OVERCOMING COVID-19 VACCINE HESITANCY
United States Facing Steeper Uphill Struggle than United Kingdom

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Background

Achieving a high overall vaccination rate is crucial for overcoming the COVID-19 pandemic (Randolph & Barreiro, 2020). To prevent widening health disparities, it is also important to increase vaccination rates among the diverse populations that are most gravely affected by the pandemic. Given these concerns, governmental, healthcare, and policy groups need data to guide their strategic vaccination campaigns. Understanding factors that influence the willingness to be vaccinated, with the goal to inform strategies to reach vaccine hesitant populations, is critically important.

Vaccine misinformation has proliferated on various media outlets during the pandemic. This may have reinforced pre-existing vaccine hesitancy (i.e., the tendency to delay or refuse vaccines despite having access, seeFacciolà et al., 2019). Past studies and the early experience with the pandemic suggest that race, ethnicity and income are associated with vaccine hesitancy (see Bunch, 2021; Goldlust, Lee, & Bansal, 2017). Moreover, it is unclear how the lack of a vaccine for children will affect hesitancy among parents (Mendel-Van, Nowak, & Aikin, 2017).

This policy brief analyzes data collected shortly before vaccines were formally approved. Our findings on vaccine willingness and trends around race and gender are broadly in line with findings of other surveys conducted after the approval of COVID-19 vaccines in the United States (Kim, 2021; Savoia et al., 2021; Social Experts Action Network, 2021) and the United Kingdom (Office for National Statistics, 2021; Sonawane, Troisi, & Deshmukh, 2021; University of Oxford, 2021).

However, our study provides more detailed insights into the socioeconomic factors and information seeking behaviors associated with the willingness to get the COVID-19 vaccine. It also examines in more depth the challenges faced by government, health experts, and media, to communicate reliable information about the pandemic, and suggests strategies to overcome them.

Key Findings

Two nationally representative online surveys were conducted in the United States (N=2,280) and in the United Kingdom (N=2,000) in October and November 2020. The surveys identify similarities but also major differences between the two countries.

- In the **United States**, 51% of the adult population said they were willing to be vaccinated against COVID-19, 28% were not, and 21% were undecided.

- In the **United Kingdom**, 71% of the adult population said they were willing to be vaccinated, 14% were not, and 15% were undecided.

- **Race** may be a major barrier to achieving high COVID-19 vaccination rates in the United States. Black respondents were 64% less willing to be vaccinated than White respondents.

- **Gender** may be a barrier to achieving high vaccination rates in the United States and United Kingdom. Women were 43% less willing to be vaccinated than men in the United States. They were 41% less willing than men to be vaccinated in the United Kingdom.

- **Age and income.** Older individuals and those with higher income indicated a higher willingness to be vaccinated in both countries.

- **Trust** appears key to vaccination acceptance. Individuals with higher levels of trust in mass media were more willing to be vaccinated in both countries. Individuals with a higher general level of trust in others were more willing to be vaccinated in the United States.

- **Medical information.** Individuals who consulted medical sources were more willing to be vaccinated.

- **Media sources.** Reliance on conservative outlets, mainstream outlets, and television was not associated in a statistically significant way with the willingness to be vaccinated.

- **Concern** about getting COVID-19 is strongly associated with willingness to get vaccinated. Individuals who were more concerned about the pandemic indicated they were more willing to be vaccinated, but this effect was much stronger in the United Kingdom than in the United States.

Overall, in the United States, the factors most strongly associated with willingness to be vaccinated are race (White), gender (male), age (older), income (higher), trust in mass media, and concern about getting coronavirus.

In the United Kingdom, the factors most strongly associated with willingness to be vaccinated are gender (male), age (older), income (higher), trust in mass media, and concern about getting coronavirus. Race is not associated with the willingness to be vaccinated, unlike in the United States.

Policy Recommendations

Our findings reinforce the need for a multi-pronged strategy to increase COVID-19 vaccination rates, especially in the United States. Reaching Black Americans and women will be critical to achieve high vaccination rates. In both countries, measures to reach populations that are hesitant or are undecided about getting the COVID-19 vaccine will be important to mitigate the effects of the pandemic on inequality. Some measures will mainly involve government (local, state, national) but many will require multi-stakeholder collaboration and solutions.

