watchful, the cost-anxious, the system-distrusters, and the COVID-Skeptics.</td>
<td>Identify key barriers driving low demand</td>
<td>Surgo Ventures, CMU/ Facebook</td>
<td>State, County (coming soon)</td>
<td>Biweekly/ As available</td>
</tr>
<tr>
<td>COVID-19 Vaccine Coverage Index (CVAC)</td>
<td>This is a measure of the community-level concern for a difficult vaccine rollout—both overall and by 5 barrier domains: historic undervaccination, sociodemographic barriers, resource-constrained settings, health care-accessibility barriers, and irregular care-seeking behaviors.</td>
<td>Identify which communities face challenges to vaccine coverage and why</td>
<td>Surgo Ventures</td>
<td>County</td>
<td>Static, infrequent</td>
</tr>
<tr>
<td><strong>COVID-19 Community Vulnerability Index (CCVI)</strong></td>
<td>This is a measure of community vulnerability to the negative health, economic, and social impacts of the COVID-19 pandemic through 7 thematic areas: socioeconomic status, minority status and language, household and transportation, epidemiological factors, healthcare system factors, high-risk environments, and population density.</td>
<td>Identify where and why communities are vulnerable to COVID-19 impacts</td>
<td>Surgo Ventures, Census Tract</td>
<td>Static, Infrequent</td>
<td></td>
</tr>
<tr>
<td><strong>Social Vulnerability Index (SVI)</strong></td>
<td>This is a measure of community vulnerability to prepare and respond to adverse impacts of disastrous events through 4 themes: socio-economic status, household composition and disability, minority status and language, and housing type and transportation.</td>
<td>Identify where and why communities are vulnerable to hazardous events</td>
<td>CDC</td>
<td>Census Tract</td>
<td>Static, Infrequent</td>
</tr>
</tbody>
</table>
FOCUS: COVID-19 VACCINATION

Household Pulse Survey

The U.S. Census Bureau’s Household Pulse Survey measures vaccine hesitancy as a proportion of individuals responding that they would “probably not” or “definitely not” receive a COVID-19 vaccine when available; strong hesitancy includes only those that would “definitely not” receive the COVID-19 vaccine when available.

Figure A1. County-level Vaccine Hesitancy from the ASPE.

CMU/Facebook Symptom Survey

The CMU/Facebook Symptom Survey measures COVID-19 vaccine acceptance as a proportion of individuals who either have already received a COVID-19 vaccine or would definitely or probably choose to receive one if it were offered to them today.

Source: ASPE, Data as of June 15, 2021
Learn more: Website, Methodology
Geoprecision: State, Public Use Micro-data Area (PUMA), County

Source: CMU Delphi/Facebook, Data as of June 14, 2021
Learn more: Website, Methodology
Geo-precision: State, Metro Area, Hospital Referral Region, County
COVID-19 Vaccine Personas

The CMU/Facebook Symptom Survey assesses Americans’ likelihood to get the COVID-19 vaccine based on beliefs and barriers in real time—identifying the size of five distinct population subgroups defined by their vaccine intention, underlying concerns and barriers driving intention.

All personas are represented in Figure A3.

The COVID-19 Vaccine Persona Tool is a six question tool that can be used by anyone to quickly identify which of the five personas someone falls into with over 90% accuracy. For example, providers in Rhode Island are using the tool to personalize information per patient, tailoring messages to barriers as identified by the five segments to build confidence and COVID-19 vaccine intention.

Figure A3. Key Barriers and Targeted Solution Examples by Persona

The Five Vaccine Personas

**The Enthusiasts**
- Are ready to get vaccinated
- Want to wait and see, given their concerns on vaccine safety and effectiveness
- Are concerned about the financial and time cost of getting vaccinated
- Believe people of their race aren’t treated fairly by the U.S. health care system
- Have low COVID-19 risk perceptions and believe several COVID-specific conspiracy theories

**The Watchful**
- Appointment availability
- Community norms
- Financial cost
- Time
- Trust
- Access and inequity

**The Cost-Anxious**
- Vaccine Safety
- Vaccine Safety
- Vaccine Safety
- Vaccine Safety

**The System Distrusters**
- Make it easy for them to get the vaccine.
- Make it visible that others are vaccinated or intend to be
- Bring vaccines to people. Offer paid time off.
- Listen and learn. Partner with trusted community organizations.
- Don’t try to debunk. Enlist trusted figures to persuade.

