



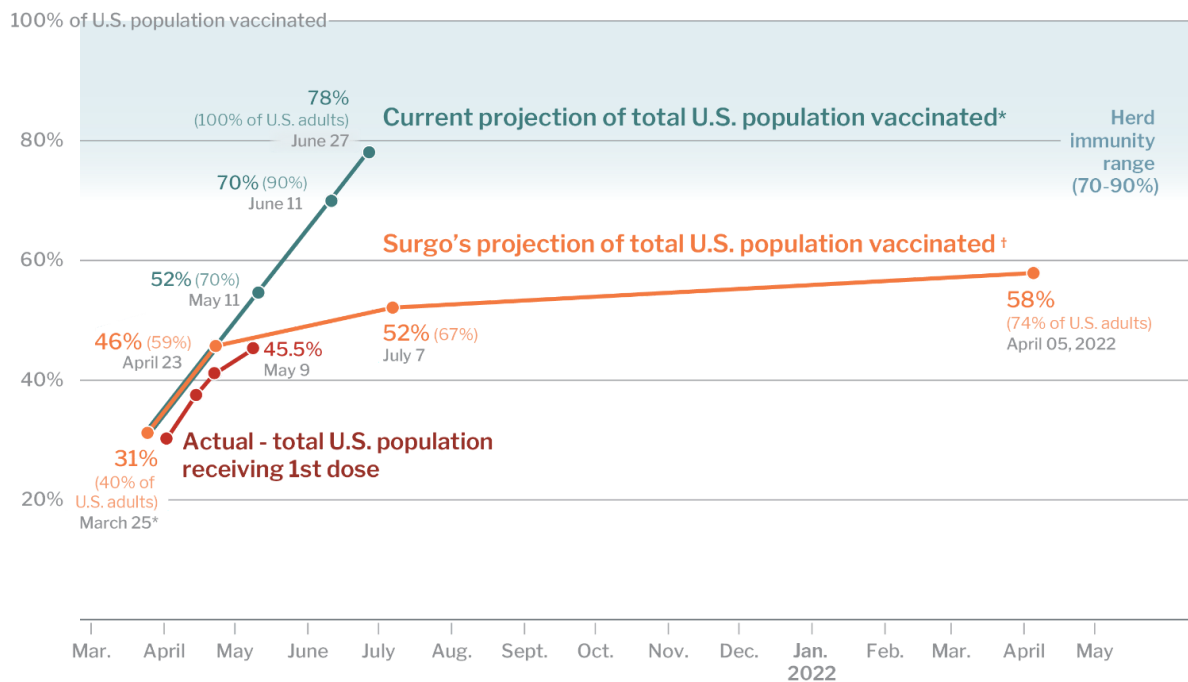
A Large-Scale Facebook Survey Of U.S. Adults: Leveraging Precision Health to Increase COVID-19 Vaccine Uptake

May 2021

Executive Summary

In early April 2021, Surgo Ventures [predicted](#) the plateauing of vaccine uptake (see below) —the gap between demand and vaccine supply—in the United States by analyzing the answers we received to one simple question on a [national survey](#): **When do you plan to get vaccinated?**¹

We will need to work in a much more precise way to close this vaccine uptake gap efficiently and effectively with limited time and resources. How do we do it? By using a **precision health approach** that looks at specific vaccination barriers and beliefs at a geographically granular level.



* Assuming vaccinations continue at current rate of 0.6% of adults per day receiving their first dose

† Calculated based on Surgo's nationally representative survey of 1,670 adults in the United States from March 18-March 25, 2021
Source: Surgo Ventures

About Surgo Ventures

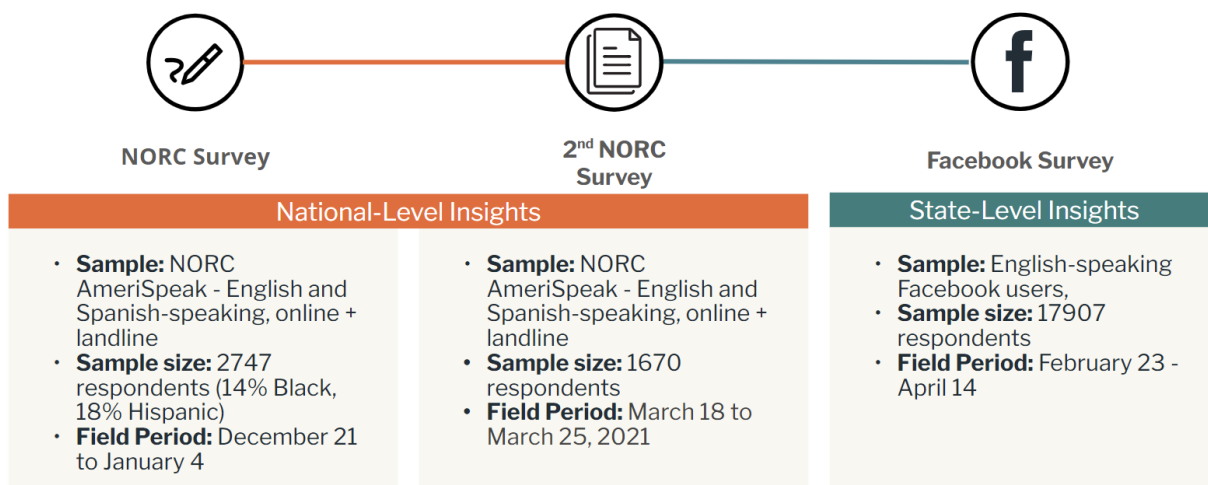
¹ This projection was based on a national survey of U.S. adults, administered via NORC at the University of Chicago in March 2021. Our data were used to emphasize the shift to demand-side vs supply-side issues in vaccination as a key hurdle in restarting the economy in the U.S. Congress Joint Economic Committee "Vaccinations and the Economic Recovery" hearing.

Surgo Ventures, with headquarters in Washington, DC and a hub in the United Kingdom, is a nonprofit organization dedicated to solving health and social problems with precision.

Previous studies of COVID-19 vaccine confidence have focused on differences between demographic groups, describing the disparate outcomes, but not the reasons for those outcomes. We focus instead on **the underlying drivers shaping a person’s intention and subsequent action**. Getting people vaccinated depends on closing the intention-action gap. The discourse on party affiliation and race is informative, but not actionable. National level data also does not provide the granularity needed for action by state and county leaders. By employing a psychobehavioral segmentation approach—a technique that segments the population based on barriers and beliefs related to vaccination—we have identified five different types of people living in the US who differ in their attitudes toward the COVID-19. These subgroups **are malleable, multidimensional, and targetable at a granular level**.

Adopting and adapting a localized approach to COVID-19 vaccine uptake is fundamental to building vaccine confidence in America. It is an approach that recognizes that states, counties, and even zip codes require different approaches to building vaccine confidence and long-term trust in public health, and that, over time, tactics will need to evolve even within communities.

