Concerns, Attitudes, and Intended Practices of Healthcare Workers to COVID-19 Vaccination in the Caribbean

PAHO

Pan American Health Organization

World Health Organization
REGIONAL OFFICE FOR THE Americas

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Contents

List of Figures

List of Tables

Foreword

Healthcare workers have long been recognized as the heroes of the immunization program. Without their tireless efforts and dedication, the Region of the Americas would not be the global trailblazer in immunization that it is today: the first region to eliminate multiple diseases and lead the introduction of new vaccines like human papillomavirus (HPV) and rotavirus to national routine vaccination programs. In fact, the Caribbean specifically has a long history of being a global leader in immunization, with successes in certification of measles, rubella, and congenital rubella syndrome elimination and 36 years without a case of polio. One of the key factors contributing to this success has been the commitment and dedication of national immunization program staff in promoting the benefits of vaccines and ensuring the vaccination of all eligible children, adolescents, and adults.

Beyond the act of administering vaccines, maintaining necessary cold chains, and conducting surveillance for vaccine-preventable diseases, healthcare workers play another critical role when it comes to vaccination: building trust between the public and the immunization program. In fact, healthcare workers are generally cited as the most trusted source of information on vaccination.

It is thus imperative that healthcare workers themselves are confident in vaccination as a public health good and are able to transmit this confidence to their patients, family, friends, and community members. However, just as with the general public, healthcare workers are at risk of falling prey to misinformation about vaccines, especially in the context of the infodemic that is complicating the response to the COVID-19 pandemic globally.

For these reasons, the Pan American Health Organization (PAHO) set out to understand the attitudes and intents of healthcare workers in 14 Caribbean countries about routine immunization and COVID-19 vaccination. During April and May 2021, a mixed-methods survey was carried out to capture the thoughts, opinions, and reasoning of over 1,000 healthcare workers who lent their time to participate in this study.

It is our hope that the findings presented in this report can be of use to public health decisionmakers, policymakers, communications professionals, and healthcare workers who seek to be vaccine advocates among their peers. By using social and behavioral data such as that shared here, immunization programs can have more success in targeting their interventions to build confidence and acceptance for vaccination among key audiences, including Caribbean healthcare workers.

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Acknowledgments

Introduction

On 10 March 2020, the first case of COVID-19 was reported in the CARICOM Caribbean Subregion. As of 10 May 2021, 167,003 cases had been confirmed in the Caribbean, with more than 130,000 recovered and 2,808 deaths attributed to COVID-19 in the Subregion (*1*). The pandemic has led to the steepest recession in the history of Latin America and the Caribbean, which, according to the projections made by the Economic Commission for Latin America and the Caribbean, will mean a regional drop in growth of -9.1% in 2020. Other projections include an increase in the poverty rate of 7.0 percentage points, which will reach 37.3% of the population (231 million in total, with 45 million new poor) (*2*).

Vaccines present an important measure for gaining control of the COVID-19 pandemic and research has been occurring at an accelerated rate to provide safe, effective vaccines to the world's population (*3*). The Values Framework for the Allocation and Prioritization of COVID-19 Vaccination, released by WHO SAGE on 14 September 2020, offers guidance on the prioritization of groups for vaccination within countries while supply is limited. Healthcare workers, older adults, and adults with chronic diseases have been identified as priority groups to receive the first doses of an approved COVID-19 vaccine.

An essential part of these plans is a communication campaign, which will target not only members of the public but the specific priority groups identified by each country. The COVID-19 pandemic is the first in history in which technology and social media are being used on a massive scale to keep people safe, informed, productive, and connected. A study from the United States of America found that the Internet is the main source of information on COVID-19 (*4*) but at the same time, the technology we rely on to keep connected and informed is enabling and amplifying an infodemic – an overabundance of information both online and offline – that continues to undermine the global response and jeopardizes measures to control the pandemic. The newly developed COVID-19 vaccines have been significant targets of misinformation and disinformation, leading to public mistrust and concerns over vaccine safety. Previously, social media has been demonstrated to be a powerful channel for the propagation of anti-vaccine information and consequently to have an inverse impact on uptake of influenza vaccine, but if social media is used to spread reliable vaccine information from trusted healthcare workers (HCWs) and public health authorities, they can foster public trust in vaccination (*5*). The possible negative impact on the acceptance and mistrust of COVID-19 vaccines in the Caribbean Subregion must be assessed and communication strategies and public policy implemented to ensure rapid recovery from the effects of this pandemic.

Hamel et al. (*6*) identified that in the United States of America at least 27% of the public was vaccine hesitant, and the main reasons expressed were concern over the possible side effects of the vaccine, the vaccine being too new, and a lack of trust in the government to make sure the vaccine is safe and effective. At least 85% of the population indicated their own doctor or healthcare provider was the most trusted source of information. However, a survey among HCWs in the United States identified that vaccine hesitancy was a serious problem with at least 15% of the HCWs who were offered vaccination refusing to take the vaccine (*7*). This was mirrored in other parts of the country, leading to a reduction in the uptake of vaccines (*8*). Studies from across the world have found nurses to be more hesitant toward COVID-19 vaccination than other HCWs (*9–11*). Female sex has been identified by several studies to be a negative predictor of vaccine uptake (*10, 12–17*), as have younger age and parenthood/having children at home (*9, 15, 17, 18*). Studies from Latin America and the Caribbean have found rural-dwelling, lower education, and financial insecurity to be associated with vaccine hesitancy among both HCWs and the public (*16, 19*). This is also found in studies from other parts of the world (*15, 17, 18*).

Targeting HCWs is important to increase vaccine uptake (*20*). Studies of HCWs in Europe and Canada

found concerns about vaccine safety to be a key influencer of vaccine hesitancy (*21, 22*). In France, vaccine information specifically targeting HCWs has shown to increase vaccine uptake among hospital staff (*23*), and HCWs' trust in the institutions delivering information on vaccines and vaccination is essential for vaccine acceptance (*21*). A study among HCWs in Mexico also found information and being well-informed to be key to vaccine uptake (*24*). The extent to which this infodemic has affected and influenced the knowledge and attitudes of HCWs must be assessed in order to design and implement targeted communication campaigns and ensure that messaging geared toward HCWs is appropriately responding to their concerns and questions. This evidence can also lead decisionmakers in the development of public policy to establish adequate measures to ameliorate its impact. Therefore,

documenting their attitudes to COVID-19 vaccination is of utmost importance to the eventual success of a targeted communication effort and the uptake of the COVID-19 vaccines.

The objectives of this study are to gather and use quality data on the behavioral and social drivers of vaccination and COVID-19 vaccines among HCWs in the Caribbean, and to improve implementation strategies and tailor communication approaches on COVID-19 vaccines and vaccines in general in the Caribbean, with the final aim to contribute to increasing vaccination acceptance and improving vaccine confidence among HCWs. In this manner, programs can design, target, and evaluate interventions to achieve greater impact with more efficiency, and to examine and understand comparable trends over time.

Methods

Survey Instrument Development

The instrument is based on a tool presented in the interim guidance document *Data for Action: Achieving high uptake of COVID-19 vaccines* by WHO and UNICEF (*25*), and a questionnaire developed by the University of California at Los Angeles (*26*). It was adapted for use in the Caribbean, reviewed by the Caribbean Technical Advisory Group for Immunization, and piloted in the Caribbean to ensure questions and response options were understood as intended and measured what they were designed to measure. The instrument includes specific questions geared at HCWs, as they are a target audience for COVID-19 vaccine communications, considering their important role as trusted sources of information on vaccines and the fact that they are to be among the first group to be vaccinated as vaccines are rolled out. Questions on the influenza vaccine were added to facilitate the comparison between attitudes toward COVID-19 vaccine and another vaccine given to adults in the Caribbean.

Survey Implementation

Data were collected anonymously using an electronic survey in English and in French via Qualtrics® (Qualtrics, Provo, UT) (Annex A). Qualtrics recorded the respondents' start and end date and time and used cookies and IP address tracking and geographical coordinates (latitude/longitude) to prevent multiple submissions by the same respondent. It was set to accept responses from within the Caribbean region. The project team tested the web survey before it was opened for project data collection.

Questions were grouped into several categories:

1. Country, sex, age, job title, healthcare worker category;
2. Opinion questions 1:
   a. Attitudes to vaccines in general (7 Likert questions)
   b. Vaccine readiness (3 Likert questions);
3. Opinion questions 2: Attitudes toward COVID-19 vaccines:
   a. Overall attitudes (3 Likert questions),
   b. Vaccination if a COVID-19 vaccine becomes publicly available (4 Likert questions),
   c. Reasons for delaying or refusing a COVID-19 vaccine (5 Likert questions and one open text);
4. Reasons contributing to opinions of COVID-19 vaccines (8 Likert questions and one open text);
5. Attitudes toward influenza vaccine (2 Likert questions and two open text).

If the respondent consented to take the survey, they were presented with all the questions. They were not required to respond to any of the opinion questions. There was no review or confirmation step at the end of the survey. All Likert questions used four response options: Strongly agree; Agree; Disagree; Strongly disagree.

In Trinidad and Tobago, there were complications due to poor Internet access, so a paper form of the questionnaire was circulated. Paper forms were collected for 86 such respondents and their responses were uploaded using Qualtrics at a location with stable Internet access.

Survey Dissemination and Advertising the Survey

The Qualtrics platform created a link and quick response (QR) code for survey dissemination. These were distributed to the ministries of health and professional associations of the participating countries through Pan American Health Organization (PAHO) country offices in the Caribbean. PAHO country offices advised the country officials to distribute the survey via communications

at health clinics and in professional associations or societies. At the subregional level, the questionnaire link and QR code were sent to regional entities such as the Regional Nursing Body and the Caribbean Community (CARICOM), and academic institutions, specifically the University of the West Indies (UWI), to be distributed to their graduates' list. Several webinars with the assigned PAHO focal points were carried out to present the survey and describe its components.

The survey had the option of multiple completes per link to allow for snowballing. However, the survey was protected to ensure that each respondent only completed the survey once. Qualtrics monitors survey activity using a browser-based cookie. If someone who has already taken the survey attempted to repeat it, they were kept out. There were no payments or incentives to complete the survey. Data collection occurred between 15 March and 30 April 2021.

Sample Size

The sample size for the study was calculated using the total number of HCWs in the categories reported to the WHO National Health Workforce Accounts Portal (NHWA): nurses, physicians, midwives, dentists, and pharmacists. Fourteen countries of the Caribbean that provide Human Resources for Health data to the NHWA portal reported a total of 38,671 HCWs. To calculate the sample, a complex multilevel sample was used to add representativity. Population $N = 38,671$ was defined in 14 countries with a vaccine acceptance of 50% and a margin of error of 5% and a design effect of 2, resulting in $n = 761$ distributed across countries in proportion to their population of HCWs. Sample size was calculated using Open Epi, version 3.01.

Statistical Analysis

Summaries were calculated using proportions, where the denominator was the number of respondents who answered the question, and the numerator was the number of persons who gave the response in question. Data were summarized as if they were

from a simple random sample of Caribbean HCWs. Responses to each of the 32 opinion questions were summarized using all four categories: Strongly agree; Agree; Disagree; Strongly disagree, and two consolidated categories: Strongly agree combined with Agree (Agree); Disagree combined with Strongly disagree (Disagree).

Binary consolidated response categories (agree vs. disagree) were analyzed using chi-square statistics to identify questions that yielded different proportions of agreement between respondent categories. The main analysis approach was to examine groups of questions and look for patterns in responses between respondent categories – and to use those patterns to inform communication strategies for HCWs. The chi-square *p*-values were used to confirm that the patterns in proportions were statistically significant.

The question, "*If a COVID-19 vaccine becomes available, I intend to get it as soon as possible*" was identified as a proxy of COVID-19 vaccine acceptance. Those who disagree or strongly disagree with this statement were considered to be *COVID-19 vaccine hesitant*.

Multivariable logistic regression was used to assess outcomes for every opinion question. Respondents who said "Strongly agree" or "Agree" were coded with an outcome of 1 and those who said "Disagree" or "Strongly disagree" were coded with 0. Explanatory factors included three categorical variables: job category (five levels, with physicians as the reference group), sex (with males as the reference), and age quartile (with the youngest quartile as the reference group).

Each opinion question reports the percentage of respondents in each response category along with the number of persons in that category who answered the question. The number of responses by question are given in Annex B. The data and chi-square and logistic regression results for all 32 questions and all respondent categories are listed in Annex C.

Data Cleaning and Categorization

After the survey was closed, responses in English and French were downloaded from the Qualtrics platform. The two datasets were appended together. Respondents were dropped from the dataset if they a) indicated they were not a healthcare worker, b) did not consent to answer the questions, c) were younger than 21 years of age, d) did not give a substantive response to any of the 32 opinion questions, or e) indicated via their job description that they were not included in the target population (e.g., veterinarians, receptionists, hospital laundry workers, orderlies, medical records officers).

Variables from the French dataset were translated to be compatible with English. Open text responses were translated using Google Translate, and both the English and French text was provided to the qualitative response categorization team.

Respondents were assigned to several categories for the purpose of reporting results:

1. Job categories:
   a. Five broad categories: Physicians; Nurses; Public Health Professionals; Allied Health Professionals; and Other (Persons who answered "other" entered a free text job title and a team categorized some of those as falling in the other four categories and some as being indeed, other. The dataset was updated with these team-corrected classifications.);
2. Care categories
   a. Most physicians and nurses were assigned to a category named "Care",
   b. Exceptions included:
      i. Environmental and occupational health and hygiene professionals,
      ii. National immunization program staff (includes vaccinators),
      iii. Nursing professionals (community and public health),
      iv. Public health professionals, who were assigned to a category named "Public Health",
   c. All allied health professionals were also assigned to "Public Health",
   d. The third category consisted of those whose job category was "Other";
3. Age categories
   a. The age quartiles of the dataset: 21–32; 33–40; 41–50; and 51–87 years of age.

Summarizing Open Text Responses

Open text responses were collected for five questions:

1. Job category: Other, please specify
2. Question 28: Other reasons for delaying or refusing COVID-19 vaccine
3. Question 37: Other factors that contributed to my opinion on a COVID-19 vaccine
4. Question 39: If you disagree with taking the flu vaccine, why?
5. Question 41: If you disagree with recommending the flu vaccine to friends and family, why?

In all cases, French responses were translated automatically using Google Sheets and the Google Translate function. Both the French response and English translation were furnished to the qualitative response categorization team, which consisted of three pairs of investigators. Each pair had a member with strong quantitative skills and a member with strong qualitative skills. The pairs examined open-text responses to questions 28, 37, 39, and 41 and categorized them as reflecting one of four domains from the WHO behavioral and social drivers of COVID-19 vaccination model, which was adapted by the team to fit the survey findings (25). The domains identified in this framework are: thinking and feeling, motivation, social processes, and practical issues. The pairs of investigators then collated their work and conferred to resolve discordant decisions. The responses were once again analyzed and coded by three team members. All team members participated in a further review where a consensus decision was made on

all answers for which there had been doubt about the final domain and/or construct following the initial review.

Ethics Committee and Confidentiality

The study protocol was submitted for approval by the PAHO Ethics Review Committee (PAHOERC). The study team obtained consent from the participants who agreed to participate in the survey. The consent form was available online before the participants had access to the virtual questionnaire. All study procedures were described in detail such that the participants were fully informed of their requirements while in the study. During this consent process, HCWs were informed that they were free to choose to take part in the research study or not. The welcoming information emphasized that participation was voluntary, that there was no negative consequence and no expected appropriate answer to the questions. All potential participants could agree or decline to participate in the study. Those who consented to participate in the study were enrolled.

Results

A total of 1,197 HCWs completed the survey; all countries and territories managed to fill their own quota for the sample size. Table 1 shows the number of respondents by country.

Of the total respondents, 902 (75%) were female and 309 (25%) 21–32 years old. Most (521, or 43%) of the participants were physicians. The sample is summarized in Tables 1 and 2 and Figure 1. The number of opinion questions answered by respondents varied from as few as 1 to as many as 32. The average was 26 and the median was 28. Annexes B and C show how many respondents answered each opinion question.

