Report: The effect of information aimed to increase the COVID vaccine uptake, and determinants of vaccine hesitancy in Wyoming

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Summary

- Recent polls show that a significant proportion (around 40%) of the adult Wyoming population is hesitant to taking a COVID-19 vaccine.
- We designed a survey to examine what type(s) of information might increase the vaccine uptake. We examined how a person’s willingness to take a COVID-19 vaccine is influenced by information that communicates (1) private health benefits; (2) health benefits to others; (3) benefits to the local economy; or (4) the rigor of the vaccine development process. We compare our results to the results from a national sample of participants.
- In the absence of information interventions, the intended vaccine uptake rate was the same for our Wyoming participants as for the nationally recruited participants.
- Wyoming participants responded differently to the information, compared to the nationally recruited participants. While most types of information applied in our study increased vaccine intentions among nationally recruited participants, none of the messages affected vaccine intentions for Wyoming participants. This suggests vaccine hesitancy might be particularly sticky in Wyoming.
- To achieve a high vaccination rate in Wyoming, relatively ambitious measures might be needed. Such measures could include campaigns with consistent and repeated messaging by particularly trusted sources of health information, i.e., family physicians, or individually targeted vaccine pre-commitments. COVID-19 vaccine mandates would likely also help the vaccination rate, but are unpopular in Wyoming. Our data show that 59 percent of Wyoming participants (compared to 37 percent of a national sample) would not support a general vaccine mandate, even if exemptions were allowed.
- Given the prevalence of vaccine hesitancy, it is also important to ensure that those willing to vaccinate have easy access to a COVID-19 vaccine. We examined characteristics and attitudes in our Wyoming sample that correlate with the willingness to vaccinate. Factors that increase the willingness to take a COVID-19 vaccine are vaccine confidence, having had a flu shot, being a man, having medium or high trust in the government, as well as identify as liberal or moderate on the political spectrum.

1. Background

The scientific community has come together in an unprecedented effort to rapidly develop COVID-19 vaccines. The vaccines will benefit society in multiple ways – they save lives and reduce the need for alternative, very costly, ways to control the virus, i.e., frequent testing and social distancing measures. However, the benefits from the vaccines depend on the extent to which
people get vaccinated. A prominent barrier to achieving mass vaccinations is so called “vaccine hesitancy” – a preference amongst people for not taking the vaccine.

If a meaningful proportion of people are unwilling to take a COVID-10 vaccine, the overall vaccination rate will be relatively low, and it will likely take longer to get to that rate. This, in turn, makes it harder to reduce the prevalence of the virus (including resulting morbidity and deaths), and might have implications for (safe) relaxations of social distancing measures, such as school closures. Further, even if policies entailing social distancing measures are entirely alleviated despite relatively low vaccination rates, some people are likely to voluntarily socially distance, if COVID-19 is still perceived as a significant threat to either personal health or the health or loved ones. Like mandated social distancing, such voluntary social distancing could slow down economic activity, particularly in the service sector.

Survey based studies find an intended COVID-19 vaccination rate in the United States in the range of 50 to 80% (Duquette, 2020; Fisher et al., 2020; Loomba et al., 2020; Malik et al., 2020; Pogue et al., 2020; Reiter et al., 2020; Robinson et al., 2020; Taylor et al., 2020; Thunström et al., 2020a). Hesitancy towards a COVID-19 vaccine generally increased over the course of 2020, but has declined in most states since the end of last year. However, vaccine hesitancy in Wyoming does not seem to follow this general trend. A poll by WYSAC in February 2021 suggests vaccine hesitancy in Wyoming remains at high levels (around 40%), while the Wall Street Journal reported, based on recent data collected by the CDC in March 2021, that vaccine hesitancy in Wyoming might even be increasing.¹

The state of Wyoming has been successful in rolling out the COVID-19 vaccines. According to the CDC’s vaccine tracker (CDC, 2021), 18 percent of the Wyoming population had received a first dose of the vaccine, and 27 percent of the population had received two doses, on March 30 2021. Corresponding numbers for the nation as a whole were 16 percent and 29 percent. This suggests the logistics of giving people access to the vaccines have worked relatively well in Wyoming. As more and more people get vaccinated, the proportion of unvaccinated people who are reluctant to taking the vaccine will, however, most certainly increase and slow down the growth rate of the vaccine uptake.

