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THE COVID STATES PROJECT:
A 50-STATE COVID-19 SURVEY
REPORT #60: VACCINE MISINFORMATION,
FROM UNCERTAINTY TO RESISTANCE

USA, August 2021

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Report of August 9, 2021, v.2

[Percent holding misperceptions typo updated on p.8 of the report]

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

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Northeastern University
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COVER MEMO

Summary Memo — August 9, 2021

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From April 2020 through July 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 June 9 and July 7, 2021, we surveyed 20,669 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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COVID-19 vaccine misinformation:

From uncertainty to resistance

In mid-July 2021, President Biden emphatically claimed that social media platforms were [“killing people”](#) by facilitating the spread of vaccine misinformation. Not long after, Senate Republican leader Mitch McConnell similarly declared that [misinformation was to be blamed](#) for the low vaccination rates of Americans.

The public debate that followed brought to the forefront a series of important questions. How prevalent is the public’s belief in vaccine misinformation? Is that belief associated with vaccine resistance? Are some social groups more susceptible to it than others? Are social media companies responsible for the higher levels of vaccine resistance among some of their users?

This report focuses on the first three questions, exploring misinformation beliefs across social groups and their connection with vaccine attitudes. We address the last question in [our previous report](#) and in [a post](#) published by the Washington Post’s Monkey Cage blog.

KEY TAKEAWAYS

We asked respondents to mark four popular vaccine misinformation claims as true or false. When in doubt, they could also select “Not sure.” Here are some of the patterns we found:

- **Twenty percent of Americans report believing at least one vaccine misinformation statement. More than half (51%) say they are not sure whether to believe at least one false claim.**
- **Belief in vaccine misinformation is associated with lower vaccination rates and higher vaccine resistance.** Among respondents who did not mark any misinformation items as true, 70% reported being vaccinated, while 15% were vaccine resistant. Among those who thought multiple misinformation statements were true, 46% said they were vaccinated and 42% were vaccine resistant.
- **Uncertainty about misinformation is also linked to lower vaccination rates and higher vaccine resistance.** Among respondents who identified all four misinformation claims as false, only 5% were vaccine resistant and 85% were vaccinated. Among those who did not identify any claim as true but were uncertain about at least one, 25% were vaccine

resistant and 56% were vaccinated. Among respondents who thought at least one of the false statements was accurate, 39% were vaccine-resistant and 44% were vaccinated.

- **Misperceptions and uncertainty emerge as important predictors of vaccine attitudes even when we account for other factors** including geography, demographic characteristics, political affiliation, trust in institutions, news consumption, and personal experience with COVID-19.
- **People aged 25 to 44, those with high socioeconomic status, and Republicans are most likely to hold vaccine misperceptions**, with over 25% in each group marking at least one misinformation statement as true.
- **Women, African-Americans, young people, and those with lower socioeconomic status are most likely to report uncertainty** as to whether misinformation statements are true or not.

The prevalence of vaccine misperceptions

In COVID States project surveys, we ask respondents to evaluate four popular vaccine misinformation items. The false statements we ask about include¹:

- The COVID-19 vaccines will alter people's DNA.
- The COVID-19 vaccines contain microchips that could track people.
- The COVID-19 vaccines contain the lung tissue of aborted fetuses.
- The COVID-19 vaccines can cause infertility, making it more difficult to get pregnant.

While all four claims [have been debunked](#), close to one in ten Americans believe each individual statement to be true. Specifically, 8% of our respondents think that vaccines may allow you to be microchipped, 9% say vaccines use aborted fetal cells, 10% believe vaccines can alter human DNA, and 11% are concerned that vaccines can cause infertility (see Figure 1). **Overall, 20% of Americans think that at least one of these four false claims is accurate.**

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¹ We debrief respondents after they answer our vaccine misinformation questions. They are informed that each of those items is false, and that the additional true items we include in the question are correct.