TABLE 1. **Respondents by country and job category**

	PHYSICIANS	NURSES	PUBLIC HEALTH	ALLIED PROFESSIONALS	OTHER	TOTAL
Antigua and Barbuda	17	7	2	3	0	29
Bahamas	8	22	13	13	23	79
Barbados	43	13	8	13	5	82
Belize	9	21	6	6	5	47
Dominica	1	4	3	4	2	14
Grenada	7	25	5	4	2	43
Guyana	3	3	1	5	1	13
Haiti	59	18	16	7	2	102
Jamaica	151	18	16	27	3	215
Saint Kitts and Nevis	3	62	11	6	4	86
Saint Lucia	1	9	6	2	1	19
Saint Vincent and the Grenadines	1	16	2	3	2	24
Suriname	30	19	7	2	4	62
Trinidad and Tobago	188	93	20	63	18	382
Total	521	330	116	158	72	1,197

FIGURE 1. Respondents by age, sex, and job category
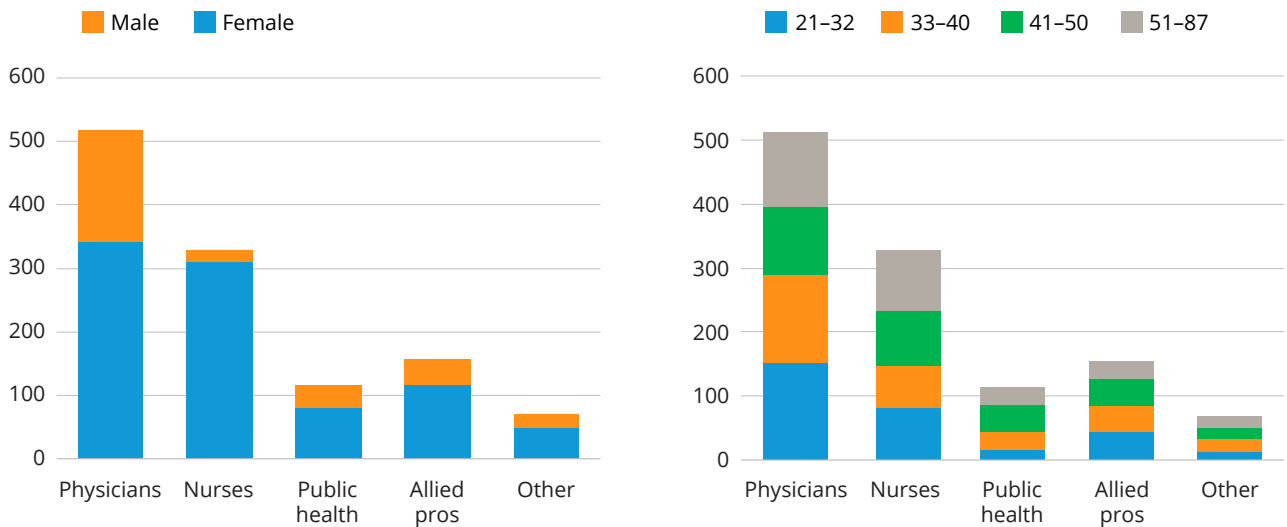
TABLE 2. Respondents by age, sex, and job category

	PHYSICIANS			NURSES			PUBLIC HEALTH		ALLIED PROFESSIONALS			OTHER			TOTAL		
	FEMALE	MALE	OTHER/ MISSING	FEMALE	MALE	OTHER/ MISSING	FEMALE	MALE	FEMALE	MALE	OTHER/ MISSING	FEMALE	MALE	FEMALE	MALE	OTHER/ MISSING
Quartile 1: 21–32y	113	39	1	75	5	1	11	5	33	12	0	11	3	243	64	2
Quartile 2: 33–40y	102	34	0	63	3	0	24	5	32	8	0	12	7	233	57	0
Quartile 3: 41–50y	59	45	2	82	4	0	29	14	31	12	0	9	8	210	83	2
Quartile 4: 51–87y	63	54	0	89	5	1	17	10	19	8	0	16	2	204	79	1
Missing age	6	2	1	2	0	0	1	0	1	1	1	2	2	12	5	2
Total	343	174	4	311	17	2	82	34	116	41	1	50	22	902	288	7

Table 3 summarizes the percentage of respondents in various categories who said they agree or strongly agree with many of the survey's opinion questions. Statistically significant differences, based on multivariable logistic regression, are marked with an asterisk (*). In the paragraphs that follow, key results are described. The full detailed response summary and regression results for all the opinion questions may be found in Annex C.

Attitudes to routine vaccines

Concerning attitudes to vaccines, respondents displayed widespread agreement that vaccines in general are a good way to protect oneself from disease, with no statistically significant differences among comparison groups (98%). Respondents also agreed that vaccines are safe (95%), efficient (97%), and that vaccine information provided by public health authorities and healthcare providers is reliable and trustworthy (94%).

TABLE 3. Summary of responses by HCW categories, age, and sex

PERCENT OF RESPONDENTS WHO AGREE OR STRONGLY AGREE WITH:	ALL	HCW CATEGORIES					AGE QUARTILES				SEX	
	(%)	PHYSICIANS**	NURSES	PUBLIC HEALTH PRO-FESSIONALS	ALLIED HEALTH PRO-FESSIONALS	OTHER	21–32**	33–40	41–50	51–87	MALE**	FEM
Q6. General vaccine importance	98	98	98	99	97	95	99	99	97	97	96	98*
Q8. General vaccine safety	95	96	94	95	91	93	94	93	95	97	90	96*
Q9. General vaccine effectiveness	97	97	96	98	97	100	96	96	98	98	95	98*
Q13. New vaccines carry more risk than old	56	48	65*	45	64*	74*	59	55	52	55	51	57
Q15. General fear of adverse events of vaccines	77	73	82*	74	82*	85*	81	76	76	75*	77	78
Q16. Confidence in COVID-19 vaccine effectiveness	92	96	85*	97	82*	93	86	93*	92*	96*	92	92
Q17. Confidence in COVID-19 vaccine development transparency	83	88	76*	92	72*	72*	77	79	82	92*	84	82
Q19. Intend to get vaccinated: ASAP	77	85	66*	77*	62*	75	64	76*	82*	85*	81	75
Q20. Intend to get vaccinated: wait and see	47	36	60*	39	59*	58*	61	49*	42*	35*	41	49
Q21. Intend to get vaccinated: maybe in future	39	29	52*	30	51*	47*	47	37	40	31*	32	41
Q22. Intend to get vaccinated: never	4	4	4	3	3	2	4	3	4	4	8	3*
Q24. (COVID-19 vaccine) Information gap	30	20	45*	22	43*	35*	39	29	30*	22*	28	31
Q26. Lack of trust in COVID-19 vaccine development thoroughness	47	38	60*	34	65*	52	56	45*	47*	40*	43	49
Q27. Fear COVID-19 vaccine may cause COVID-19	21	15	33*	14	24*	21	21	18	21	22	21	21
Q29. Lack of trust in COVID-19 vaccine development pace	62	54	70*	55	73*	65	69	65	57*	54*	57	63
Q31. Importance of opinions of friends and family	29	25	34*	28	33	27	33	30	31	22*	31	28
Q36. Importance of information on social media	30	21	43*	28	35*	39*	38	29	30*	23*	24	32
Q38. Influenza vaccine confidence	77	84	67*	84	69*	68*	79	80	77	75	82	75
Q40. Influenza vaccine recommendation confidence	87	92	83*	91	76*	82	91	88	87	86	89	87

* p < 0.05
** Logistic regression reference category

Vaccine readiness

Beyond general attitude, HCWs showed some differences when responding to questions about new vaccines and COVID-19 vaccines. The paragraphs that follow summarize those differences. Only differences that were statistically significant in logistic regression that adjusted for job category, respondent sex, and respondent age quartile are described. Full details are available in Annex C. The sentences below include *p*-values of specific statistically significant differences.

Despite the overall agreement on the importance, safety, and efficacy of vaccines, HCWs displayed some concerns when it comes to new vaccines. When asked about general vaccine readiness, 56% of all respondents agreed that new vaccines carry more risk than older vaccines. Variations were observed between HCW categories, where only 48% of physicians vs. 65% of nurses (*p* < 0.001), 64% of allied professionals (*p* = 0.005) and 74% "others" (*p* = 0.002) agreed that new vaccines carry more risk (Table 4).

TABLE 4. **Readiness: New vaccines carry more risk than older vaccines**

	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	56	44	822					
HCW: Physicians	48	52	372		1.0			
HCW: Nurses	65	35	221	**<0.001**	2.0	**<0.001**	1.4	2.8
HCW: Public health pros	45	55	83		0.9	0.822	0.6	1.5
HCW: Allied pros	64	36	103		1.9	**0.005**	1.2	3.0
HCW: Other	74	26	43	**<0.001**	3.2	**0.002**	1.5	6.5
Physician (General and family)	48	52	211					
Physician (Surgical)	55	45	40					
Physician (Medical)	43	57	103					
Physician (Emergency)	61	39	18	0.364				
Nurse (Community and public health)	49	51	73					
Nurse (Critical care)	84	16	31					
Nurse (Outpatients)	67	33	27					
Nurse (Ward)	70	30	79	**0.004**				
Care category: Care	55	45	519					
Care category: Public health	54	46	260					
Care category: Other	74	26	43	**0.037**				
Sex: Male	51	49	205		1.0			
Sex: Female	57	43	613	0.132	1.1	0.602	0.8	1.5
Age Q1: 21–32	59	41	210		1.0			
Age Q2: 33–40	55	45	199		0.9	0.465	0.6	1.3
Age Q3: 41–50	52	48	206		0.7	0.155	0.5	1.1
Age Q4: 51–87	55	45	193	0.604	0.8	0.42	0.6	1.3

Note: Colored bars are scaled so if 100% of respondents gave an answer, the entire table cell would be filled with color from left to right.

Likewise, 77% of all respondents concurred that they are concerned about serious adverse effects of vaccines, with physicians displaying the least level of agreement (73%) vs. nurses (82%; $p < 0.001$), allied professionals (82%; $p = 0.022$), and "others" (85%; $p = 0.030$). Some 81% of the youngest respondents, age quartile (AQ) 21–32, were concerned with adverse side effects compared with 75% of the oldest respondents, AQ 51–87 ($p = 0.041$) (Table 5).

Attitudes toward COVID-19 vaccines

When surveying attitudes and perceptions specifically pertaining to COVID-19 vaccines, widespread difference was found when comparing among both HCW categories and age quartiles. Overall, 92% of respondents agreed that a COVID-19 vaccine will protect against severe COVID-19 infection. Physicians were the most confident among HCWs (96%), and nurses and allied professionals were least confident (85% and 82%, respectively; $p < 0.001$ for both

TABLE 5. **Readiness: Concerns about serious adverse effects of vaccines**

	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	77	23	1129					
HCW: Physicians	73	27	494		1.0			
HCW: Nurses	82	18	306	**0.002**	1.9	**<0.001**	1.3	2.8
HCW: Public health pros	74	26	111		1.1	0.587	0.7	1.8
HCW: Allied pros	82	18	150		1.7	**0.022**	1.1	2.7
HCW: Other	85	15	68	**0.004**	2.2	**0.03**	1.1	4.4
Physician (General and family)	72	28	281					
Physician (Surgical)	78	22	50					
Physician (Medical)	74	26	140					
Physician (Emergency)	70	30	23	0.785				
Nurse (Community and public health)	78	22	95					
Nurse (Critical care)	87	13	45					
Nurse (Outpatients)	83	17	35					
Nurse (Ward)	82	18	114	0.629				
Care category: Care	76	24	702					
Care category: Public health	79	21	359					
Care category: Other	85	15	68	0.182				
Sex: Male	77	23	270		1.0			
Sex: Female	78	22	853	0.845	0.9	0.433	0.6	1.2
Age Q1: 21–32	81	19	295		1.0			
Age Q2: 33–40	76	24	267		0.8	0.196	0.5	1.1
Age Q3: 41–50	76	24	280		0.7	0.131	0.5	1.1
Age Q4: 51–87	75	25	271	0.293	0.7	**0.041**	0.4	1.0

Note: Colored bars are scaled so if 100% of respondents gave an answer, the entire table cell would be filled with color from left to right.

categories). The youngest quartile, 21–32 years, displayed less belief in the effectiveness of a COVID-19 vaccine (86%) than did AQ 33–40 (93%; $p = 0.020$), AQ 41–50 (92%; $p = 0.010$), and AQ 51–87 (96%; $p < 0.001$). Similarly, while 83% of respondents overall were confident in the scientific approval process of a COVID-19 vaccine, physicians (88%) were more so than nurses (76%; $p < 0.001$), allied professionals (72%; $p < 0.001$), and "others" (72%; $p = 0.007$). Respondents in the oldest AQ, 51–87, (92%) compared with respondents in the youngest AQ, 21–32, (77%; $p < 0.001$) were the most confident.

Vaccine hesitancy

In assessing COVID-19 vaccine readiness, of 848 participants, 195 (23%) respondents displayed some level of vaccine hesitancy. Across HCW categories, 15% of physicians disagreed on receiving a COVID-19 vaccine as soon as possible compared with 34% of nurses ($p < 0.001$), 23% of public health professionals ($p = 0.014$), 38% of allied professionals ($p < 0.001$), and 25% of other professionals ($p = 0.089$) (Figure 2).

FIGURE 2. **Respondents by job category**

% who disagree with the statement:
"*If a new COVID-19 vaccine becomes available, I intend to get it as soon as possible.*"

All (N = 848)	23%
Physicians (n = 415)	15%
Public health pros (n = 90)	23%
Other (n = 52)	25%
Nurses (n = 187)	34%*
Allied pros (n = 104)	38%*

*Indicates that the portion of respondents disagreeing in this category differs from the portion of physicians by an amount that is statistically significant

Differences in hesitancy between subcategories of nurses ($p = 0.092$) were not significant. However, there were significant differences within physician specialties, with clinicians and emergency doctors being more willing to get the vaccine as soon as possible, compared with general practitioners and family doctors ($p = 0.007$) (Figure 3).

FIGURE 3. **Vaccine hesitancy by HCW subcategory (specialty)**

% who disagree with the statement:
"*If a new COVID-19 vaccine becomes available, I intend to get it as soon as possible.*"

Nurse (Outpatients) (n = 23)	22%
Nurse (Community and public health) (n = 60)	27%
Nurse (Ward) (n = 66)	39%
Nurse (Critical care) (n = 29)	48%
Physician (Medical) (n = 114)	5%
Physician (Emergency) (n = 18)	11%
Physician (Surgical) (n = 46)	17%
Physician (General and family) (n = 237)	19%
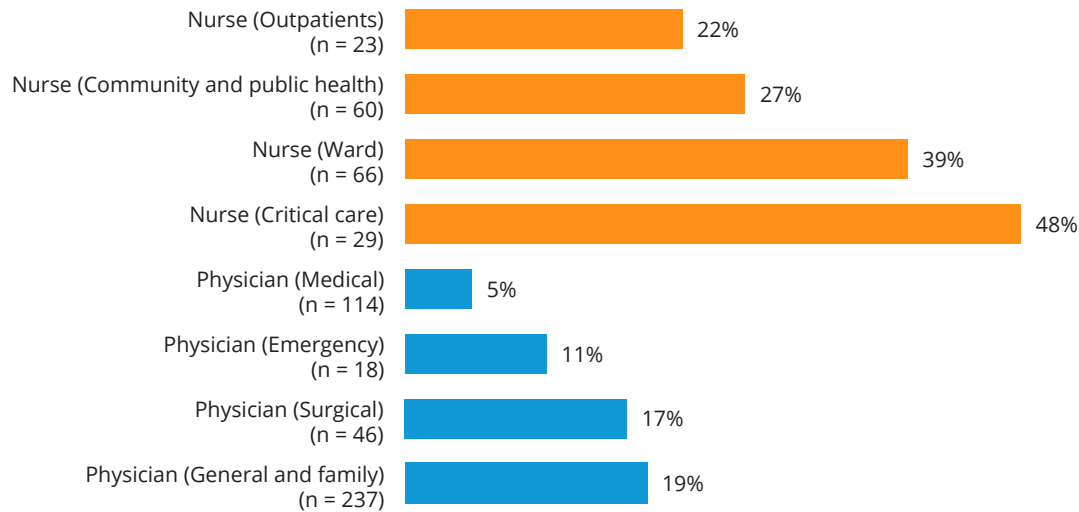
*Indicates that the portion of respondents disagreeing in this category differs from the portion of physicians by an amount that is statistically significant

The difference between sexes was not significant, with 19% of males and 25% of females indicating hesitance (p = 0.731). When comparing across age quartiles, vaccine hesitancy was most prevalent among younger HCWs, where only 64% of AQ 21–32, compared with 76% of AQ 33–40 (p = 0.007), 82% of AQ 41–50 (p < 0.001), and 85% of AQ 51–87 (p < 0.001) intended to get a COVID-19 vaccine as soon as possible (Figure 4).