Several measures aimed to encourage greater vaccine uptake have been raised in the public debate, such as increasing trust in the COVID-19 vaccines, or paying people to get vaccinated (Largent and Miller, 2021). Information campaigns are likely to complement such measures, or to be used in isolation, given the (often) relative ease and low-cost of implementing information policies. However, it is not clear to what extent information will affect vaccine behavior. The success of information at increasing vaccinations depends on whether COVID-19 vaccine hesitancy is driven by a lack of saliency or knowledge of certain aspects of the pandemic or the vaccine. Further, the content of the information matters, as well as the trust people assign to the information they receive.

In this study, we examined the effectiveness of different types of information in promoting COVID-19 vaccinations in Wyoming. Specifically, we examined the effect of four different messages. First, private health benefits from getting the COVID-19 vaccine matters to vaccine intentions (Callaghan et al., 2020). For Wyoming, we tested for the extent intended vaccinations

¹ https://www.wsj.com/articles/as-covid-19-vaccinations-ramp-up-hesitancy-wanes-11617096603 (On April 2, 2021, the data underlying the article did not yet seem to have be publicly released by the CDC.)
are affected by (1) a message communicating the private health benefits. Next, survey-based studies find that COVID-19 vaccine intentions increase from information about vaccine safety and from information that communicates how a person keep others safe by getting vaccinated (Palm et al., 2021; Rieger, 2020). We therefore also tested whether intended vaccinations in Wyoming are affected by (2) a message that signals vaccine safety by explaining the rigor of the vaccine development process, and (3) a message communicating benefits to others’ health from getting vaccinated. Finally, worries about the impact of COVID-19 on the economy, and measures to control virus spread, have been found to affect compliance with other types of COVID-19 related health recommendations (Probst et al., 2020; Mann et al., 2020). We therefore tested whether the willingness to get vaccinated is affected by (4) a message highlighting the benefits to the local and national economies from vaccinations. We also explored the characteristics and attitudes amongst people in Wyoming that might deter them from taking a COVID-19 vaccine.

Ashworth et al. (2021) use a similar survey experiment to examine the effect of the same information messages on a nationally recruited sample, and their data collection proceeded during the same time period as the data collection for this study. We could therefore use data from Ashworth et al. (2021) to compare our results based on Wyoming participants to the results from a nationally recruited sample.

2. The survey experiment

We designed a survey experiment to examine the effect on vaccine intentions from different types of information -- messages making salient either the private benefits, benefits to others, economic benefits or the rigor of the vaccine development process. We recruited 638 survey participants from Wyoming (via WYSAC and the survey company Qualtrics). Data was collected between mid-December 2020 and mid-February 2021.

Participants were randomized into the different treatment groups: one group for each type of information, as well as a control group that received no information. Each participant only saw one message (or no message, if in the control group). After being exposed to the message, participants were asked whether or not they would take a vaccine as soon as it became available to them (yes/no). Their answer to that question is our measure of vaccine intentions. If participants answered “no,” we further asked them about their reasons for not wanting to take the vaccine. Finally, participants answered a battery of questions eliciting attitudes towards COVID-19 and the COVID-19 vaccines, attitudes towards vaccine mandates, and demographic questions.

Details on the characteristics of the Wyoming sample and the nationally recruited sample (N=1,696) from Ashworth et al. (2021) are presented in the Appendix.2 We note the Wyoming sample is not fully representative of the Wyoming population. For instance, participants in our sample are much more likely to be highly educated, compared to the general Wyoming population. Specifically, 55 percent of our Wyoming sample has a college degree, whereas the corresponding number for the general Wyoming population is 30 percent (Census Bureau, 2021). Further, our

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2 While Ashworth et al. (2021) recruited more than 3,000 participants nationwide, a subset of 1,696 participants took part of the same treatments as our Wyoming participants. The others participated in other treatments. This subset of 1,696 participants is the total number of nationally recruited participants that we use for comparisons with the Wyoming data in this study. We have no reason to believe that this subset of data is skewed relative to the total sample in Ashworth et al., given Ashworth et al. randomized participants into all treatment groups.
sample has a higher share of women (61 percent), compared to the general Wyoming population (49 percent).