Short-term measures

- Increase the amount of factual medical information across all types of media channels, including clear and transparent data about the effectiveness of vaccines.

- Develop programs via multiple channels, such as community outreach and media campaigns, to reach Black residents in the United States, with the goal to increase trust in vaccines.
- Increase efforts via multiple channels, such as mass media, medical providers, and pediatricians, to reach women with clear information about vaccine safety.

Medium-term measures

- Promote measures that increase the share of accurate and reliable medical/scientific information available about the pandemic and the safety and efficacy of vaccines.
- Facilitate initiatives among traditional media and online information providers to develop measures to assist consumers in discerning the quality of sources and of information content.
- Promote information literacy and digital literacy across the life span and across all levels of education, from early childhood to old age.

Findings

The findings reported in this white paper are part of a larger study on information seeking conducted by the research team. Data collection took place nine months into the pandemic and shortly before vaccines were formally approved. During that time, the United States was on the upswing of the third, biggest wave of the pandemic. The United Kingdom was on the upswing of the second wave of the pandemic, which was comparatively less severe than the third wave in the United States. Our work examines how individuals under these conditions of uncertainty obtained and updated what they know about the virus, how information sources and updating practices are associated with their level of understanding of the unfolding pandemic and the willingness of individuals to adopt appropriate responses. The findings reveal that the two countries are similar in some respects and different in others.

Overall, during the observation period, 51% of adults in the United States strongly agreed or agreed that they would be vaccinated; 28% disagreed or strongly disagreed; and 21% were undecided. In contrast, 70% of the adult population in the United Kingdom strongly agreed or agreed that they were willing to be vaccinated; 14% disagreed or strongly disagreed; and 15% were undecided.
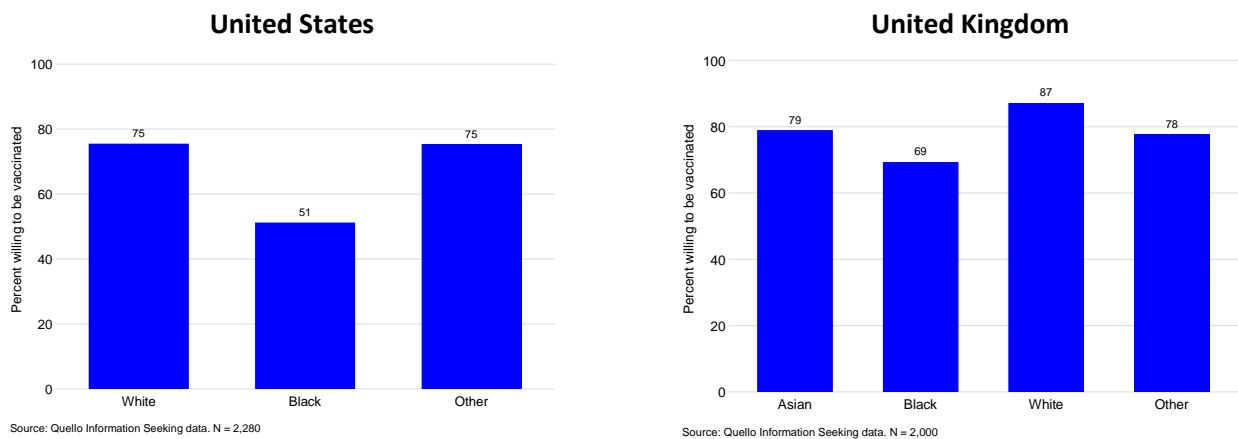

Figure 1: Willingness to be vaccinated by race and ethnicity. Respondents were asked how strongly they agreed or disagreed with the statement: "If a coronavirus vaccine were available, I would take it." Figure percentages include those who agreed or strongly agreed. Respondents were also asked to indicate what racial or ethnic group they considered themselves belonging to.

Race and ethnicity were associated with vaccine hesitancy, but major differences exist between the two countries (see Figure 1). Race was a major barrier to being willing to get vaccinated in the United States. Black residents were 24 percentage points less willing to be vaccinated than White residents. In the United Kingdom, there were differences between individuals of different races and ethnicities, but these differences were not statistically significant in a multivariate model with the willingness to get vaccinated.