While a relatively small percent of respondents report that they believe each statement, there is a considerable proportion (ranging from 22% for microchips to 37% for infertility) who say they are not sure whether the misinformation items are true. The most prevalent misperception in our data links the COVID-19 vaccines to infertility. It is a clear cause for concern that only about half (52%) of our respondents were able to identify this particular statement as false. **In total, 51% reported that they were not sure about the veracity of at least one false statement.**

COVID-19 misinformation beliefs among Americans

[Percent respondents who believe each false statement is accurate, inaccurate, or say they are not sure]

National sample, N = 16,996, Time period: 06/09/2021-07/07/2021

Source: 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 1.

Twitter data

In addition to our survey data, the COVID States Project has access to a Twitter panel of 1.6 million accounts matched to demographic information. From November 2020 to July 2021, the project collected over 3.8 million tweets about COVID-19 vaccines. Of those, about fifty five thousand, or close to 1.5%, included key terms potentially linking them to one of the four misinformation items above (e.g., "microchip", "DNA", "abort", "infertility").

Important to note, the numbers we present likely include messages debunking or parodying vaccine misinformation as well as ones promoting it. We should thus interpret these data as indicating roughly what proportion of the vaccine conversations on Twitter revolve around these problematic claims (see Figure 2).

Among the four misinformation items, the idea that vaccines contain microchips was most mentioned on Twitter, though its popularity decreased over time. The second most popular false claim, which connected vaccines to infertility, increased in prevalence after November 2020.

Tweets about COVID-19 misinformation items

Tweets about the following four false vaccine statements:

1. The COVID-19 vaccines will alter people's DNA.
2. The COVID-19 vaccines contain microchips that could track people.
3. The COVID-19 vaccines contain the lung tissue of aborted fetuses.
4. The COVID-19 vaccines can cause infertility, making it more difficult to get pregnant.

[Shown as percent of all tweets about COVID-19 vaccines posted during the same time period]

Sample: 3,871,021 tweets about COVID-19 vaccines, 54,460 tweets about misinformation topics.

Source: 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 2.

Overall, only a minority of Americans firmly believe vaccine misinformation or engage in discussions about it on social media. We find, however, a much more prevalent uncertainty about the accuracy of false vaccine stories. Public doubts about the ethics, efficacy, and safety of the COVID-19 shots remain a significant challenge in the face of vaccine hesitancy and resistance.

Misinformation and vaccination rates

Does believing vaccine misinformation lead to lower vaccination rates? Our data suggest that the two are at least connected. Overall, 80% of respondents did not mark any of the false statements as accurate, 9% reported believing one false statement, and 10% reported believing two or more false statements². Among people who did not believe any misinformation items, 70% reported being vaccinated, and 15% were vaccine resistant. For those who marked a single false item as accurate, 43% were vaccinated and 36% were vaccine resistant. In the group that thought multiple statements were true, 46% were vaccinated, and a staggering 42% were vaccine resistant (see Figure 3).

COVID-19 vaccine status and number of misperceptions

COVID-19 vaccine status among respondents who said none, one, or more than one of the following false statements were accurate:

1. The COVID-19 vaccines will alter people's DNA.
2. The COVID-19 vaccines contain microchips that could track people.
3. The COVID-19 vaccines contain the lung tissue of aborted fetuses.
4. The COVID-19 vaccines can cause infertility, making it more difficult to get pregnant.

National sample, N = 16,996, Time period: 06/09/2021-07/07/2021

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Figure 3.

Importantly, vaccine attitudes are associated not only with believing misinformation, but also with experiencing uncertainty. In our most recent data, 40% of respondents correctly identified all statements as false, 20% said at least one statement was true, and another 40% did not mark any statement as true but did select “not sure” at least once.

Among respondents who identified all four misinformation claims as false, only 5% were vaccine resistant, and 85% were vaccinated. Among those who did not identify any claim as true but were uncertain about at least one, vaccine resistance was 25%, and 56% were vaccinated. Respondents who thought at least one of the false items was accurate were 39% vaccine-resistant and 44% vaccinated (see Figure 4).

² The total is below 100 percent due to rounding. The exact numbers are 80.2%, 9.4%, and 10.4%.

COVID-19 vaccine status and uncertainty about misinformation

COVID-19 vaccine status among respondents who...

