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Receptiveness of American adults to COVID-19 vaccine boosters: A survey analysis



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ABSTRACT

Objective: This Short Communication report summarizes results from a recent survey on the willingness of American adults to accept COVID-19 vaccine boosters. We seek to identify evolving hesitancies and objections to booster shots among those who previously accepted vaccination.

Methods: A representative, web-based survey of 600 adults in the State of Florida was fielded, and the results are analyzed using both descriptive and inferential statistical methods.

Results: The survey responses show that while booster shot hesitancy is relatively low among vaccinated Americans, nearly a third (30.4%) say that they are only somewhat likely or less to receive a vaccine booster shot. Statistical analysis shows that trust in public health guidance is the driving factor behind booster shot hesitancy, while significant differences also exist based on race and level of education. The most frequently cited objections to booster shots include concerns over the necessity of additional shots and adverse reactions to the initial vaccination.

Conclusion: Objections to booster shots highlight emerging communications challenges that health professional will need to consider and address as vaccine guidance continues to evolve.

Innovation: This study contributes to innovation in health communications by identifying emerging challenges and barriers in the ongoing effort to promote COVID-19 vaccination.

1. Introduction

Despite the documented efficacy of SARS-CoV2 vaccines [1], rates of vaccination in the United States have continued to lag behind expectations set by public health officials and government leaders [2]. Ongoing vaccine hesitancy has been attributed to a number of factors, including widespread misinformation and the politicization of the COVID-19 pandemic [3]. As public health officials and clinical providers work to overcome these challenges, the FDA has already approved vaccine booster shots for at-risk individuals, with many experts speculating that regular vaccine boosters may be a long-term necessity in the ongoing fight against COVID-19 [4]. In April 2021, Pfizer CEO Albert Bourla suggested that "... there will be likely a need for a third dose, somewhere between six and 12 months and then from there, there will be an annual revaccination..." [5]. Officials in the Biden Administration have echoed this sentiment via sustained public messages beginning in August 2021 [6].

In this Short Communication report, we summarize responses to a recent survey on the willingness of American adults to accept COVID-19 vaccine boosters. Survey participants were asked to share their current vaccination status, as well as their willingness to receive COVID-19 vaccine booster shots. Additional variables were collected based on prior research

and known correlates of vaccine hesitancy, including (1) trust in public health messaging, (2) personal demographics (i.e. age, gender, and race), (3) educational attainment, and (4) political affiliation [3,7]. The primary aim of this research is to understand any evolving vaccine hesitancies among vaccinated adults. As ongoing vaccinations are necessary to combat the emergence of viral variants, it will be important for health professionals to understand what potential barriers and objections may exist among previously vaccinated individuals, particularly with an eye toward crafting effective public health messaging.

2. Methods

We conducted a web-based survey of 600 adults in the state of Florida between July 15 and July 25, 2021. The time frame for this survey was one month prior to the White House announcement of "a plan for administering booster shots later this fall" [8]. The sample was purchased through an industry leading market research provider, and respondents were identified using a stratified, quota sampling approach to ensure representativeness. Balanced quotas were determined (by region of the state) for gender, age, race, ethnicity, and political affiliation. These quota groups were carefully balanced during the survey administration, as each has been linked to

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vaccine acceptance in prior studies [3,7]. Table 1 provides a summary of the survey respondents compared to the state's demographic composition. Some natural limitations of web-based panels should be noted, including their tendency to underrepresent those without a high-school degree, as well as residents of rural areas which may lack reliable internet service.

Respondents were asked how likely they are to receive regular booster shots of the COVID-19 vaccine “if they are recommended by public health experts”. Response options included (1) “very likely”, (2) “somewhat likely”, (3) “not very likely”, and (4) “not at all likely”. Those who did not choose “very likely” were subsequently asked about potential objections to vaccine boosters. A descriptive summary of the survey responses is provided below. Additionally, in order to identify potential correlates of booster shot hesitancy, we constructed a binary logit model to predict the likelihood of respondents choosing an answer other than “very likely” when asked about their willingness to receive additional COVID-19 booster shots. The model, which predicted the likelihood of a respondent being less than “very likely” to receive a COVID-19 booster shot, included (1) a measure of confidence in the vaccine guidance offered by public health officials, (2) a vector of demographic control variables, (3) a measure of highest education level, and (4) a measure of political affiliation.

3. Results

Among the survey respondents, 69.8% reported having received at least one vaccine dose, while another 6.8% indicated that they will either “probably” or “definitely get vaccinated”. These respondents ($n = 460$) were asked how likely they were to receive regular booster shots “if they are recommended by public health experts?” Among the respondents, 69.6% indicated that they would be “very likely” to receive regular booster shots, while 23.0% indicated that they would be only “somewhat likely” to do

Table 1
Sample comparison.