3. Results

3.1. One-shot information messages had no effect on Wyoming participants – vaccine hesitancy in Wyoming might be “sticky”

Figure 1 shows the intended vaccine uptake across all treatment groups, for the Wyoming sample and for the nationally recruited sample from Ashworth et al. (2021). The “control” treatment group received no information in our study, the “private” treatment group received information on the private health benefits from getting vaccinated, the “public” treatment group received information on the health benefits to others from getting vaccinated, and the “vaccine safety” treatment group received information on the rigor of the COVID-19 vaccine development process.

![Figure 1. Share who intends to take the COVID-19 vaccine across different treatments and samples](image-url)
Figure 1 shows that the proportion of participants who intended to get vaccinated was the same for both the Wyoming and national samples (48-49 percent), in the control treatment, i.e., the treatment that received no information.\(^3\)

Figure 1 also shows that the national sample responded to the information messages that emphasize the benefits of the vaccine by increasing their intended vaccine uptake by around 10 percentage points or more, compared to the control treatment (Pearson \(\chi^2 = 12.31, p < 0.001\), when comparing the average proportion who intend to vaccinate in all benefits treatment groups to the corresponding proportion in the control group). The effect of the treatment communicating the rigor of the vaccine development process was, however, not statistically significant (Pearson \(\chi^2 = 1.30, p = 0.254\)). Although the intended vaccine uptake in the vaccine safety treatment was higher than in the control treatment (53 percent, compared to 49 percent) for the national sample, this effect is not statistically significant. The message communicating private health benefits from the vaccine was particularly effective in increasing vaccine intentions for the national sample (intended vaccine uptake for the national sample is 65 percent in this treatment, compared to 49 percent in the control; Pearson \(\chi^2 = 16.88, p < 0.001\)).

The relative effectiveness of the information that communicates benefits to self stands in contrast to findings on the effectiveness of information types for other types of COVID-19 related self-protective behavior. Previous research (Jordan et al., 2020; Thunström et al., 2020b) shows that other preventative behavior (e.g., testing and handwashing) are largely motivated by prosocial preferences, i.e., concern for others, and boosted particularly by information that stresses the benefit to others (compared to self) from undertaking the preventive behavior. Private health benefits from the COVID-19 vaccine may be perceived as particularly large compared to private benefits from other type of preventative behavior, which could explain why making salient health benefits to self is (relatively speaking) more effective than stressing benefits to others, in promoting vaccinations.

In contrast to the national sample, the Wyoming sample in our study did not respond to any of the information messages. Tests find no statistically significant differences between the proportion wanting the vaccine in any of the information treatment groups and the control group.

### 3.2. Wyoming men might respond more to information than women

Ashworth et al. (2021) show that there may be important differences in the response to the information treatments across subgroups within the U.S. population. Our sample size for Wyoming is too small to generate reliable results across subgroups. Still, we performed an exploratory analysis of gender differences, since gender has consistently been shown to be one of the most important determinants of vaccine attitudes (women are more vaccine hesitant than men). Based on nationally recruited samples, Ashworth et al. (2021) and Thunström et al. (2021) find that women are more hesitant than men also towards the COVID-19 vaccine. We explored whether similar gender differences might exist in Wyoming, and whether the information interventions

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\(^3\) Wyoming vaccine hesitancy in our study is somewhat higher than in recent polls by WYSAC, which suggest around 60 percent intend to get vaccinated, see WYSAC (2021).
employed in this study differently affected Wyoming men and women. Results are presented in Figure 2 below.

Figure 2. Share who intends to take the COVID-19 vaccine across different treatments and gender (Wyoming participants only)

Figure 2 shows that in the absence of information (i.e., in the control treatment), there were no meaningful or statistically significant differences in vaccine hesitancy between Wyoming men and women. Visually, the results in Figure 2 suggest that Wyoming men might be more responsive to information than Wyoming women. Further, the results seem to imply that men respond particularly strongly to the message that communicates benefits to the economy from getting vaccinated -- in the treatment group that received the message about the benefits to the economy, 64 percent of men stated that they intend to take the vaccine, compared to 49 percent of men in the control group. However, due to the small sample sizes of the subgroups, this rather large difference in proportions of men who intend to get vaccinated is not statistically significant (Pearson $\chi^2 = 2.395, p = 0.122$).

