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THE COVID STATES PROJECT:
A 50-STATE COVID-19 SURVEY
REPORT #43: COVID-19 VACCINE RATES
AND ATTITUDES AMONG AMERICANS

USA, March 2021

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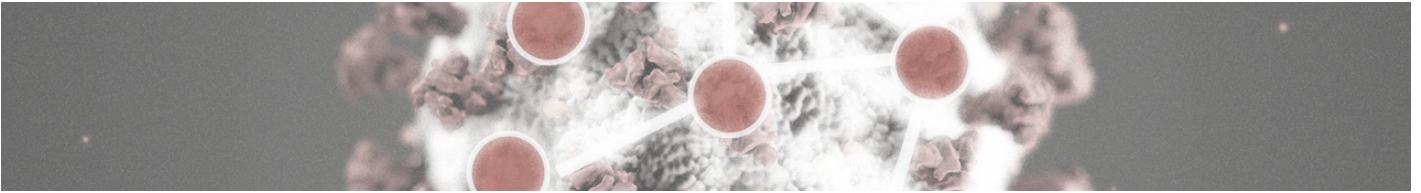Northeastern University Network Science Institute · HARVARD Kennedy School SHORENSTEIN CENTER on Media, Politics and Public Policy · HARVARD MEDICAL SCHOOL · RUTGERS THE STATE UNIVERSITY OF NEW JERSEY · Northwestern University

Report of March 12, 2021, v.1

The COVID States Project

From: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States

A joint project of:
Northeastern University, Harvard University, Rutgers University, and Northwestern University

Authors: David Lazer (Northeastern University); Katherine Ognyanova (Rutgers University); Matthew A. Baum (Harvard University); James Druckman (Northwestern University); Jon Green (Northeastern University); Adina Gitomer (Northeastern University); Matthew Simonson (Northeastern University); Roy H. Perlis (Harvard Medical School); Mauricio Santillana (Harvard Medical School); Alexi Quintana (Northeastern University); Jennifer Lin (Northwestern University), and Ata Uslu (Northeastern University)

COVER MEMO

Summary Memo — March 12, 2020

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From April 2020 through March 2021, we conducted multiple waves of a large, 50-state survey, some results of which are presented here. You can find previous reports online at covidstates.org.

Note on methods:

Between February 5 and March 1, 2021, we surveyed 21,500 individuals across all 50 states plus the District of Columbia. The survey was conducted by PureSpectrum via an online, nonprobability sample, with state-level representative quotas for race/ethnicity, age, and gender (for methodological details on the other waves, see covidstates.org). In addition to balancing on these dimensions, we reweighted our data using demographic characteristics to match the U.S. population with respect to race/ethnicity, age, gender, education, and living in urban, suburban, or rural areas. This was the latest in a series of surveys we have been conducting since April 2020, examining attitudes and behaviors regarding COVID-19 in the United States.

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Contents

Unequal: COVID-19 vaccine rates and attitudes among Americans

Executive summary

Who has been most likely to be vaccinated? And who is most likely to be vaccine resistant? Among the early, eligible individuals, who has received the vaccine, and who has refused to be vaccinated? In this report we address these questions by examining the relationship between various sociodemographic categories and vaccination rates, vaccination resistance, vaccination hesitancy, vaccine accessibility, and vaccine refusal. We examine both the current state of these relationships, as well as changes in vaccine resistance over time. We find strong relationships between these vaccine outcomes at the individual level and age, education, income, race, partisanship, gender, and urbanicity. All of these relationships are statistically significant in a multivariable analysis; but education stands out as a particularly powerful predictor. The divergent vaccination rate likely partially reflects the complex distribution process for the vaccine that has hurt those with the least resources and knowledge to navigate that complexity. Further, the emphasis in many states on mass vaccination sites reduces the contact of vaccine skeptics with the person best able to discuss the benefits and risks of vaccination: [their primary care physicians](#).

Key findings from this study include:

- Education is strongly correlated with vaccination rates (29% of respondents with graduate degrees vs 9% of those with a high school education or less) and vaccine resistance (8% vs 30%).

- Higher income respondents are far more likely to be vaccinated than lower income (24% for highest income cohort vs 9% for lowest income cohort); and have much lower levels of vaccine resistance (11% vs 29%).

- Asian Americans (17%) and Whites (16%) have the highest vaccination rates, and African Americans (12%) and Hispanics (9%) the lowest. Asian Americans have by far the lowest levels of vaccine resistance (10%), with Whites (21%), Hispanics (22%), and African Americans (26%) all at far higher levels.

- Democrats and Republicans have similar vaccination rates (17% vs 16%), but only 9% of Independents have been vaccinated. Independents (31%) and Republicans (30%) have far higher levels of vaccine resistance than Democrats (11%).

- Women are less likely to be vaccinated than men (13% vs 17%), and more likely to be vaccine resistant (25% vs 18%).

- Rural areas have lower vaccination rates (12%) than urban and suburban (15% each), and far higher vaccination resistance (29% for rural areas; 22% for suburban; 16% for urban).

- There are substantial variations of vaccine resistance by state: Massachusetts with the lowest levels (9%) and Oklahoma and North Dakota with the highest (33%).

Introduction

The vaccine stage of the pandemic is focused on two issues: distributing the vaccine to the willing and communicating to the unwilling about the benefits of being vaccinated. There are significant concerns regarding inequality for both distribution and vaccine resistance. Our survey data allow us to directly evaluate questions of who is getting vaccinated, who has access to being vaccinated, and who is vaccine resistant and hesitant. We focus on as outcomes: vaccination, vaccine resistance, vaccine hesitancy, vaccine access, and vaccine refusal. These are measured as follows:

Vaccination status is based on self-reports that someone has already been vaccinated (14% of Americans in February 2021, see Figure 1). Note that we do not ask whether someone received one or two doses of a vaccine, or which vaccine they received.

Vaccine resistance is the proportion of individuals in a given category who indicate that they "would not get the COVID-19 vaccine" or are "extremely unlikely" to get the vaccine if made available to them. Nationally, that figure is 21% for February 2021. We use the "would not" measure to report February (Figure 1) measures, and the "extremely unlikely" measure for the over time comparisons (Figure 2).[1]

Vaccine hesitancy is defined as preferring to get the vaccine "after at least some people I know" or "after most people I know." About 31% of Americans are vaccine-hesitant.

Vaccine access is defined as those in one of the high priority groups—individuals 65 and older or healthcare workers—who report having the vaccine available to them. This is defined as anyone who says they have already been vaccinated, or have a vaccine available to them (regardless of whether they have been vaccinated).

Vaccine refusal is when an individual in the high priority groups reports having the vaccine available to them but reports that they will not get vaccinated.

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[1] We believe that the "preferred timing" question is superior at getting at the nuances distinguishing vaccine resistance and hesitancy, because it better captures the essential preference of hesitant individuals to "wait and see how it goes with other people." However, we have the full time series data for the "how likely would you be to get vaccinated" responses. We therefore report the most recent data for the analysis of resistance and hesitancy now, but use the time series data to look at changes in vaccine resistance. See report 35 for a discussion/analysis of the relationship between these two ways of structuring the question.

When would you get vaccinated?

If you were able to choose when to get a COVID-19 vaccine, would you get it...

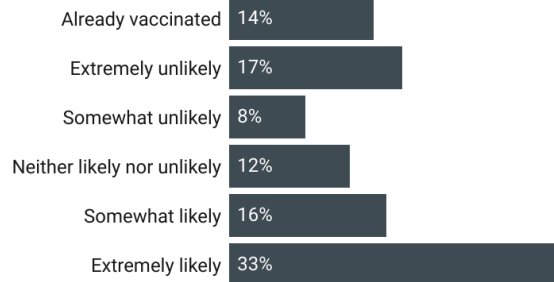| Category	Percent
Already vaccinated	14%
As soon as possible	33%
After at least some people I know	15%
After most people I know	16%
Would not get the COVID-19 vaccine	21%

Likelihood of getting vaccinated

If a vaccine against COVID-19 was available to you, how likely would you be to get vaccinated?

Category	Percent
Already vaccinated	14%
Extremely unlikely	17%
Somewhat unlikely	8%
Neither likely nor unlikely	12%
Somewhat likely	16%
Extremely likely	33%

National sample, N = 21,500, Time period: 02/05/2021-03/01/2021

Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of: Northeastern University, Harvard University, Rutgers University, and Northwestern University) www.covidstates.org

Figure 1.

Vaccine resistance over time among Americans (06/20-02/21)

If a vaccine against COVID-19 was available to you, how likely would you be to get vaccinated?
[Percent respondents who say "extremely unlikely"]

Month	Percent
Jun 20	12%
Jul 20	12%
Aug 20	16%
Sep 20	19%
Oct 20	19%
Nov 20	17%
Dec 20	20%
Feb 21	17%

Wave 5: N = 22,470 (6/12/2020-6/28/2020) / Wave 7: N = 19,058 (7/10/2020-7/26/2020) / Wave 9: N = 21,196 (8/7/2020-8/26/2020) / Wave 10: N = 20,433, (9/04/2020-9/28/2020) / Wave 11: N = 18,002 (10/2/2020-10/23/2020) / Wave 13: N = 24,019 (11/03/2020-11/30/2020) / Wave 14: N = 25,640, (12/16/2020-01/10/2021) / Wave 16: 21,500 (02/05/2021-03/01/2021)
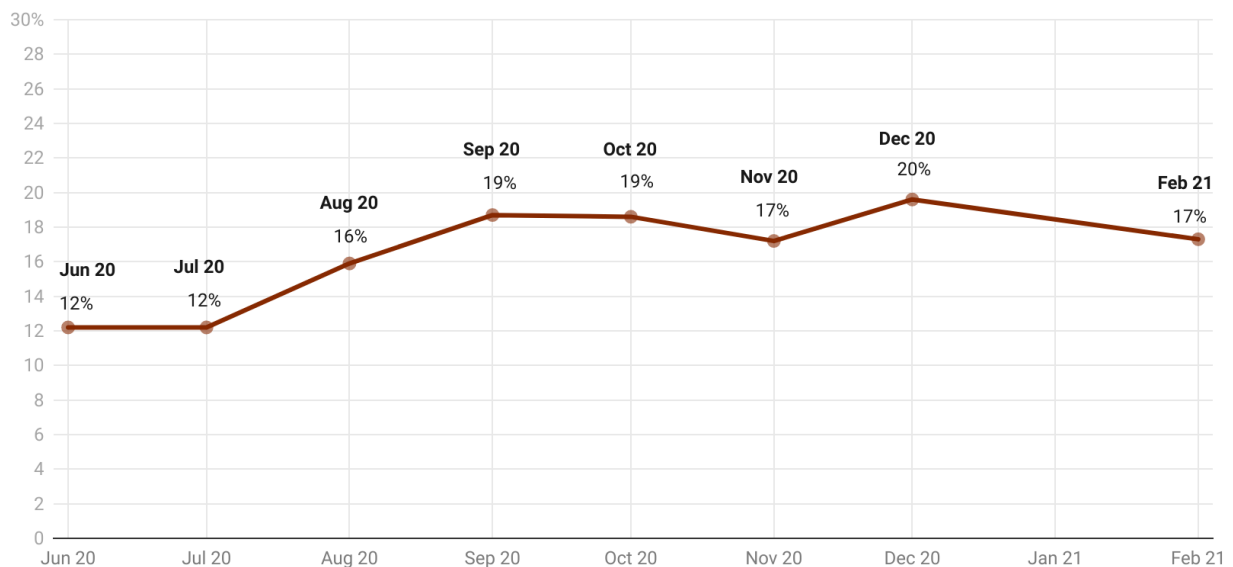
Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of: Northeastern University, Harvard University, Rutgers University, and Northwestern University) www.covidstates.org
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Figure 2.