FIGURE 4. **Vaccine hesitancy by HCW age group and sex**

% who disagree with the statement:
"*If a new COVID-19 vaccine becomes available, I intend to get it as soon as possible.*"

Age Q4: 51–87 (n = 215)	15%
Age Q3: 41–50 (n = 207)	18%
Age Q2: 33–40 (n = 204)	24%
Age Q1: 21–3 (n = 208)	36%*
Male (n = 239)	19%
Female (n = 602)	25%
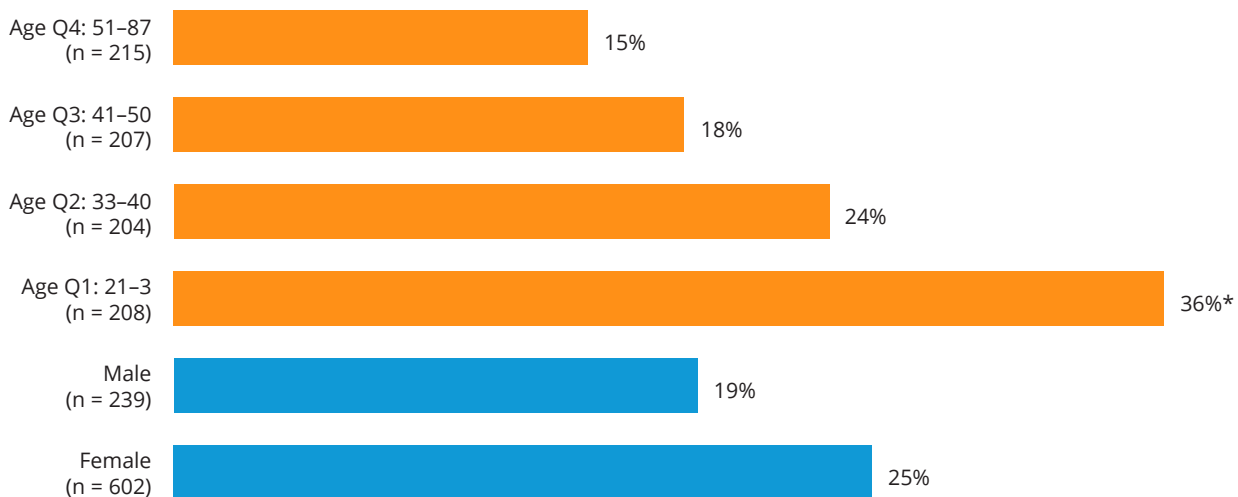
*Respondents in the youngest quartile were significantly more hesitant than those in any of the older quartiles

One-third of physicians (36%) wanted to wait to see how the COVID-19 vaccine affects others, compared with 60% of nurses ($p < 0.001$), 59% of allied professionals ($p < 0.001$), and 58% of "others" ($p < 0.001$). So did 61% of the youngest respondents, AQ 21–32, compared with 49% of AQ 33–40 ($p = 0.011$), 42% of AQ 41–50 ($p < 0.001$), and only 35% of AQ 51–87 ($p < 0.001$). Similarly, 29% of physicians compared with 52% of nurses ($p < 0.001$), 51% of allied professionals ($p < 0.001$), and 47% of others ($p = 0.005$) agreed that while they did not intend to get a COVID-19 vaccine soon, they might in the future. So did 47% of the youngest respondents, AQ 21–32, compared with 31% of the oldest respondents, AQ 51–87 ($p < 0.001$). Only 4% of all participants stated an intention to refuse a COVID-19 vaccine altogether; comparing by gender, 8% of male respondents compared with 3% of female respondents agreed that they did not intend ever to get a COVID-19 vaccine ($p < 0.001$).

Eighty-five percent of participants were confident that there will be other treatment against COVID-19 soon, with significant differences within specialty subcategories, in particular among physicians, with emergency doctors less confident on the availability of an effective treatment compared with other specialties ($p < 0.001$).

One-third of participating HCWs did not know enough about the vaccines to make a decision, mostly critical care nurses (Figure 5) and allied health professionals ($p < 0.001$) in the younger age groups (Figure 6).

FIGURE 5. **Knowledge about the vaccine to make a decision, by nurse subcategory**

Q-24: I do not yet know enough about the vaccine to make a decision, by nurse subcategory (N = 1,039)
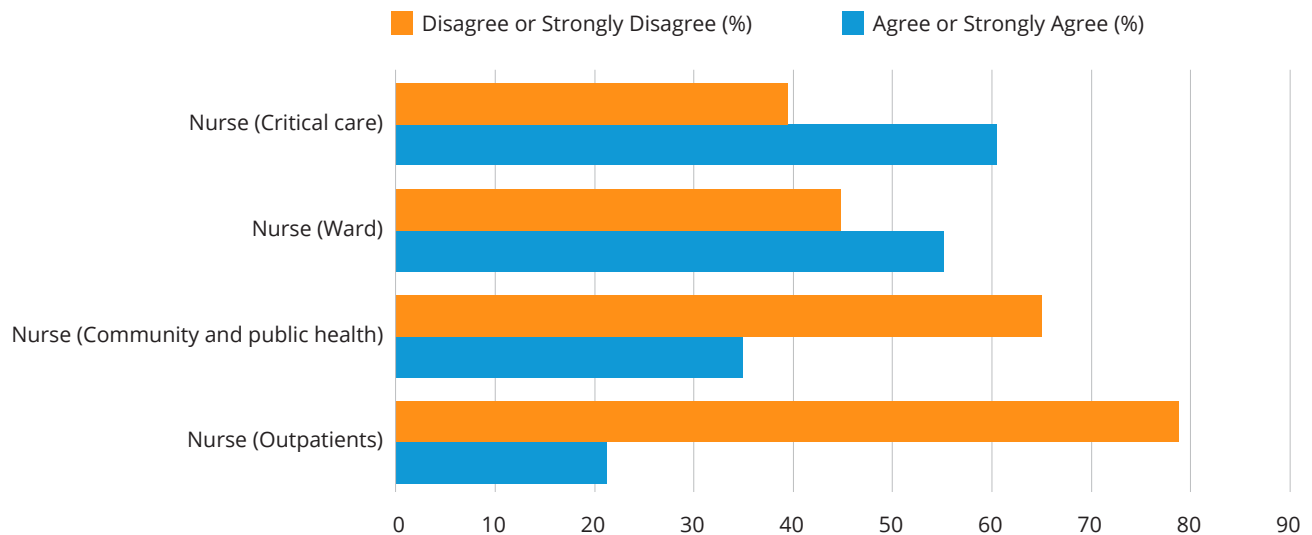
p-value < 0.001

FIGURE 6. **Knowledge about the vaccine to make a decision, by age**

Q-24: I do not yet know enough about the vaccine to make a decision

■ Agree or Strongly Agree (%)   ■ Disagree or Strongly Disagree (%)
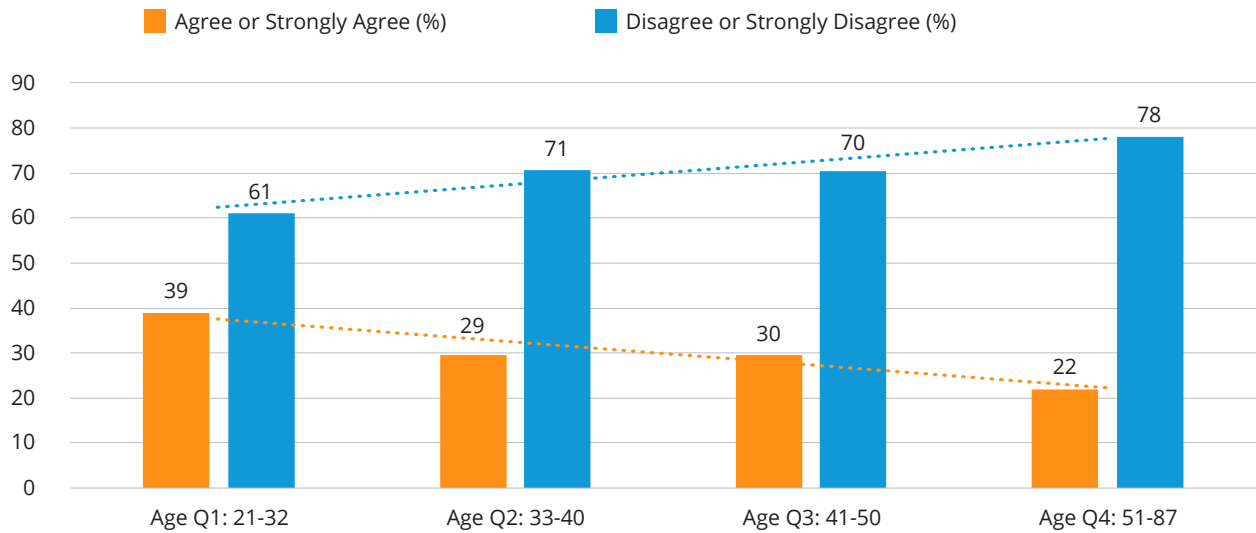
p-value < 0.001

Gaining natural immunity against the virus was seen as favorable by 29% of HCWs, mostly nurses compared with physicians (42% vs. 19%, *p* < 0.001), and from critical care nursing (53%, *p* = 0.04). Almost half of respondents (47%) agreed or strongly agreed that the development of the vaccine may have been rushed or that the vaccine may not have been thoroughly tested, with more nurses agreeing with that statement (60%, *p* < 0.001) (Table 6). There were significant differences within specialty subcategories among physicians (*p* = 0.01) and nurses (*p* < 0.001), with surgical doctors and critical care nurses having the highest percentages. One-fifth of HCWs (21%) believe that vaccines can cause

the disease, the majority being nurses compared with physicians (33% vs. 15%, *p* < 0.001).

Factors that contributed to the opinion on COVID-19 vaccines

When asked about the reasons behind their attitudes and perceptions of COVID-19 vaccines, 30% of respondents agreed that they do not yet know enough about the vaccine to decide; however, this was true for only 20% of physicians compared with 45% of nurses (p < 0.001), 45% of allied professionals (p < 0.001), and 35% of "other" HCWs (p = 0.008). Across age quartiles, 39% of AQ 21–32 agreed about not yet

knowing enough about the vaccines compared with 30% of AQ 41–50 (p = 0.007) and only 22% of AQ 51–87 (p < 0.001). Similarly, 29% of respondents expressed a preference to gain natural immunity against SARS-CoV-2. This was true for 19% of physicians, compared with 42% of nurses (p < 0.001), 29% of public health professionals (p = 0.0175), 39% of allied professionals (p < 0.001), and 40% of others (p < 0.001). Some 47% of respondents agreed that the development of COVID-19 vaccines may have been rushed, or the vaccines may not have been thoroughly tested. Some 38% of physicians agreed with this, compared with 60% of nurses (p < 0.001) and 65% of allied professionals (p < 0.001). The youngest respondents, AQ 21–32, with 56% were more in agreement, compared with 45% of AQ 33–40 (p = 0.049), 47% of AQ 41–50 (p = 0.023), and 40% of AQ 51–87 (p < 0.001).

TABLE 6. **Reasons: Development may be rushed/vaccine may not be thoroughly tested**

	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	47	53	916					
HCW: Physicians	38	62	421		1.0			
HCW: Nurses	60	40	229	**<0.001**	2.7	**<0.001**	1.9	3.8
HCW: Public health pros	34	66	92		0.9	0.749	0.6	1.5
HCW: Allied pros	65	35	120		3.0	**<0.001**	2.0	4.7
HCW: Other	52	48	54	**<0.001**	1.8	0.054	1.0	3.2
Physician (General and family)	43	57	234					
Physician (Surgical)	44	56	45					
Physician (Medical)	26	74	125					
Physician (Emergency)	41	59	17	**0.01**				
Nurse (Community and public health)	42	58	74					
Nurse (Critical care)	75	25	36					
Nurse (Outpatients)	52	48	25					
Nurse (Ward)	73	27	82	**<0.001**				
Care category: Care	46	54	573					
Care category: Public health	49	51	289					
Care category: Other	52	48	54	0.554				
Sex: Male	43	57	233		1.0			
Sex: Female	49	51	678	0.16	0.9	0.665	0.7	1.3
Age Q1: 21–32	56	44	234		1.0			
Age Q2: 33–40	45	55	211		0.7	**0.049**	0.5	1.0
Age Q3: 41–50	47	53	233		0.6	**0.023**	0.4	0.9
Age Q4: 51–87	40	60	225	**0.003**	0.5	**<0.001**	0.3	0.7

Note: Colored bars are scaled so if 100% of respondents gave an answer, the entire table cell would be filled with color from left to right.
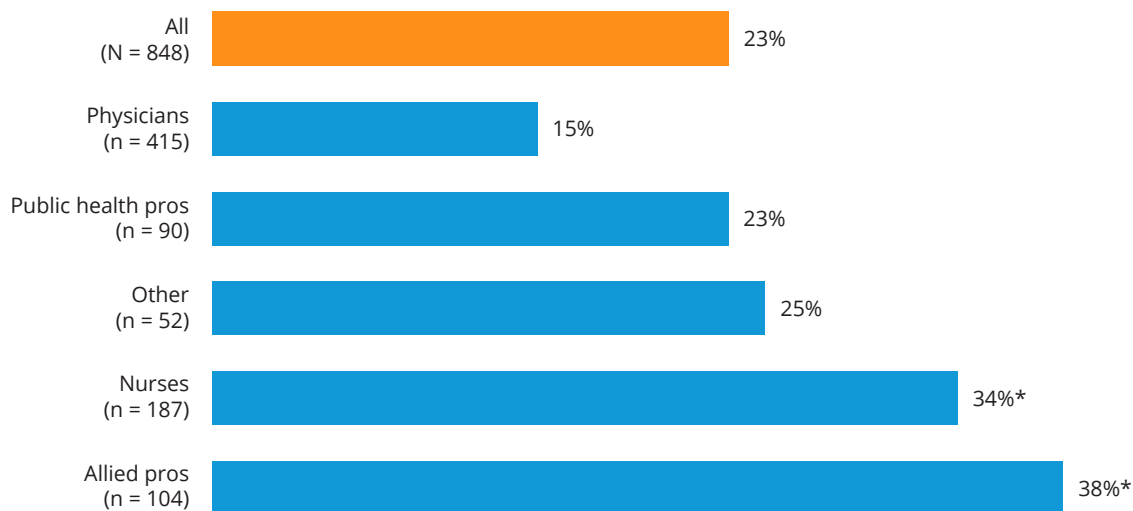
For 48% of respondents, the country of manufacture of a COVID-19 vaccine shaped their opinion on the vaccine. Among physicians, 46% agreed with this statement, compared with 57% of nurses (p = 0.004). Some 30% of respondents reported that information they had seen on social media shaped their opinion of a COVID-19 vaccine. This was true for only 21% of physicians, compared with 43% of nurses (p < 0.001), 35% of allied professionals (p = 0.002), and 39% of "other" HCWs (p = 0.006). The same was observed when comparing respondents across age quartiles, where 38% of AQ 21–32 agreed that social media shaped their opinion on COVID-19 vaccine, compared with 30% of AQ 41–51 (p = 0.030) and 23% of AQ 51–87 (p < 0.001) (Figure 7).

FIGURE 7.   **Social media as opinion shaper, by age**

Opinion shapers: Information I've seen on social media

■ Agree or Strongly Agree (%)   ■ Disagree or Strongly Disagree (%)
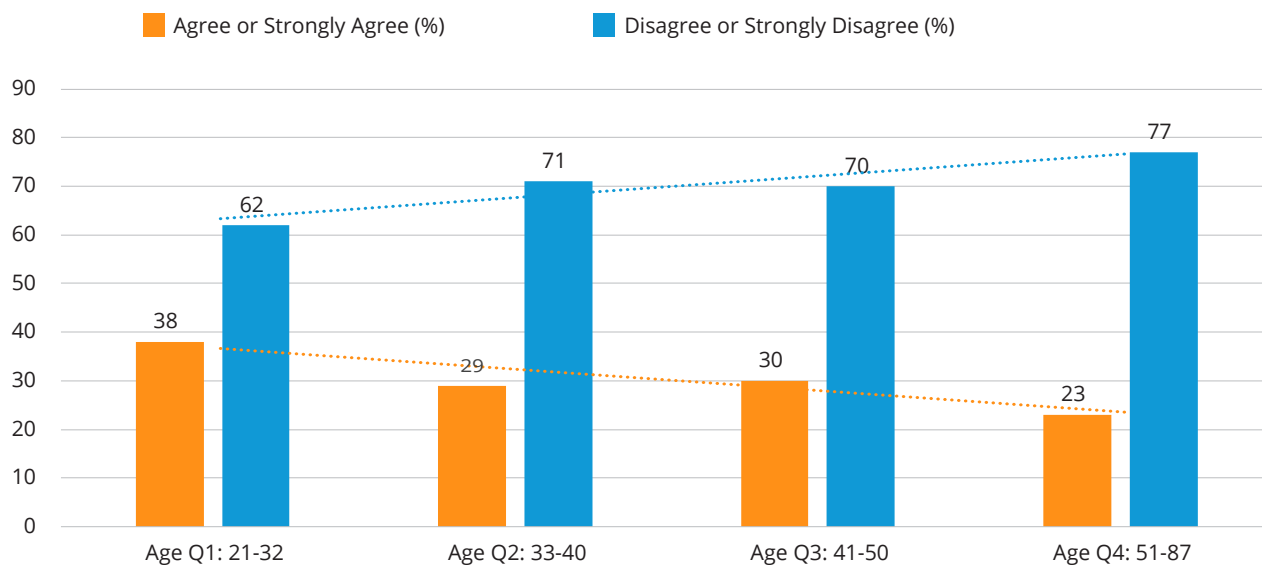
p-value = 0.006

Attitudes toward influenza vaccine

Some 23% of the respondents would not take the influenza vaccine and 13% would not recommend it to family and friends. Nurses were more reluctant than physicians in both cases (p ≤ 0.001), and there were statistically significant differences among other HCW categories (p < 0.001). Females were more reluctant than males to take the flu vaccine (25%, p = 0.041) (Table 7), and there were significant differences between physician subcategories regarding recommending the influenza vaccine to friends and family (p = 0.043).