Comparison to the national sample. The similarity in vaccine hesitancy between Wyoming men and women in Figure 2 stands in contrast to the results in Ashworth et al. (2021), who find a large gender difference for the national sample – Ashworth et al. find that 39 percent of women and 59 percent of men would take the vaccine if it was available to them today, in the absence of

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4 For example, after separating the data by gender, we have 57 men in the control group and 45 men in the economic benefit treatment. Thus, while men were more responsive to the economic message, tests find the difference is not statistically significant.
information interventions similar to those applied in this study. Further, Ashworth et al. (2021) find that men and women increase their vaccine intentions by similar proportions when given the information messages. Any potential higher responsiveness of men to information messages might therefore be relatively unique to Wyoming.

3.3. Reasons, attitudes and characteristics that explain intentions to decline the COVID-19 vaccine

Next, we report on the reasons stated by our survey participants for not wanting to take the vaccine. Participants could state multiple reasons. Across all treatment groups, a total of 319 Wyoming participants stated that they would not want to take the vaccine. The below Figure 3 is based on the response from those participants.

![Figure 3. Reasons for not wanting to take a COVID-19 vaccine](image)

Figure 3. Reasons for not wanting to take a COVID-19 vaccine

Figure 3 shows that the most common reasons for not wanting the COVID-19 vaccine was the vaccine novelty and worries about vaccine side effects. Low trust in both the companies that produce the vaccines and the government agency overseeing vaccine approval (the Food and Drug Administration, FDA) were also common reasons for not wanting the vaccine.

Comparison to the national sample. The results in Figure 3 are largely consistent with answers given by the nationally recruited participants in Ashworth et al. (2021). Note too that while one of the main deterrents from getting vaccinated appears to be concerns about the safety of the vaccine, the one-shot messages about the rigor of the vaccine development process used in this study and in Ashworth et al. (2021) does not seem to be enough to alleviate that worry and raise the
willingness to vaccinate. The result in Figure 3 that deviates the most from the results for the national sample in Ashworth et al. is the proportion of participants that intended not to get vaccinated because (at least partly) of a belief that COVID-19 is not severe enough to grant vaccination. For our Wyoming sample, this proportion was 63 percent, while Ashworth et al. show that the corresponding portion for a national sample was 55 percent.

The prevalence of vaccine hesitancy also means it is particularly important to give those who are willing to vaccinate the opportunity to do so. We therefore explored characteristics and attitudes amongst Wyoming participants that correlate with willingness to get vaccinated. More precisely, we used a Probit regression (N=638) to explore characteristics and attitudes that explain stated intention to take a vaccine in our study. Marginal effects from the Probit regression are reported in Figure 4 below (brackets show 95 percent confidence intervals).

![Figure 4. Determinants of willingness to take a vaccine](image)

Figure 4 shows that those who had a flu shot in the last 2 years, all else equal, were around 20 percent more likely to state that they would take a COVID-19 vaccine in our study. Further, people with higher confidence in the safety of the vaccine were substantially more likely to want the vaccine, which is consistent with the results reported in Figure 3. Income did not seem to matter to vaccine intentions for our Wyoming participants, and neither did age nor knowing someone who died from COVID-19. However, as also implied by Figure 2, women were less likely to want the vaccine, and so were people in Wyoming who are politically conservative (compared to moderate or liberal). Further, a low trust in the government had a large negative effect on intentions to get
vaccinated – Wyoming people with low trust in the government (holding all other factors constant) are around 20 percent less likely to intend to take the vaccine than those with a moderate trust in the government.

Our results in Figure 4 should be interpreted with some caution, since we are simultaneously testing multiple hypotheses. However, the results in Figure 4 are similar to results for two different national samples (Ashworth et al., 2021; Thunström et al., 2021).

4. Discussion and policy suggestions for Wyoming

We find that while short information on private health benefits, health benefits to others or benefits to the economy increases vaccine intentions on a national level, such information does not seem to affect vaccine intentions in Wyoming. This suggests that vaccine intentions in Wyoming may be relatively “sticky,” i.e., people in Wyoming who are hesitant towards COVID-19 vaccines might be harder to persuade, compared to COVID-19 vaccine hesitant Americans nationwide.