We order our following discussion below according to the level of inequality in vaccination rates with respect to various demographic categories (from highest to lowest inequality).
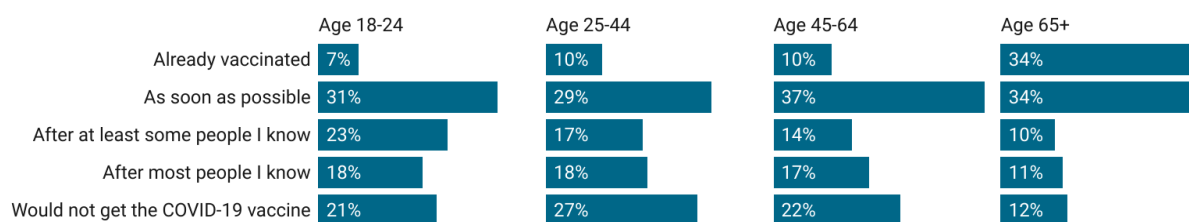
Age

For the category with the largest inequality in vaccination rate — age — the discrepancies derive directly from policy choices. Older Americans are much more likely to be vaccinated than younger Americans (see Figure 3). It has been a policy decision in every state to prioritize older individuals because risk is so age-dependent—for instance, an individual in their mid-70s is about 10 times more likely to die if infected than an individual in their mid-40s. As of March 1, 2021, we find that about one in three 65 and older individuals has been vaccinated, versus a bit less than one in ten of individuals who are under 65. Further, vaccine resistance is at its lowest (12%) among the oldest respondents, which is very good news. Even in the absence of full herd immunity, vaccinating the 88% of 65+ year-olds who are not vaccine resistant would dramatically reduce mortality in the entire population.

As we have found in report 35, vaccine resistance has a complex relationship with age—as noted, it is lowest among the oldest cohort (65+, 12%), which is followed by the *youngest cohort* (ages 18-24, 21%). Note that the oldest cohort also has the lowest level of vaccine hesitancy. As we discuss in report 35, in turn, the relatively high levels of vaccine resistance in the second- (ages 25-44, 27%) and third- (ages 45-64, 22%) youngest cohorts seem to be driven by parental status—i.e., parents seem to be more vaccine resistant than non-parents.

Preferred vaccine timing by age

If you were able to choose when to get a COVID-19 vaccine, would you get it...

	Age 18-24	Age 25-44	Age 45-64	Age 65+
Already vaccinated	7%	10%	10%	34%
As soon as possible	31%	29%	37%	34%
After at least some people I know	23%	17%	14%	10%
After most people I know	18%	18%	17%	11%
Would not get the COVID-19 vaccine	21%	27%	22%	12%

National sample, N = 21,500, Time period: 02/05/2021-03/01/2021

Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of: Northeastern University, Harvard University, Rutgers University, and Northwestern University) www.covidstates.org
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Figure 3.

These patterns of vaccine resistance have been generally steady since June 2020, when we first began asking about vaccination. Figure 4 plots the responses to another vaccine attitude survey question, regarding how likely individuals would be to get vaccinated if the vaccine were made available to them.

Interpreting "extremely unlikely" as indicating vaccine resistance, we find that, overall, vaccine resistance reached its peak in late December, and has dropped since that time.[2] Currently, vaccine resistance among older Americans is exactly where it was in June (9%). On the other hand, the youngest cohort has shifted substantially, with over double the level of resistance in February 2021 as at its low point, in July 2020 (17% vs. 8%), though this group remains slightly less resistant than the remaining two cohorts. The two middle cohorts maintain the highest levels of resistance but are currently roughly halfway between their highest and lowest points of vaccine resistance.

Vaccine resistance by age (06/20-02/21)

If a vaccine against COVID-19 was available to you, how likely would you be to get vaccinated?
[Percent respondents who say "extremely unlikely"]

Wave 5: N = 22,470 (6/12/2020-6/28/2020) / Wave 7: N = 19,058 (7/10/2020-7/26/2020) / Wave 9: N = 21,196 (8/7/2020-8/26/2020) / Wave 10: N = 20,433, (9/04/2020-9/28/2020) / Wave 11: N = 18,002 (10/2/2020-10/23/2020) / Wave 13: N = 24,019 (11/03/2020-11/30/2020) / Wave 14: N = 25,640, (12/16/2020-01/10/2021) / Wave 16: 21,500 (02/05/2021-03/01/2021)

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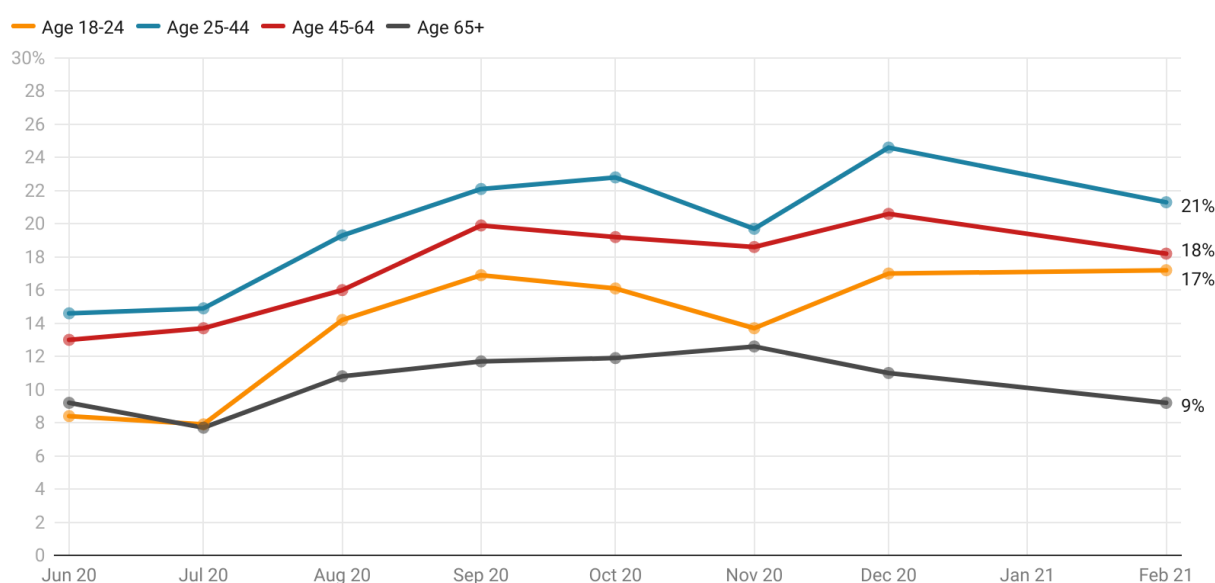・Created with Datawrapper

Figure 4.

We also asked a subset of respondents — those who we anticipated would get first access to the vaccine: individuals older than 65 and health care workers — whether they had been vaccinated or had the opportunity to get vaccinated. This should provide some insight into the extent to which the observed vaccination gaps derive from access versus individual choice. (Access is simply the sum of all of the "yes" response categories.).

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[2] Since we are focusing on vaccine resistance, we do not report the other response categories: somewhat unlikely; neither likely nor unlikely; somewhat likely; extremely likely.

Among those with access, vaccine refusal is by far the lowest for the oldest cohort, at 9%, and highest for the second youngest cohort, at 25%. Unsurprisingly, there is a somewhat higher level of access (summing all of the types of yes responses) for older respondents, at 73%, than the younger cohorts.

Attitudes and access to COVID-19 vaccine by age

Is a COVID-19 vaccine currently available to you? [Asked to medical professionals and people age 65+]

	Age 18-24	Age 25-44	Age 45-64	Age 65+
Yes and I have been vaccinated	22%	32%	43%	36%
Yes and I will get vaccinated	26%	17%	16%	28%
Yes and I will not get vaccinated	21%	25%	18%	9%
No	31%	26%	24%	27%

National sample, N = 21,500, Time period: 02/05/2021-03/01/2021

Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of: Northeastern University, Harvard University, Rutgers University, and Northwestern University) www.covidstates.org
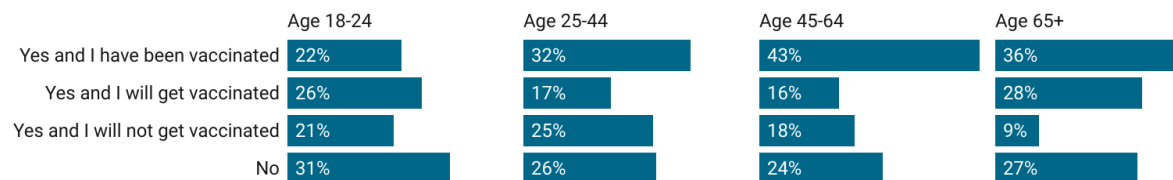 • Created with Datawrapper

Figure 5.

Education

There are enormous education divides in who has *already* been vaccinated, and in who is *willing* to be vaccinated; as well as a substantial divide in vaccine access. **A remarkable 29% of respondents with graduate degrees report having been vaccinated, compared to only 9% of those with a high school education or less (see Figure 6)**. The gap in vaccine resistance is similarly wide, with 30% of individuals with a high school education or less indicating that they would not get vaccinated, compared to 8% of those with a graduate degree. Individuals with a graduate degree also have the lowest level of vaccine hesitancy, at 22% (compared to 34% for individuals with a high school education or less).

Preferred vaccine timing by education

If you were able to choose when to get a COVID-19 vaccine, would you get it...

	High School or Less	Some College	Bachelor Degree	Graduate Degree
Already vaccinated	9%	13%	19%	29%
As soon as possible	27%	32%	40%	41%
After at least some people I know	15%	16%	15%	13%
After most people I know	19%	17%	14%	9%
Would not get the COVID-19 vaccine	30%	22%	12%	8%

National sample, N = 21,500, Time period: 02/05/2021-03/01/2021

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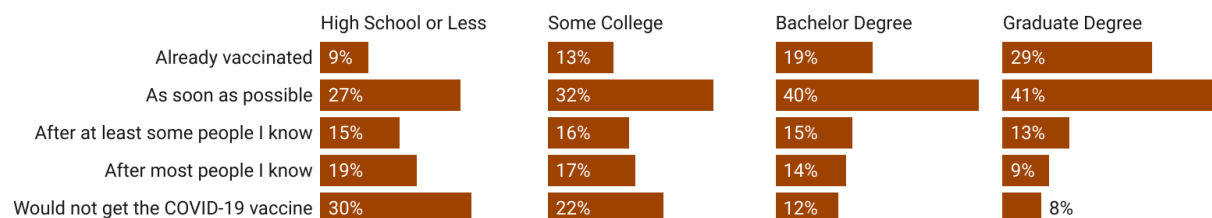 • Created with Datawrapper

Figure 6.

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The education gaps have substantially increased through the pandemic (Figure 7). The vaccine resistance of all education groups started low and subsequently increased, peaking in the fall/early winter, and dropping slightly in February. However, for the more educated respondents, vaccine resistance started lower, went up less, and peaked earlier (October rather than December). Thus, as of February, vaccine resistance had increased by a single point from the spring low for college graduates (10%) and those with graduate degrees (6%), versus a 5-point increase for individuals with some college (18%), and an 8-point increase for those with some or all of high school (24%).

We note that the differences we observe across levels of education cannot be fully explained by the vaccine prioritization of older Americans and health care professionals, although both of those groups are more likely to include highly educated individuals compared to the rest of the population. That is, even when we remove healthcare workers and elderly respondents from our pool, people with higher education are still more likely to have gotten (or want to be) vaccinated. Conversely, as we discuss in report 40, there are similar educational gaps in vaccination rates among health care workers as we see in the rest of the population.