To inform this work, we have conducted three large-scale surveys, all representative of the U.S. population and weighted to population benchmarks:²



After our first NORC survey, we identified five psychobehavioral personas (types of people, or Vaccine Personas) living in the U.S. based on their likelihood of getting vaccinated and their barriers to and beliefs about COVID-19 vaccination:

- **The Enthusiasts** are ready to get vaccinated
- **The Watchful** want to wait and see, given their concerns on vaccine safety and effectiveness
- **The Cost-Anxious** are concerned about the financial and time cost of getting vaccinated

² See Methodology for more details.

- **The System Distrusters** believe people of their race aren't treated fairly by the U.S. healthcare system
- **The COVID Sceptics** have low COVID-19 risk perceptions and believe several COVID-specific conspiracy theories

The relative breakdowns of the vaccine personas we've identified have shifted over time in the U.S. population as the pandemic and the response to it have progressed.

In this document, we present the first state-level data on the five vaccine personas, informed by our third survey, and answering the following questions:

1. What are the key barriers to COVID-19 vaccination by state, and how can states address them?
2. Which types of people living in the US should state leaders focus on to increase vaccine uptake?

Our findings show that states are heterogenous, facing many different vaccination-related challenges related to both structural barriers and individuals' beliefs. We provide actionable solutions for time- and resource-pressed state and local policy makers to increase and promote equitable vaccine uptake in the United States. Focusing on the barriers and beliefs people hold, overlaid with their likeliness of getting vaccinated, helps guide programming with precision and greater accuracy, improving program efficiency and effectiveness, and increasing return on investment.

Key Findings and Opportunity Areas

1. **The top reported challenges by non-vaccinated individuals are appointment availability, having the time to get vaccinated, and concerns over cost.** These barriers, however, vary state by state. In Alabama and Mississippi, which have the lowest vaccination rates, policymakers will want to focus on increasing appointment availability and exploring ways to reduce the time-burden of vaccination. In Wyoming and Idaho, state officials should focus on emphasizing that vaccination is free of cost and educating on how to schedule an appointment. Notably, we found that in **states where unvaccinated individuals were most enthusiastic to get vaccinated, people anticipated barriers to vaccination at much higher rates**, suggesting that they don't start thinking more concretely about barriers until they've confirmed that they even want to get vaccinated and that perceived difficulty may be related to intensity of demand.
 - **Opportunity Area:** *States should focus on the barriers most prominent for their populations to immediately increase vaccine uptake. Addressing these barriers will help close the gap between vaccine intention and action for individuals already primed for vaccination.*
2. **Specific vaccine personas are more prevalent in certain states.** Arkansas, North Dakota, and Nevada should focus their efforts on COVID Sceptics while Mississippi and Alaska should prioritize the concerns of the Cost-Anxious. Respectively, Delaware, Hawaii, and

Rhode Island should invest in interventions for Watchful individuals, and Washington, D.C., and Maryland should develop strategies to respond to the concerns of System Distrusters.

- **Opportunity Area:** States should focus on interventions that build confidence in the vaccine based on the most prevalent personas in their population. These efforts should be informed by local context, looking different even for states with the same most prevalent segment. For example, COVID misinformation circulating in Arkansas is likely different from Nevada. System Distrusters in Idaho differ from those in Georgia.

3. Black, Latinx, and white respondents fall across all five personas, indicating that we cannot treat racial categories as monoliths. However, there are some patterns in which personas are most prevalent. Higher proportions of white respondents identify as COVID Skeptics (17.7% in March) compared to Latinx (13.2%) and Black (10.7%) respondents. System Distrusters are more likely to identify as Black (18%) and Latinx (11%) than white (4%). Differences between racial subgroups in percentage of Enthusiasts shrunk over time. In March, over 20% of respondents from across all racial and ethnic groups identified as Enthusiasts.

- **Opportunity Area:** Inequities in vaccine uptake have been reported across the country by [the CDC](#). To close the equity gap in vaccination, we need to address the unique concerns that Black and Latinx individuals have, which our national data show are heterogenous. Ensuring racial equity in vaccination will require tackling both issues of access and concerns about vaccination. We can look state by state to see which personas and barriers are most prevalent for non-white populations. By broadening the conversation around identity to include multidimensional barriers and beliefs, policymakers can take an equity-oriented approach while explicitly addressing the valid concerns of their constituents.

4. Vaccine personas, belief in conspiracy theories, and anticipated vaccination timelines vary across the political spectrum. Republicans remain overrepresented in the COVID Skeptic persona, but that number has fallen over time, from 33% in January to 26% in March. Republicans (61%) and Independents (41%) are at least twice as likely to believe in any conspiracy theory compared to Democrats (25%). Across all political groups, between 20 and 30% of respondents said they want to wait at least three months to get vaccinated or don't know when they will get vaccinated.

- **Opportunity Area:** The discourse around political affiliation is not helpful in addressing underlying drivers of vaccine hesitancy as it reduces individuals to one facet of their identity. Localized efforts should focus on combating misinformation around COVID-19 that spans party lines, increasing access to vaccination, and emphasizing the benefits of vaccination that most appeal to specific subpopulations, such as gathering with family, going to church, socializing with friends, traveling, and attending sporting events.

Ultimately, vaccine uptake initiatives must be designed locally, accounting for resources and context and guided by our insights into who should be focused on when. We detail a roadmap for the types of interventions to use for each segment. Essentially, to use analogy, we are providing the ingredients but the exact recipe should be guided by local context. With precise, parallel data-driven efforts across the country we can drive vaccination program productivity and impact, reach herd immunity faster, and put the COVID-19 pandemic behind us.

Barriers to Vaccination

States are heterogenous, facing many different vaccination-related barriers. Notably, Surgo found that in **states where unvaccinated individuals were most enthusiastic to get vaccinated, people anticipated barriers to vaccination at much higher rates**, suggesting that people don't start thinking more concretely about barriers until they've confirmed that they even want to get vaccinated and that perceived difficulty may be related to intensity of demand.