**The COVID Skeptics**

Learn more: Website, Methodology, Insights Report
Geoprecision: State, County (coming soon)
COVID-19 Accessibility Barriers

The CMU/Facebook COVID-19 Symptom Survey also measures the proportion of vaccinated individuals experiencing and unvaccinated individuals anticipating barriers to getting the COVID-19 vaccine for any of the following reasons:

- No available appointments
- Not having time (away from work or school)
- Concerns about cost
- Difficulty traveling to a vaccination site
- Not knowing how to schedule an appointment
- Vaccine website or phone crashing
- Information not available in my native language
- No vaccine clinics close by
- Limited access to internet or phone (to schedule an appointment)
- No one to provide childcare while getting vaccinated

COVID-19 Vaccine Coverage Index (CVAC)

The CVAC identifies which communities face challenges to vaccine coverage and why, based on five underlying community-level barrier domains affecting scale-up of COVID-19 vaccine coverage.

**Figure A4.** The COVID-19 Vaccine Coverage Index Theme Descriptions

<table>
<thead>
<tr>
<th>Theme</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historic Undervaccination</td>
<td>lower standard vaccination coverage, higher vaccine refusal</td>
</tr>
<tr>
<td>Sociodemographic Barriers</td>
<td>socioeconomically disadvantaged groups, lack of access to information</td>
</tr>
<tr>
<td>Resource-constrained Health System</td>
<td>limited workforce, infrastructure, funding, quality</td>
</tr>
<tr>
<td>Health care Accessibility Barriers</td>
<td>underinsured, delayed care-seeking, lack of transportation access, limited transport connectivity</td>
</tr>
<tr>
<td>Irregular Care-seeking Behaviors</td>
<td>lack of personal doctor or usual source of care, failure to seek routine care</td>
</tr>
</tbody>
</table>

**Figure A5.** The COVID-19 Vaccine Coverage Index

Source: Surgo Ventures
Learn more: Website, Methodology, Insights Report
Geo-precision: State, County
COVID-19 Community Vulnerability Index (CCVI)

The CCVI measures vulnerability to the negative health, economic and social impacts of the COVID-19 pandemic through seven thematic areas.

Source: Surgo Ventures
Learn more: Website, Methodology, Insights Report
Geo-precision: State, County, Census Tract, Zip Code

Social Vulnerability Index (SVI)

The SVI measures community vulnerability to potential negative impacts caused by external stressors, such as national disasters and pandemics, through four thematic areas.

Source: CDC
Learn more: Website, SVI 2018 Documentation
Geo-precision: State, County, Census Tract
Increasing COVID-19 Vaccine Uptake: A Four-Step Framework to Promote Access, Acceptance, and Equity

All materials are available under a Creative Commons BY-NC license.

Please cite this report as:
Surgo Ventures, Resolve to Save Lives (2021) COVID-19 Vaccine Precision Response Toolkit: An End-to-End Vaccination Improvement Framework to Improve COVID-19 Vaccine Uptake

Acknowledgments:
This guide was developed by Surgo Ventures and Resolve to Save Lives with additional support and input from the following:
- American Public Health Association
- Duke-Margolis Health Policy Center
- and the National Association of County and City Health Officials

Surgo Ventures is a nonprofit organization dedicated to solving health and social problems with precision. We do this by bringing together all the tools available from behavioral science, data science, and artificial intelligence to unlock solutions that will improve and save lives. We work globally: in the United States, the United Kingdom, and in low- and middle-income countries on issues like COVID-19, tuberculosis, maternal and child health, housing, and more.
covid19@surgoventures.org

Resolve to Save Lives is an initiative of Vital Strategies, a leading global public health organization and a trusted partner of governments and civil society organizations around the world. We help governments strengthen their public health systems to contend with the most important and difficult health challenges. We bring the best of public health thinking to design solutions that can scale rapidly and improve lives.
covid19-ct@vitalstrategies.org

Version 1, Published June 17, 2021