TABLE 7. Attitudes to taking the influenza vaccine ("I would take the flu vaccine if offered")

	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	77	23	958					
HCW: Physicians	84	16	458		1.0			
HCW: Nurses	67	33	227		0.4	**<0.001**	0.3	0.6
HCW: Public health pros	84	16	94		1.0	0.933	0.6	1.9
HCW: Allied pros	69	31	122		0.5	**0.001**	0.3	0.7
HCW: Other	68	32	57	**<0.001**	0.5	**0.035**	0.3	1.0
Physician (General and family)	86	14	256					
Physician (Surgical)	73	27	48					
Physician (Medical)	84	16	132					
Physician (Emergency)	77	23	22	0.128				
Nurse (Community and public health)	69	31	74					
Nurse (Critical care)	57	43	35					
Nurse (Outpatients)	69	31	29					
Nurse (Ward)	68	32	79	0.622				
Care category: Care	79	21	608					
Care category: Public health	74	26	293					
Care category: Other	68	32	57	0.07				
Sex: Male	82	18	245		1.0			
Sex: Female	75	25	707	**0.041**	0.8	0.264	0.5	1.2
Age Q1: 21–32	79	21	241		1.0			
Age Q2: 33–40	80	20	231		1.0	0.915	0.7	1.6
Age Q3: 41–50	77	23	232		0.9	0.597	0.6	1.4
Age Q4: 51–87	75	25	238	0.547	0.8	0.321	0.5	1.2

Qualitative Responses Categorized by Behavioral and Social Domain (BeSD) and Construct and by HCW Job Category

As part of this analysis, 25 different constructs were identified under the four domains (20 pertaining to COVID-19 vaccine, 14 pertaining to influenza vaccine).[1] Some answers contained information that fell under two separate constructs and sometimes within two different domains. In these cases, the answer was coded as belonging to both constructs and domains. In some cases, the four percentages in a row sum to more than 100%.

Figure 8 summarizes WHO's behavioral and social domains (BeSD) and constructs that were used to categorize the opinions expressed in four free-text responses (Q28, 37, 39, and 41). In addition to the constructs already established in the WHO BeSD document, 11 new constructs were identified among Caribbean HCW responses, including one expressing that respondents would be more inclined to accept vaccination if their preferred vaccine brand was available. These new constructs are identified in Figure 8 with a black border. Figure 9 summarizes all of the qualitative responses across all of these four free-text questions, showing both domains and constructs. Each bar is annotated with the percentage of free-text respondents who were classified into that

FIGURE 8. WHO behavior and social determinants domains and constructs for COVID-19 vaccines, Caribbean HCWs survey iteration

Thinking & feeling	Perceived disease risk – to self	Perceived disease risk – to family and friends	*Perceived disease risk – to patients	Trust in new vaccine	Confidence in vaccine safety	*Capacity to support client information needs	Confidence in vaccine benefits	Confidence in protecting others	Benefits: Safe to see family and friends
Motivation	Intention	Extent of intention	*Willing-ness to recommend vaccines					Benefits: Safe to travel	Confidence in vaccine brand available
Social processes	*Stigma	Vaccine decision autonomy	Travel autonomy	Family norms	Religious beliefs / religious leader norms	Descriptive social norms	Workplace norms	Confidence in providers	Negative information
					Community leader norms		Provider recommen-dation	Confidence in health authorities	Race and ethnicity
Practical issues	Previous uptake of adult vaccination	Know where to go	*Availability of onsite vaccination	Preferred site	Ease of access	Reasons for low ease of access:	Affordability	Vaccine availability	Service satisfaction
							Eligibility for vaccines	Information needs (met/ unmet)	Service quality

Constructs with borders are new suggestions (not currently in published framework)

*Applies to HCWs only

1   Some of the constructs were identified twice under factors contributing to opinions on COVID-19 vaccines and on influenza vaccines.

category. The domain-based color schemes adhere to those used in the WHO BeSD manual.

An overall analysis of the answers submitted for the four free-text questions showed that respondents' answers fit mostly within the thinking and feeling domain.

Specifically, most answers were classified as being related to their confidence (or lack of) in the vaccines' benefits (42%), as well as their perceived low risk of the disease compared with the perceived risks associated with the vaccines (28.5%), and their confidence (or lack thereof) in the vaccines' ability to protect them (28%) (Figure 9).

FIGURE 9. **Qualitative response domains classified using the WHO Behavioral and Social Drivers (BeSD) rubric, all four qualitative questions together**

Domain	Category	Percentage
Thinking & Feeling	Confidence in vaccine benefits	42.0%
	Perceived disease risk - to self	28.5%
	Confidence in vaccine safety	28.0%
	Trust in a new vaccine	15.0%
	Confidence in vaccine brand available	2.1%
	Confidence in protecting others	1.6%
	Benefits: Safe to travel	1.0%
	Capacity to support client info needs	0.3%
Social Processes	Confidence in health authorities	6.2%
	Confidence in providers	3.9%
	Negative information	3.4%
	Vaccine decision autonomy	1.8%
	Religious beliefs & norms	1.6%
	Descriptive social norms	0.5%
	Family norms	0.3%
	Race & ethnicity	0.3%
	Provider recommendation	0.3%
	Workplace norms	0.3%
Practical Issues	Eligibility for vaccines	4.9%
	Information needs	4.7%
	Vaccine availability	3.9%
	Previous uptake of adult vaccination	3.6%
	Ease of access	0.3%
Motivation	Willingness to recommend vaccines	1.6%
	Extent of intention	0.3%

Open text answers from n = 436 respondents were categorized for this figure.

Attitude toward COVID-19 Vaccines

Regarding the two questions related to HCWs' opinions on COVID-19 vaccines (Q28 "Other reasons for delaying or refusing a COVID-19 vaccine" and Q37 "Other factors in my COVID-19 vaccine opinion"), the respondents' answers overwhelmingly corresponded to the thinking and feeling domain (Figure 10). The primary construct identified as part of the qualitative analysis was related to doubts regarding vaccine safety (31.4%). Many respondents pointed to their concerns regarding potential

FIGURE 10. **Qualitative response domains classified using the WHO Behavioral and Social Drivers (BeSD) rubric, open text questions about COVID-19 vaccines**
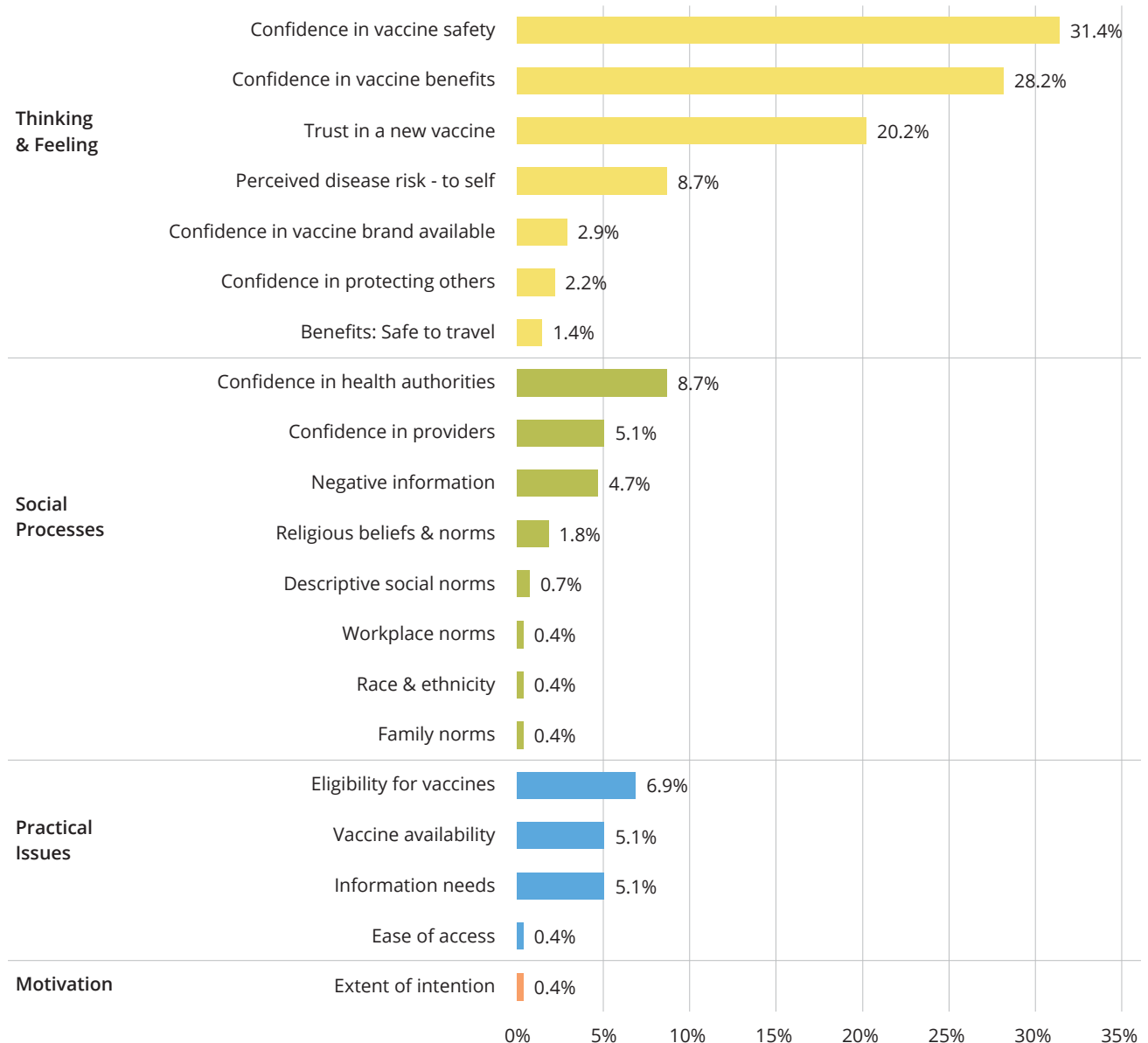
Open text answers from n = 277 respondents of Q28 and/or Q37 were categorized for this figure.

long-term side effects caused by the vaccines as a reason for influencing their opinion and for refusing or delaying the COVID-19 vaccine. Similarly, an important number of answers within the thinking and feeling domain fell under the construct related to confidence in vaccine benefits (28.2%). These answers pointed to sentiments of uncertainty on the length of the immunity provided by the vaccine, as well as the protection (or lack thereof) against variants of concern. Another important and significant construct that the respondents reported was related to trust (or lack thereof) in the COVID-19 vaccines (20.2%) (Figure 10). As one respondent described:

"I have issues with the short period of time it took to produce the current vaccines, as well as issues with the trial/testing periods."

It is important to point out that some of the respondents' answers to these two questions indicated a low perceived risk for themselves regarding COVID-19 (8.7%), directly influencing their willingness to receive the vaccine. Most of these answers argued that a low prevalence of the disease in their country rendered the COVID-19 vaccines unnecessary. Several respondents listed allergies, prior COVID-19 infection, or medical conditions as a reason for delaying or refusing a COVID-19 vaccine.

Another finding extracted from some respondents pointed to the brand of the COVID-19 vaccine available to them as reason for delaying or refusing to get vaccinated (2.9%). This prompted the investigation team to create a new construct under the think and feel domain related to confidence in specific vaccine brands, as these responses insinuated that if a different brand of the COVID-19 vaccines were made available to these HCWs, their intent of getting vaccinated would change toward vaccine acceptance.

Among the responses classified under the social processes domain, the most influential number of answers involved HCWs' confidence (or lack thereof) in their health authorities (8.7%). Respondents voiced concerns on issues such as authorities' handling of the pandemic and the messaging communicated to the public. This issue is exacerbated when combined with vaccine safety concerns, as one respondent indicated:

"Authorities wants to force the vaccines upon citizens but won't take any responsibility if anything was to transpire or happen to you after."

Another stated: "Dishonesty of public health officials and denial of obvious adverse events in some persons."

Issues related to global equity appeared in some responses, with participants indicating skepticism that their countries would already be receiving quality vaccines. Similarly, one respondent reported, "Rich nations cheating and bullying poor countries." Furthermore, some HCWs reported negative information as influencing their opinion (4.7%). As one participant stated:

"I took the first dose and I'm having second thoughts of taking the second dose, too much news I don't know what to believe."

On the other hand, other HCWs pointed to a lack of information as influencing their opinion on the COVID-19 vaccines (5.1%). However, due to the extremely open-endedness of the question, it was unclear in the responses from what sources and on which topics they were hoping to receive more information. Answers related to the motivational domain were only identified once under the questions related to COVID-19 vaccines (0.4%).

It should be noted that in some cases, respondents listed pregnancy as a reason for not wanting to get vaccinated; since COVID-19 vaccination was not offered to pregnant individuals in all countries at the time of the survey, it is unclear whether respondents were referring to practical issues (i.e., they would like to get vaccinated but were unable to) or if they were referring to an increased risk perception toward taking the vaccine (i.e., even with the vaccines being offered to pregnant individuals, they would choose not to get vaccinated out of fear that the vaccine might cause damage to them or their fetuses).

Also, although it was not an answer that appeared often, the study team does wish to highlight here that some respondents indicated racial concerns around vaccine safety, indicating that the vaccines had not been properly tested in all races and ethnicities, and therefore might not be safe for the Caribbean population. The topic of trust in authorities among populations of color must also be considered, as one participant noted:

"Based on past ethical issues, black people do have some trust issues which must be addressed to give more confidence in vaccines."

Attitude toward Influenza Vaccines

For the two questions relating to HCWs' attitudes toward influenza vaccines (Question 39, "If you disagree with getting the flu vaccine for yourself, why?" and Question 41, "If you disagree with recommending the flu vaccine, why?"), the majority of answers followed the same pattern as the questions about COVID-19 vaccines, by corresponding mostly to the thinking and feeling domain (Figure 11). The dominant concerns were related to (lack of) confidence in vaccine benefits (48.6%), where many respondents expressed doubts on

FIGURE 11. Qualitative response domains classified using the WHO Behavioral and Social Drivers (BeSD) rubric, open text questions about influenza vaccine
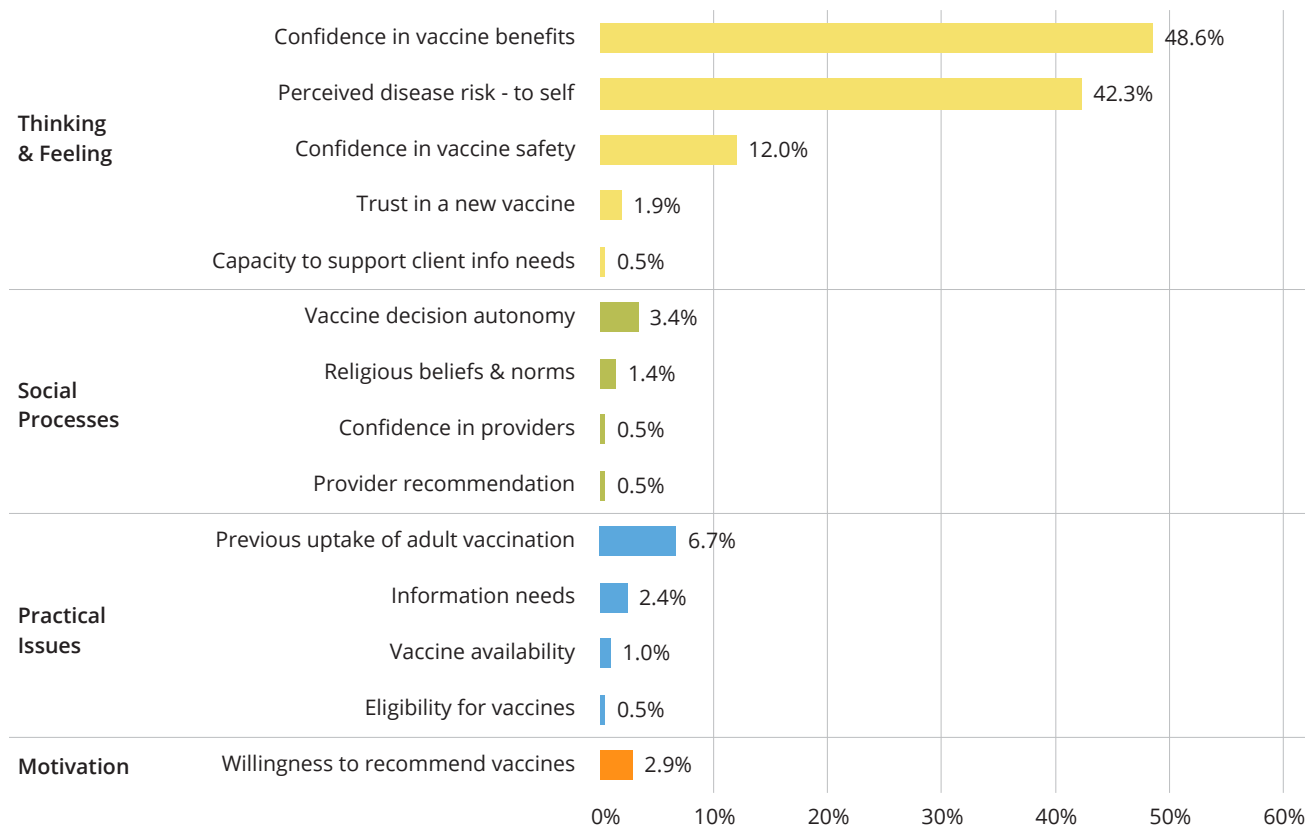
Open text answers from n = 208 respondents of Q39 and/or Q41 were categorized for this figure

influenza vaccines' ability to prevent them from catching flu. As one respondent described:

"The flu vaccines sometimes have a negative effect on individuals, and it definitely doesn't mean you still can't catch flu."