Vaccine resistance by education (06/20-02/21)

If a vaccine against COVID-19 was available to you, how likely would you be to get vaccinated?
[Percent respondents who say "extremely unlikely"]

Wave 5: N = 22,470 (6/12/2020-6/28/2020) / Wave 7: N = 19,058 (7/10/2020-7/26/2020) / Wave 9: N = 21,196 (8/7/2020-8/26/2020) /
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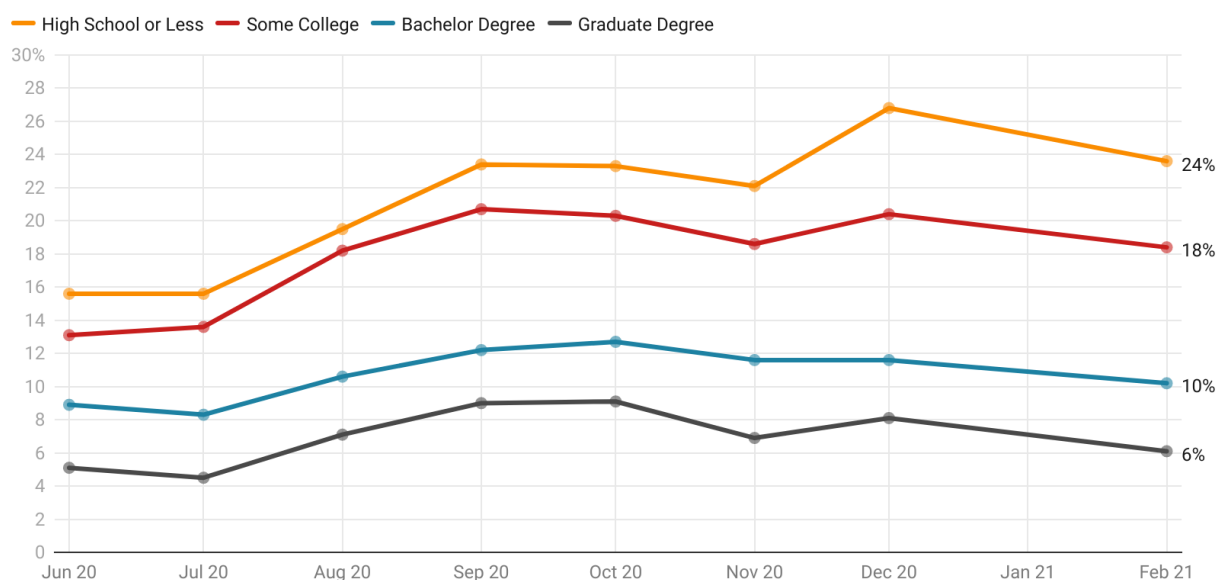• Created with Datawrapper

Figure 7.

For the subsample of prioritized groups, people 65 and older and health care workers, individuals with a graduate degree were twice as likely to be vaccinated as those with a high-school degree or less (51% vs. 24%). Education was positively related to vaccine availability, and negatively to vaccine resistance: 80% of individuals with a graduate degree reported that the vaccine was available to them, versus 67% of those with a high school degree or less; individuals with a graduate degree were less than a half as likely to be vaccine resistant than those with a high school degree or less (7% vs. 19%), and substantially less likely to be vaccine hesitant (30% vs. 43%).

Attitudes and access to COVID-19 vaccine by education

Is a COVID-19 vaccine currently available to you? [Asked to medical professionals and people age 65+]

	High School or Less	Some College	Bachelor Degree	Graduate Degree
Yes and I have been vaccinated	24%	32%	41%	51%
Yes and I will get vaccinated	24%	26%	23%	23%
Yes and I will not get vaccinated	19%	16%	12%	7%
No	33%	26%	25%	20%

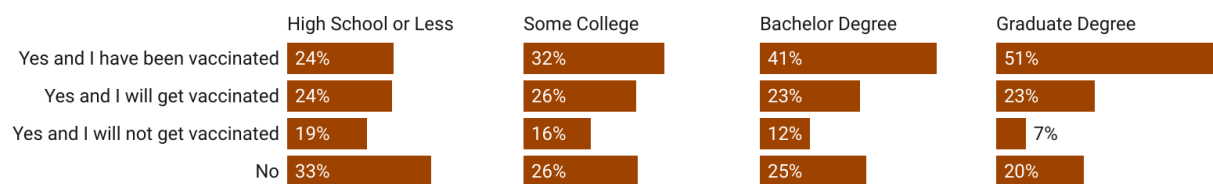*National sample, N = 21,500, Time period: 02/05/2021-03/01/2021*

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Figure 8.

Income

Income shows a very similar pattern to education, perhaps because the two are strongly correlated (note multivariable analysis below). As can be seen in Figure 9, there is a large gap in vaccination rates, ranging from 9% for those with incomes less than $25,000, to 24% for those with incomes greater than $150,000. This rate steadily increases with income level. Vaccine resistance for those at the bottom end of the scale is 29%, versus 11% for the most affluent. Vaccine hesitancy shows a similar pattern.

Preferred vaccine timing by income

If you were able to choose when to get a COVID-19 vaccine, would you get it...

	Under 25K	25K to under 50K	50K to under 75K	75K to under 100K	100K to under 150K	Over 150K
Already vaccinated	9%	14%	17%	18%	21%	24%
As soon as possible	28%	31%	35%	37%	38%	43%
After at least some people I know	15%	15%	14%	15%	17%	13%
After most people I know	18%	18%	15%	15%	13%	9%
Would not get the COVID-19 vaccine	29%	23%	18%	15%	11%	11%

National sample, N = 21,500, Time period: 02/05/2021-03/01/2021

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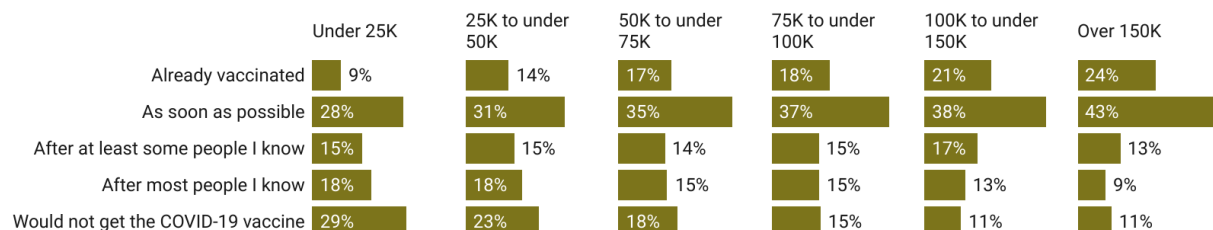 • Created with Datawrapper

Figure 9.

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Time trends across income groups are also similar to those observed for education, starting with relatively similar rates of vaccine resistance across all income levels in the spring, followed by increases in vaccine resistance, particularly among individuals at lower income levels (see Figure 10). Moreover, all income groups have declined in vaccine resistance between December and February.

Vaccine resistance by income (06/20-02/21)

If a vaccine against COVID-19 was available to you, how likely would you be to get vaccinated?
[Percent respondents who say "extremely unlikely"]

Under 25K — 25K to under 50K — 50K to under 75K — 75K to under 100K — 100K to under 150K — Over 150K

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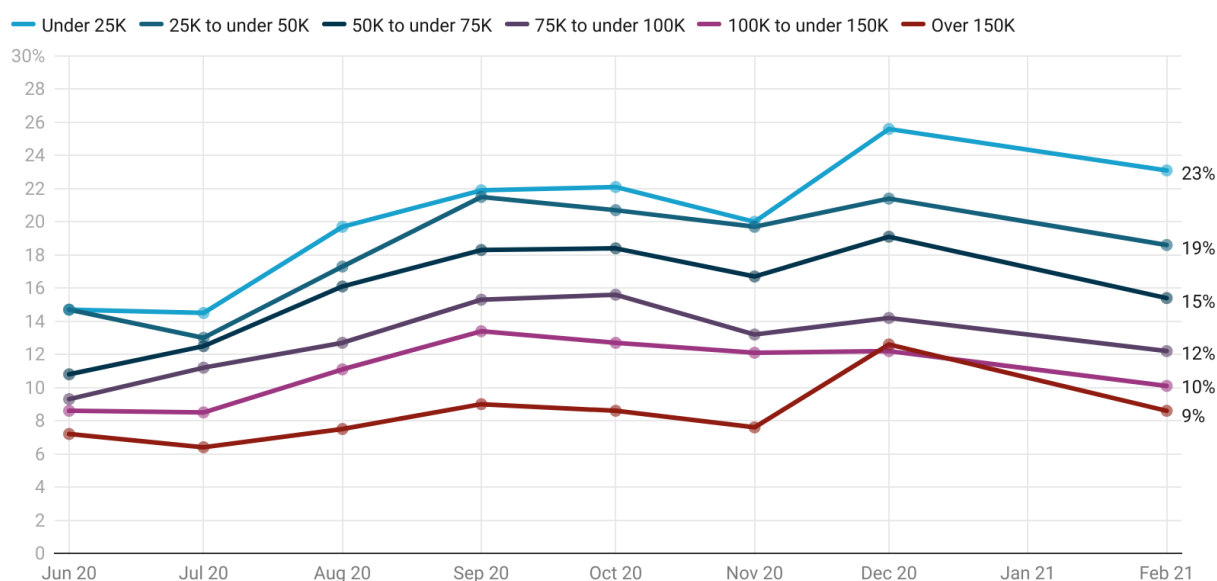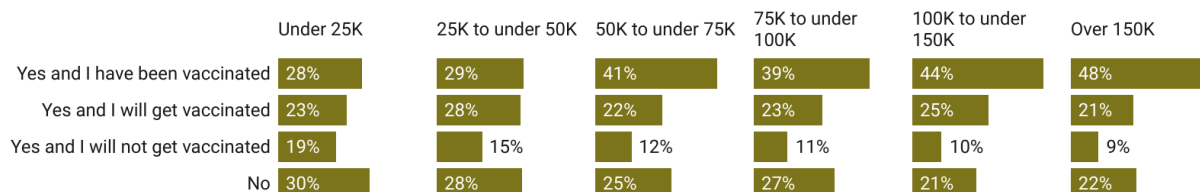
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Figure 10.

Focusing on the relationship between income and access for individuals 65 and older as well as health care workers, we find a pattern that is similar to what we found with education, if less dramatic: higher income individuals in this early-access subset are more likely to be vaccinated, and less likely to be vaccine resistant. 48% of the highest income group – those making more than $150,000 – report being vaccinated, versus 28% of the lowest income group – those making less than $15,000 (Figure 11). Vaccine access is highest for the high income group (78%), as compared to the lowest income group (70%). Finally, the highest income group reports a substantially lower rate of vaccine refusal at 9%, as compared to 19% for the lowest income group.

Attitudes and access to COVID-19 vaccine by income

Is a COVID-19 vaccine currently available to you? [Asked to medical professionals and people age 65+]

	Under 25K	25K to under 50K	50K to under 75K	75K to under 100K	100K to under 150K	Over 150K
Yes and I have been vaccinated	28%	29%	41%	39%	44%	48%
Yes and I will get vaccinated	23%	28%	22%	23%	25%	21%
Yes and I will not get vaccinated	19%	15%	12%	11%	10%	9%
No	30%	28%	25%	27%	21%	22%

National sample, N = 21,500, Time period: 02/05/2021-03/01/2021

Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of: Northeastern University, Harvard University, Rutgers University, and Northwestern University) www.covidstates.org
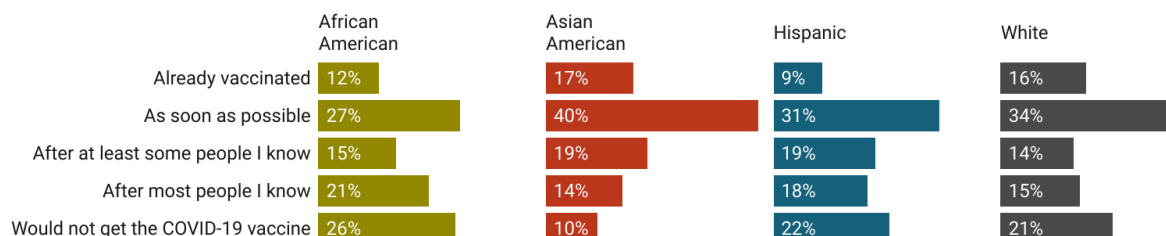• Created with Datawrapper

Figure 11.