Gender was also strongly associated with vaccine hesitancy. Using a multivariate analysis that controls for other socioeconomic and other factors (see Tables 1 and 2 in the appendix) women were 43% less willing to be vaccinated than men in the United States and 40.9% less willing than men to be vaccinated in the United Kingdom. Based on raw percentages, 43% of women in the United States were willing to get vaccinated, 23% were undecided and 34% were unwilling. Among male respondents, 61% indicated a willingness to be vaccinated, 18% were undecided, and 21% were unwilling. In the United Kingdom, 67% of women were willing to be vaccinated, 17% were undecided and 16% were unwilling. In contrast, 75% of men indicated a willingness to be vaccinated, 13% were undecided, and 12% were unwilling.

Our data also indicate an association between age and income and willingness to be vaccinated (see Figure 2). Older individuals indicated a higher willingness to get vaccinated in both countries, but this association was much weaker and less clear in the United States than in the United Kingdom. In the United Kingdom, the subset of respondents with a strong willingness to be vaccinated is nearly 15 years older than those who do not want to get vaccinated. Moreover, the range between minimum and maximum age as well as the range between the 25th and the 75th percentile of the respondents is generally slightly wider in the United States than in the United Kingdom.

Similarly, individuals with higher income were more willing to be vaccinated in both countries. Both income and age effects were smaller than the effect of race in the United States and of gender in both countries. The effect of income was larger than the effect of age in the United States. In contrast, the effect of age was larger than the effect of income in the United Kingdom. In a simple bivariate analysis, education is positively associated with the willingness to get vaccinated. However, it is not associated in a statistically significant way with the willingness to get vaccinated once other factors are included in the analysis.
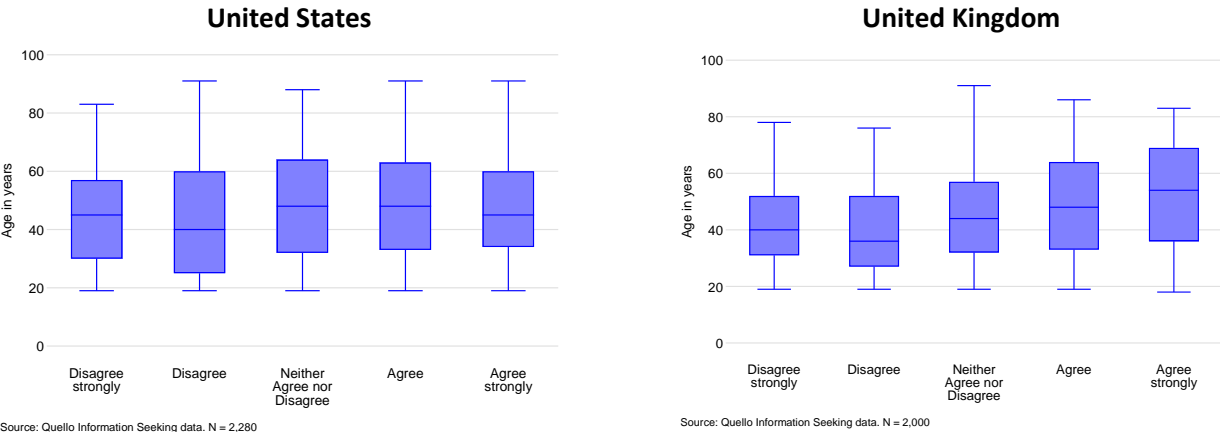

Figure 2: Willingness to be vaccinated by age. Respondents were asked how strongly they agreed or disagreed with the statement: "If a coronavirus vaccine were available, I would take it." The graphs depict the age of respondents in the five groups, ranging from those who strongly disagreed to those who strongly agreed. The rectangles depict the median age of individuals (solid line in the middle) as well as the 25th percentile (lower end) and the 75th percentile (upper end). The whiskers illustrate the minimum and maximum age of respondents in each group. Age is less clearly and less strongly related to the willingness to get vaccinated in the U.S. than in the U.K. Moreover, the age range of responses in each group in the U.S. is wider.