Two other main constructs were (low) perceived disease risk to oneself (42.3%), as many respondents did not perceive influenza to be a significant public health problem in their country, followed by (lack of) confidence in vaccine safety (12.0%) and concerns about the side effects of influenza vaccines.

Practical issues were the second most common domain for influenza vaccines. Most answers related to previous uptake of adult vaccination (6.7%), as respondents expressed having a bad experience with previous vaccination. However, these answers were also classified under the thinking and feeling

domain, as they signal a lack of confidence in the vaccines' safety.

When the qualitative data were analyzed by HCW category or age group, there was no significant difference in the domain identification previously done for factors contributing to respondents' opinion on COVID-19 vaccination. However, on one hand the research team observed a difference between sexes, where female respondents were more likely to answer within the thinking and feeling domain (79% of females vs. 66% of males). On the other hand, more males expressed answers within the social processes (21% of males vs. 15% of females) and practical issues (17% of males vs. 12% of females) domains.

Similarly, no differences were observed in domain identification for respondents' attitudes to influenza vaccines when analyzing the data by comparison of groups.

Discussion

Vaccination is one of public health's most critical tools in protecting populations from many dangerous diseases, including now against COVID-19; however, some HCWs are not fully convinced of the effectiveness and safety of these vaccines, which can result in a delay or refusal to get vaccinated when offered (*27*). HCWs are the first priority population for vaccination against COVID-19, as established by SAGE in the road map for prioritizing uses of COVID-19 vaccines in the context of limited supply (*28*), and they are the most trusted source of vaccine and vaccination-related information to the general population (*6*). The concerns, attitudes, and intended practices of physicians, nurses, and other HCWs influence the decision of the public regarding vaccination.

In this study assessing the intention of HCWs to get the COVID-19 vaccine as soon as possible, it was observed that 77% of the participants would receive the vaccine and 23% could be qualified as "vaccine hesitant." However, despite 23% of respondents indicating they would not get vaccinated against COVID-19 as soon as they had the opportunity, only 4% of respondents reported that they never intend to get vaccinated. Nurses were classified as hesitant at a rate twice more than physicians, and younger age quartiles reported more hesitancy to COVID-19 vaccination than older age groups. These findings are consistent with similar studies carried out elsewhere. In Spain, 22.43% were hesitant to receive the COVID-19 vaccine, with nurses reporting hesitancy twice more than physicians (35% vs. 17.5%) (*22*). Kutter et al. (*17*) found that 35.6% of 11,760 employees in two hospitals in Philadelphia had no intention to be vaccinated against COVID-19. Gagneux-Brunon et al. (*10*) reported 25.9% vaccine hesitancy among French HCWs, with a lower vaccine acceptance among nurses than physicians (35.3% vs. 7.9%) and those under 30 years (30.5%). Gadoth et al. (*26*) found that nurses were more prone to delay COVID-19 vaccine than physicians.

The study also found that there were important differences among specialties within professional categories, especially physicians and nurses. Clinicians and emergency physicians were more prone to want to get the vaccine as soon as possible, compared with general practitioners and family doctors (p = 0.007). Although not statistically significant, critical care nurses were more hesitant than outpatient, community, and public health nurses. As Verger et al. (*21*) noted, HCWs are not a homogeneous group, and most are not immunization experts, which is why building trust in this population requires providing credible information from trustworthy sources.

Regarding gender, the study did not find a difference in responses between men and women, an association that has been found in various papers (10, 26, 29). It identified higher willingness for uptake of a COVID-19 vaccine in the oldest age group, which is the most vulnerable group in terms of suffering severe outcomes from COVID-19 (*26*).

This study utilized as proxy for vaccine hesitancy the intention to get the vaccine as soon as possible. Intent to get vaccinated or vaccine uptake rates were also used in other studies to describe vaccine hesitancy (11, 14, 15, 17, 21, 29). Gagneux-Brunon et al. (*10*) considered vaccine hesitancy when participants either refused or postponed vaccination or had doubts about vaccine efficacy. Other studies consider the statements on risk of new versus older vaccines and concerns about serious adverse effects (*26*) or a fear of adverse events (*16*) as proxies for hesitancy.

More than half of nurses in this study preferred to wait to see how the COVID-19 vaccine affects others (60%) or stated that they might get it in the future (52%). Most respondents agreed that COVID-19 vaccine protects against severe infection and were confident in the scientific approval process. However, nurses and allied professionals were less confident, as were younger age groups.

The percentage of respondents in this study who would not take the influenza vaccine was the same as those who showed hesitancy against COVID-19 vaccines (23%). Previous influenza vaccination behavior had been found as a predictor of COVID-19 vaccine acceptance in a study conducted in Hong Kong in March 2020 (30). This could mean that vaccine hesitancy among HCWs who participated in this study is not necessarily only hesitancy regarding COVID-19 vaccination, but regarding adult vaccination in general.

Vaccine readiness and attitudes to vaccines in general

The findings presented in this report show that there was widespread agreement that vaccines in general are a good way to protect from disease, that they are safe and reliable, and that vaccine information provided by public health authorities and healthcare providers is reliable and trustworthy. However, HCWs who participated in the study expressed concerns when it comes to new vaccines, specifically reporting perceived risk in taking them due to concerns of serious adverse effects that could cause harm in the long-term. Similar findings were reported in other recent studies (15, 31). Nurses and younger respondents showed more concerns than physicians and older age groups.

Factors that contributed to the opinion on COVID-19 vaccines

There were important gaps in knowledge and accuracy of information on COVID-19 vaccines among participating HCWs from the Caribbean. A third of participants referenced insufficient knowledge on vaccines to make a decision, and a third agreed that they preferred natural immunity to COVID-19 vaccination. Almost half thought that the development of the vaccines may have been rushed or that the vaccines may not have been thoroughly tested, and this is one of the concerns also reported in other studies (32). One-fifth stated that COVID-19 vaccines can cause the disease. Nurses were less informed or reported more misinformation on COVID-19 vaccines than physicians. There were also significant differences within specialty subcategories, with critical care nurses having more knowledge gaps than other types of nurses. This finding was surprising, since critical care

nurses are highly trained professionals that should have access to accurate information on vaccines; moreover, they had more probability of being involved in the care of a COVID-19 patient, meaning one would expect them to have a clear understanding of the grave dangers the disease can cause. This finding was not consistent with other studies. According to Fakonty et al., ICU staff were less hesitant than HCWs from other areas (33). Gagneux-Brunon et al. (10) found that HCWs involved in the care of COVID-19 patients and considering themselves at risk of disease were more likely to accept COVID-19 vaccination than HCWs not caring for COVID-19 patients. However, regarding the findings of this study, it is important to recognize that critical care nurses are not a monolith; they bring their own personal beliefs and perceptions to their jobs, and these also influence the decisions they make regarding their own health. Likewise, they also can be exposed to misinformation about vaccines that can cause them to doubt their safety, efficacy, and benefits.

Qualitative analysis of open text questions confirmed and complemented the main findings in the quantitative component, with respondents expressing concerns related to perceived risks – including in the long-term – with taking COVID-19 vaccines, doubts regarding the vaccines' ability to effectively protect against COVID-19, and a lack of information from trusted sources or lack of trust in authorities, as the study of Verger et al. (21) reported. Concerns for vaccination safety were common findings in other studies (21, 29). There were some contrasting responses regarding vaccine safety. Gaps in perceived risk of COVID-19 vaccination versus risk of COVID-19 disease were widened by some respondents who answered that they did not see COVID-19 as a problem in their country. The most repeated constructs mentioned by respondents (33%) were related to confidence in vaccine safety, benefits, and trust. The most influential construct under the social processes domain was the lack of HCWs' confidence in their health authorities (10%), with participants including statements in the open-ended questions on mandating vaccines, dishonesty, and denial or hiding of adverse events.

Interpretation of the results

Efforts need to be made to increase risk perception of COVID-19 disease versus all approved vaccines so that HCWs feel more confident not only getting vaccinated themselves but also in recommending that their patients, family, and friends get vaccinated as well. Messaging also needs to emphasize the importance of taking the first vaccine that is available and not delaying vaccination in hopes of receiving a vaccine of personal preference. Trusted spokespersons should be used to empathetically communicate critical messages about vaccine safety and efficacy and the importance of getting vaccinated with the first vaccine that is offered. This is especially important in situations where health authorities and government figures are not trusted sources of information for all audiences. References to religious objections for not getting vaccinated, as indicated in some qualitative responses, highlight the need to work with religious leaders among these trusted spokespersons.

Given answers to open-ended questions that allergies, previous COVID-19 infection, or underlying medical conditions were reasons for not immediately being vaccinated against COVID-19, messaging should also seek to clarify that allergies are not a contraindication for vaccination, and that many comorbidities in fact increase the risk of complications from COVID-19 disease, meaning populations with those conditions will benefit greatly from the protection offered by COVID-19 vaccines. Additionally, the importance of getting vaccinated against COVID-19 following prior infection should be clearly communicated.

Likewise, in response to participants' responses about not having enough information or not enough research having been carried out to make sound decisions about COVID-19 vaccination, results of studies should be clearly and transparently communicated and explained to HCWs so they are continuously informed about new findings on vaccine effectiveness and safety.

Considering the statistically significant hesitancy among respondents in the youngest age group, a variety of channels should be employed to reach this audience with key messages in favor of vaccination. For example, authorities should explore social media platforms like Instagram and TikTok in addition to traditional communications channels.

Reasons for vaccine hesitancy listed in the qualitative answers that can be classified as misinformation, as well as the indication that social media is a source of information for HCWs about COVID-19 vaccines, show that HCWs would benefit from targeted training on identifying misinformation and trusted sources of information related to vaccines and vaccination. This would enable them to identify misinformation and thus be better informed themselves and able to correct rumors they hear from colleagues, patients, and community members.

Relevance of the study's findings

The results of this study could be used to tailor communication strategies by age group, professional category, and specialty of HCWs, focusing efforts on those groups that show more hesitancy toward COVID-19 vaccines. Training and continuing education of HCWs – in particular, physicians, and nurses – must continue so these groups can identify and address misinformation with their peers, patients, and community members, and have less anxiety related to the vaccines. Other groups of HCWs should be empowered as well. Specific interventions for primary care physicians and nurses can be implemented, considering that these professionals have close contact with the public on health-related matters, including related to vaccination.

Vaccine hesitancy among HCWs follows similar characteristics to the general population, where social listening activities and studies have also shown concerns about the process of developing COVID-19 vaccines (regarding the speed at which they were developed and the testing and approval processes); perceived risks of taking the vaccine, including in the long-term; and mistrust of authorities. Dispelling doubts among physicians and nurses could have a positive effect on the population, which is highly influenced by the opinion of their healthcare providers.

Inaccurate information spread on social networks influenced participating HCWs on COVID-19 vaccines.

However, social media can be a powerful tool to provide accurate information, debunk myths and rumors, facilitate the exchange of ideas, understand different population groups' concerns and doubts, and target different generations of HCWs in the Caribbean. A variety of platforms should be considered to ensure that younger HCWs, who in this study showed more hesitancy, are reached and engaged as well.

Younger age groups were more hesitant about COVID-19 vaccination than older age groups of HCWs. The perception of lower risk to COVID-19 disease among generally healthy individuals could explain this phenomenon, as well as the fact that these groups widely use social media and could be more exposed to fake news. Similarly, responses to open-ended questions that referenced concerns about blood clots and adenovirus vector vaccines could reflect concerns of respondents in younger age groups, where more cases of Thrombosis with Thrombocytopenia Syndrome (TTS) have been reported. It is important to note that these cases of TTS are extremely rare, and the WHO Strategic Advisory Group of Experts on Immunization (SAGE) and the Global Advisory Committee on Vaccine Safety (GACVS) have both stated that the benefits of these vaccines far outweigh any potential risks (*34*).

Nurses were twice more hesitant and less informed than physicians. Hesitancy among nurses is a major concern as the nature of their work puts them in more and longer contact with patients. Efforts in the short, mid, and long term should emphasize capacity building and training of nurses in communicating about vaccination, especially related to vaccine safety, with users of health services, their families, and members of their communities. In addition to education, policy-level interventions must be considered by national and subnational governments where vaccine hesitancy among HCWs is affecting the vaccination of the general public as well.

More research is needed to acknowledge the multifactorial nature of vaccine hesitancy among HCWs. There is a variety of individual and social characteristics that influence vaccination acceptance; only by understanding and addressing these will

it be possible to ensure a broader coverage of COVID-19 vaccines.

Strengths and Limitations

This study has several strengths:

- It was widely publicized, and the online survey was available for 50 days, casting a wide net for Caribbean HCWs to respond.
- It was available in English and French.
- In Trinidad and Tobago, it was available in paper form in addition to the website interface.
- Pretest work resulted in confusing phrases being identified and adjusted for clarity within the survey tool.
- Free text responses were independently categorized by several teams. Disagreements were resolved after consultation with the Behavioral and Social Drivers (BeSD) team from WHO Headquarters and further internal survey team review.
- Some consistent contrasting patterns in responses are evident between physicians and nurses and between the youngest and oldest respondents.
- Even without underlying differences, 5% of hypothesis tests are expected to yield p-values below 0.05. This work reports 224 chi-square p-values, so 11 or 12 would be expected to have p-values below 0.05 even if there were no underlying differences. In this analysis, 93 of the 224 comparisons yielded a p-value below 0.05, so it seems likely that there are very real differences of opinion between subgroups in these data.

It also has several limitations:

- The sample is not likely to be perfectly representative of Caribbean HCWs.
- The open invitation to participate was circulated through numerous professional networks, but it is not possible to know what portion of Caribbean HCWs heard about the survey in time to participate, nor whether those who heard are similar in demographics and attitude to those who did not hear.

- Similarly, it is not possible to know what portion of those who learned of the survey decided to participate, and why; likewise, the reasons are not known why those who did not participate did not.

- Because the sample is likely to be clustered by profession and by location of health facilities, the responses to questions are likely to be correlated with each other – persons in the same country or professional organization or the same health facility are subject to similar sources of information and are more likely to give responses similar to their colleagues than to those given by people from other job categories or locations. It is not possible to know the locations of the respondents, so it is not possible to account for spatial clustering in the analysis. Analyses of correlated data that cannot account for correlation are likely to yield smaller p-values than those that are able to account for the correlation, so there is a possibility that some of the statistically significant p-values here do not reflect truly significant differences.

- Due to the nature of the survey, answers received for the four free-text questions were limited to the information provided by the respondents. Some of these included one-word responses. There was no way of following up with respondents to obtain further explanation or information on what was entered in the survey. This meant that the analysis of these questions required some interpretation from the team on the intent and meaning behind the entries, inserting assumptions into the analysis.

- Understanding that the survey took place between March and April 2021 and the rapidly changing epidemiological situation in some countries, it is important to note that some of the attitudes and perceptions regarding perceived severity of COVID-19 disease described here could have changed as well.

- When the survey instrument was initially developed, COVID-19 vaccines were not yet available; however, by the time the instrument was implemented, vaccines were available in almost all participating countries. Some respondents indicated the survey questions were confusing because they posed COVID-19 vaccination as a hypothetical, while they themselves had already been vaccinated.

- The survey was rolled out during an incredibly busy time for Caribbean HCWs, as they were involved with vaccination campaigns and general pandemic response. This may have impacted the survey response rate.

Recommendations

Based on the WHO BeSD framework as well as the results of the survey, Table 8 outlines possible interventions to be implemented at country level to improve vaccine acceptance among HCWs.

As discussed in the "Interpretation of results" section in the Discussion above, considering the majority of responses fall under the "think and feel" domain and constructs related to low confidence in vaccine safety, efficacy, and benefits, PAHO suggests focusing on interventions that increase risk perception of COVID-19 as a disease in relation to COVID-19 vaccination. At the same time, interventions should seek to increase HCWs' understanding and acceptance of the safety, efficacy, and benefits of vaccination. Educational campaigns and provider and institutional recommendations can be employed to facilitate these objectives.

Additionally, because trust is such a critical issue for the immunization program, further interventions may be considered to address study findings under the "social processes" domain related to lack of confidence in health authorities. Such efforts might include transparent, timely communication from authorities on COVID-19 vaccination, or collaboration with trusted leaders in HCW communities who can advocate for vaccination.

For additional information on Table 8, including likely impact on vaccine uptake and strength of evidence, please see the WHO Guidance Data for Action: Achieving high uptake of COVID-19 vaccines.

For examples of messaging to adapt for communication strategies, see Annex E.