Race

We also observe substantial variations in vaccination rates with respect to race (see Figure 12). Asian-American (17%) and White (16%) respondents report the highest rates of vaccination; Hispanic respondents report the lowest (9%), and African American respondents are in between (12%). Asian Americans stand out as having by far the lowest level of vaccine resistance (10%), followed by White (21%), Hispanic (22%), and African American (26%) respondents. We note also the higher levels of vaccine hesitancy among Hispanics (37%) and African Americans (36%) than Whites (29%) and Asian Americans (33%). Looking at the time trends for individuals who indicate that they are "extremely unlikely" to get vaccinated (Figure 13), we see somewhat similar trends across racial groups, albeit at very different levels: low points in the spring, peaks in the early fall, small declines in the late fall, peaks again in late December, and drops since. The trend for African Americans is particularly notable. African Americans have consistently been most likely to be vaccine resistant (using the "extremely unlikely" measure), but with a fairly dramatic drop in our February data – from 28% in December to 20%, which is very close to the rates for Hispanic (17%) and White (18%) respondents.

Preferred vaccine timing by race

If you were able to choose when to get a COVID-19 vaccine, would you get it...

	African American	Asian American	Hispanic	White
Already vaccinated	12%	17%	9%	16%
As soon as possible	27%	40%	31%	34%
After at least some people I know	15%	19%	19%	14%
After most people I know	21%	14%	18%	15%
Would not get the COVID-19 vaccine	26%	10%	22%	21%

National sample, N = 21,500, Time period: 02/05/2021-03/01/2021

Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of: Northeastern University, Harvard University, Rutgers University, and Northwestern University) www.covidstates.org
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Figure 12.

The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States   14

Vaccine resistance by race (06/20-02/21)

If a vaccine against COVID-19 was available to you, how likely would you be to get vaccinated?
[Percent respondents who say "extremely unlikely"]

— White — Hispanic — African American — Asian American

Wave 5: N = 22,470 (6/12/2020-6/28/2020) / Wave 7: N = 19,058 (7/10/2020-7/26/2020) / Wave 9: N = 21,196 (8/7/2020-8/26/2020) / Wave 10: N = 20,433, (9/04/2020-9/28/2020) / Wave 11: N = 18,002 (10/2/2020-10/23/2020) / Wave 13: N = 24,019 (11/03/2020-11/30/2020) / Wave 14: N = 25,640, (12/16/2020-01/10/2021) / Wave 16: 21,500 (02/05/2021-03/01/2021)

Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of: Northeastern University, Harvard University, Rutgers University, and Northwestern University) www.covidstates.org
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Figure 13.

Among those respondents 65 and older and/or health care workers, we see similar rates of *access* to vaccines across racial groups, with Whites, Asian Americans, and Hispanics at 74%, and African Americans at 71% (see Figure 14). However, there are substantial differences in rates of vaccination *intake* within this population, with higher rates for White (36%) and (especially) Asian-American (49%) respondents, and lower rates among Hispanic (27%) and African American (29%) respondents. This is partially driven by divergent rates of vaccine refusal with exceptionally low rates of refusal among Asian Americans (5%), followed by Whites (13%), Hispanics (17%), and African Americans (21%).

Attitudes and access to COVID-19 vaccine by race

Is a COVID-19 vaccine currently available to you? [Asked to medical professionals and people age 65+]
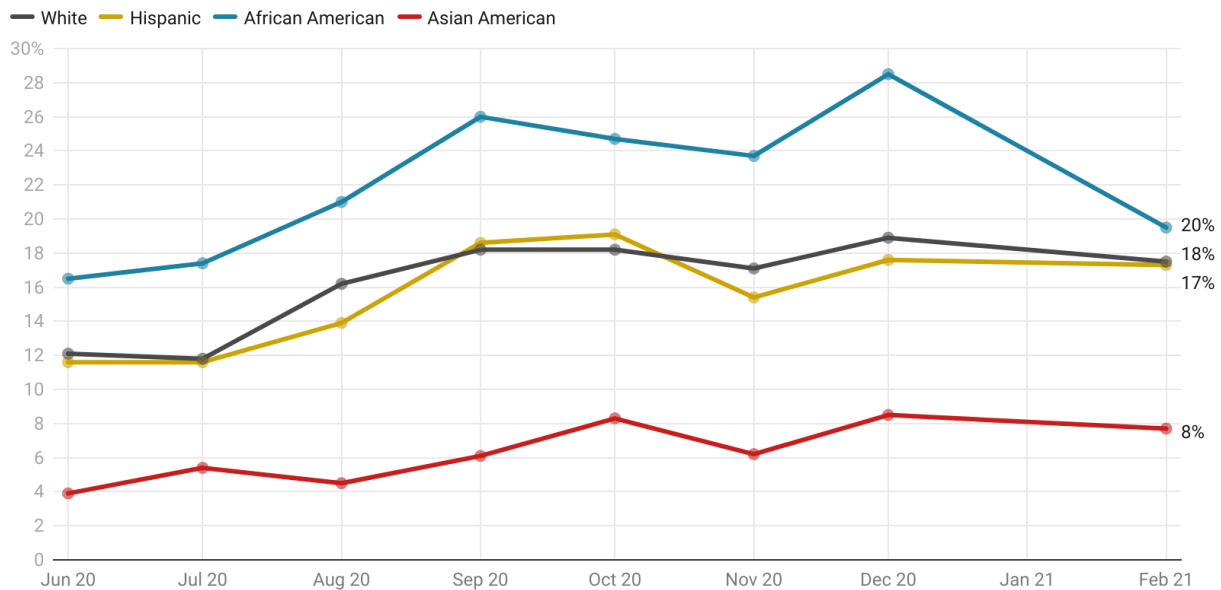

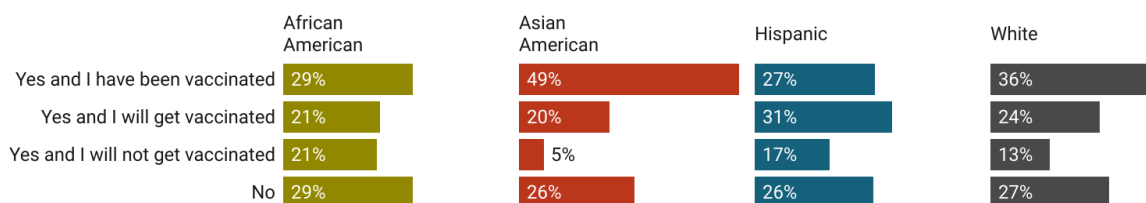*National sample, N = 21,500, Time period: 02/05/2021-03/01/2021*

Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of: Northeastern University, Harvard University, Rutgers University, and Northwestern University) www.covidstates.org
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Figure 14.

Partisanship

Partisanship carries the next-strongest association with vaccination rates. As shown in Figure 15, Democrats (17%) and Republicans (16%) have nearly identical rates of vaccination, while Independents have a vaccination rate just above half of those of partisans (9%). The story is more complex when looking at vaccine resistance, where the levels of vaccine resistance among Republicans (30%) and Independents (31%) are about three times that of Democrats (11%). Independents report the highest levels of vaccine hesitancy at 36%, versus 30% for Republicans and 28% for Democrats.

Preferred vaccine timing by party

If you were able to choose when to get a COVID-19 vaccine, would you get it...

	Republican	Democrat	Independent/Other
Already vaccinated	16%	17%	9%
As soon as possible	25%	44%	24%
After at least some people I know	13%	15%	16%
After most people I know	17%	13%	20%
Would not get the COVID-19 vaccine	30%	11%	31%

National sample, N = 21,500, Time period: 02/05/2021-03/01/2021

Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of: Northeastern University, Harvard University, Rutgers University, and Northwestern University) www.covidstates.org
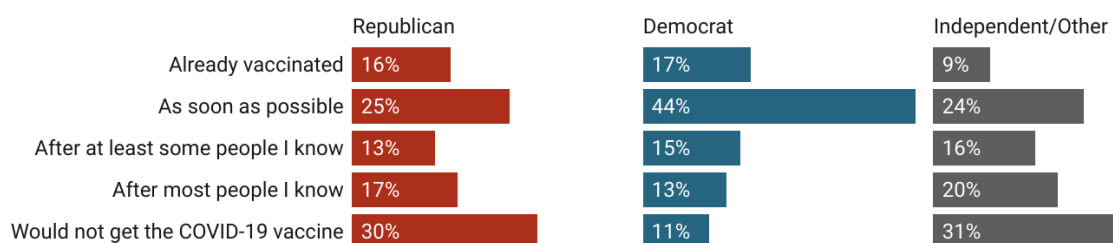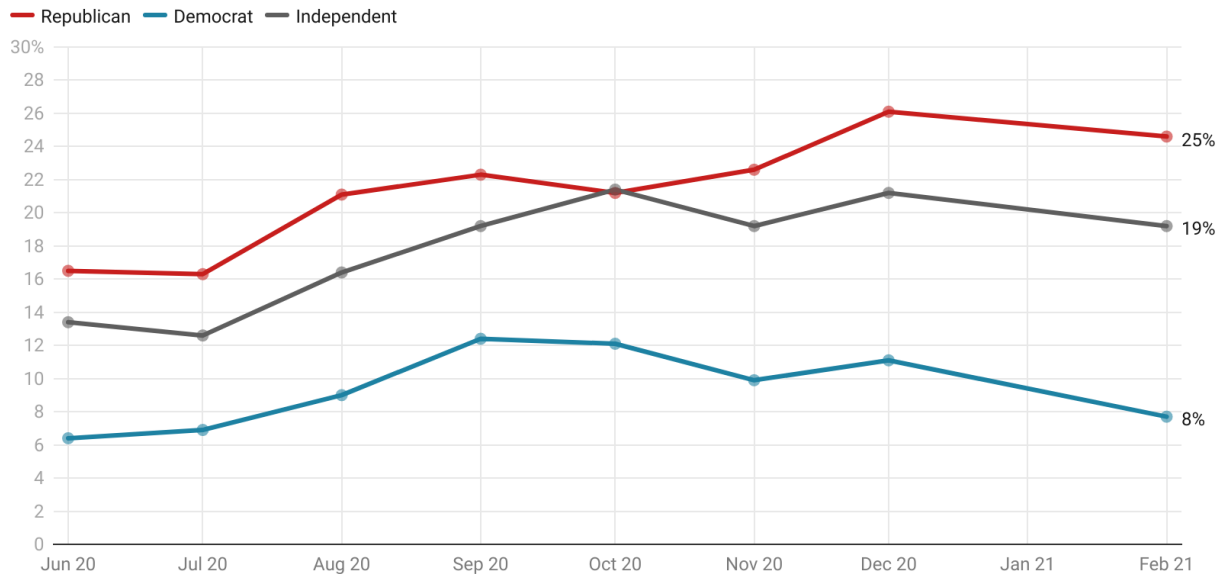 • Created with Datawrapper

Figure 15.

The time trends for vaccine resistance are notable (Figure 16). All partisan groups reached their low points in terms of vaccine resistance in the early summer. Democratic vaccine resistance peaked in the two months *before* the election, reaching 12% in September, and dropping to 8% by February. Meanwhile, Republican vaccine resistance increased *after* the election, jumping from 22% in October to 26% in December, and holding roughly steady since. Independent resistance steadily increased through October, when it reached 22%; it has declined slightly since then, hitting 19% as of February.

Focusing on vaccine availability for individuals aged 65 and older and health care workers, Republicans (72%) and Independents (69%) report lower levels of access to vaccines than Democrats (77%), while vaccine refusals are substantially less frequent among Democrats (7%), than among Republicans and Independents (18% for Republicans and 19% for Independents). These results are shown in Figure 17.