We find some preliminary evidence that Wyoming men might be more responsive to information interventions than Wyoming women, although our sample size is too small to allow us to identify gender differences with confidence. Further, and consistent with studies based on national samples (Ashworth et al., 2021; Thunström et al., 2021), our study implies that the main reasons for people in Wyoming not to want to take the COVID-19 vaccine are vaccine novelty, worry about side effects, distrust in the companies developing the vaccine as well as in the FDA. We also find that people in Wyoming who have had a flu vaccine in the last two years are around 20 percent more likely to want a COVID-19 vaccine. The importance of flu vaccines in predicting COVID-19 vaccine intentions is consistent with findings in studies based on national samples. Here, an added challenge for Wyoming is its low flu vaccination rates. Wyoming consistently ranks amongst states with the lowest flu vaccination rates, both for adults and children (CDC, 2021b; AAP, 2021). Other groups in Wyoming who are more willing to take the COVID-19 vaccine are those who trust the vaccine to be safe, men, people who identify as liberal or moderate on the political spectrum, as well as those with medium or high trust in the government. Given the prevalence of COVID-19 vaccine hesitancy in Wyoming, it will be important to ensure that as many people as possible from the groups in the Wyoming population that express willingness to vaccinate get easy access to the vaccine.

What else can be done to promote vaccinations in Wyoming? If aiming to increase vaccinations with information, the source of information may be important. Trust in the source is known to impact the effectiveness of health information. Information communicated from the national political leadership might not be effective at increasing vaccinations in Wyoming. Our results imply that people in Wyoming with low trust in the government are less willing to vaccine. This is consistent with results from numerous studies that find a correlation between trust in government and general vaccine uptake (Larson et al., 2018). The negative effect of low trust in government on vaccinations might pose a particularly pronounced challenge in Wyoming, given the widespread distrust of the federal government. In Wyoming, distrust of the current federal government is high, as manifested by the low confidence in COVID-19 information from President Joe Biden (only 45 percent of people in Wyoming perceives him to be a trustworthy source for COVID-19 information, see WYSAC, 2021). It is therefore likely important in Wyoming that state and local health authorities communicate the importance and benefits of the COVID-19
vaccine. For instance, most people in Wyoming (60 percent) perceive Governor Mark Gordon to be a trusted source for COVID-19 information (WYSAC, 2021).

That said, previous research shows that the most trusted source of vaccine information, by a large margin, is the family physician or pediatrician (Freed et al., 2011). If information will be used to encourage vaccinations in Wyoming, targeted campaigns and one-on-one recommendations from family physicians (and pediatricians, when the vaccine becomes available for children) might therefore be the most effective measure in promoting vaccinations, relative to information from other sources, e.g., national or even state or local health authorities.

It is, however, possible that the vaccine hesitancy in Wyoming is, to some extent, shared by care givers. State and local health authorities may work to ensure high awareness amongst the care givers about the safety of the vaccines and their benefits both to individual patients and the community. This is important, given attitudes and beliefs among family care givers are likely to matter to their willingness to recommend the vaccine to their patients. For instance, Raude et al. (2016) finds that family physicians with lower trust in government and science are less likely to recommend vaccines in general. Further, family physicians might be reluctant to recommend the vaccine if they believe their patients feel strongly about not taking the vaccine. Here, it may be important to ensure family care givers are accurately informed about the hesitancy to the COVID-19 vaccine — a study finds that pediatricians generally overestimate their patients’ reluctance to vaccines (Healy et al., 2014).

Finally, information may be complemented by other measures that encourage vaccinations. One of the most effective measures in increasing flu vaccination rates identified in the scientific literature are so called “default nudges” that pre-commit individuals to getting vaccinated at a specific date and time, unless the individual actively opts out of the vaccination (Patel, 2018). These pre-commitments can be sent by mail or email to individuals by, for instance, their employer, family care giver, or local health authorities. A less aggressive, but still effective, form of such a default nudge is to send individuals a message in which they are asked to pre-commit to a pre-specified date and time for the vaccination, and then direct them to a website where they can reserve a time. While the research showing the effectiveness of such default nudges mainly focuses on flu vaccines, default nudges are effective because they draw on psychological and behavioral tendencies (e.g., inertia and procrastination) that are likely to also affect COVID-19 vaccinations.