TABLE 8: **Recommendations by domains, indicator, intervention category, and description**

Domain	Indicator (problem areas)	Intervention category and description

What people think and feel	% of HCWs who would trust the new COVID-19 vaccine "very much" or "moderately" (item 10)
	
	% of HCWs who think a COVID-19 vaccine is "very" or "moderately" important for their health (item 11)
		1. Educational campaign
		  a. Educational campaign consisting of informational posters with disease risk, letters, educational materials, group educational session highlighting disease salience and importance of vaccine.
		  b. Educational campaign consisting of posters encouraging vaccination to protect yourself and patients.
		  c. 15-minute in-service educational seminar; personalized education of vaccine.
		  d. Lectures/posters, employee education.
		  e. Health education with all relevant personnel in a health facility/hospital.
		  f. Educational program for health care providers using a train-the-trainer model.
		  g. Decision aid that guides HCW through decision-making process for vaccination.
		2. Institutional recommendation
		  a. Institutions, such as hospitals, encourage vaccination and vaccination stickers.
		3. Provider recommendation
		  a. Provider recommends COVID-19 vaccine.
		4. Not categorized
		  a. HCW vaccination campaign consisting of a *mandatory declination policy* where HCWs sign a form saying they are declining the vaccine and understand the risks of non-vaccination to themselves and others.

Social processes	% of HCWs who think most of the people they work with will get a COVID-19 vaccine (item 25)
	
	% of HCWs who think most of their close family and friends would want them to get a COVID-19 vaccine (item 22)
		1. On-site vaccination
		  a. Increase convenient access and affordability of vaccine by providing vaccination on site or at work.
		2. Institutional recommendation
		  a. Health care facility recommends vaccine and encourages vaccinated by providing "I vaccinated" stickers.
		3. Not categorized
		  a. System to disclose vaccination status to managers.

Motivation	% of HCWs who would recommend a COVID-19 vaccine to eligible individuals (item 17)
	
	% of HCWs who would get a COVID-19 vaccine if it was available to them (item 15)
		1. Educational campaign
		  a. 15-minute in-service educational seminar; personalized education of vaccine and building interpersonal communication skills of HCWs.
		  b. Decision aids that guide HCW through decision-making process for vaccination.
		2. Reminders and recall
		  a. Letter and telephone reminders.
		  b. E-mail reminders.
		3. Incentives
		  a. Incentives for vaccination including free lunches, raffles, lottery tickets, and cash prizes.
		  b. Monetary incentives for vaccination.
		4. Institutional recommendation
		  a. Institutional recommendation.
		5. Vaccine champions
		  a. Vaccine champions.
		6. Not categorized
		  a. Training for providers to reinforce provider recommendation with health risk appraisal (an assessment of a patient's health risks and preventive behaviors).
		  b. Process for considering non-compliance with vaccination as part of routine employee performance reviews.

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Annexes

PAHO
Pan American Health Organization · World Health Organization · REGIONAL OFFICE FOR THE Americas

CONCERNS, ATTITUDES, AND INTENDED PRACTICES OF HEALTHCARE WORKERS TO COVID-19 VACCINE IN THE CARIBBEAN

Thank you very much for participating in this survey for healthcare workers. The questionnaire has a duration of no more than eight (8) minutes.

No. _____

1 **Country where you work: _____**

2 **Sex: Male ☐ Female ☐ Other**   3. **Age: _____**

4 **Job title/Post: _____**   5. **HCW Category:**

Please choose the box with the response that best fits your personal concerns, attitudes and intended practices:

		Strongly Agree	Agree	Don't Know	Disagree	Strongly Disagree
	Attitudes to vaccines					
6	Vaccines are important for my health					
7	Getting vaccines is a good way to protect myself from disease					
8	Overall, vaccines are safe					
9	Overall, vaccines are effective					
10	Getting vaccinated is important for the health of others in my community					
11	The information I receive about vaccines from public health authorities/ my healthcare provider is reliable and trustworthy					
12	Generally, I do what my doctor or health care provider recommends about vaccines for myself and my family					
	Vaccine readiness	Strongly Agree	Agree	Don't Know	Disagree	Strongly Disagree
13	New vaccines carry more risk than older vaccines					
14	I would recommend a COVID-19 vaccine to friends and family					

		Strongly Agree	Agree	Don't Know	Disagree	Strongly Disagree
15	I am concerned about serious adverse effects of vaccines					

	Attitudes towards COVID-19 vaccine	**Strongly Agree**	**Agree**	**Don't Know**	**Disagree**	**Strongly Disagree**
16	A coronavirus (COVID–19) vaccine will protect me from severe COVID disease					
17	I am confident in the scientific approval process for a new coronavirus (COVID–19) vaccine					
18	I would be willing to participate in a vaccine trial for a coronavirus (COVID–19) vaccine					
	If a new coronavirus (COVID–19) vaccine becomes publicly available:					
19	I intend to get it as soon as possible					
20	I intend to wait to see how it affects others before I get it					
21	I do not intend on getting it soon, but might sometime in the future					
22	I do not intend to ever get the vaccine					
	Please indicate how you feel about the statements below	**Strongly Agree**	**Agree**	**Don't Know**	**Disagree**	**Strongly Disagree**
23	I am confident there will be other effective treatments soon					
24	I do not yet know enough about the vaccine to make a decision					
25	I want to gain natural immunity to the virus that causes COVID–19					
26	Development of the vaccine may be rushed/the vaccine may not be thoroughly tested prior to approval					
27	I believe vaccines may give you the disease they are designed to protect against					
28	Other reasons for delaying or refusing COVID-19 vaccine:					

	Attitudes towards COVID-19 vaccine					
	The following factors contributed to my opinion on a COVID–19 vaccine:	**Strongly Agree**	**Agree**	**Don't Know**	**Disagree**	**Strongly Disagree**
29	The pace at which the vaccine was researched and developed					
30	The unfolding & frequently evolving science of SARS–CoV–2					
31	Actions and opinions of my friends and family regarding the vaccine					
32	The relationship between coverage rates and community transmission					

33	My own research on COVID–19 vaccines					
34	The country in which a vaccine is manufactured					
35	The potential cost of a COVID–19 vaccine					
36	Information I've seen on social media.					
37	Other factors:					

	Attitudes towards influenza vaccine	**Strongly Agree**	**Agree**	**Don't Know**	**Disagree**	**Strongly Disagree**
38	I would take the flu vaccine if offered					
39	If you disagree, what are the reasons why? _____					
		Strongly Agree	**Agree**	**Don't Know**	**Disagree**	**Strongly Disagree**
40	I would recommend the flu vaccine to friends and family					
41	If you disagree, what are the reasons why? _____					

Thanks again for your participation!

Please, feel free to share this survey with other healthcare workers who may be interested in participating.

Annex B. Number of Responses, by Question

Question Text	Number of Responses
Attitudes: Vaccines are important for my health	1,159
Attitudes: Vaccines are a good way to protect myself from disease	1,143
Attitudes: Vaccines are safe	1,075
Attitudes: Vaccines are effective	1,081
Attitudes: Vaccines are important for the health of others	1,143
Attitudes: Vaccine information is reliable and trustworthy	1,031
Attitudes: I do what my care provider recommends about vaccines	1,144
Readiness: New vaccines carry more risk than older vaccines	822
Readiness: I would recommend a COVID-19 vaccine to friends and family	1,008
Readiness: I am concerned about serious adverse effects of vaccines	1,129
COVID-19: A COVID–19 vaccine will protect me from severe COVID disease	909
COVID-19: I am confident in the COVID-19 vaccine scientific approval process	892
COVID-19: I would be willing to participate in a COVID-19 vaccine trial	815
COVID-19 vaccine: I intend to get it as soon as possible	848
COVID-19 vaccine: I intend to wait to see how it affects others before I get it	1,008
COVID-19 vaccine: I do not intend to get it soon, but might in the future	996
COVID-19 vaccine: I do not intend to ever get the vaccine	965
Reasons: I am confident there will be other effective treatments soon	682
Reasons: I do not yet know enough about the vaccine to make a decision	1,039
Reasons: I want to gain natural immunity to the virus that causes COVID–19	964
Reasons: Development may be rushed/vaccine may not be thoroughly tested	916
Reasons: I believe vaccines may give you the disease	955
Opinion shapers: The pace at which the vaccine was researched and developed	972
Opinion shapers: The unfolding & frequently evolving science of SARS–CoV–2	932
Opinion shapers: Actions and opinions of friends and family	958
Opinion shapers: Relationship between coverage rates and community transmissi	723
Opinion shapers: My own research on COVID–19 vaccines	960
Opinion shapers: The country in which a vaccine is manufactured	904
Opinion shapers: The potential cost of a COVID–19 vaccine	854
Opinion shapers: Information I´ve seen on social media.	950
Influenza: I would take the flu vaccine if offered	958
Infuenza: I would recommend the flu vaccine to friends and family	932

Note: Blue bars are scaled so that if the entire cell were blue, it would represent N=1,197.

ANNEX C

Summary of Responses Including Colored Bars and Chi-Square and Logistic Regression *P*-Values, by Question

Each table in this annex summarizes responses to a single survey question. The rows represent subgroups of respondents. The first four columns summarize the proportion who answered Strongly agree, Agree, Disagree, and Strongly disagree. The next two columns consolidate the responses into two categories: Strongly agree and Agree versus Disagree and Strongly disagree. The next column indicates the number of persons in each subgroup who responded to the question. The next column lists chi-square *p*-values that test the hypothesis that the percentage who Strongly agree or Agree is the same:

a) Between nurses and physicians
b) Across all categories of healthcare workers
c) Among categories of physicians
d) Among categories of nurses
e) Among care categories
f) Between men and women
g) Among age quartiles.

P-values smaller than 0.05 are listed in a bold font and indicate a statistically significant difference.

The final four columns show results from multivariable logistic regression, where the outcome is 1 if the respondent selected Strongly agree or Agree and is 0 if they selected Disagree or Strongly disagree. The regression uses three categorical predictors: healthcare worker category (physician is the reference group); sex (male is the reference); and age quartile (youngest is the reference group). Each table lists odds ratios, *p*-values, and 95% confidence intervals for the odds ratios. *P*-values smaller than 0.05 are listed in a bold font and indicate a statistically significant result when simultaneously adjusting for differences in job category, sex, and age.

TABLE Q-6. Attitudes: Vaccines are important for my health

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	69	29	2	0	98	2	1 159					
HCW: Physicians	78	20	1	0	98	2	516		1.0			
HCW: Nurses	58	40	2	0	98	2	320	0.649	0.6	0.372	0.2	1.9
HCW: Public Health Pros	72	27	1	0	99	1	113		2.0	0.525	0.2	16.2
HCW: Allied Pros	65	32	3	0	97	3	146		0.5	0.27	0.1	1.7
HCW: Other	48	47	3	2	95	5	64	0.362	0.3	0.102	0.1	1.3
Physician (General and family)	78	21	1	1	98	2	292					
Physician (Surgical)	68	30	2	0	98	2	53					
Physician (Medical)	82	16	2	0	98	2	147					
Physician (Emergency)	79	21	0	0	100	0	24	0.917				
Nurse (Community and public health)	68	31	0	1	99	1	100					
Nurse (Critical care)	48	48	4	0	96	4	46					
Nurse (Outpatients)	69	28	3	0	97	3	36					
Nurse (Ward)	48	50	3	0	97	3	119	0.647				
Care category: Care	71	27	2	0	98	2	733					
Care category: Public health	68	30	2	0	98	2	362					
Care category: Other	48	47	3	2	95	5	64	0.355				
Sex: Male	73	23	3	1	96	4	277		1.0			
Sex: Female	67	31	1	0	98	2	876	**0.018**	2.9	**0.026**	1.1	7.5
Age Q1: 21–32	67	33	1	0	99	1	296		1.0			
Age Q2: 33–40	70	29	1	0	99	1	278		0.5	0.387	0.1	2.6
Age Q3: 41–50	68	29	2	0	97	3	292		0.3	0.101	0.1	1.3
Age Q4: 51–87	71	26	2	1	97	3	278	0.16	0.2	0.081	0.1	1.2

TABLE Q-7. Attitudes: Vaccines are a good way to protect myself from disease

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	67	30	2	1	98	2	1 143					
HCW: Physicians	77	21	1	1	98	2	507		1.0			
HCW: Nurses	56	41	3	1	96	4	312	0.072	0.4	0.115	0.1	1.2
HCW: Public Health Pros	72	27	1	0	99	1	113		1.7	0.642	0.2	13.7
HCW: Allied Pros	63	33	3	1	96	4	147		0.5	0.236	0.1	1.6
HCW: Other	48	48	2	2	97	3	64	0.196	0.4	0.272	0.1	2.0
Physician (General and family)	78	20	1	1	98	2	287					
Physician (Surgical)	67	33	0	0	100	0	52					
Physician (Medical)	79	19	1	0	99	1	144					
Physician (Emergency)	79	21	0	0	100	0	24	0.629				
Nurse (Community and public health)	67	32	0	1	99	1	96					
Nurse (Critical care)	45	51	2	2	96	4	47					
Nurse (Outpatients)	65	32	3	0	97	3	34					
Nurse (Ward)	47	47	5	1	94	6	116	0.293				
Care category: Care	69	28	2	1	98	3	720					
Care category: Public health	67	31	2	1	98	2	359					
Care category: Other	48	48	2	2	97	3	64	0.903				
Sex: Male	72	25	2	1	97	3	272		1.0			
Sex: Female	66	32	2	1	98	2	865	0.482	1.8	0.255	0.7	4.8
Age Q1: 21–32	64	34	1	1	98	2	292		1.0			
Age Q2: 33–40	66	33	0	1	99	1	278		1.6	0.543	0.4	6.7
Age Q3: 41–50	68	30	2	0	98	2	285		0.7	0.589	0.2	2.3
Age Q4: 51–87	73	24	2	1	97	3	272	0.478	0.6	0.393	0.2	1.9

TABLE Q-8. Attitudes: Vaccines are safe

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	41	53	4	2	95	5	1 075					
HCW: Physicians	47	48	3	2	96	4	495		1.0			
HCW: Nurses	34	61	5	1	94	6	286	0.472	0.5	0.073	0.2	1.1
HCW: Public Health Pros	45	50	5	0	95	5	102		0.8	0.642	0.3	2.2
HCW: Allied Pros	35	57	5	4	91	9	136		0.5	0.088	0.2	1.1
HCW: Other	34	59	5	2	93	7	56	0.364	0.7	0.606	0.2	2.5
Physician (General and family)	45	51	2	2	95	5	281					
Physician (Surgical)	45	47	4	4	92	8	51					
Physician (Medical)	51	46	4	0	96	4	140					
Physician (Emergency)	65	35	0	0	100	0	23	0.435				
Nurse (Community and public health)	47	53	0	0	100	0	93					
Nurse (Critical care)	33	55	13	0	88	13	40					
Nurse (Outpatients)	23	74	0	3	97	3	31					
Nurse (Ward)	26	64	8	2	91	9	106	**0.008**				
Care category: Care	42	53	4	2	94	6	685					
Care category: Public health	41	54	4	1	95	5	334					
Care category: Other	34	59	5	2	93	7	56	0.818				
Sex: Male	44	46	7	3	90	10	261		1.0			
Sex: Female	40	56	3	1	96	4	809	**<0.001**	3.1	**<0.001**	1.7	5.8
Age Q1: 21–32	36	59	4	1	94	6	267		1.0			
Age Q2: 33–40	40	53	5	2	93	7	262		0.7	0.353	0.3	1.5
Age Q3: 41–50	42	53	4	1	95	5	273		1.2	0.608	0.6	2.7
Age Q4: 51–87	48	48	2	1	97	3	260	0.349	1.7	0.216	0.7	4.1

TABLE Q-9. Attitudes: Vaccines are effective

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	46	51	2	1	97	3	1 081					
HCW: Physicians	52	44	2	1	97	3	502		1.0			
HCW: Nurses	39	58	3	1	96	4	281	0.899	0.6	0.237	0.2	1.4
HCW: Public Health Pros	47	51	2	0	98	2	108		1.6	0.56	0.3	7.0
HCW: Allied Pros	42	55	2	1	97	3	132		2.0	0.352	0.5	9.0
HCW: Other	40	60	0	0	100	0	58	0.594	1.0			
Physician (General and family)	52	44	2	2	95	5	287					
Physician (Surgical)	50	48	2	0	98	2	50					
Physician (Medical)	50	48	1	1	98	2	142					
Physician (Emergency)	74	26	0	0	100	0	23	0.399				
Nurse (Community and public health)	53	46	1	0	99	1	95					
Nurse (Critical care)	41	51	5	3	92	8	37					
Nurse (Outpatients)	35	61	3	0	97	3	31					
Nurse (Ward)	27	68	4	1	95	5	101	0.236				
Care category: Care	47	49	2	1	96	4	685					
Care category: Public health	47	51	2	0	98	2	338					
Care category: Other	40	60	0	0	100	0	58	0.122				
Sex: Male	48	47	4	2	95	5	257		1.0			
Sex: Female	46	52	2	1	98	2	818	**0.011**	3.2	**0.005**	1.4	7.0
Age Q1: 21–32	41	55	2	1	96	4	283		1.0			
Age Q2: 33–40	45	51	3	1	96	4	264		0.8	0.578	0.3	1.9
Age Q3: 41–50	47	51	2	0	98	2	265		2.0	0.215	0.7	6.0
Age Q4: 51–87	54	44	1	1	98	2	257	0.295	2.1	0.176	0.7	6.4