Vaccine resistance by party (06/20-02/21)

If a vaccine against COVID-19 was available to you, how likely would you be to get vaccinated?
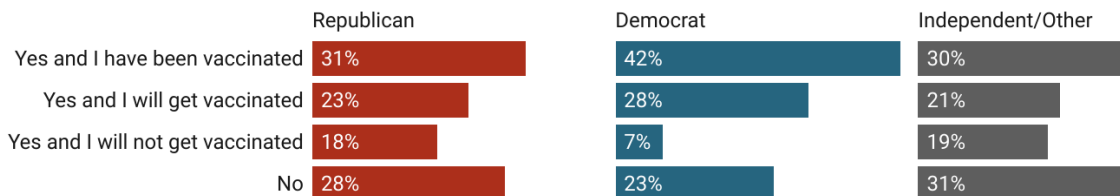[Percent respondents who say "extremely unlikely"]

Wave 5: N = 22,470 (6/12/2020-6/28/2020) / Wave 7: N = 19,058 (7/10/2020-7/26/2020) / Wave 9: N = 21,196 (8/7/2020-8/26/2020) / Wave 10: N = 20,433, (9/04/2020-9/28/2020) / Wave 11: N = 18,002 (10/2/2020-10/23/2020) / Wave 13: N = 24,019 (11/03/2020-11/30/2020) / Wave 14: N = 25,640, (12/16/2020-01/10/2021) / Wave 16: 21,500 (02/05/2021-03/01/2021)

Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of: Northeastern University, Rutgers University, and Northwestern University) www.covidstates.org
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Figure 16.

Attitudes and access to COVID-19 vaccine by party

Is a COVID-19 vaccine currently available to you? [Asked to medical professionals and people age 65+]

National sample, N = 21,500, Time period: 02/05/2021-03/01/2021

Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of: Northeastern University, Harvard University, Rutgers University, and Northwestern University) www.covidstates.org
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Figure 17.

Gender

There are substantial differences in vaccination rates, resistance, and hesitancy when it comes to gender, with 17% of men reporting having been vaccinated, compared to 13% of women (Figure 18). One in four women (25%) report being unwilling to get vaccinated, compared to less than one in five men (18%). Finally, 33% of women are vaccine hesitant, compared to 29% of men.

Preferred vaccine timing by gender

If you were able to choose when to get a COVID-19 vaccine, would you get it...

	Total	Male	Female
Already vaccinated	14%	17%	13%
As soon as possible	33%	37%	30%
After at least some people I know	15%	15%	15%
After most people I know	16%	14%	18%
Would not get the COVID-19 vaccine	21%	18%	25%

National sample, N = 21,500, Time period: 02/05/2021-03/01/2021

Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of: Northeastern University, Harvard University, Rutgers University, and Northwestern University) www.covidstates.org
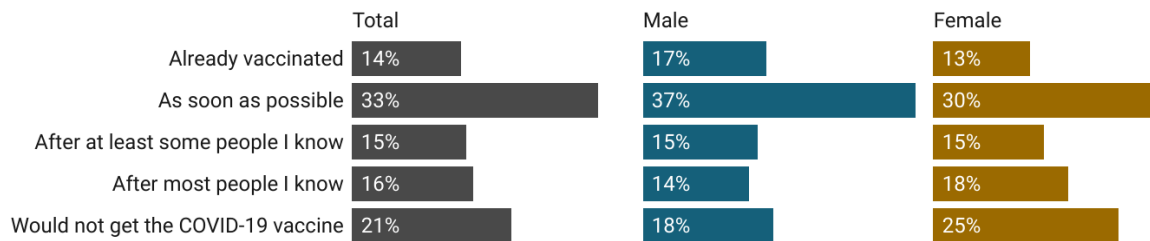　・Created with Datawrapper

Figure 18.

The gender gap in vaccine resistance has persisted throughout this period, varying relatively modestly over time, from 4% in June, growing to 8% in September, and dropping to 6% in February (see Figure 19).

Vaccine resistance by gender (06/20-02/21)

If a vaccine against COVID-19 was available to you, how likely would you be to get vaccinated?
[Percent respondents who say "extremely unlikely"]

Wave 5: N = 22,470 (6/12/2020-6/28/2020) / Wave 7: N = 19,058 (7/10/2020-7/26/2020) / Wave 9: N = 21,196 (8/7/2020-8/26/2020) / Wave 10: N = 20,433, (9/04/2020-9/28/2020) / Wave 11: N = 18,002 (10/2/2020-10/23/2020) / Wave 13: N = 24,019 (11/03/2020-11/30/2020) / Wave 14: N = 25,640, (12/16/2020-01/10/2021) / Wave 16: 21,500 (02/05/2021-03/01/2021)

Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of: Northeastern University, Harvard University, Rutgers University, and Northwestern University) www.covidstates.org
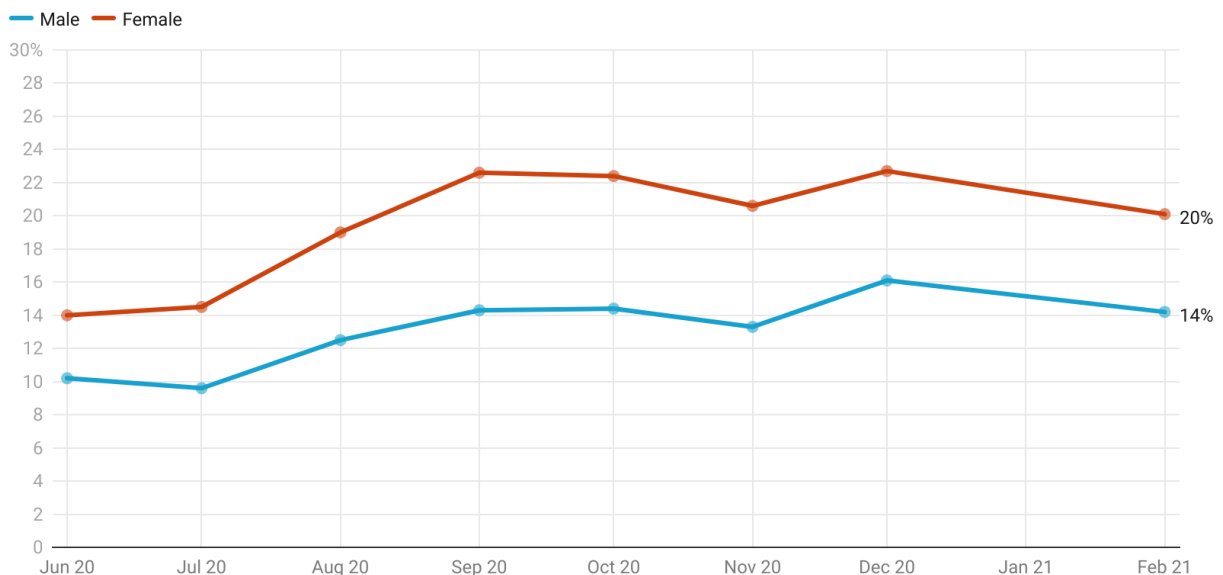　・Created with Datawrapper

Figure 19.

Among those aged 65 or above and/or health care workers, the gender gap in vaccine availability is small (74% for men and 72% for women), as per Figure 20. However, we find a more substantial gender gap in vaccine refusal – 10% of men have refused vaccinations, compared to 17% of women.

Attitudes and access to COVID-19 vaccine by gender

Is a COVID-19 vaccine currently available to you? [Asked to medical professionals and people age 65+]

	Total	Male	Female
Yes and I have been vaccinated	35%	39%	32%
Yes and I will get vaccinated	24%	25%	24%
Yes and I will not get vaccinated	14%	10%	17%
No	27%	26%	28%

National sample, N = 21,500, Time period: 02/05/2021-03/01/2021

Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of: Northeastern University, Harvard University, Rutgers University, and Northwestern University) www.covidstates.org
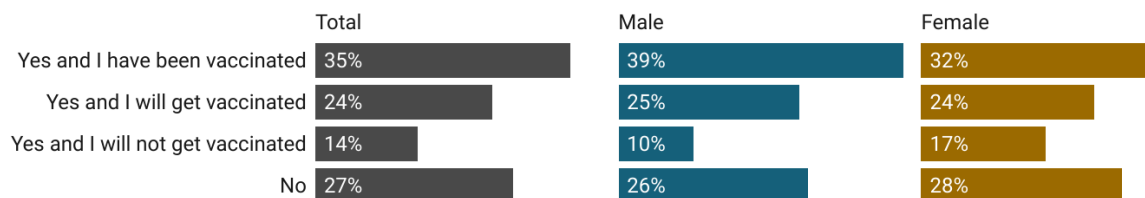• Created with Datawrapper

Figure 20.

Urbanicity

With respect to Figure 21, we see modest gaps in vaccination rates between urban and suburban respondents (15% each), as compared to rural (12%). There are, however, very substantial gaps in vaccine resistance, with the lowest levels in urban areas (16%), compared to suburban (22%) and rural (29%) areas. In contrast, vaccine hesitancy is similar across the three categories, varying between 30% (for suburban respondents) and 32% (for urban and rural respondents).

Preferred vaccine timing by residential area

If you were able to choose when to get a COVID-19 vaccine, would you get it...

	Rural area resident	Suburban area resident	Urban area resident
Already vaccinated	12%	15%	15%
As soon as possible	28%	32%	37%
After at least some people I know	14%	14%	17%
After most people I know	18%	16%	15%
Would not get the COVID-19 vaccine	29%	22%	16%

National sample, N = 21,500, Time period: 02/05/2021-03/01/2021

Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of: Northeastern University, Harvard University, Rutgers University, and Northwestern University) www.covidstates.org
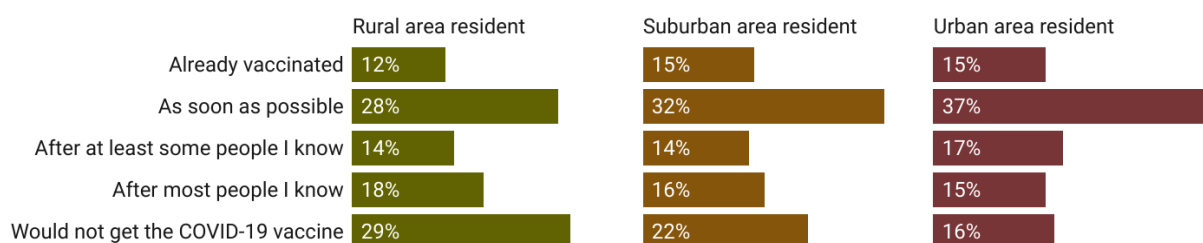• Created with Datawrapper

Figure 21.

Vaccine resistance by residential area type (06/20-02/21)

If a vaccine against COVID-19 was available to you, how likely would you be to get vaccinated?
[Percent respondents who say "extremely unlikely"]

━━ Rural area resident   ━━ Suburban area resident   ━━ Urban area resident

Wave 5: N = 22,470 (6/12/2020-6/28/2020) / Wave 7: N = 19,058 (7/10/2020-7/26/2020) / Wave 9: N = 21,196 (8/7/2020-8/26/2020) /
Wave 10: N = 20,433, (9/04/2020-9/28/2020) / Wave 11: N = 18,002 (10/2/2020-10/23/2020) / Wave 13: N = 24,019 (11/03/2020-11/30/2020) /
Wave 14: N = 25,640, (12/16/2020-01/10/2021) / Wave 16: 21,500 (02/05/2021-03/01/2021)
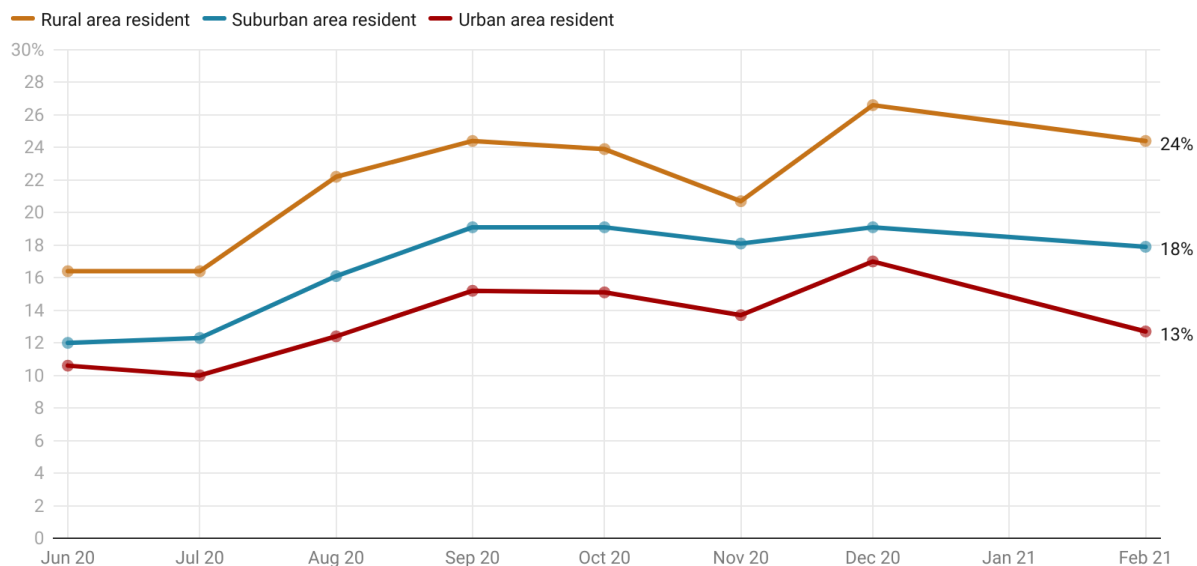
Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of: Northeastern University, Harvard University, Rutgers University, and Northwestern University) www.covidstates.org
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Figure 22.