- (1) Identify one or more misinformation statements about COVID-19 vaccines as true
- (2) Do not identify misinformation statements as true, but select "Not sure" at least once
- (3) Correctly identify all misinformation statements about COVID-19 vaccines as false

National sample, N = 16,996, Time period: 06/09/2021-07/07/2021

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Figure 4.

So far, we observe a consistent pattern: COVID-19 misperceptions and uncertainty seem to be linked to vaccination status. It is also important to know whether this relationship between misinformation and vaccine attitudes is still present after we account for key demographic, geographic, political, and other factors. All else being equal, are those of us who eschew misinformation more likely to be vaccinated?

Figure 5 and Figure 6 show estimates produced by models³ that account for demographics, geography, political party, news consumption, trust in the government, trust in science, and personal experience with COVID-19. Even when all of those factors are taken into consideration, both belief in false vaccine claims and uncertainty about those claims were significantly linked to vaccination attitudes. Both were associated with a lower likelihood of being vaccinated (Figure 5), as well as a higher likelihood of being vaccine-resistant (Figure 6).

We can also examine how well individual misperceptions predict vaccine resistance. In those analyses, the belief that COVID-19 shots can cause infertility had the strongest association with resistance, followed by thinking that vaccines can alter human DNA, with microchip misinformation items coming third in importance. Thinking that vaccines contain aborted fetal cells did not significantly predict resistance levels among respondents.

³ The figures present results from two logistic regressions with identical predictors, estimating the probability of reporting that one has been vaccinated (Figure 6) or that one will *not* get vaccinated (Figure 7). The vertical reference lines at zero indicate no effect. Coefficients whose confidence intervals touch that zero line are not statistically distinguishable from zero. Coefficients that are to the right (left) of the line are associated with a higher (lower) marginal probability of observing the outcome.

COVID-19 vaccine status: Already vaccinated

The numbers are coefficients from logistic regressions. Estimates are presented in red, confidence intervals in gray. Outcome variable: respondent reports they have received at least one dose of the COVID-19 vaccine.

National sample, N = 16,996, Time period: 06/09/2021-07/07/2021

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COVID-19 vaccine status: Will not get vaccinated

The numbers are coefficients from logistic regressions. Estimates presented in red, confidence intervals in gray. Outcome variable: respondent reports they do not intend to get vaccinated

National sample, N = 16,996, Time period: 06/09/2021-07/07/2021

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 and Figure 6.

Group differences in vaccine misperceptions

Knowing that misinformation is consistently linked to negative vaccination outcomes, we also examine the differences in misperception levels across social groups. As Figure 7 shows, women (18% of whom believe at least one false item) are four percentage points less likely to hold misperceptions compared to men (at 22%). Women, however, are eight percentage points more likely than men to report uncertainty instead of marking all misinformation claims as false.

COVID-19 misperceptions by gender, race/ethnicity, and age

Survey respondents were asked to identify the following four vaccine misinformation items as either true or false. When uncertain, they also had the option of saying "Not sure".

1. The COVID-19 vaccines will alter people's DNA.
2. The COVID-19 vaccines contain microchips that could track people.
3. The COVID-19 vaccines contain the lung tissue of aborted fetuses.
4. The COVID-19 vaccines can cause infertility, making it more difficult to get pregnant.

- Respondents who marked at least one misinformation item as true
- Respondents who marked none as true, but at least one as "not sure"
- Respondents who correctly marked all misinformation items as false

National sample, N = 16,996, Time period: 06/09/2021-07/07/2021

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Figure 7.

In terms of race, Asian Americans are least likely to believe a false claim (16% do), compared to African American (21%), Hispanic (20%), and White (20%) respondents. African Americans report the highest level of uncertainty, 8-10 percentage points above that for other groups. A total of 48% among Black respondents mark none of the misinformation claims as true, but say at least once that they are not sure.