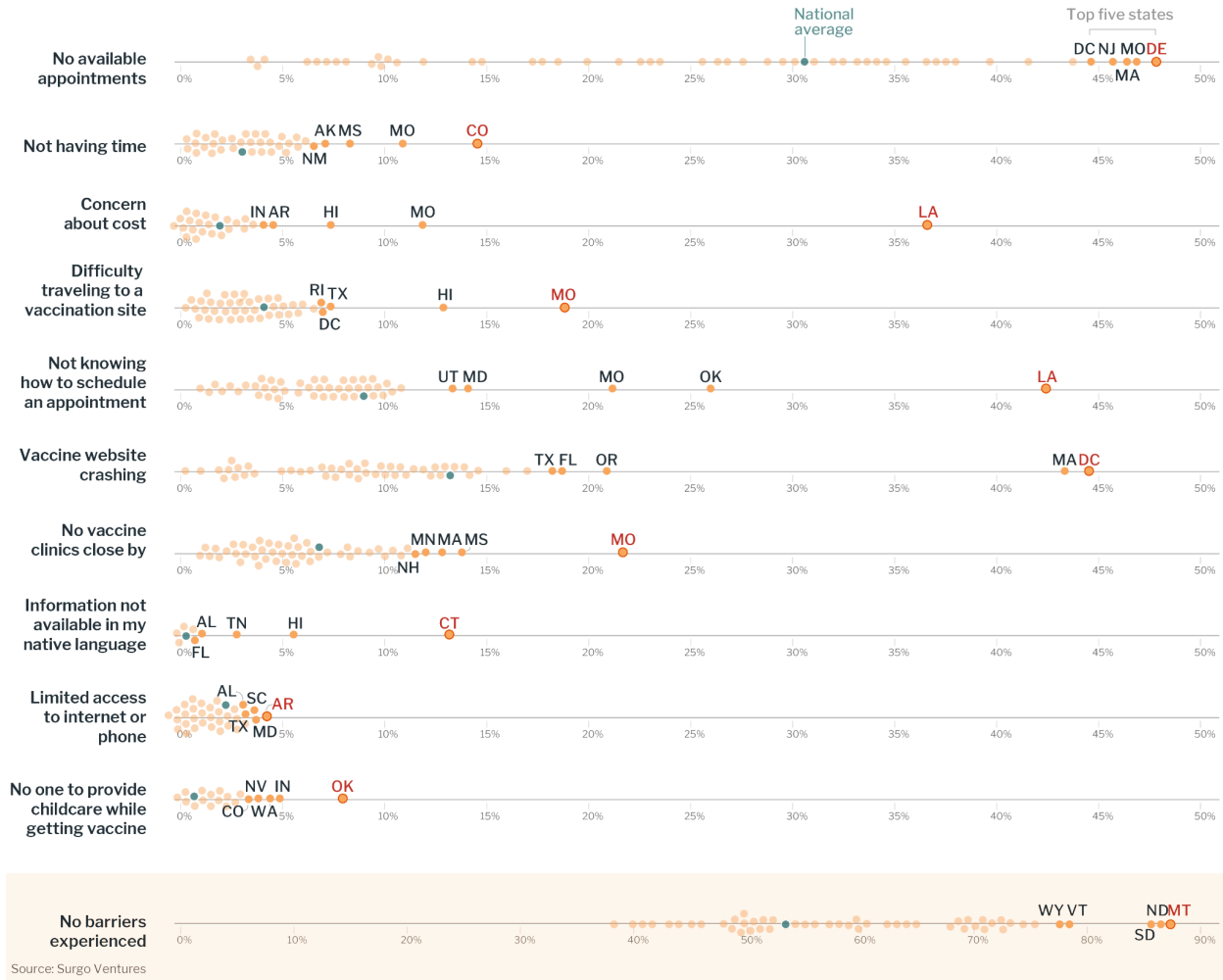
For example, in Vermont, where 60% of unvaccinated respondents were enthusiastic to get the jab as soon as possible, 47% anticipated barriers to vaccination. In contrast, in Arkansas, where 2% of unvaccinated survey respondents were enthusiastic to get vaccinated, only 18% anticipated barriers. Because of this finding, Surgo divided its key findings among **barriers identified by people who had already been vaccinated with at least one dose, and people who have not yet been**.

Barriers for Vaccinated Individuals

Those who have already been vaccinated with at least one dose reported that **lack of appointment availability** was the top barrier to vaccination. It was the top or second highest experienced barrier reported in most states (48 states + D.C.). Other commonly experienced barriers included **vaccine websites crashing** (28 states) and **not knowing how to schedule an appointment** (12 states). In 8 states, **no vaccine clinics close by** was a top concern: Alaska, Delaware, Minnesota, Missouri, Mississippi, Nebraska, New Hampshire, and New Mexico. In other people states reported **difficulty traveling to a vaccination site** as a top barrier: Missouri, Hawaii, and Texas. Given that these were barriers experienced by those already vaccinated, they may have been addressed to some degree as states improve vaccine distribution and scheduling processes.

What are the main **experienced** vaccine barriers for people in each state?

Barriers identified by U.S. adults who had already been vaccinated with at least one dose.