There are fairly similar time trends across the categories, with peaks in vaccine resistance in September and December, followed by declines between December and February that are largest for urban residents (17% to 13%) and smaller for suburbanites (19% to 18%). These results are shown in Figure 22.

Consulting Figure 23, there are not large gaps in vaccine availability for respondents who are 65 and older and/or health care workers (rural is the low at 71%, and suburban the high at 74%). There may be a bit more of a lag for the vaccination of urban residents than rural and suburban (30% of urban residents say that they have the vaccine available and will get vaccinated, as compared to 23% for suburban and rural residents).

Attitudes and access to COVID-19 vaccine by residential area

Is a COVID-19 vaccine currently available to you? [Asked to medical professionals and people age 65+]

National sample, N = 21,500, Time period: 02/05/2021-03/01/2021

Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of: Northeastern University, Harvard University, Rutgers University, and Northwestern University) www.covidstates.org
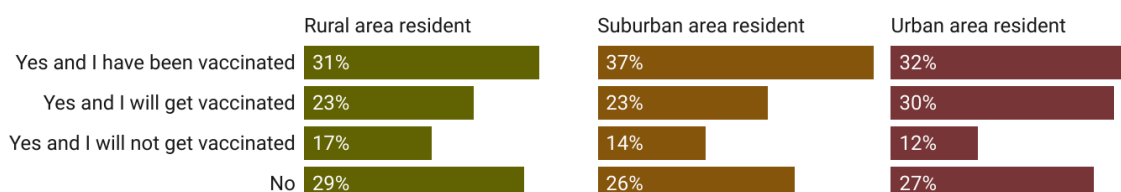 • Created with Datawrapper

Figure 23.

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Geography

There are substantial geographic variations in vaccine resistance. Oklahoma and North Dakota have the highest levels of vaccine resistance at 33%, and Massachusetts has the lowest at 9%. More generally, the East Coast – from Virginia north through Maine – and California have especially low levels of vaccine resistance. In contrast, the clusters of states around Montana and Texas are all relatively vaccine resistant. Figure 24 provides a graphical depiction of state-level vaccine resistance, and we include a table with the exact estimates of vaccine resistance for every state in the Appendix.

Americans who say they would not get a COVID-19 vaccine

If you were able to choose when to get a COVID-19 vaccine, would you get it...
[Percent respondents who say "I would not get the COVID-19 vaccine"]

National sample, N = 21,500, Time period: 02/05/2021-03/01/2021

Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of: Northeastern University, Harvard University, Rutgers University, and Northwestern University) www.covidstates.org
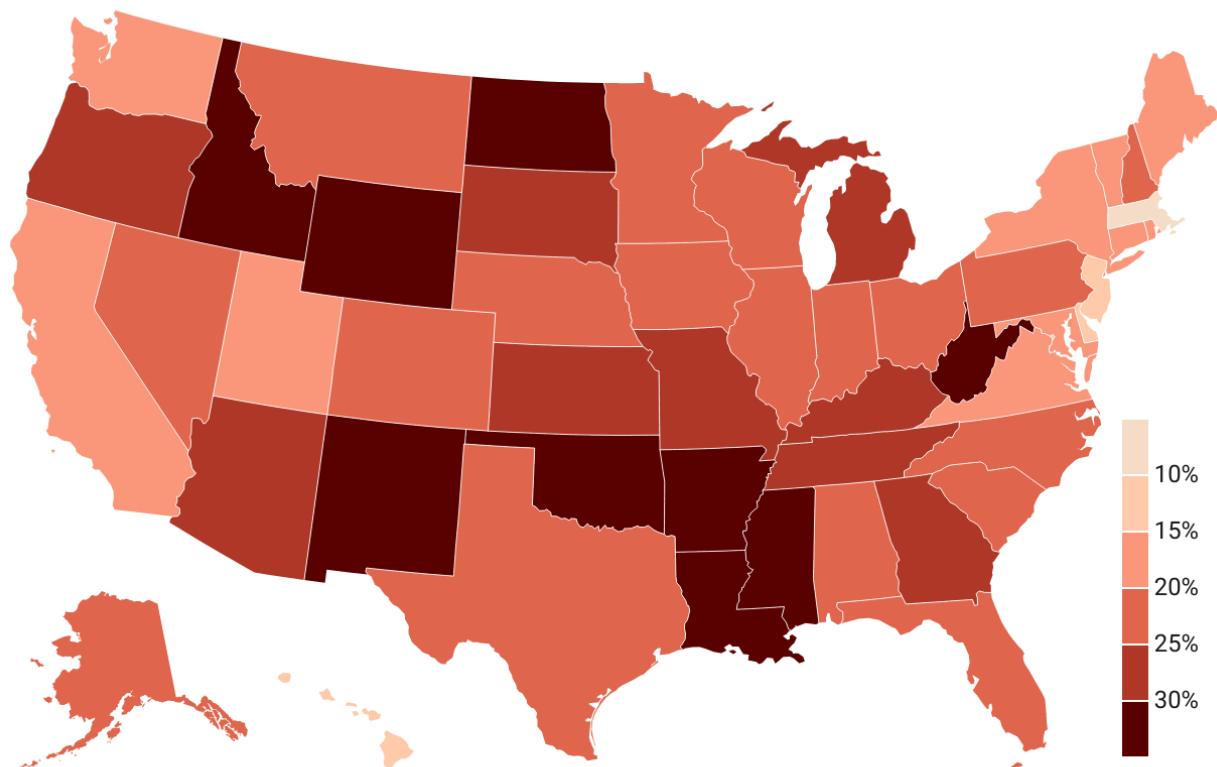 • Created with Datawrapper

Figure 24.

Race by gender, education, and income

We next describe differences in vaccine resistance across racial groups, broken out by gender, education, and income (see Figure 25). Beginning with race/gender, we see the largest gender gaps among White respondents (8 percentage points), followed by African American (7 points), Asian (4 points), and Hispanic (1 point) respondents, with women being more vaccine resistant across all four groups.

We find fairly − albeit imperfectly − linear downward patterns in vaccine resistance as education increases across all four racial groups (Figure 25 again). For White respondents, as education increases, vaccine resistance declines by 22 percentage points, from 28% for high school graduates to 6% among respondents with graduate degrees. Among African Americans, the corresponding decline is 11 points, from 28% among high school graduates to 17% among respondents with a bachelor or graduate degree. Among Hispanics, we see only a slight difference in resistance as education increases from high school (22%) to some college (24%), followed by moderate declines as education increases to bachelor (17%) or graduate degree (8%). The education differential in vaccine resistance among Asian American respondents ranges from a high of 18% among high school graduates, to lows of 6% and 7% for bachelor and graduate degrees, respectively.

We also find near-linear downward trends in vaccine resistance across all four racial groups as income increases (Figure 25 again). The largest such drop emerges among White respondents, from 30% resistance among respondents earning less than $25,000 per year, to just 10% among their counterparts earning over $150,000 per year. The second-largest drop emerges for African Americans (32% to 14%), among whom respondents with the lowest income are also the most highly vaccine resistant group. The corresponding income gap among Hispanics is 15 percentage points (28% resistance among the least wealthy to 13% among the most wealthy). Finally, the income gap is smallest among Asian Americans, varying only from 14% among respondents in the two lowest income brackets, to 8% among respondents in the highest.

Looking at the same data across racial groups, but within income categories (i.e., reading the columns of Figure 25, as opposed to the rows), we find the largest racial vaccine resistance gap among the least wealthy respondents (a high of 32% among African Americans, and a low of 10% among Asian Americans). At the opposite extreme, we see the smallest racial gap among the wealthiest respondents (a high of 14% among African Americans and a low of 8% among Asian Americans).

The clear implication of these patterns is that race is interacting with gender, education, (and especially) income, to produce quite substantial socio-economic gaps in vaccine resistance.

Vaccine resistance demographics: Race by gender, education, and income

If you were able to choose when to get a COVID-19 vaccine, would you get it...
[Percent respondents who say they would not get the COVID-19 vaccine]

Race / Gender	Men	Women
White	17%	25%
Hispanic	21%	23%
African American	22%	29%
Asian American	8%	12%

Race/Education	High School Graduate	Some College	Bachelor Degree	Graduate Degree
White	28%	22%	12%	6%
Hispanic	22%	24%	17%	8%
African American	28%	24%	17%	17%
Asian American	18%	13%	6%	7%

Race/Income	Under 25K	25K to under 50K	50K to under 75K	75K to under 100K	100K to under 150K	Over 150K
White	30%	23%	18%	15%	11%	10%
Hispanic	28%	21%	21%	15%	15%	13%
African American	32%	25%	20%	19%	13%	14%
Asian American	12%	14%	8%	9%	5%	8%

National sample, N = 21,500, Time period: 02/05/2021-03/01/2021

The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of: Northeastern University, Harvard University, Rutgers University, and Northwestern University) www.covidstates.org

Figure 25.

Multivariable analysis

A number of factors matter in terms of vaccination and resistance rates, including age, education, income, race and ethnicity, political affiliation, and geography. None of this is particularly surprising; indeed, every single one of these variables is also associated with whether someone received the flu vaccine (based on our data on self reports on flu vaccinations). The failures of the public health system predate COVID-19, but COVID-19 has stressed the system in distinctive ways that have amplified certain flaws, which have resulted in these patterns. These factors are, of course, correlated with one another, but in a multivariable analysis, all of them are statistically significant.

In order to provide a sense of these relationships in a multivariable context, Figures 26 and 27 compare the probabilities of vaccination and vaccine resistance relative to the modal case in our data: a woman who is White, aged 25-44, has an education at or below high-

school level, earns an income of between 25K and 50K, and is a Democrat living in a suburban area in the South. Thus, for example, if you take this modal case, but shift education from high school or less to a graduate degree, the probability of vaccination increases from 7% to 17%. Our baseline hypothetical individual starts with a predicted probability of vaccine resistance of 17% – and changing her from Democrat to Republican increases her vaccine resistance to 46%. Shifting her from White to Black drops her probability of being vaccinated from 7% to 6%, and increases her probability of being vaccine resistant from 17% to 28%.

Predicted probability of being vaccinated among Americans

The predicted probability of being vaccinated for someone who is female, White, age 25-44, with education at or below high-school level, income of 25K to under 50K, Democrat, living in a suburban area in the South is 7% (shown in gray below). This graph shows how vaccination probability shifts if a single demographic characteristic of that focal person changes (e.g. switches from female to male, or from high-school-educated to college-educated).