Trust was strongly associated with the willingness to be vaccinated, but the patterns differ in the two countries (see Figure 3). Individuals with a higher general level of trust in others were more willing to be vaccinated in the United States. Trust in mass media reporting was positively associated with the willingness to be vaccinated in both countries, although the effect was less in the United States than in the United Kingdom. We believe that this pattern is an outcome of the different media systems in the two countries, including the dominant position of the BBC in the United Kingdom and the highly diverse and competitive American media landscape. We also find hints in our data that the mixed messages from the Trump administration contributed to the U.S. pattern.

Our data does not suggest a strong influence of the political leaning of media sources consulted by individuals on the willingness to be vaccinated once other factors are controlled for. Reliance on conservative outlets, such as talk radio, mainstream outlets, and television was not associated in a statistically significant way with the willingness to be vaccinated in either country. However, individuals who more frequently got information from medical outlets indicated a higher willingness to be vaccinated in both countries. This effect was stronger in the United States than in the United Kingdom.

Individuals who were more concerned about the pandemic indicated a higher willingness to be vaccinated against COVID-19 in both countries. This effect was much stronger in the United Kingdom than in the United States. A different pattern was visible between comfort in potentially risky situations and the willingness to be vaccinated. Individuals with a higher level of tolerance for risky situations and behavior (e.g., being in a closed room where social distancing is not possible) indicated a higher willingness to be vaccinated in the United States, whereas risk tolerance was negatively related to willingness to be vaccinated in the United Kingdom.
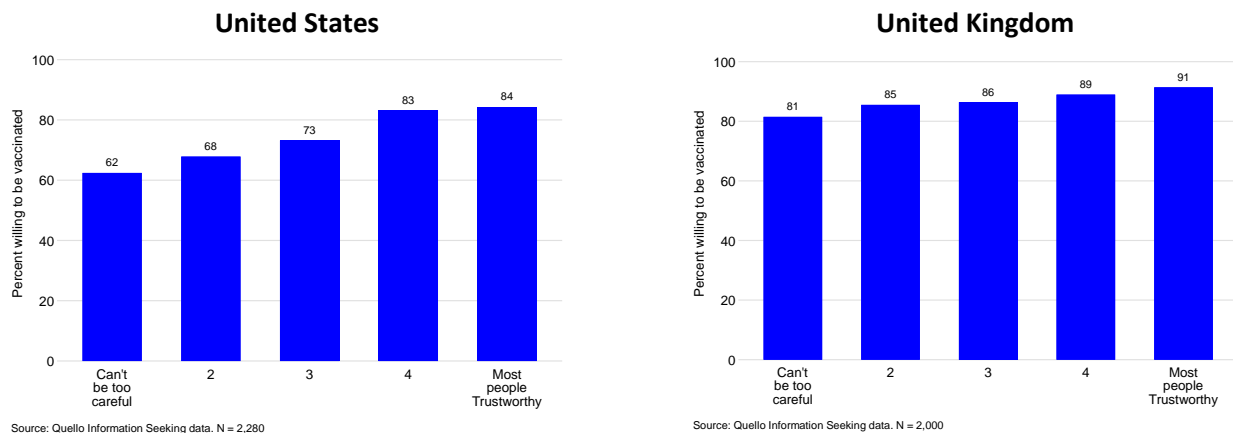

Figure 3. Trust in others and the willingness to be vaccinated. Respondents were asked how strongly they agreed or disagreed with the statement: "If a coronavirus vaccine were available, I would take it." Figure percentages include those who agreed or strongly agreed. Respondents were also asked: "Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?" Data for the United States indicate a stronger association between trust in others and the willingness to get vaccinated. There is a 22 percentage point difference in the willingness to get vaccinated between people with low and high trust. In the United Kingdom that difference is only 10 percentage points.