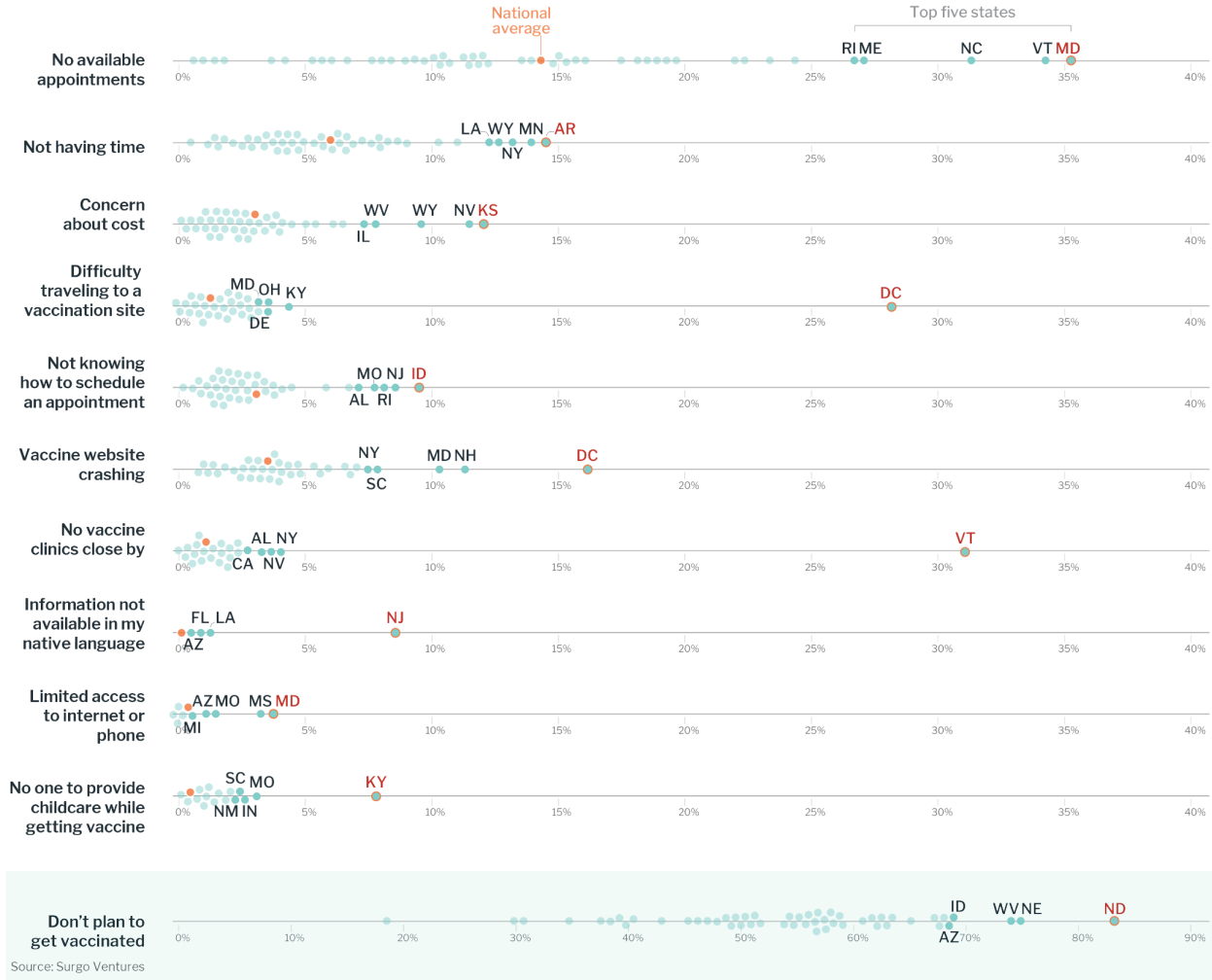


Barriers for Unvaccinated Individuals

For those not yet vaccinated, **vaccine appointment availability** was the top expected barrier to vaccination. This was the top or second-most anticipated barrier reported in 44 states. Unlike experienced barriers, concerns about **having the time to get vaccinated** (27 states) and **concerns over cost** (12 states) were some of the top anticipated barriers to getting vaccinated. Other anticipated barriers included **difficulty traveling a vaccination site, no vaccine clinics close by, and not knowing how to schedule an appointment.**

What are the main anticipated vaccine barriers for people in each state?






Barriers identified by U.S. adults who have not yet been vaccinated.



The Five Vaccine Personas in the US

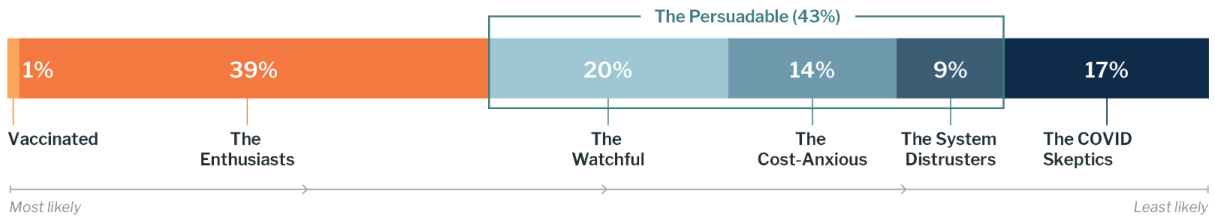
Demography may or may not be destiny—but it’s certainly insufficient in solving the challenges of COVID-19 vaccination. We must also focus on people’s unique barriers and beliefs about vaccination and prioritize tailored interventions based on psychobehavioral segmenting. Focusing on the barriers and beliefs people hold, overlaid with their likeliness of getting vaccinated, helps guide programming with precision and greater accuracy, improving program efficiency and effectiveness and increasing return on investment.

Thus, [we have identified five psychobehavioral “personas”](#) of people living in the US based on their likelihood of getting vaccinated and their barriers to and beliefs about the COVID-19 vaccine—**The Enthusiasts, The Watchful, The Cost-Anxious, The System Distrusters, and The COVID Skeptics.**

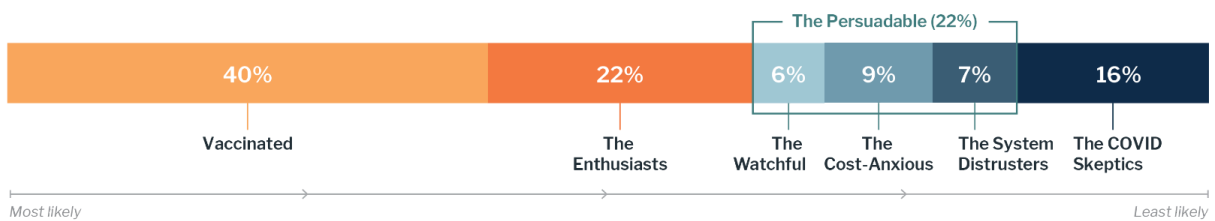
Vaccine Persona	Description
 Enthusiasts	People who want to get the vaccine as soon as possible. A key challenge will be ensuring that they can access the vaccine before they lose enthusiasm. Their reported vaccination likelihood (on a scale up to 10) is 9.37.
 Watchful	People who primarily need to see friends and peers having safe, positive vaccination experiences before they will commit. Their reported vaccination likelihood (on a scale up to 10) is 4.95.
 Cost-Anxious	People for whom time and financial cost are the primary barriers. Every member of this group has delayed seeing care for their health in the past due to cost regardless of insurance status. Their reported vaccination likelihood (on a scale up to 10) is 4.16.
 System Distrusters	People who primarily believe that people of their own race are not treated fairly by the health system. Members of this group are likely to belong to, but are not exclusively, communities of color. Their reported vaccination likelihood (on a scale up to 10) is 3.81.
 COVID Skeptics	People who don't believe in vaccines in general, but the primary barrier is their deeply held beliefs around COVID-19. Every person in this group believes in at least one conspiracy theory. Their reported vaccination likelihood (on a scale up to 10) is 2.34.

The distribution of these personas has shifted nationally over time, as shown below. These personas are traits not states, meaning that individuals can move from one group to another as their beliefs and vaccine intention change. We hypothesize that these shifts are of The Persuadable personas—Watchful, Cost-Anxious, and System Distrusters—to the Enthusiast and Vaccinated groups. Efforts must now include not only prioritizing The Persuadable and focusing on dismantling the real or perceived barriers that stand in their way, but also convincing at least some proportion of the COVID Skeptics.






Surgo Ventures' first U.S. survey (conducted 12/21/20 - 1/4/21)



Second survey (conducted 3/18/21 - 3/25/21)