Policy makers may also consider more paternalistic policies to increase the COVID-19 vaccination rate, such as mandates. However, our data show that COVID-19 vaccine mandates are particularly unpopular in Wyoming. We find that 59 percent of Wyoming participants would not support a broad mandate for the general population, even if exemptions would be granted, and 52 percent would not support a mandate for essential workers only. The corresponding proportions in the nationally recruited sample used for comparison in this study are 37 and 32 percent. While possible that the Wyoming population would be less averse to more narrowly applied mandates,

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5 Note that most previous research on general vaccine hesitancy pertains to hesitancy towards childhood vaccinations, such that pediatricians are the prime care givers.
such as vaccine requirements to physically attend certain high risk events or work places, it is likely that any paternalistic policies will be relatively unpopular in Wyoming.

Our study has important limitations. First, our Wyoming sample is not fully representative of the Wyoming population. For instance, the proportion of women and highly educated people are higher among our Wyoming participants than they are in the Wyoming population. It is, however, unclear how that might affect our results, if at all. Second, participants in our study received a one-shot message about benefits from the vaccine or the vaccine development process. A one-shot message is a relatively mild information intervention, compared to information campaigns that persist over some time. Our results therefore do not suggest that campaigns with consistent and repeated messaging cannot be effective in Wyoming. Our study does, however, imply that it might be harder to encourage the Wyoming population to take the vaccine, using simple messages, than it would be to persuade the overall U.S. population.
References


Centers for Disease Control and Prevention, CDC (2021b), https://www.cdc.gov/flu/fluvoxview/coverage-1718estimates.htm (Retrieved April 6, 2021)


Appendix

Table 1A. Descriptive statistics of characteristics and attitudes of Wyoming and nationally recruited survey participants

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sample</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>National</td>
<td>Wyoming</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N=1,696</td>
<td>N=638</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>0.49</td>
<td>0.61</td>
<td>0.49</td>
</tr>
<tr>
<td>Age</td>
<td>45.67</td>
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<td>49.10</td>
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<tr>
<td>College degree</td>
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<td>0.55</td>
<td>0.55</td>
</tr>
<tr>
<td>High income</td>
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<td>0.13</td>
<td>0.13</td>
</tr>
<tr>
<td>Middle income</td>
<td>0.56</td>
<td>0.58</td>
<td>0.49</td>
</tr>
<tr>
<td>Low income</td>
<td>0.34</td>
<td>0.29</td>
<td>0.45</td>
</tr>
<tr>
<td>Conservative</td>
<td>0.35</td>
<td>0.44</td>
<td>0.50</td>
</tr>
<tr>
<td>Moderate</td>
<td>0.42</td>
<td>0.37</td>
<td>0.48</td>
</tr>
<tr>
<td>Liberal</td>
<td>0.22</td>
<td>0.18</td>
<td>0.39</td>
</tr>
<tr>
<td>Vaccine confidence</td>
<td>0.53</td>
<td>0.57</td>
<td>0.50</td>
</tr>
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<td>Vaccine complacency</td>
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<td>Vaccine constraint</td>
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<td>Flu vaccine</td>
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<td>0.61</td>
<td>0.49</td>
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<tr>
<td>Preventative behavior</td>
<td>10.90</td>
<td>9.45</td>
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<tr>
<td>Trust in government</td>
<td>64.96</td>
<td>61.21</td>
<td>34.47</td>
</tr>
<tr>
<td>Know someone who died</td>
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<td>0.37</td>
<td>0.48</td>
</tr>
<tr>
<td>Low trust in government</td>
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<td>0.37</td>
<td>0.48</td>
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<tr>
<td>High trust in government</td>
<td>0.28</td>
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<tr>
<td>Medium trust in government</td>
<td>0.41</td>
<td>0.31</td>
<td>0.46</td>
</tr>
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</table>

Table A1 shows that, on average, Wyoming survey participants are slightly older, more educated, more politically conservative and wealthier, compared to the national sample. Wyoming participants are also more likely to have taken the flu vaccine and display more positive attitudes about vaccines in general. There is a smaller proportion of Wyoming participants that states high trust in government agencies (e.g., CDC), compared to the nationally recruited participants. There is, however, also a smaller proportion of Wyoming participants that states low trust. Finally, a larger fraction of Wyoming participants knows someone who died from COVID-19, compared to the corresponding fraction of the nationally recruited participants.