Our data is compatible with concerns about an "infodemic" that complicates the pandemic. We do not find a discernible statistical association between the amount of information accessed by individuals (how "information-rich" they are) and their state of knowledge about the pandemic (how "knowledge-rich" they are). This suggests that it is difficult for individuals to find correct facts in the avalanche of information offered by online and offline media. Finding and ascertaining facts is further complicated by incomplete knowledge of the pandemic among experts. Science relies on a discourse in which robust knowledge is sorted out from unreliable information. However, when incremental change in knowledge gets amplified through online and offline media, the ability of

non-experts to discern correct from inaccurate information can be weakened. Our evidence suggests that individuals instead rely on general hunches and perceptions. Thus, the willingness to get vaccinated is associated with factors such as trust in others, trust in media, and concerns about the virus, in addition to socioeconomic factors such as income.

Human Subjects Review

The study was reviewed and approved by the Institutional Review Board at Michigan State University under MSU Study ID: STUDY00004862 (finalized on September 1, 2020).

Peer Review

Some of the findings reported in this policy brief have not been subjected to formal peer review. A related paper by Reisdorf et al. (in print) was accepted by the peer-reviewed *Journal for Quantitative Description* in March 2021.

Data Availability

Data is available upon request from the authors. Please contact Grant Blank (grant.blank@gmail.com) or Johannes M. Bauer (bauerj@msu.edu).

Acknowledgments

Additional Information

Quello Center Information Seeking Project website, https://quello.msu.edu/informationseeking/

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Appendix: Data, Methods, and Analysis

We conducted nationally representative online surveys in the United States (N=2,280) and the United Kingdom (N=2,000) in late October and early November 2020. Respondents were stratified by age, gender, race, and region. Post-stratification weights were applied to the analyses to ensure that our data match national population proportions. Although completed shortly before vaccines were officially approved, the data allow a detailed examination of the factors that influence the willingness of individuals to get vaccinated against COVID-19.

The surveys asked respondents a series of questions about their information-seeking behaviors, such as the media and information sources they consulted as well as the actions they took to verify and update information. We also asked respondents about their concerns related to the pandemic, their experiences with the pandemic, the effects of the pandemic on their lives, and about their state of knowledge related to the coronavirus. Further, we asked about their comfort with potentially risky situations, such as being in a crowded room where social distancing is not possible, their willingness to adopt preventative measures, and their willingness to be vaccinated. Finally, we collected socio-demographic data.

Multiple methods were used to analyze the data. Bivariate associations in the data were identified using descriptive statistical methods. In addition, multivariate methods were used to identify the contribution of specific factors, controlling for other factors. The willingness to get vaccinated was examined using an ordinal logit model. This approach generates a more accurate and reliable picture of the contributions of individual factors, such as race and gender, because the effects of other factors are statistically controlled. Tables 1 and 2 summarize the findings of an ordinal logit model, estimating the strength of the association of socio-demographic and other factors with the willingness to get vaccinated. Respondents were asked whether they agreed or disagreed with the statement: "If a coronavirus vaccine were available, I would take it." Responses were measured using a five-item Likert scale, ranging from "disagree strongly" to "agree strongly".

Table 1 shows that in the United States, annual household income (+)[1], being female (−), being Black or African American (−), the number of medical sources used (+), trust in others (+), trust in mass media (+), concern about getting infected with COVID-19 (+), and comfort with engaging in risky behavior related to the pandemic (+) are statistically associated with the willingness to be vaccinated at the 99% confidence level. Age (+) is statistically significant at the 95% confidence level. Factual knowledge about COVID-19 (+) is just below the 95% statistical significance level.

Table 2 shows that in the United Kingdom, age (+), annual household income (+), being female (−), factual knowledge about COVID-19 (+), trust in mass media (+), and concern about getting COVID-19 (+) are statistically associated with the willingness to be vaccinated at the 99% confidence level. Self-rated ability to use the Internet (−), children under 18 in the household (−), the number of medical sources consulted (+), and comfort with risky behavior related to the pandemic (−) are statistically significant at the 95% confidence level.

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[1] (+) and (−) after each variable indicate the direction of the association. A (+) sign indicates that a factor, such as annual household income, is positively associated with the willingness to get vaccinated. In other words, higher income is associated with a higher willingness to get vaccinated. The parameter estimates in Tables 1 and 2 provide more detail on the strengths of the associations.