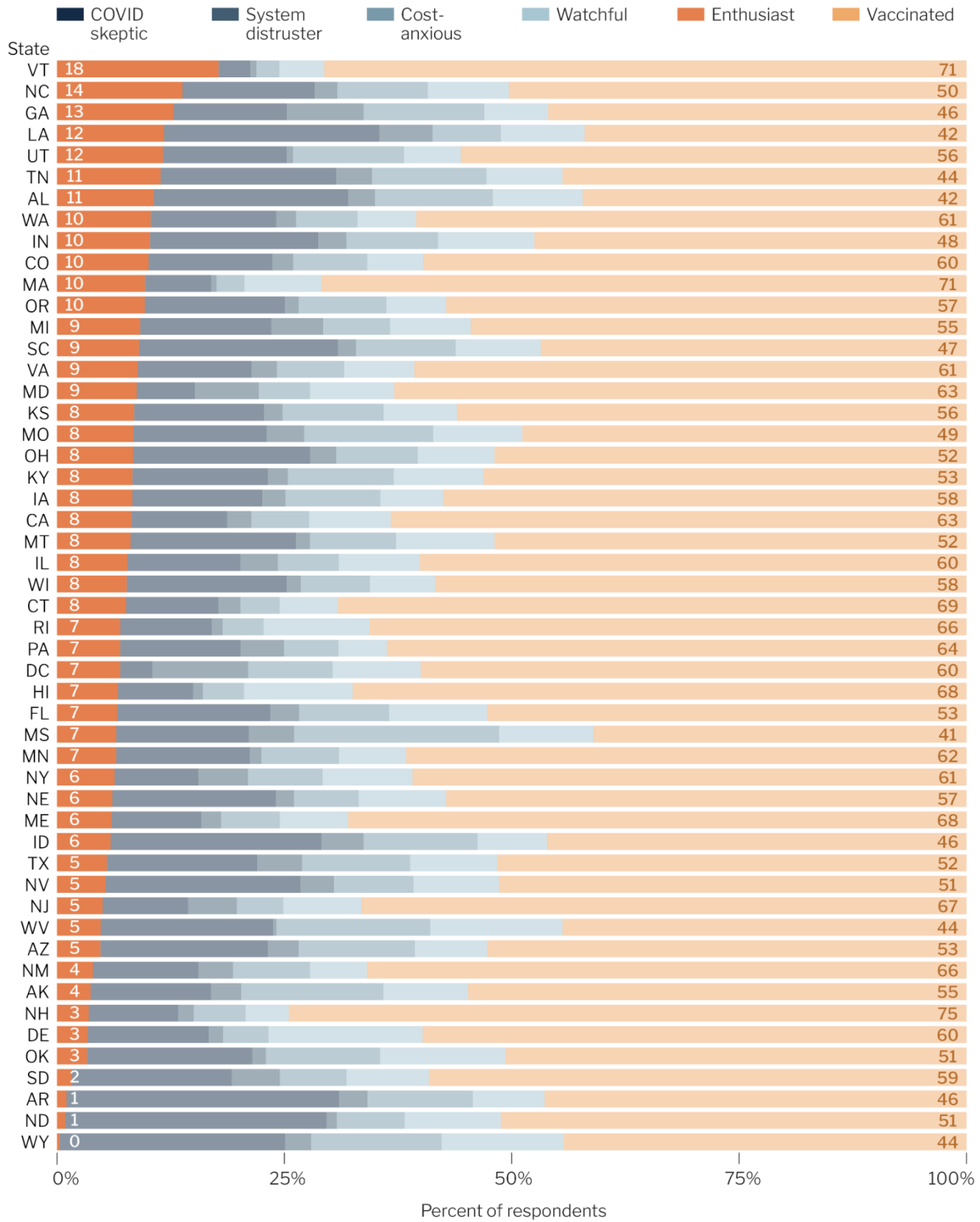


Our data show us exactly where those vaccine personas are most prevalent. In analyzing findings from the Facebook survey, we identified **where the psychobehavioral vaccine personas are clustered among states, providing a useful blueprint for state leaders in deploying precise and localized uptake efforts.** Prioritizing programmatic efforts based on the breakdown of these personas will allow state leaders to improve program efficiency and effectiveness with precision. See [Table](#) for a state-by-state breakdown of the top barriers to vaccination and the prevalence of each vaccine persona.

Vaccine Persona	States with highest proportion of segment (% of the state adult population)
 <p>Enthusiasts</p>	<ol style="list-style-type: none"> 1. Vermont (18%) 2. North Carolina (14%) 3. Georgia (13%) 4. Tie: Louisiana (12%) and Utah (12%)
 <p>Watchful</p>	<ol style="list-style-type: none"> 1. Delaware (17%) 2. West Virginia (15%) 3. Oklahoma (14%) 4. Wyoming (13%) 5. Hawaii (12%)
 <p>Cost-Anxious</p>	<ol style="list-style-type: none"> 1. Mississippi (23%) 2. West Virginia (17%) 3. Alaska (16%) 4. Tie: Wyoming (14%) and Missouri (14%)
 <p>System Distrusters</p>	<ol style="list-style-type: none"> 1. Washington, DC (11%) 2. Georgia (8%) 3. Maryland (7%) 4. Tie: Michigan (6%) and Louisiana (6%)
 <p>COVID Skeptics</p>	<ol style="list-style-type: none"> 1. Arkansas (30%) 2. North Dakota (29%) 3. Wyoming (25%) 4. Louisiana (24%) 5. Idaho (23%)

The chart below depicts the population breakdown at the state level that falls into each persona ordered by percentage of Enthusiasts. See Appendix for charts ordered by Watchful, Cost-Anxious, System Distruster, and COVID Skeptic.

Segment types by state, sorted by enthusiast



Demographic Analysis of Personas

Individuals within demographic groups—race, ethnicity, political affiliation, age, etc.—fall across all five of these personas. We looked specifically at race/ethnicity and political affiliation as they relate to the vaccine personas and belief in conspiracy theories.

Race and ethnicity: Black, Latinx, and white respondents fall across all five personas, indicating that we cannot treat racial categories as monoliths. COVID Sceptics hold steady across all racial and ethnic groups between January and March. Higher proportions of white respondents identify as COVID Sceptics (17.7% of white respondents in March) compared to Latinx (13.2%) and Black (10.7%) respondents. System Distrusters are more likely to identify as Black (18%) and Latinx (11%). The share of Black respondents who identified as a System Distruster fell from 31.2% in January to 18.3% in March. The percentage of Cost-Anxious fell by nearly half from January to March in the Latinx population, from 16.8% to 8.6%. While proportionally more white respondents identified as Enthusiasts in January, differences between racial subgroups have shrunk. In March, 23% of Black respondents, 20.3% of Latinx respondents, and 20.3% of white respondents identified as vaccine Enthusiasts.

Segment	Black		Latinx		White	
	January	March	January	March	January	March
COVID Sceptic	9.5%	10.7%	15.4%	13.2%	20.8%	17.7%
System Distruster	31.2%	18.3%	11.5%	11.4%	2.8%	4.1%
Cost-Anxious	14.3%	11.2%	16.8%	8.6%	12.4%	8.0%
Watchful	13.8%	2.6%	17.0%	4.9%	15.2%	7.3%
Enthusiast	25.5%	23.0%	35.6%	20.3%	44.5%	20.3%
Vaccinated	0%	34.2%	0.8%	41.7%	1.0%	42.6%

Politics: Democrats, Independents, and Republicans fall across all five personas. While Republicans are overrepresented in the COVID Skeptic persona, that number has fallen over time. While nearly one-third of Republicans identified as COVID Skeptics in January, our March survey revealed that this proportion had shrunk to 25% by March. Both Republicans and Independents had a similar percent of vaccinated individuals and, as of March, 19% of Independents and 14.4% of Republicans identified as Enthusiasts.