Female, White, Age 25-44, High-school or less, Income 25K-50K, Democrat, Suburban, South: Vaccine probability 7%

National sample, N = 21,500, Time period: 02/05/2021-03/01/2021

Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of: Northeastern University, Harvard University, Rutgers University, and Northwestern University) www.covidstates.org
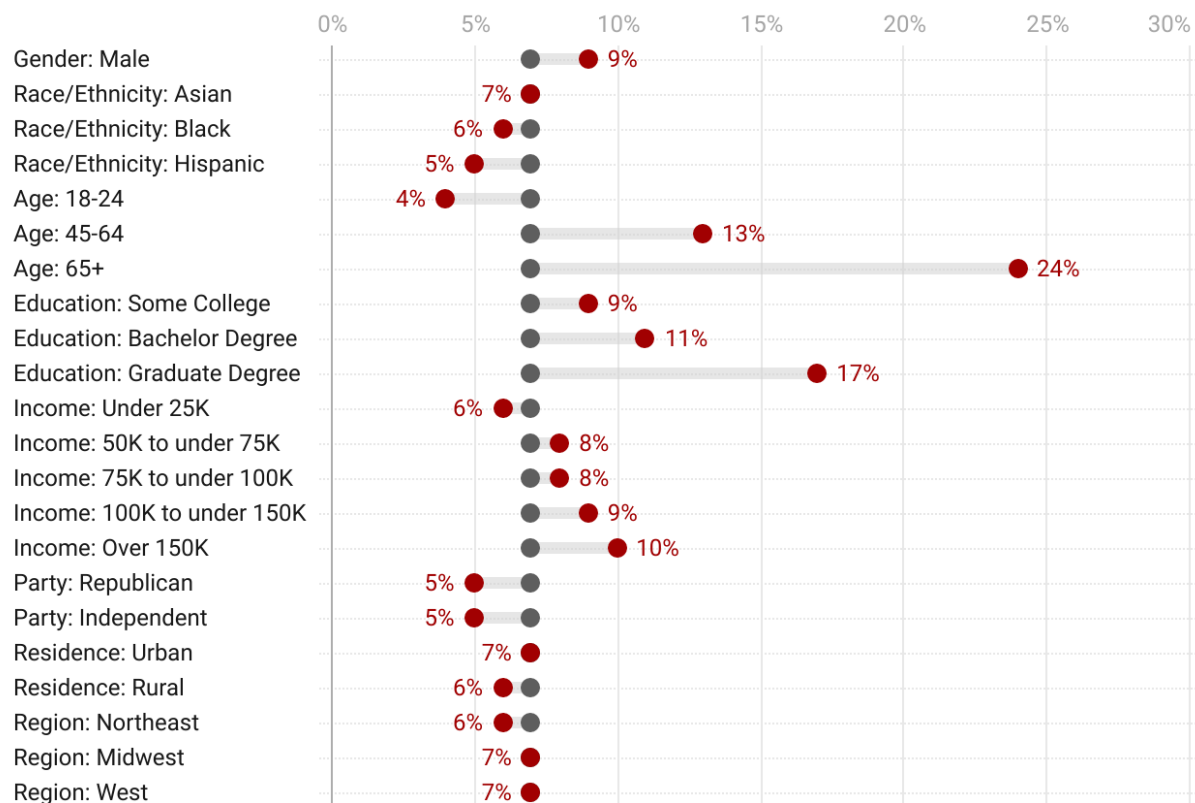・Created with Datawrapper

Figure 26.

Predicted probability of vaccine resistance among Americans

The predicted probability of being vaccine-resistant for someone who is female, White, age 25-44, with education at or below high-school level, income of 25K to under 50K, Democrat, living in a suburban area in the South is 17% (shown in gray below). This graph shows how vaccine resistance probability shifts if a single demographic characteristic of that focal person changes (e.g. switches from female to male, or from high-school-educated to college-educated).

Gender: Male	12%
Race/Ethnicity: Asian	11%
Race/Ethnicity: Black	28%
Race/Ethnicity: Hispanic	19%
Age: 18-24	20%
Age: 45-64	14%
Age: 65+	12%
Education: Some College	13%
Education: Bachelor Degree	9%
Education: Graduate Degree	7%
Income: Under 25K	20%
Income: 50K to under 75K	15%
Income: 75K to under 100K	13%
Income: 100K to under 150K	12%
Income: Over 150K	12%
Party: Republican	46%
Party: Independent	37%
Residence: Urban	13%
Residence: Rural	20%
Region: Northeast	14%
Region: Midwest	17%
Region: West	18%

Female, White, Age 25-44, High-school or less, Income 25K-50K, Democrat, Suburban, South: Resistance probability 17%

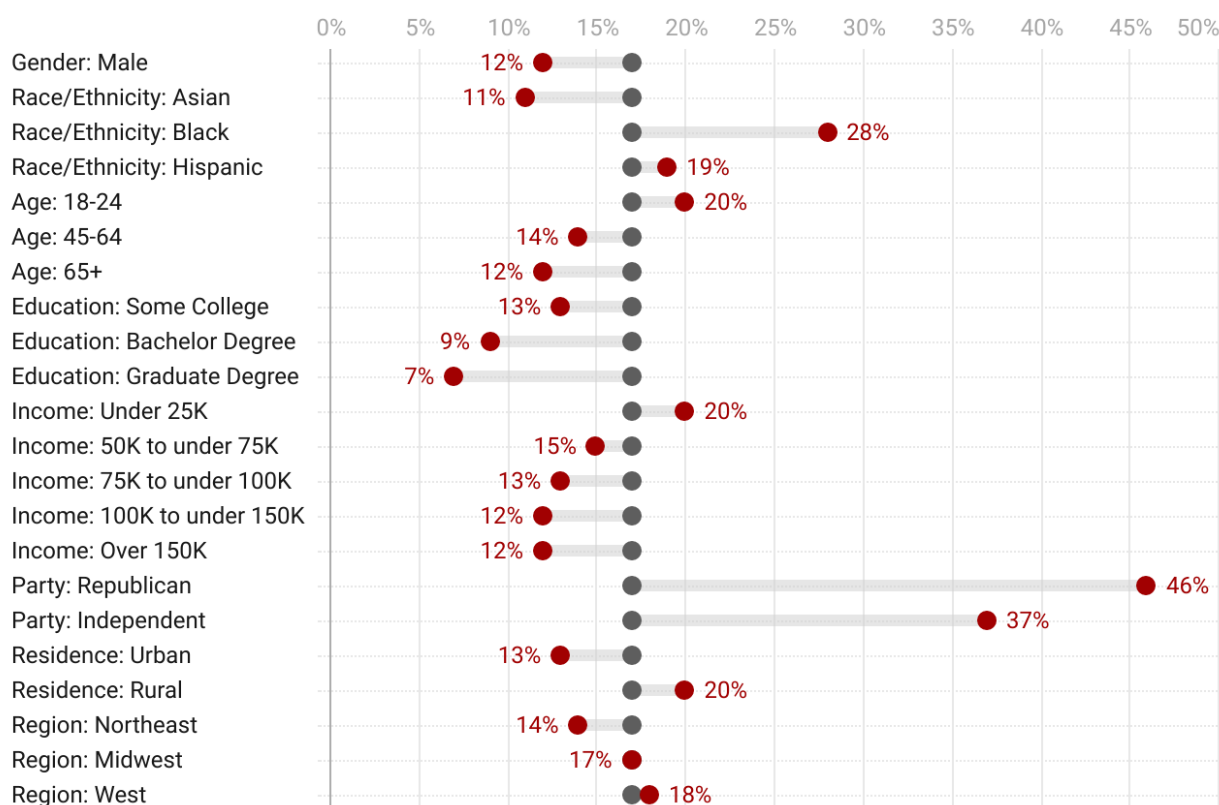*National sample, N = 21,500, Time period: 02/05/2021-03/01/2021*

Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of: Northeastern University, Harvard University, Rutgers University, and Northwestern University) www.covidstates.org
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Figure 27.

Marginal probabilities of our hypothetical respondent reporting vaccine hesitancy – defined as saying they would wait to take the vaccine after some or most people they know have already taken it – are shown in Figure 28. The vaccine hesitant group is considered important for vaccine messaging, as they are perhaps the most "persuadable" among those who do not already plan to get vaccinated as soon as they are able. As the figure shows, non-white respondents, those in the youngest age group, and those who do not identify as Democrats – i.e., Republicans and Independents – are the likeliest to report vaccine hesitancy in this multivariate setting. Older, higher-educated, and higher-income respondents are especially unlikely to be vaccine hesitant.

Predicted probability of vaccine hesitancy among Americans

The predicted probability of being vaccine-hesitant for someone who is female, White, age 25-44, with education at or below high-school level, income of 25K to under 50K, Democrat, living in a suburban area in the South is 34% (shown in gray below). This graph shows how vaccine resistance probability shifts if a single demographic characteristic of that focal person changes (e.g. switches from female to male, or from high-school-educated to college-educated).

Female, White, Age 25-44, High-school or less, Income 25K-50K, Democrat, Suburban, South: Hesitancy probability 34%

National sample, N = 21,500, Time period: 02/05/2021-03/01/2021

Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of: Northeastern University, Harvard University, Rutgers University, and Northwestern University) www.covidstates.org
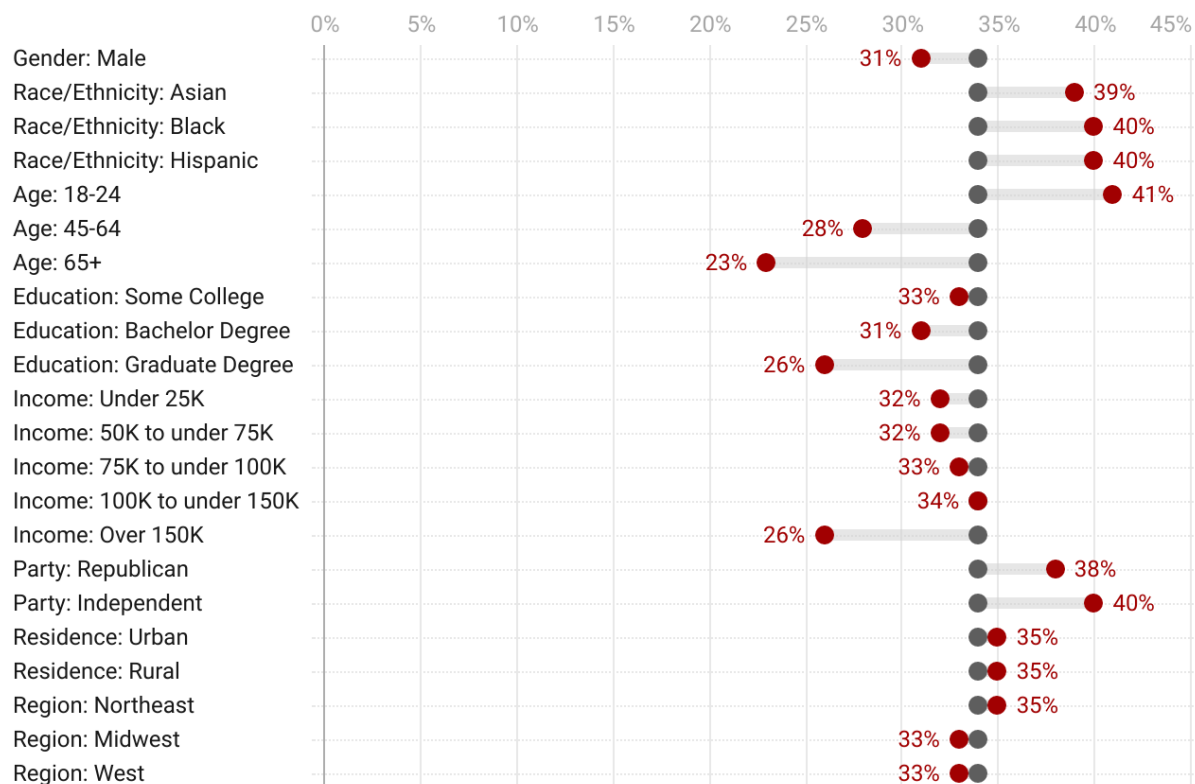 • Created with Datawrapper

Figure 28.

Figures 29 and 30 report vaccination and refusal probabilities (relative to the same modal case) for the subsample of individuals who are 65 and older and/or health care workers. The same variables associated with vaccine resistance tend to be associated with vaccine refusal among those in prioritized groups, suggesting that vaccine resistance is predictive of vaccine refusal, and highlights that as vaccines become more abundant this spring, the policy concern regarding vaccines will shift from supply and distribution to vaccine resistance.