TABLE Q-10. Attitudes: Vaccines are important for the health of others

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	63	35	2	0	98	2	1 143					
HCW: Physicians	74	25	1	0	99	1	513		1.0			
HCW: Nurses	54	44	2	0	98	2	308	0.24	0.3	0.061	0.1	1.1
HCW: Public Health Pros	60	39	1	0	99	1	114		0.8	0.875	0.1	7.7
HCW: Allied Pros	55	41	3	1	96	4	144		0.2	**0.048**	0.1	1.0
HCW: Other	42	53	3	2	95	5	64	**0.042**	0.2	0.077	0.0	1.2
Physician (General and family)	72	27	1	0	99	1	292					
Physician (Surgical)	73	27	0	0	100	0	51					
Physician (Medical)	77	22	1	0	99	1	147					
Physician (Emergency)	87	13	0	0	100	0	23	0.81				
Nurse (Community and public health)	67	31	2	0	98	2	99					
Nurse (Critical care)	49	49	2	0	98	2	43					
Nurse (Outpatients)	60	37	3	0	97	3	35					
Nurse (Ward)	43	55	2	0	98	2	112	0.983				
Care category: Care	67	32	1	0	99	1	719					
Care category: Public health	60	38	2	0	98	3	360					
Care category: Other	42	53	3	2	95	5	64	0.077				
Sex: Male	65	32	3	0	97	3	275		1.0			
Sex: Female	63	36	1	0	99	1	863	**0.043**	3.1	**0.04**	1.1	9.2
Age Q1: 21–32	62	37	1	0	99	1	297		1.0			
Age Q2: 33–40	62	37	1	0	99	1	276		1.2	0.785	0.3	5.7
Age Q3: 41–50	61	38	1	0	99	1	282		1.1	0.916	0.3	4.4
Age Q4: 51–87	68	30	2	0	98	2	272	0.732	0.7	0.518	0.2	2.4

TABLE Q-11. Attitudes: Vaccine information is reliable and trustworthy

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	39	55	4	2	94	6	1 031					
HCW: Physicians	45	49	4	2	94	6	468		1.0			
HCW: Nurses	33	60	5	2	93	7	285	0.573	0.5	0.059	0.3	1.0
HCW: Public Health Pros	42	58	0	0	100	0	100		1.0			
HCW: Allied Pros	34	57	8	1	91	9	120		0.7	0.495	0.3	1.7
HCW: Other	26	67	5	2	93	7	58	0.062	1.0	0.988	0.3	3.5
Physician (General and family)	46	48	4	3	94	6	267					
Physician (Surgical)	42	53	2	2	95	5	43					
Physician (Medical)	44	50	4	1	94	6	140					
Physician (Emergency)	56	39	6	0	94	6	18	0.973				
Nurse (Community and public health)	46	51	3	0	97	3	95					
Nurse (Critical care)	21	68	5	5	89	11	38					
Nurse (Outpatients)	23	74	3	0	97	3	35					
Nurse (Ward)	26	63	9	2	89	11	101	0.107				
Care category: Care	40	53	5	2	93	7	656					
Care category: Public health	40	55	4	0	96	4	317					
Care category: Other	26	67	5	2	93	7	58	0.318				
Sex: Male	44	46	6	4	90	10	244		1.0			
Sex: Female	38	58	4	1	95	5	781	**0.002**	2.8	**0.001**	1.5	5.1
Age Q1: 21–32	34	58	6	2	92	8	258		1.0			
Age Q2: 33–40	40	54	3	2	95	5	242		1.4	0.375	0.7	2.9
Age Q3: 41–50	35	59	4	2	94	6	263		1.4	0.39	0.7	2.8
Age Q4: 51–87	48	49	2	1	96	4	254	0.229	2.4	**0.036**	1.1	5.4

TABLE Q-12. Attitudes: I do what my care provider recommends about vaccines

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	38	54	7	1	92	8	1 144					
HCW: Physicians	44	50	5	1	94	6	505		1.0			
HCW: Nurses	31	60	8	1	91	9	306	0.086	0.6	**0.044**	0.3	1.0
HCW: Public Health Pros	41	53	6	0	94	6	115		0.9	0.904	0.4	2.2
HCW: Allied Pros	33	54	12	1	87	13	150		0.5	**0.033**	0.3	0.9
HCW: Other	25	66	9	0	91	9	68	0.071	0.7	0.534	0.3	2.0
Physician (General and family)	44	49	5	2	94	6	286					
Physician (Surgical)	32	57	11	0	89	11	53					
Physician (Medical)	47	50	3	0	97	3	144					
Physician (Emergency)	50	45	0	5	95	5	22	0.216				
Nurse (Community and public health)	43	52	5	0	95	5	96					
Nurse (Critical care)	26	60	12	2	86	14	43					
Nurse (Outpatients)	25	72	3	0	97	3	36					
Nurse (Ward)	24	65	10	1	89	11	112	0.153				
Care category: Care	39	54	6	1	93	7	712					
Care category: Public health	38	53	9	0	91	9	364					
Care category: Other	25	66	9	0	91	9	68	0.661				
Sex: Male	39	53	7	1	91	9	279		1.0			
Sex: Female	37	55	7	1	93	7	859	0.532	1.3	0.41	0.7	2.2
Age Q1: 21–32	36	58	5	1	94	6	290		1.0			
Age Q2: 33–40	33	57	9	1	90	10	275		0.5	0.053	0.3	1.0
Age Q3: 41–50	36	56	8	0	92	8	287		0.7	0.305	0.4	1.4
Age Q4: 51–87	46	49	5	0	95	5	274	0.105	1.2	0.638	0.6	2.5

TABLE Q-13.　Readiness: New vaccines carry more risk than older vaccines

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	17	38	36	8	56	44	822					
HCW: Physicians	12	36	43	9	48	52	372		1.0			
HCW: Nurses	25	40	29	7	65	35	221	<0.001	2.0	<0.001	1.4	2.8
HCW: Public Health Pros	11	34	41	14	45	55	83		0.9	0.822	0.6	1.5
HCW: Allied Pros	21	43	29	7	64	36	103		1.9	0.005	1.2	3.0
HCW: Other	28	47	21	5	74	26	43	<0.001	3.2	0.002	1.5	6.5
Physician (General and family)	13	36	44	8	48	52	211					
Physician (Surgical)	15	40	40	5	55	45	40					
Physician (Medical)	10	33	48	10	43	57	103					
Physician (Emergency)	11	50	17	22	61	39	18	0.364				
Nurse (Community and public health)	19	30	41	10	49	51	73					
Nurse (Critical care)	32	52	13	3	84	16	31					
Nurse (Outpatients)	19	48	33	0	67	33	27					
Nurse (Ward)	32	38	23	8	70	30	79	0.004				
Care category: Care	17	38	37	8	55	45	519					
Care category: Public health	17	37	36	10	54	46	260					
Care category: Other	28	47	21	5	74	26	43	0.037				
Sex: Male	18	34	38	11	51	49	205		1.0			
Sex: Female	17	40	36	7	57	43	613	0.132	1.1	0.602	0.8	1.5
Age Q1: 21–32	19	40	37	4	59	41	210		1.0			
Age Q2: 33–40	16	39	34	11	55	45	199		0.9	0.465	0.6	1.3
Age Q3: 41–50	17	34	39	9	52	48	206		0.7	0.155	0.5	1.1
Age Q4: 51–87	17	39	35	9	55	45	193	0.604	0.8	0.42	0.6	1.3

TABLE Q-14.　Readiness: I would recommend a COVID-19 vaccine to friends and family

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	46	42	7	4	88	12	1 008					
HCW: Physicians	57	35	5	4	92	8	477		1.0			
HCW: Nurses	32	54	8	5	87	13	254	0.033	0.4	0.001	0.2	0.7
HCW: Public Health Pros	54	40	4	1	95	5	94		1.3	0.547	0.5	3.6
HCW: Allied Pros	36	43	17	4	79	21	127		0.3	<0.001	0.2	0.6
HCW: Other	27	54	11	9	80	20	56	<0.001	0.4	0.022	0.2	0.9
Physician (General and family)	52	37	6	5	89	11	268					
Physician (Surgical)	63	31	4	2	94	6	48					
Physician (Medical)	65	31	3	1	96	4	140					
Physician (Emergency)	57	33	5	5	90	10	21	0.142				
Nurse (Community and public health)	40	54	4	2	94	6	85					
Nurse (Critical care)	18	56	18	9	74	26	34					
Nurse (Outpatients)	31	53	13	3	84	16	32					
Nurse (Ward)	32	52	9	7	84	16	87	0.023				
Care category: Care	50	40	6	5	89	11	643					
Care category: Public health	42	46	9	3	88	12	309					
Care category: Other	27	54	11	9	80	20	56	0.132				
Sex: Male	50	35	8	6	86	14	256		1.0			
Sex: Female	45	45	7	3	89	11	746	0.096	1.8	0.011	1.1	2.9
Age Q1: 21–32	40	44	9	7	84	16	246		1.0			
Age Q2: 33–40	44	44	8	4	87	13	236		1.3	0.329	0.8	2.2
Age Q3: 41–50	44	46	8	2	90	10	255		1.9	0.023	1.1	3.3
Age Q4: 51–87	58	36	4	2	94	6	253	0.006	3.1	<0.001	1.6	5.7

TABLE Q-15. Readiness: I am concerned about serious adverse effects of vaccines

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	25	53	19	3	77	23	1 129					
HCW: Physicians	18	55	23	5	73	27	494		1.0			
HCW: Nurses	35	48	16	2	82	18	306	0.002	1.9	<0.001	1.3	2.8
HCW: Public Health Pros	26	48	23	4	74	26	111		1.1	0.587	0.7	1.8
HCW: Allied Pros	25	57	15	3	82	18	150		1.7	0.022	1.1	2.7
HCW: Other	29	56	13	1	85	15	68	0.004	2.2	0.03	1.1	4.4
Physician (General and family)	17	54	24	4	72	28	281					
Physician (Surgical)	32	46	22	0	78	22	50					
Physician (Medical)	15	59	21	5	74	26	140					
Physician (Emergency)	13	57	13	17	70	30	23	0.785				
Nurse (Community and public health)	27	51	20	2	78	22	95					
Nurse (Critical care)	49	38	13	0	87	13	45					
Nurse (Outpatients)	31	51	17	0	83	17	35					
Nurse (Ward)	37	46	15	3	82	18	114	0.629				
Care category: Care	24	52	20	4	76	24	702					
Care category: Public health	26	52	19	3	79	21	359					
Care category: Other	29	56	13	1	85	15	68	0.182				
Sex: Male	24	53	17	6	77	23	270		1.0			
Sex: Female	25	53	20	2	78	22	853	0.845	0.9	0.433	0.6	1.2
Age Q1: 21–32	28	53	17	2	81	19	295		1.0			
Age Q2: 33–40	24	53	20	3	76	24	267		0.8	0.196	0.5	1.1
Age Q3: 41–50	23	54	21	3	76	24	280		0.7	0.131	0.5	1.1
Age Q4: 51–87	24	50	20	5	75	25	271	0.293	0.7	0.041	0.4	1.0

TABLE Q-16. COVID-19: A COVID–19 vaccine will protect me from severe COVID disease

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	49	43	6	3	92	8	909					
HCW: Physicians	57	39	2	1	96	4	446		1.0			
HCW: Nurses	39	46	10	5	85	15	221	<0.001	0.2	<0.001	0.1	0.3
HCW: Public Health Pros	49	48	2	1	97	3	86		0.9	0.878	0.3	3.2
HCW: Allied Pros	36	46	15	3	82	18	111		0.2	<0.001	0.1	0.4
HCW: Other	38	56	2	4	93	7	45	<0.001	0.7	0.66	0.2	3.2
Physician (General and family)	53	41	4	2	94	6	248					
Physician (Surgical)	61	35	2	2	96	4	46					
Physician (Medical)	65	35	0	0	100	0	133					
Physician (Emergency)	47	53	0	0	100	0	19	0.024				
Nurse (Community and public health)	53	42	4	1	95	5	74					
Nurse (Critical care)	13	52	19	16	65	35	31					
Nurse (Outpatients)	45	48	7	0	93	7	29					
Nurse (Ward)	34	45	13	8	79	21	77	<0.001				
Care category: Care	51	41	5	3	92	8	591					
Care category: Public health	45	45	8	2	90	10	273					
Care category: Other	38	56	2	4	93	7	45	0.533				
Sex: Male	51	41	5	3	92	8	231		1.0			
Sex: Female	48	44	6	3	92	8	673	0.747	1.4	0.281	0.8	2.7
Age Q1: 21–32	41	45	11	3	86	14	222		1.0			
Age Q2: 33–40	52	42	4	2	93	7	213		2.2	0.02	1.1	4.4
Age Q3: 41–50	43	50	4	4	92	8	224		2.3	0.01	1.2	4.5
Age Q4: 51–87	59	37	3	1	96	4	237	0.001	4.3	<0.001	2.0	9.2

TABLE Q-17. COVID-19: I am confident in the COVID-19 vaccine scientific approval process

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	28	54	13	4	83	17	892					
HCW: Physicians	35	52	9	4	88	12	435		1.0			
HCW: Nurses	18	58	17	6	76	24	206	<0.001	0.4	<0.001	0.3	0.6
HCW: Public Health Pros	36	56	7	1	92	8	84		1.4	0.464	0.6	3.2
HCW: Allied Pros	17	55	25	4	72	28	113		0.4	<0.001	0.2	0.7
HCW: Other	22	50	24	4	72	28	54	<0.001	0.4	0.007	0.2	0.8
Physician (General and family)	34	53	8	6	86	14	240					
Physician (Surgical)	40	44	13	2	84	16	45					
Physician (Medical)	38	55	6	1	93	7	130					
Physician (Emergency)	30	50	20	0	80	20	20	0.137				
Nurse (Community and public health)	29	58	12	0	88	12	65					
Nurse (Critical care)	4	65	15	15	69	31	26					
Nurse (Outpatients)	10	73	13	3	83	17	30					
Nurse (Ward)	16	49	24	11	65	35	75	0.011				
Care category: Care	30	54	11	5	84	16	573					
Care category: Public health	26	56	16	2	82	18	265					
Care category: Other	22	50	24	4	72	28	54	0.097				
Sex: Male	38	46	10	5	84	16	237		1.0			
Sex: Female	25	57	15	4	82	18	649	0.373	1.1	0.662	0.7	1.7
Age Q1: 21–32	21	56	17	6	77	23	210		1.0			
Age Q2: 33–40	29	50	15	5	79	21	222		1.1	0.571	0.7	1.8
Age Q3: 41–50	22	61	16	2	82	18	228		1.5	0.098	0.9	2.4
Age Q4: 51–87	40	52	5	3	92	8	220	<0.001	3.7	<0.001	2.0	6.8

TABLE Q-18. COVID-19: I would be willing to participate in a COVID-19 vaccine trial

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	14	27	36	23	41	59	815					
HCW: Physicians	17	35	30	17	53	47	374		1.0			
HCW: Nurses	8	16	43	32	24	76	201	<0.001	0.4	<0.001	0.2	0.5
HCW: Public Health Pros	17	29	35	19	46	54	69		0.8	0.325	0.4	1.3
HCW: Allied Pros	11	19	43	27	30	70	120		0.4	<0.001	0.2	0.6
HCW: Other	10	29	31	29	39	61	51	<0.001	0.5	0.058	0.3	1.0
Physician (General and family)	17	35	30	19	52	48	210					
Physician (Surgical)	11	42	29	18	53	47	45					
Physician (Medical)	18	34	34	14	52	48	102					
Physician (Emergency)	35	29	12	24	65	35	17	0.785				
Nurse (Community and public health)	6	18	51	25	24	76	51					
Nurse (Critical care)	3	14	40	43	17	83	35					
Nurse (Outpatients)	9	26	39	26	35	65	23					
Nurse (Ward)	13	14	43	31	26	74	80	0.483				
Care category: Care	15	30	33	22	45	55	521					
Care category: Public health	12	21	43	24	33	67	243					
Care category: Other	10	29	31	29	39	61	51	0.007				
Sex: Male	23	38	23	17	60	40	208		1.0			
Sex: Female	11	24	41	25	34	66	600	<0.001	0.4	<0.001	0.3	0.6
Age Q1: 21–32	11	24	39	26	34	66	219		1.0			
Age Q2: 33–40	12	33	33	23	44	56	199		1.5	0.05	1.0	2.3
Age Q3: 41–50	17	28	35	20	45	55	191		1.6	0.035	1.0	2.4
Age Q4: 51–87	17	26	36	22	42	58	192	0.096	1.3	0.237	0.8	2.0