Segment	Democrat		Independent		Republican	
	January	March	January	March	January	March
COVID Skeptic	6.0%	6.7%	16.4%	18.1%	32.6%	25.6%
System Distruster	11.3%	5.2%	15.6%	11.4%	13.9%	12.1%
Cost-Anxious	10.2%	6.3%	7.7%	10.8%	3.9%	7.6%
Watchful	15.7%	5.1%	15.0%	6.2%	12.6%	6.5%
Enthusiast	51.4%	28.3%	42.1%	19.0%	32.2%	14.4%
Vaccinated	2.0%	48.5%	0.5%	33.9%	0.1%	33.7%

Conspiracy Theories: In January, we found that 41.9% of respondents believed at least 1 COVID conspiracy (breakdown: 24.8% believed 1; 11% believed 2; 5.3% believed 3):

- 10.5% believed a tracking chip may be implanted through vaccine
- 25.5% believed COVID-19 was being exploited by the government to control people³
- 26.7% believed COVID-19 was made by people to manipulate world events

In our March follow-up, we found a very similar proportion (42.1%) believed at least 1 COVID conspiracy (breakdown: 20.4% believed 1; 17.8% believed 2; 3.9% believed 3)

- 7% believed a tracking chip may be implanted through vaccine
- **37.5%** believed COVID-19 was being exploited by the government to control people (an increase of 12%!)
- 23.2% believed COVID-19 was made by people to manipulate world events

Notably, **there were no differences by race or over time for the number of conspiracies believed. However, there were differences in the specific conspiracy theories by race/ethnicity and over time from January to March.**

³ While initially identified as a conspiracy theory, over the course of the pandemic perception of government response to the pandemic has become more subjective.

Republicans and Independents are at least twice as likely to believe in any conspiracy theory compared to Democrats. This also applies across the three specific conspiracy theories that we asked respondents about. The proportion of respondents in each political group believing in conspiracies has remained relatively unchanged since January, though popularity of certain beliefs has shifted.

Political party	Belief in any conspiracy theory		COVID caused by ppl to manipulate world events		COVID exploited by government to control people		Tracking chip implanted in me through vaccine	
	Jan	Mar	Jan	March	Jan	March	Jan	March
Democrat	25.5%	24.7%	17.5%	13.3%	11.4%	20.4%	7.3%	4.1%
Independent	40.8%	50.2%	25.7%	20.2%	25.9%	45.7%	10.2%	7.7%
Republican	61.6%	60.4%	37.0%	36.4%	45.7%	55.3%	15.3%	10.4%

Timing and Political Affiliation: Although many Republicans and Independents want to get vaccinated immediately, they disproportionately say that they would not get vaccinated. Around a quarter of Independents and Republicans said they would not get the vaccine, compared to only 5.9% of Democrats. Across all political groups, between 20% and 30% of respondents said they want to wait at least three months to get vaccinated or don't know when they will get vaccinated.

Timing	Democrat	Republican	Independent
Vaccinated	48.5%	33.9%	33.7%
Get the vaccine as soon as it's available	24.5%	15.3%	11.2%
Wait three months before getting it	7.4%	8.2%	8.2%
Wait a year before getting it	5.4%	9.8%	8.5%
Don't know	8.3%	9.3%	11.6%
I would not get the vaccine	5.9%	23.5%	26.5%

Persona-Specific Solutions

We can address people's specific vaccine barriers with solutions drawn from behavioral science that take both communication campaigns and structural approaches. We identified solutions for each of the five personas grounded in our research and existing literature. Solutions must be comprehensive and localized. We know that human behavior is highly context-driven and that the best solutions are tailored ones, drawing both on the wisdom of the community and localized data. Stakeholders need to engage the right set of solutions and experiments to find the optimal mix of offline and online channels, depending on the key personas in their areas, their barriers and enablers and ways to reach them. Prioritizing solutions based on the barriers and beliefs people hold, overlaid with their likeliness of getting vaccinated, helps guide programming with precision and greater accuracy, improving program efficiency and effectiveness, and increasing return on investment.

Enthusiasts

Make it easy for them to get the vaccine

Streamline the process to sign up for the vaccine and host vaccine clinics in accessible locations. Leverage text reminders to nudge early adopters to get their first and second doses of the vaccine, such as letting them know that the vaccine is “reserved” for them.

Make it visible that they've been vaccinated.

Harness the enthusiasm of this group to promote vaccination in their communities and establish vaccination as a positive social norm to influence other personas. This can take the form of a digital or in-person symbol that indicates a person has received the vaccine, texting friends to get the vaccine 15 minutes after getting the shot, or sharing their experience on social media.

Watchful

Make it visible that others are vaccinated or have positive intent to be vaccinated.

Encourage sharing of stories among members of their communities and networks like them (e.g. older female) who have been vaccinated—stories are often more powerful than numbers. Stories should be authentic and deal with initial hesitancy if any while emphasizing safe, positive experiences with vaccination. Complement stories with vivid data visualizations that transparently show vaccine progress in terms of people signing up or in terms of waiting lists to establish positive norms around intent to vaccinate. Use digital or non-digital signals (stickers, pins, bracelets) to signal vaccination.

Capitalize on positive social norms.

This group is already high mask wearing, showing an intent to comply with social norms—we can capitalize on this protective behavior by highlighting similar altruistic reasons for vaccination.

Have health providers assuage concerns around side-effects.

Given that this group has the largest number seeking advice from doctors, leverage them and other health professionals as messengers to motivationally interview patients and address specific concerns.

Allow for uncertainty through a “vaccinate later” option.

Evidence from behavioral science suggests that people prefer moderate or “compromise” options over their extreme counterparts. Capitalize on this behavioral insight by adding a “vaccinate later” option to the scheduling menu, enabling the Watchful to schedule a vaccine weeks or even months in advance.

Cost-Anxious

Prioritize communication from credible messengers that vaccination is totally free.

Enlist doctors, insurance companies, employers, healthcare systems, faith communities, and visible figures to counter this perceptual barrier to vaccination through clear and credible messaging about the “free” aspect and what people are entitled to. Use social media to amplify the reach of this message, for example, to rural populations. As having to enter insurance information on registration may counter the belief that the vaccination is free, be sure to explain why such information is being collected (e.g. for companies to record vaccinations).

Bring vaccines to people.

Increasing accessibility in this way could have a huge impact on this group, which is the least optimistic about their ease of getting vaccinated—only 62% think it will be easy to get the vaccine when it is available to them. Eliminate structural barriers by holding vaccination clinics in a variety of non-healthcare locations people go to regularly—at workplaces, religious venues, daycares, the supermarket, neighborhoods, bars, and restaurants. Deploy mobile units, particularly in rural areas.

Offer employees paid time off to get the vaccine.

Reduce barriers related to work, time, and cost by granting employees paid time off specifically to get both doses of the vaccine and recover from the expected physical response.

Make the process easy.

Remove “sludge” in the registration process by eliminating information that is not critical and pre-filling information. For those unable to register on their own, provide access to volunteer services or a call-center to help with the information. Send text reminders before appointments. Automatically register individuals for their second dose.

The System Distrusters

Listen and learn from community concerns.