Table 1. Willingness to be vaccinated in the United States

	%	%StdX	p-value
Age in years	1.1	21.4	0.034
Annual household income	10.6	30.4	0.000
Number of adults in household	4.10	3.50	0.540
Self-rated Internet ability	-8.40	-5.30	0.407
Female	-43.0	-24.5	0.000
Education			
Some college	25.8	10.9	0.264
BA or higher	36.5	15.9	0.130
Race			
Black respondents	-63.6	-28.3	0.000
Other respondents	-11.4	-4.00	0.446
Hispanic	-3.20	-1.30	0.829
Children under 18 in household	-5.40	-2.50	0.691
Political Position			
Center	-16.8	-8.30	0.168
Left	-4.90	-2.30	0.725
Urban residence	19.0	5.00	0.338
Number of conservative media sources	7.2 0	7.40	0.304
Number of medical media sources	20.0	23.7	0.001
Number of mainstream media sources	2.30	3.90	0.566
Number of TV sources	0.60	0.50	0.944
Factual knowledge about COVID-19	8.50	11.7	0.055
Trust in others	16.3	23.2	0.000
Trust in mass media	30.5	28.1	0.000
Concern about getting COVID-19	26.8	33.8	0.000
Comfort with risky behaviors	22.3	23.0	0.001
Number of cases			1,898
McKelvey & Zavoina R^2			0.246
Cutpoint 1			1.60
Cutpoint 2			2.42
Cutpoint 3			3.45
Cutpoint 4			4.70

Notes: The column labeled "%" is the percent change in the dependent variable for a one-unit change in the independent variable. The column labeled "%StdX" is the percent change in the dependent variable for a one-standard-deviation change in the independent variable. Dummy variables were used to estimate the effect of certain categorical variables. For technical reasons, these variables require the comparison of the printed percentages with a reference category for the variable. Reference categories are male, high school diploma or less, white, non-Hispanic, no children, right-wing political position, and rural residence. p-values indicate the level of statistical significance. p-values below 0.05 indicate significance at the 95% confidence level; p-values below 0.01 indicate statistical significance at the 99% confidence level; p-values below 0.001 indicate significance at the 99.9% confidence level.

Table 2. Willingness to be vaccinated in the United Kingdom

	%	%StdX	p-value
Age in years	2.50	55.1	0.000
Annual household income	11.1	24.9	0.000
Number of adults in household	-12.0	-9.80	0.077
Self-rated Internet ability	-22.5	-14.4	0.024
Female	-40.9	-23.1	0.000
Education			
GCSEs or A-Levels	-3.40	-1.70	0.850
College or University qualification	28.6	13.0	0.241
Ethnicity			
Black respondents	-41.3	-7.50	0.171
White respondents	38.7	9.00	0.158
Other respondents	-15.1	-1.40	0.778
Children under 18 in household	-25.5	-12.0	0.015
Political position			
Center	-5.50	-2.60	0.689
Left	5.00	2.30	0.734
Urban residence	3.30	1.20	0.832
Number of conservative media sources	0.90	0.90	0.889
Number of medical media sources	15.0	18.2	0.007
Number of mainstream media sources	1.20	2.20	0.833
Number of TV sources	1.10	1.10	0.902
Factual knowledge about COVID-19	23.4	31.5	0.000
Trust in others	5.90	7.00	0.304
Trust in mass media	48.8	39.7	0.000
Concern about getting COVID-19	46.6	50.7	0.000
Comfort with risky behaviors	-14.0	-13.1	0.029
Number of cases			1,597
McKelvey & Zavoina R^2			0.222
Cutpoint 1			1.12
Cutpoint 2			1.85
Cutpoint 3			2.85
Cutpoint 4			4.24

Notes: The column labeled "%" is the percent change in the dependent variable for a one-unit change in the independent variable. The column labeled "%StdX" is the percent change in the dependent variable for a one-standard-deviation change in the independent variable. Dummy variables were used to estimate the effect of certain categorical variables. For technical reasons, these variables require the comparison of the printed percentages with a reference category for the variable. Reference categories are male, less than GCSE, Asian, no children, right-wing political position, and rural residence. p-values indicate the level of statistical significance. p-values below 0.05 indicate significance at the 95% confidence level; p-values below 0.01 indicate statistical significance at the 99% confidence level; p-values below 0.001 indicate significance at the 99.9% confidence level.

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