	Sample of Respondents	State Demographics*
Gender		
Female	51.8%	51.1%
Male	47.3%	48.9%
Other	0.8%	–
Age		
18–24	8.5%	10.8%
25–44	30.7%	31.2%
45–64	34.2%	32.4%
65 +	26.7%	25.6%
Race		
Black/African American	17.5%	16.9%
White/Caucasian	72.3%	77.3%
Asian	3.0%	3.0%
American Indian/Alaska Native	1.2%	0.5%
Other	6.0%	2.3%
Ethnicity		
Hispanic	27.2%	26.4%
Non-Hispanic	72.8%	73.6%
Political Affiliation (registered voters only, $n = 541$)		
Democrat	36.0%	36.2%
Independent	25.9%	26.4%
Republican	36.6%	35.7%
Other	1.5%	1.7%
Region		
Panhandle	7.2%	7.2%
Northeast Florida	11.8%	12.4%
Central Florida	23.5%	25.5%
West Coast	24.8%	21.9%
Southeast Florida	32.7%	32.9%

* Gender, race, ethnicity, and region quotas based on U.S. Census Bureau's Population Estimates Program (PEP): <https://www.census.gov/quickfacts/FL> Age quotas based on Florida Office of Economic and Demographic Research (EDR): <http://edr.state.fl.us/Content/population-demographics/data/index-floridaproducts.cfm> Political Affiliation quotas based on Florida Division of Elections <https://dos.myflorida.com/elections/data-statistics/voter-registration-statistics/voter-registration-reportsxlsx/voter-registration-by-party-affiliation/>

so (Table 2). A combined 7.4% indicated that they would be either “not very likely” or “not at all likely” to receive additional vaccine doses.

Respondents who did not select “very likely” ($n = 130$) were asked to identify their potential objections to receiving a COVID-19 booster shot. The responses – presented in Table 3 below – suggest that just under a third of these respondents believe that booster shots are not necessary (29.2%). Additionally, 18.5% indicated that they would be unlikely to receive a booster shot due to adverse reactions to their original COVID-19 vaccination. Roughly one in ten of these respondents indicated that they are no longer worried about COVID-19 (12.3%), that receiving booster shots would be an inconvenience (10.0%), and/or that they do not believe the vaccines are effective in preventing the spread of COVID-19 (10.0%). In open-ended responses, several participants also voiced concerns over the potential cost of ongoing vaccinations.

The logit regression results – reported in Table 4 – show that confidence in public health experts is a critical predictor of booster shot acceptance. As confidence in the guidance offered by public health experts increased, the likelihood of booster shot hesitancy decreased substantially. Those who reported being “very confident” in public health guidance were 103 times less likely to express booster shot hesitancy than those who reported no confidence in public health guidance ($1/e^b$). Hispanic and non-white respondents were more likely to express booster shot hesitancy, with Hispanic respondents being 1.78 times more likely to express hesitancy, and African Americans being 2.56 times more likely to do so.

Education also was related to booster shot hesitancy among survey respondents. Those with a college degree or higher were 2.67 times less likely to express booster shot hesitancy than those with less than a high school diploma ($1/e^b$), though this latter coefficient was only statistically significant at $p \leq 0.10$. Those between the ages of 25 and 44 were 3.42 times more likely to express booster shot hesitancy than those between 18 and 24, though coefficients for older age brackets were not statistically significant. Surprisingly, given the noted politicization of the COVID-19 pandemic, political affiliation was not a significant predictor of booster shot hesitancy. Because confidence in public health guidance has also been linked to political affiliation, we tested the model without the *confidence* variable. Political affiliation was not a significant predictor even when confidence in public health guidance was removed from the model. This suggests that political influences are most pronounced in the initial stages of vaccine acceptance, and were not significant drivers of booster shot hesitancy for vaccinated individuals in summer 2021 of the pandemic. Those who initially accepted vaccination have not “changed their minds” based on political cues.

4. Discussion and conclusion

4.1. Discussion

As public health guidance around booster shots and revaccination continues to evolve, it will be increasingly important for health professionals to understand the evolving hesitancies of individuals who previously accepted vaccination. Waning immunity among previously vaccinated individuals could exacerbate COVID-19 outbreaks and further complicate the attainment and maintenance of herd immunity, particularly as more robust variants of the virus continue to emerge. Our findings suggest that while booster shot hesitancy was relatively low prior to a national effort to

Table 2

How likely will you be to receive regular booster shots of the COVID-19 vaccine if they are recommended by public health experts?

	Frequency	Percentage
Very Likely	320	69.6
Somewhat Likely	106	23
Not Very Likely	19	4.1
Not at All Likely	15	3.3

Question was only asked to those who are or plan to be vaccinated. ($N = 460$).

Table 3

For which of the following reasons would you not be willing to receive a COVID-19 vaccine booster shot?