Organize listening sessions and prioritize solutions proposed by community members to tailor the vaccination experience. To better build trust, these sessions—and all other messaging—should be available in the preferred language(s) of the community.

Partner with trusted community organizations, providers, etc. and ensure thoughtful location choices for vaccines.

This group has low expectation that their community members will get the vaccines and so focusing on getting members vaccinated is key. Trusted locations in the community, e.g. local pharmacies and faith communities, may help increase trust and convey the effort made in outreach to the community, thereby increasing intent to get vaccinated. Enlist community volunteers so that providers better reflect the community they serve.

Make it visible that the community is getting vaccinated.

As this group has low expectation that community members will get the vaccine, making vaccination stories visible is critical. Enrolling vaccine ambassadors from within the community can also increase visibility.

Track and illuminate efforts for equity in vaccine distribution.

Be transparent about equity, both tracking numbers and sharing them with the community. Equity is not only about the numbers vaccinated, but also about seemingly innocuous choices such as which vaccines are being offered in the community. Ensure that community concerns are reflected in the data tracked and shared.

The COVID Skeptics

Enlist figures trusted by this group as vaccine ambassadors.

Given that 84% of this group believe that the government is exploiting COVID-19 to control people, look to nonpolitical figures such as vaccine ambassadors to mobilize this group. These can include doctors and scientists, trusted respectively by 50% and 32% of this group, and religious leaders, who are best positioned with the 9% who say the vaccine is against their religious beliefs.

Think outside the box.

Solutions that swayed others may not work with this group. Misinformation is “sticky,” continuing to exert influence even after being debunked. The best approach is to lead with the facts, explain how the information they’re sharing or consuming is misleading, and end by reinforcing the facts again. Posing questions back can also work, including questions that may cause individuals to consider why others might want them to believe a particular thing about COVID-19 or vaccines.

Prevent misinformation from taking wider hold in the population.

This can be achieved by simply warning people that they are misinformed, providing the facts, and encouraging people to evaluate information they receive more critically.

Appendix

TABLE: Vaccine Persona Distribution and the Top Vaccination Barriers by State⁴

State	Vaccine Personas						Barriers to Vaccination*			
	Vaccinated	Enthusiast	Watchful	Cost-Anxious	System Distruster	COVID Skeptics	Top experienced barrier	2nd top experienced barrier	Top expected barrier	2nd top expected barrier
AK	54.8%	3.7%	9.3%	15.7%	3.3%	13.2%	No available appointments	No vaccine clinics close by	Not having time	Concern about cost
AL	42.2%	10.6%	9.9%	13.0%	3.0%	21.4%	No available appointments	Vaccine website crashing	No available appointments	Not having time
AR	46.4%	1.1%	7.9%	11.6%	3.1%	30.0%	No available appointments	Not knowing how to schedule an appointment	Not having time	No available appointments
AZ	52.7%	4.8%	8.0%	12.8%	3.4%	18.4%	No available appointments	Vaccine website crashing	No available appointments	Not having time
CA	63.3%	8.2%	9.0%	6.4%	2.7%	10.5%	No available appointments	Vaccine website crashing	No available appointments	Not having time
CO	59.7%	10.1%	6.2%	8.2%	2.3%	13.6%	No available appointments	Not having time	No available appointments	Not having time
CT	69.1%	7.6%	6.4%	4.3%	2.4%	10.1%	No available appointments	Information not available in my native language	No available appointments	Not knowing how to schedule an appointment

⁴ For U.S. adults over the age of 18.

DC	60.0%	7.0%	9.7%	9.3%	10.5%	3.5%	No available appointments	Vaccine website crashing	Difficulty traveling to a vaccination site	No available appointments
DE	59.8%	3.4%	17.0%	5.0%	1.6%	13.3%	No available appointments	No vaccine clinics close by	No available appointments	Vaccine website crashing
FL	52.7%	6.6%	10.8%	9.9%	3.2%	16.8%	No available appointments	Vaccine website crashing	No available appointments	Concern about cost
GA	46.0%	12.8%	7.0%	13.3%	8.5%	12.4%	No available appointments	Vaccine website crashing	No available appointments	Vaccine website crashing
HI	67.5%	6.7%	12.0%	4.5%	1.1%	8.3%	Difficulty traveling to a vaccination site	No available appointments	No available appointments	Not knowing how to schedule an appointment
IA	57.5%	8.3%	7.0%	10.4%	2.5%	14.3%	No available appointments	Vaccine website crashing	No available appointments	Vaccine website crashing
ID	46.1%	5.9%	7.7%	12.5%	4.6%	23.2%	Not knowing how to schedule an appointment	No available appointments	Not knowing how to schedule an appointment	Concern about cost
IL	60.1%	7.8%	8.9%	6.7%	4.1%	12.4%	No available appointments	Vaccine website crashing	No available appointments	Concern about cost
IN	47.5%	10.2%	10.6%	10.1%	3.1%	18.4%	Vaccine website crashing	No one to provide childcare while getting vaccine	Not having time	No available appointments

KS	56.0%	8.5%	8.1%	11.1%	2.0%	14.3%	Vaccine website crashing	No available appointments	No available appointments	Concern about cost
KY	53.1%	8.3%	9.9%	11.7%	2.2%	14.9%	No available appointments	Not knowing how to schedule an appointment	No available appointments	No one to provide childcare while getting vaccine
LA	42.0%	11.8%	9.2%	7.5%	5.9%	23.7%	Not knowing how to schedule an appointment	Concern about cost	Not having time	No available appointments
MA	70.9%	9.7%	8.5%	3.1%	0.6%	7.3%	No available appointments	Vaccine website crashing	No available appointments	Vaccine website crashing
MD	62.9%	8.8%	9.3%	5.7%	7.0%	6.4%	No available appointments	Not knowing how to schedule an appointment	No available appointments	Vaccine website crashing
ME	68.0%	6.0%	7.5%	6.5%	2.2%	9.8%	No available appointments	Vaccine website crashing	No available appointments	Not having time
MI	54.5%	9.1%	8.9%	7.4%	5.7%	14.4%	No available appointments	Not knowing how to schedule an appointment	Not having time	No available appointments
MN	61.6%	6.5%	7.4%	8.5%	1.3%	14.6%	No available appointments	No vaccine clinics close by	Not having time	No available appointments
MO	48.8%	8.4%	9.9%	14.2%	4.1%	14.7%	No available appointments	No vaccine clinics close by	No available appointments	Not knowing how to schedule an appointment