The largest gaps among demographic categories emerge for age groups. Only 9% of those 65 and older reported believing any of the false claims, followed by 17% of people aged 45 to 64, and 22% of those between 18 and 24. Those in the 25-to-44 age bracket were most likely to report believing misinformation, with 29% saying that at least one false claim was accurate – a twenty percentage-point gap with the 65+ group. Older Americans were also less likely to experience uncertainty, with fully 59% marking all claims as false, compared to 28%-42% for other age groups.

COVID-19 misperceptions by education, income, and urbanicity

Survey respondents were asked to identify the following four vaccine misinformation items as either true or false. When uncertain, they also had the option of saying "Not sure".

1. The COVID-19 vaccines will alter people's DNA.
2. The COVID-19 vaccines contain microchips that could track people.
3. The COVID-19 vaccines contain the lung tissue of aborted fetuses.
4. The COVID-19 vaccines can cause infertility, making it more difficult to get pregnant.

National sample, N = 16,996, Time period: 06/09/2021-07/07/2021

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Figure 8.

Differences were also evident in groups based on education and income. As some previous research has found, the Americans with lowest and highest socioeconomic status were more likely to be misinformed compared to those in the middle. In the case of highly educated respondents, this pattern is at least partly due to the fact that graduate degree holders are especially likely to select a definitive answer and avoid admitting that they did not know the correct response.

Misperceptions were reported by 22% of respondents who did not go to college and 25% of those who had a graduate degree, compared to 17% of people with some college education or a college degree. Similarly, false claims were identified as accurate by 22% of those in the lowest socioeconomic bracket (under \$25,000/year) and 26% of those in the highest bracket (over \$100,000/year). The number for people in the middle brackets, in comparison, ranged between 16% and 19%. While those in the lowest and the highest socioeconomic brackets had similarly high misperception rates, their uncertainty rates were different. The uncertainty was considerably lower for people with graduate degrees and those with a high income (see Figure 8).

We also found political differences, with 25% of Republicans holding misperceptions compared to 17%-19% among other groups (Figure 9). Democrats were most likely to mark all misinformation items as false (48% did so), which put them 12 to 21 percentage points ahead of other groups.

COVID-19 misperceptions by political party

Survey respondents were asked to identify the following four vaccine misinformation items as either true or false. When uncertain, they also had the option of saying "Not sure".

1. The COVID-19 vaccines will alter people's DNA.
2. The COVID-19 vaccines contain microchips that could track people.
3. The COVID-19 vaccines contain the lung tissue of aborted fetuses.
4. The COVID-19 vaccines can cause infertility, making it more difficult to get pregnant.

National sample, N = 16,996, Time period: 06/09/2021-07/07/2021

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Figure 9.

Appendix: Additional figures

COVID-19 misperceptions by gender, race/ethnicity, and age

Respondents who said none, one, or more than one of the following false statements were accurate:

1. The COVID-19 vaccines will alter people's DNA.
2. The COVID-19 vaccines contain microchips that could track people.
3. The COVID-19 vaccines contain the lung tissue of aborted fetuses.
4. The COVID-19 vaccines can cause infertility, making it more difficult to get pregnant.

■ None ■ One ■ Two or more

National sample, N = 16,996, Time period: 06/09/2021-07/07/2021

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Figure 10.

COVID-19 misperceptions by education, income, and urbanicity

Respondents who said none, one, or more than one of the following false statements were accurate:

1. The COVID-19 vaccines will alter people's DNA.
2. The COVID-19 vaccines contain microchips that could track people.
3. The COVID-19 vaccines contain the lung tissue of aborted fetuses.
4. The COVID-19 vaccines can cause infertility, making it more difficult to get pregnant.

■ None ■ One ■ Two or more

National sample, N = 16,996, Time period: 06/09/2021-07/07/2021

Source: 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.

COVID-19 misperceptions by political party

Respondents who said none, one, or more than one of the following false statements were accurate:

- 1. The COVID-19 vaccines will alter people's DNA.
- 2. The COVID-19 vaccines contain microchips that could track people.
- 3. The COVID-19 vaccines contain the lung tissue of aborted fetuses.
- 4. The COVID-19 vaccines can cause infertility, making it more difficult to get pregnant.

National sample, N = 16,996, Time period: 06/09/2021-07/07/2021

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Figure 12.