Predicted probability of being vaccinated among people in prioritized groups (medical professionals, Americans age 65+)

The predicted probability of being vaccinated for someone in a prioritized group who is female, White, age 25-44, with education at or below high-school level, income of 25K to under 50K, Democrat, living in a suburban area in the South is 26% (shown in gray below). This graph shows how the predicted probability shifts if a single demographic characteristic of that focal person changes (e.g. switches from female to male, or from high-school-educated to college-educated).

Female, White, Age 25-44, High-school or less, Income 25K-50K, Democrat, Suburban, South: Vaccine probability 26%

National sample, N = 21,500, Time period: 02/05/2021-03/01/2021

Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of: Northeastern University, Harvard University, Rutgers University, and Northwestern University) www.covidstates.org
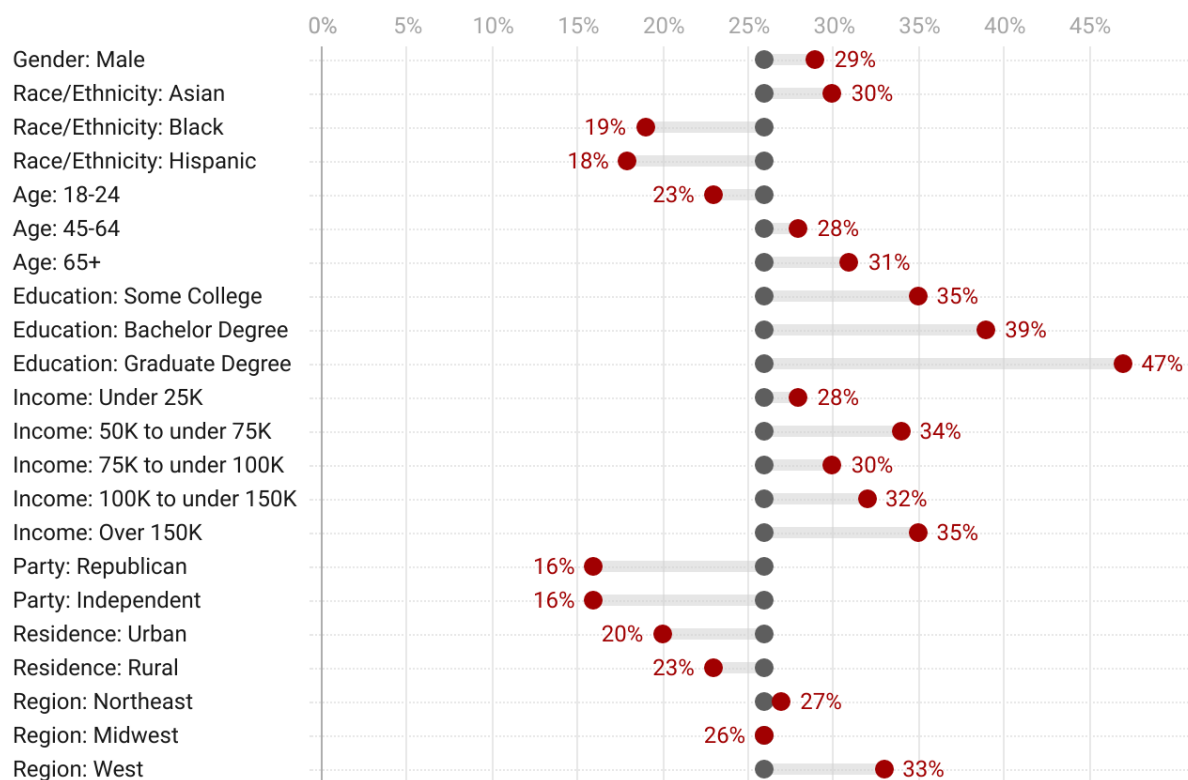 • Created with Datawrapper

Figure 29.

Predicted probability of vaccine refusal among people in prioritized groups (medical professionals, Americans age 65+)

The predicted probability of vaccine refusal for someone in a prioritized group who is female, White, age 25-44, with education at or below high-school level, income of 25K to under 50K, Democrat, living in a suburban area in the South is 15% (shown in gray below). This graph shows how the predicted probability shifts if a single demographic characteristic of that focal person changes (e.g. switches from female to male, or from high-school-educated to college-educated).

Gender: Male	10%
Race/Ethnicity: Asian	8%
Race/Ethnicity: Black	29%
Race/Ethnicity: Hispanic	17%
Age: 18-24	23%
Age: 45-64	10%
Age: 65+	7%
Education: Some College	12%
Education: Bachelor Degree	12%
Education: Graduate Degree	8%
Income: Under 25K	16%
Income: 50K to under 75K	13%
Income: 75K to under 100K	12%
Income: 100K to under 150K	12%
Income: Over 150K	12%
Party: Republican	43%
Party: Independent	41%
Residence: Urban	13%
Residence: Rural	17%
Region: Northeast	12%
Region: Midwest	14%
Region: West	12%

Female, White, Age 25-44, High-school or less, Income 25K-50K, Democrat, Suburban, South: Refusal probability 15%

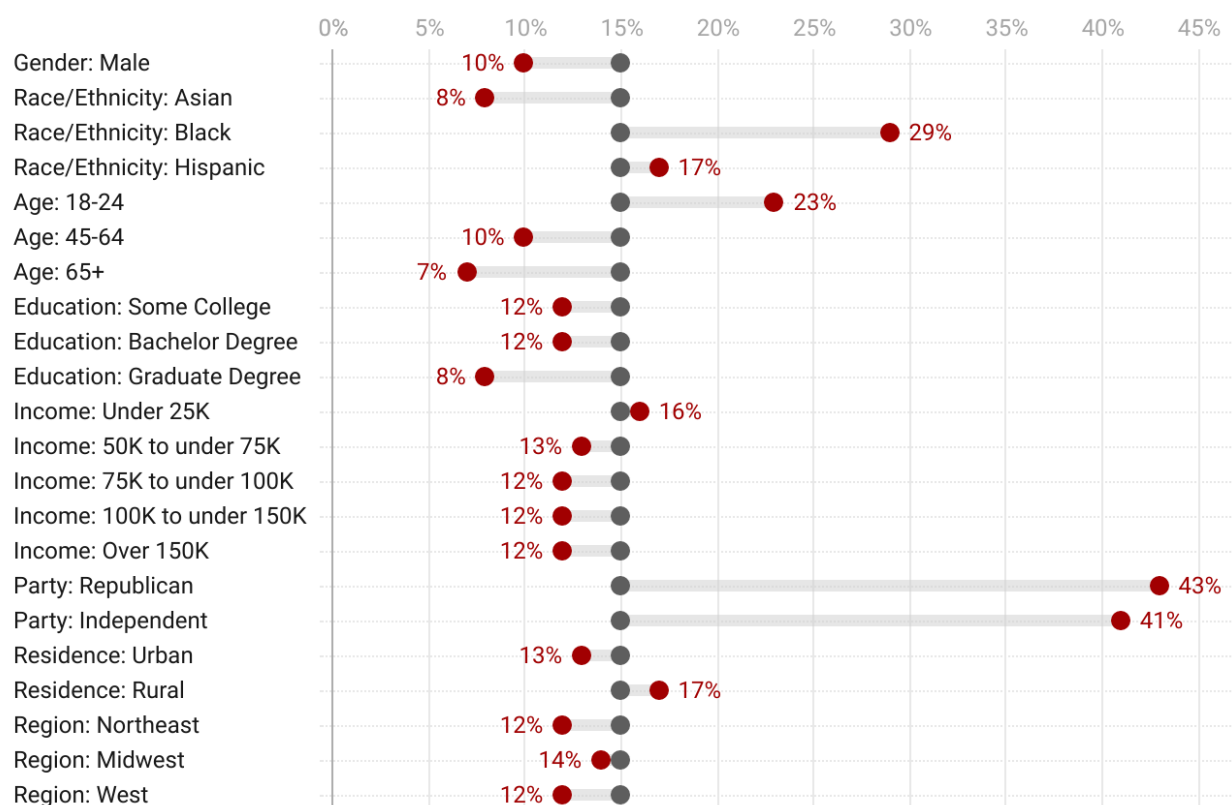*National sample, N = 21,500, Time period: 02/05/2021-03/01/2021*

Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of: Northeastern University, Harvard University, Rutgers University, and Northwestern University) www.covidstates.org
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Figure 30.

Conclusion

While all of these factors are statistically significant and consequential in terms of thinking about public health, the political (partisanship) and socioeconomic variables – especially education – stand out as most important. In terms of access, this may in part reflect the complexity of the roll out, where navigating the complicated systems to get vaccinated requires certain types of knowledge, or access to family members with that knowledge.

The complexity of the current system of distribution in many states therefore exacerbates pre-existing inequalities, driven by who can and cannot navigate that system. Making those systems simpler and less burdensome will have major benefits in terms of equity. For vaccine resistance, the current state and local strategies to maximize the number of vaccinations (mass vaccination centers, online sign ups, etc.) essentially cut out of the loop the most trusted informational resource that our research has shown would be most persuasive in declaring vaccination is safe: their own doctor.

The effects of this distribution strategy will therefore be especially consequential for those groups that start as vaccine skeptics, across all strata discussed in this report. **In short, the system of vaccine distribution should also be seen as the primary system for communication to vaccine resistant and hesitant individuals about the risks of (not) being vaccinated.** Communication strategies that rest primarily on advertising and elite messaging (especially by non scientists and non doctors) are likely to be far less effective at informing people about the risks of vaccination, and persuading them that the benefits outweigh the risks.

Appendix A: Vaccine attitudes by state

If you were able to choose when to get a COVID-19 vaccine, would you get it...

State	Already vaccinated	As soon as possible	After at least some people I know	After most people I know	Would not get the COVID-19 vaccine	Error Margin	N
National	15	33	15	16	21	1	21459
AK	29	19	16	14	23	7	277
AL	13	30	13	20	24	6	375
AR	13	25	13	19	31	5	388
AZ	15	28	18	13	27	6	389
CA	11	32	24	18	15	5	507
CO	17	33	15	13	22	6	453
CT	13	42	12	15	17	6	420
DC	19	43	15	10	13	7	291
DE	17	34	18	18	13	6	395
FL	12	31	15	18	24	5	520
GA	13	26	15	18	28	5	461
HI	19	41	14	16	11	7	369
IA	16	35	11	17	21	6	396
ID	13	29	12	16	30	5	456
IL	13	30	16	21	20	5	487

IN	17	29	17	14	24	5	417
KS	17	29	14	14	26	5	407
KY	9	31	16	18	26	5	407
LA	11	27	13	17	30	6	388
MA	13	47	18	13	9	6	461
MD	15	37	16	17	16	6	419
ME	12	40	14	18	16	5	433
MI	10	29	16	19	27	5	457
MN	14	36	16	13	21	5	426
MO	13	34	11	18	25	5	424
MS	14	25	14	17	31	6	445
MT	13	31	18	16	22	5	404
NC	15	32	15	16	22	5	480
ND	15	25	8	19	33	6	350
NE	10	41	11	17	21	6	437
NH	15	39	13	12	21	6	332
NJ	12	41	17	16	13	6	431
NM	18	31	7	14	30	7	349
NV	15	30	15	16	24	6	390
NY	12	36	17	17	19	4	563
OH	14	33	11	20	22	4	510
OK	15	27	8	17	33	6	419
OR	14	34	13	13	27	6	443
PA	14	35	14	17	21	5	499

RI	13	40	18	12	17	6	383
SC	11	31	16	19	23	6	406
SD	17	29	14	12	27	6	411
TN	13	32	13	14	29	5	461
TX	16	30	15	16	24	5	534
UT	14	38	15	18	15	5	425
VA	18	30	16	16	20	5	427
VT	12	37	17	17	18	6	321
WA	17	38	15	13	17	5	450
WI	12	35	14	19	21	5	464
WV	14	26	15	16	30	5	407
WY	14	18	14	22	32	6	295