	Frequency	Percentage
I don't think that a booster shot is necessary	38	29.2
I had side effects from the original COVID-19 vaccine	24	18.5
I'm no longer worried about COVID-19	16	12.3
I don't think that the vaccines work to prevent COVID-19	13	10.0
Regular booster shots would be an inconvenience	13	10.0
Other	13	10.0

Question was only asked to those who did not report being "Very Likely" to receive COVID-19 booster shots if recommended by public health guidance. (N = 130).

Table 4

Logistic Regression: Likelihood of Booster Shot Hesitancy (n = 458).

	e ^b	β	s.e.
Confidence in public health guidance			
Not at all confident	–	–	–
Not very confident	0.264	–1.332	0.290
Somewhat confident	0.082**	–2.506**	0.085
Very confident	0.009***	–4.638***	0.010
Gender (Female)	1.024	0.024	0.253
Age			
18–24	–	–	–
25–44	3.424**	1.231**	1.942
45–64	1.848	0.614	0.980
65+	1.294	0.258	0.748
Hispanic (Yes)	1.779**	0.576**	0.501
Race			
White	–	–	–
African American	2.563***	0.941***	0.928
Other	1.983*	0.685*	0.772
Education			
< high school	–	–	–
High school/some college	0.443	–0.815	0.229
Four-year degree or higher	0.375*	–0.982*	0.198
Political Affiliation			
Non-voter	–	–	–
Democrat	1.038	0.037	0.468
Independent	1.577	0.455	0.741
Republican	1.244	0.218	0.598
Constant	6.106	1.809	8.375
-2LL	–212.625	–	–
Pseudo R ²	0.246	–	–

* p ≤ 0.10.

** p ≤ 0.05.

*** p ≤ 0.01.

boost American adults' immunity, the three-in-ten adults who reported not being "very likely" to receive a booster shot could complicate such efforts. The lack of perceived necessity and concerns over side-effects experienced during initial vaccination necessitate policy and health communication responses to such beliefs.

These concerns highlight some key communications challenges that health professionals will need to consider as vaccine guidance evolves. First, given the overwhelming importance of confidence in public health guidance, health professionals may be well served by focusing their efforts on communication channels that promote greater trust among health consumers. This may include an emphasis on more localized sources, such as primary care physicians or community health leaders. Evidence suggests that primary care physicians are a critical component of not only mass vaccination campaigns, but also individual health messaging about the importance of vaccination [9]. Such trust would not be uncommon for localized information. Research already shows that individuals have greater trust in local news information about the pandemic, for instance, compared to national sources [10]. This messaging should address concerns over the necessity and efficacy of vaccine boosters, as well as patient concerns over previous side effects.

Second, given the documented booster hesitancy among Hispanic and non-white individuals, health professionals may need to be particularly deliberate when addressing specific vulnerable and at-risk population groups. Historically grounded concerns over trust, as well as persistent communication barriers, mean that reaching these at-risk groups may require unique and targeted messaging efforts. Recent literature has suggested that "... culturally-tailored communications" may "... help reduce COVID-19 vaccine hesitancy among communities disproportionately impacted by the pandemic" [11]. Addressing these concerns also requires health professionals to consider the effects of digital information dissemination on revaccination campaigns. Recent COVID-19 dis- and misinformation campaigns on social and digital media have targeted non-white communities [12]. How such efforts can be blunted, whether through community outreach or other targeted means of social platform moderation, will be central to re-vaccination efforts.

Finally, health professionals will need to consider (and counter) any deleterious effects arising from media coverage of "breakthrough infections," particularly during the omicron variant surge, which has the potential to inadvertently impact public attitudes toward ongoing (re)vaccination. It remains unclear if and to what extent recent reporting on these cases may influence public confidence in the efficacy of COVID-19 vaccines [13,14], though notably, we found that 10% of previously vaccinated individuals questioned whether the vaccines were effective in stopping the initial spread of COVID-19.

4.2. Innovation

While a number of prior studies have looked at vaccine hesitancy and vaccination intentions, booster shot hesitancy has been a rarely studied phenomenon. Aside from the inherent novelty of the COVID-19 pandemic, this article takes an innovative approach to the study of vaccine hesitancy by expanding the scope of consideration to include the attitudes and intentions of those who have previously accepted vaccination but may have subsequently developed hesitancies, whether based on initial vaccine experiences or subsequent information exposure. We apply social science survey design methods to the study of this critical health behavior in order to deepen our understanding of how personal, social, and psychological factors influence personal health decisions, particularly in a uniquely politicized context, which emphasizes the criticality of trust and confidence in public health messaging.

4.3. Conclusion

The communicative challenges highlighted above – increasing trust and confidence in public health messaging, targeted messaging for at-risk groups, and offsetting counter-productive media messaging – warrant further attention from health professionals and researchers alike. The success of ongoing vaccination efforts – and thus the end of the COVID-19 pandemic – may depend in large part on the ability of health professionals to anticipate and preempt these communication challenges as vaccine guidance evolves.

Declaration of Competing Interest

The authors report no conflicts of interest, financial or otherwise, related to this study or submission.

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