MS	41.0%	6.5%	10.4%	22.5%	5.0%	14.5%	No available appointments	No vaccine clinics close by	Not having time	No available appointments
MT	51.9%	8.1%	10.8%	9.5%	1.5%	18.2%	No available appointments	Not having time	No available appointments	Not having time
NC	50.3%	13.8%	8.9%	9.9%	2.5%	14.5%	No available appointments	Vaccine website crashing	No available appointments	Not having time
ND	51.2%	0.9%	10.6%	7.5%	1.1%	28.7%	No available appointments	Vaccine website crashing	No available appointments	Concern about cost
NE	57.2%	6.1%	9.6%	7.1%	2.0%	18.0%	No available appointments	No vaccine clinics close by	No vaccine clinics close by	Concern about cost
NH	74.5%	3.5%	4.8%	5.7%	1.7%	9.8%	Vaccine website crashing	No vaccine clinics close by	Vaccine website crashing	No available appointments
NJ	66.5%	5.0%	8.6%	5.1%	5.4%	9.4%	No available appointments	Vaccine website crashing	No available appointments	Not knowing how to schedule an appointment
NM	65.9%	4.0%	6.3%	8.5%	3.8%	11.6%	No available appointments	No vaccine clinics close by	No available appointments	Not having time
NV	51.4%	5.4%	9.4%	8.8%	3.7%	21.4%	No available appointments	Not knowing how to schedule an appointment	Not having time	Concern about cost
NY	60.9%	6.4%	9.9%	8.2%	5.4%	9.2%	No available appointments	Vaccine website crashing	No available appointments	Not having time
OH	51.9%	8.4%	8.5%	9.0%	2.9%	19.4%	No available appointments	Not knowing how to schedule an appointment	No available appointments	Not having time

OK	50.7%	3.3%	13.8%	12.6%	1.5%	18.1%	No available appointments	Not knowing how to schedule an appointment	Not having time	No available appointments
OR	57.2%	9.7%	6.6%	9.7%	1.5%	15.4%	No available appointments	Vaccine website crashing	No available appointments	Not having time
PA	63.7%	7.0%	5.4%	6.0%	4.8%	13.2%	No available appointments	Not knowing how to schedule an appointment	No available appointments	Not having time
RI	65.6%	7.0%	11.7%	4.5%	1.2%	10.0%	No available appointments	Vaccine website crashing	No available appointments	Not knowing how to schedule an appointment
SC	46.8%	9.0%	9.4%	11.0%	2.0%	21.9%	No available appointments	Vaccine website crashing	No available appointments	Vaccine website crashing
SD	59.1%	1.7%	9.1%	7.3%	5.3%	17.5%	No available appointments	Not knowing how to schedule an appointment	Not having time	Concern about cost
TN	44.4%	11.4%	8.4%	12.6%	4.0%	19.3%	No available appointments	Vaccine website crashing	No available appointments	Not knowing how to schedule an appointment
TX	51.6%	5.5%	9.6%	11.9%	4.9%	16.5%	No available appointments	Vaccine website crashing	No available appointments	Not having time
UT	55.6%	11.7%	6.3%	12.2%	0.7%	13.6%	No available appointments	Vaccine website crashing	No available appointments	Vaccine website crashing

VA	60.7%	8.9%	7.7%	7.4%	2.8%	12.5%	No available appointments	Vaccine website crashing	No available appointments	Concern about cost
VT	70.6%	17.8%	5.0%	2.5%	0.7%	3.5%	No available appointments	Vaccine website crashing	No available appointments	No vaccine clinics close by
WA	60.5%	10.3%	6.5%	6.8%	2.2%	13.8%	No available appointments	Vaccine website crashing	No available appointments	Not having time
WI	58.4%	7.7%	7.2%	7.6%	1.6%	17.6%	No available appointments	Not knowing how to schedule an appointment	No available appointments	Not having time
WV	44.4%	4.8%	14.6%	16.9%	0.4%	19.0%	No available appointments	Vaccine website crashing	Concern about cost	Not having time
WY	44.3%	0.3%	13.4%	14.4%	2.9%	24.8%	No available appointments	Vaccine website crashing	Not having time	Concern about cost

*We observe that states that have large numbers of Enthusiasts are reporting more barriers.

Methodology

For state-level estimates of barrier prevalence and vaccine persona breakdown, Surgo collected survey data through the Facebook platform. The final survey sample consisted of 17,097 U.S. adults older than 18 run from February 23, 2021 to April 14, 2021. Data was collected via Qualtrics and recruited respondents through the Facebook platform using ads. The 20 minute survey was conducted online in English. The sample is representative of the U.S. population and weighted to population benchmarks.

For estimates of vaccination rollout timelines, we used data collected from a short survey. The final survey sample consisted of 1,670 U.S. adults older than 18 run from March 18 to March 25, 2021. Data was collected using a probability-based household panel (NORC AmeriSpeak). The survey was conducted online and over the phone and in both English and in Spanish. The sample is representative of the U.S. population and weighted to population benchmarks

Vaccination timeline projection

Vaccination timeline projections were calculated based on survey respondents' preferred timelines for getting vaccinated (e.g., "as soon as it's available," "in three months," "in a year," "don't know" and "would not get vaccinated") and U.S. vaccination rates as of March 25, 2021 (the end date of fielding of our NORC survey). These projected timelines assumed that vaccinations would continue at the rate of 0.6% of adults per day receiving their first vaccine dose.

State-level estimates and weighting

To estimate national- and state-level estimates of the distribution of vaccine personas and vaccine barriers, we weighted responses from our Facebook survey to population benchmarks. Briefly, we used the `pewmethods` package in R to "rake" the data, iteratively weighting the sample to make it population-representative based on four variables: State, Age, Sex, and Race. When data for one or more of these demographic variables was unavailable for a respondent, missing values were replaced with substituted values using multiple imputation to generate the most plausible values for the missing data. Data on population benchmarks were obtained from the U.S. Census Bureau's 2019 population estimates using the `tidy census` package in R. All data presented in this document have been weighted to population benchmarks.

Segmentation methodology

A k-medoid partitioning around medoids (PAM) clustering algorithm (with a Gower distance metric) was used to identify clusters of individuals that differed on the following seven variables:

1. **Health insurance status** (whether an individual had health insurance)
2. **Cost barriers to medical care** (whether an individual had delayed medical care in the past year because of cost)
3. **Degree to which an individual agreed the COVID-19 vaccine was unsafe**
4. **Degree of worry about COVID-19**
5. **Early adoption** (whether an individual said they would get COVID vaccine in first three months it is offered)
6. **Conspiratorial belief score** (0-3 score; 1 point each for agree with the following statements: vaccine would insert a tracking chip; COVID-19 is caused by ring of people who manipulate world events; COVID-19 is being exploited by government to control people)
7. **Perception of racial fairness in medical system** (agreement with statement that people of your race are treated fairly in a healthcare setting)

These variables were selected for segmentation based on their relationship to self-reported COVID-19 vaccine likelihood observed in predictive models and their actionability in order to identify population groups and effective interventions. After segments were defined, they were then profiled on COVID-19 vaccine uptake likelihood as well as a variety of demographic and other characteristics. Cluster solutions from 3 to 8 groups were explored. The 5-cluster solution was considered most actionable based on differences between segments in vaccine likelihood barriers and perceptions and is reported here.

Percent of individuals in each cluster represents the population-weighted proportion of respondents in each segment.