TABLE Q-19. COVID-19 vaccine: I intend to get it as soon as possible

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	39	38	16	7	77	23	848					
HCW: Physicians	49	37	11	4	85	15	415		1.0			
HCW: Nurses	26	40	22	12	66	34	187	<0.001	0.3	<0.001	0.2	0.5
HCW: Public Health Pros	39	38	18	6	77	23	90		0.5	0.014	0.3	0.9
HCW: Allied Pros	33	29	27	12	62	38	104		0.3	<0.001	0.2	0.5
HCW: Other	17	58	15	10	75	25	52	<0.001	0.5	0.089	0.3	1.1
Physician (General and family)	46	35	14	5	81	19	237					
Physician (Surgical)	46	37	15	2	83	17	46					
Physician (Medical)	57	38	3	3	95	5	114					
Physician (Emergency)	44	44	6	6	89	11	18	0.007				
Nurse (Community and public health)	23	50	22	5	73	27	60					
Nurse (Critical care)	17	34	28	21	52	48	29					
Nurse (Outpatients)	30	48	17	4	78	22	23					
Nurse (Ward)	29	32	23	17	61	39	66	0.092				
Care category: Care	44	36	13	7	80	20	541					
Care category: Public health	33	37	22	8	70	30	255					
Care category: Other	17	58	15	10	75	25	52	0.006				
Sex: Male	45	36	12	7	81	19	239		1.0			
Sex: Female	37	38	18	7	75	25	602	0.053	0.9	0.731	0.6	1.4
Age Q1: 21–32	33	31	23	13	64	36	208		1.0			
Age Q2: 33–40	37	39	17	7	76	24	204		1.9	0.007	1.2	2.9
Age Q3: 41–50	37	44	14	4	82	18	207		2.8	<0.001	1.7	4.5
Age Q4: 51–87	49	36	11	4	85	15	215	<0.001	3.5	<0.001	2.1	5.6

TABLE Q-20. COVID-19 vaccine: I intend to wait to see how it affects others before I get it

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	13	34	39	14	47	53	1 008					
HCW: Physicians	9	27	45	19	36	64	452		1.0			
HCW: Nurses	18	42	29	11	60	40	259	<0.001	3.1	<0.001	2.2	4.3
HCW: Public Health Pros	10	29	47	14	39	61	98		1.3	0.241	0.8	2.1
HCW: Allied Pros	20	39	32	9	59	41	137		2.7	<0.001	1.8	4.1
HCW: Other	18	40	37	5	58	42	62	<0.001	2.6	<0.001	1.5	4.5
Physician (General and family)	10	32	44	13	42	58	252					
Physician (Surgical)	15	21	50	15	35	65	48					
Physician (Medical)	5	21	46	29	25	75	131					
Physician (Emergency)	14	19	38	29	33	67	21	0.013				
Nurse (Community and public health)	6	39	44	10	46	54	79					
Nurse (Critical care)	29	53	5	13	82	18	38					
Nurse (Outpatients)	14	43	36	7	57	43	28					
Nurse (Ward)	22	44	22	13	65	35	101	0.001				
Care category: Care	13	32	39	17	45	55	629					
Care category: Public health	14	36	39	11	50	50	317					
Care category: Other	18	40	37	5	58	42	62	0.06				
Sex: Male	13	28	42	18	41	59	249		1.0			
Sex: Female	14	36	38	13	49	51	754	0.018	1.0	0.805	0.8	1.4
Age Q1: 21–32	19	42	30	9	61	39	251		1.0			
Age Q2: 33–40	12	37	40	11	49	51	243		0.6	0.011	0.4	0.9
Age Q3: 41–50	13	29	42	16	42	58	249		0.4	<0.001	0.3	0.6
Age Q4: 51–87	10	25	44	21	35	65	251	<0.001	0.3	<0.001	0.2	0.5

COVID-19 vaccine: I do not intend to get it soon, but might in the future

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	8	31	35	27	39	61	996					
HCW: Physicians	7	22	36	35	29	71	456		1.0			
HCW: Nurses	9	43	30	19	52	48	254	<0.001	2.7	<0.001	1.9	3.8
HCW: Public Health Pros	7	23	46	24	30	70	96		1.1	0.598	0.7	1.9
HCW: Allied Pros	14	37	31	18	51	49	131		2.6	<0.001	1.7	3.9
HCW: Other	7	41	36	17	47	53	59	<0.001	2.2	0.005	1.3	3.9
Physician (General and family)	7	25	36	32	32	68	252					
Physician (Surgical)	6	25	39	29	31	69	51					
Physician (Medical)	7	15	35	43	22	78	130					
Physician (Emergency)	4	17	35	43	22	78	23	0.189				
Nurse (Community and public health)	4	38	34	25	41	59	80					
Nurse (Critical care)	24	43	14	19	68	32	37					
Nurse (Outpatients)	0	43	43	13	43	57	30					
Nurse (Ward)	13	44	29	14	57	43	95	0.028				
Care category: Care	8	28	34	30	36	64	627					
Care category: Public health	9	34	36	22	43	57	310					
Care category: Other	7	41	36	17	47	53	59	0.064				
Sex: Male	9	23	37	31	32	68	244		1.0			
Sex: Female	8	33	34	25	41	59	747	0.007	1.2	0.273	0.9	1.7
Age Q1: 21–32	9	38	31	22	47	53	255		1.0			
Age Q2: 33–40	9	29	39	23	37	63	241		0.7	0.052	0.5	1.0
Age Q3: 41–50	9	31	35	25	40	60	251		0.7	0.072	0.5	1.0
Age Q4: 51–87	6	24	32	37	31	69	236	0.002	0.5	<0.001	0.3	0.7

COVID-19 vaccine: I do not intend to ever get the vaccine

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	2	2	37	59	4	96	965					
HCW: Physicians	2	3	28	68	4	96	463		1.0			
HCW: Nurses	3	2	51	45	4	96	228	0.968	2.0	0.133	0.8	4.8
HCW: Public Health Pros	1	2	32	65	3	97	96		0.9	0.856	0.3	3.2
HCW: Allied Pros	2	2	43	54	3	97	126		0.4	0.285	0.1	2.0
HCW: Other	2	0	52	46	2	98	52	0.875	0.6	0.592	0.1	4.4
Physician (General and family)	1	5	33	61	6	94	257					
Physician (Surgical)	4	0	23	72	4	96	47					
Physician (Medical)	1	1	21	77	2	98	136					
Physician (Emergency)	0	0	22	78	0	100	23	0.268				
Nurse (Community and public health)	1	0	43	56	1	99	75					
Nurse (Critical care)	10	0	53	37	10	90	30					
Nurse (Outpatients)	0	7	44	48	7	93	27					
Nurse (Ward)	2	2	60	35	5	95	85	0.231				
Care category: Care	2	3	34	61	5	95	613					
Care category: Public health	1	1	40	58	3	97	300					
Care category: Other	2	0	52	46	2	98	52	0.239				
Sex: Male	3	5	28	65	8	92	236		1.0			
Sex: Female	2	1	40	57	3	97	725	<0.001	0.2	<0.001	0.1	0.5
Age Q1: 21–32	2	3	36	60	4	96	238		1.0			
Age Q2: 33–40	1	2	41	56	3	97	236		0.7	0.536	0.3	2.0
Age Q3: 41–50	1	2	44	52	4	96	247		0.7	0.426	0.3	1.8
Age Q4: 51–87	2	2	27	69	4	96	232	0.908	0.8	0.561	0.3	1.9

TABLE Q-23. Reasons: I am confident there will be other effective treatments soon

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	21	64	11	3	85	15	682					
HCW: Physicians	17	65	15	3	82	18	298		1.0			
HCW: Nurses	24	64	9	3	88	12	178	0.116	1.8	**0.044**	1.0	3.2
HCW: Public Health Pros	28	58	10	4	86	14	69		1.3	0.441	0.6	2.8
HCW: Allied Pros	27	63	9	1	90	10	90		2.0	0.069	0.9	4.3
HCW: Other	15	72	6	6	87	13	47	0.311	1.5	0.411	0.6	3.7
Physician (General and family)	20	64	14	2	84	16	174					
Physician (Surgical)	18	68	15	0	85	15	34					
Physician (Medical)	13	71	12	4	84	16	76					
Physician (Emergency)	7	36	43	14	43	57	14	**0.001**				
Nurse (Community and public health)	24	65	8	4	88	12	51					
Nurse (Critical care)	25	64	11	0	89	11	28					
Nurse (Outpatients)	25	61	14	0	86	14	28					
Nurse (Ward)	21	65	8	6	86	14	63	0.954				
Care category: Care	19	64	13	3	84	16	424					
Care category: Public health	26	62	9	3	88	12	211					
Care category: Other	15	72	6	6	87	13	47	0.309				
Sex: Male	26	61	11	2	87	13	179		1.0			
Sex: Female	19	66	12	4	85	15	499	0.439	0.7	0.157	0.4	1.2
Age Q1: 21–32	23	62	13	2	85	15	179		1.0			
Age Q2: 33–40	21	67	9	3	88	12	154		1.3	0.465	0.7	2.4
Age Q3: 41–50	19	65	13	4	84	16	170		0.8	0.59	0.5	1.5
Age Q4: 51–87	20	64	11	4	85	15	168	0.759	0.9	0.778	0.5	1.7

TABLE Q-24. Reasons: I do not yet know enough about the vaccine to make a decision

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	9	22	47	23	30	70	1 039					
HCW: Physicians	6	14	51	29	20	80	478		1.0			
HCW: Nurses	13	32	40	15	45	55	263	**<0.001**	3.8	**<0.001**	2.7	5.5
HCW: Public Health Pros	8	13	54	25	22	78	97		1.3	0.394	0.7	2.2
HCW: Allied Pros	12	30	38	20	43	57	138		3.2	**<0.001**	2.1	4.9
HCW: Other	6	29	59	6	35	65	63	**<0.001**	2.2	**0.008**	1.2	4.0
Physician (General and family)	6	18	52	24	25	75	267					
Physician (Surgical)	12	12	44	33	23	77	52					
Physician (Medical)	3	6	52	39	9	91	136					
Physician (Emergency)	0	17	52	30	17	83	23	**0.002**				
Nurse (Community and public health)	4	31	45	20	35	65	83					
Nurse (Critical care)	24	37	29	11	61	39	38					
Nurse (Outpatients)	6	15	67	12	21	79	33					
Nurse (Ward)	17	39	31	14	55	45	96	**<0.001**				
Care category: Care	9	19	47	25	28	72	657					
Care category: Public health	9	25	45	21	34	66	319					
Care category: Other	6	29	59	6	35	65	63	0.092				
Sex: Male	8	20	45	28	28	72	250		1.0			
Sex: Female	9	22	48	21	31	69	782	0.315	0.8	0.187	0.6	1.1
Age Q1: 21–32	10	28	45	16	39	61	267		1.0			
Age Q2: 33–40	9	20	51	19	29	71	248		0.7	0.057	0.5	1.0
Age Q3: 41–50	10	20	49	22	30	70	261		0.6	**0.007**	0.4	0.9
Age Q4: 51–87	4	18	45	33	22	78	246	**<0.001**	0.4	**<0.001**	0.3	0.6

TABLE Q-25. Reasons: I want to gain natural immunity to the virus that causes COVID–19

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	9	20	36	35	29	71	964					
HCW: Physicians	6	12	34	47	19	81	466		1.0			
HCW: Nurses	9	32	41	17	42	58	238	<0.001	3.5	<0.001	2.4	5.1
HCW: Public Health Pros	10	19	38	33	29	71	90		1.9	0.017	1.1	3.2
HCW: Allied Pros	16	23	32	28	39	61	117		2.8	<0.001	1.8	4.4
HCW: Other	9	30	38	23	40	60	53	<0.001	2.9	<0.001	1.6	5.3
Physician (General and family)	6	16	37	40	22	78	262					
Physician (Surgical)	10	14	31	45	24	76	49					
Physician (Medical)	6	5	30	59	11	89	132					
Physician (Emergency)	0	13	35	52	13	87	23	0.042				
Nurse (Community and public health)	5	24	51	20	29	71	80					
Nurse (Critical care)	17	36	33	14	53	47	36					
Nurse (Outpatients)	17	31	28	24	48	52	29					
Nurse (Ward)	6	39	39	15	46	54	79	0.04				
Care category: Care	8	19	35	39	26	74	621					
Care category: Public health	11	22	40	27	33	67	290					
Care category: Other	9	30	38	23	40	60	53	0.023				
Sex: Male	12	16	34	38	28	72	246		1.0			
Sex: Female	8	22	37	33	29	71	711	0.844	0.7	0.079	0.5	1.0
Age Q1: 21–32	8	20	36	35	29	71	249		1.0			
Age Q2: 33–40	7	21	40	33	27	73	219		0.9	0.783	0.6	1.4
Age Q3: 41–50	11	21	37	32	32	68	240		1.0	0.896	0.6	1.5
Age Q4: 51–87	7	19	34	40	26	74	242	0.561	0.8	0.214	0.5	1.2

TABLE Q-26. Reasons: Development may be rushed/vaccine may not be thoroughly tested

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	14	33	37	16	47	53	916					
HCW: Physicians	9	29	42	20	38	62	421		1.0			
HCW: Nurses	23	38	28	12	60	40	229	<0.001	2.7	<0.001	1.9	3.8
HCW: Public Health Pros	8	26	46	21	34	66	92		0.9	0.749	0.6	1.5
HCW: Allied Pros	22	43	28	8	65	35	120		3.0	<0.001	2.0	4.7
HCW: Other	11	41	43	6	52	48	54	<0.001	1.8	0.054	1.0	3.2
Physician (General and family)	12	31	40	17	43	57	234					
Physician (Surgical)	9	36	44	11	44	56	45					
Physician (Medical)	5	21	46	29	26	74	125					
Physician (Emergency)	6	35	29	29	41	59	17	0.01				
Nurse (Community and public health)	8	34	36	22	42	58	74					
Nurse (Critical care)	39	36	17	8	75	25	36					
Nurse (Outpatients)	16	36	32	16	52	48	25					
Nurse (Ward)	33	40	22	5	73	27	82	<0.001				
Care category: Care	15	31	37	17	46	54	573					
Care category: Public health	13	36	36	15	49	51	289					
Care category: Other	11	41	43	6	52	48	54	0.554				
Sex: Male	14	29	36	20	43	57	233		1.0			
Sex: Female	14	35	37	14	49	51	678	0.16	0.9	0.665	0.7	1.3
Age Q1: 21–32	17	39	32	12	56	44	234		1.0			
Age Q2: 33–40	11	34	42	13	45	55	211		0.7	0.049	0.5	1.0
Age Q3: 41–50	15	31	40	13	47	53	233		0.6	0.023	0.4	0.9
Age Q4: 51–87	12	28	35	25	40	60	225	0.003	0.5	<0.001	0.3	0.7

TABLE Q-27. Reasons: I believe vaccines may give you the disease

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	5	15	42	37	21	79	955					
HCW: Physicians	4	11	40	44	15	85	469		1.0			
HCW: Nurses	8	25	43	25	33	67	236	<0.001	3.0	<0.001	2.0	4.5
HCW: Public Health Pros	2	12	39	47	14	86	90		1.0	0.921	0.5	1.8
HCW: Allied Pros	7	17	44	32	24	76	112		1.7	0.041	1.0	2.9
HCW: Other	4	17	52	27	21	79	48	<0.001	1.4	0.38	0.7	3.1
Physician (General and family)	5	10	43	41	16	84	264					
Physician (Surgical)	8	16	37	39	24	76	49					
Physician (Medical)	2	11	35	51	14	86	133					
Physician (Emergency)	0	4	43	52	4	96	23	0.131				
Nurse (Community and public health)	6	16	44	34	22	78	82					
Nurse (Critical care)	18	25	39	18	43	57	28					
Nurse (Outpatients)	0	25	46	29	25	75	28					
Nurse (Ward)	10	32	43	15	43	57	87	0.017				
Care category: Care	6	15	41	38	21	79	621					
Care category: Public health	5	15	43	37	20	80	286					
Care category: Other	4	17	52	27	21	79	48	0.961				
Sex: Male	6	15	37	42	21	79	242		1.0			
Sex: Female	5	15	43	36	21	79	707	0.926	0.7	0.077	0.5	1.0
Age Q1: 21–32	7	13	43	36	21	79	245		1.0			
Age Q2: 33–40	4	15	46	36	18	82	228		0.9	0.804	0.6	1.5
Age Q3: 41–50	5	16	42	37	21	79	226		1.0	0.95	0.6	1.6
Age Q4: 51–87	6	16	36	42	22	78	242	0.82	1.0	0.904	0.7	1.6

TABLE Q-29. Opinion shapers: The pace at which the vaccine was researched and developed

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	15	47	31	7	62	38	972					
HCW: Physicians	11	43	38	8	54	46	446		1.0			
HCW: Nurses	22	48	24	6	70	30	246	<0.001	2.1	<0.001	1.5	3.0
HCW: Public Health Pros	11	45	32	13	55	45	92		1.1	0.673	0.7	1.8
HCW: Allied Pros	20	53	21	6	73	27	131		2.2	<0.001	1.4	3.5
HCW: Other	9	56	33	2	65	35	57	<0.001	1.5	0.159	0.8	2.8
Physician (General and family)	11	46	37	6	57	43	254					
Physician (Surgical)	14	40	40	7	53	47	43					
Physician (Medical)	10	40	39	12	49	51	126					
Physician (Emergency)	17	39	35	9	57	43	23	0.539				
Nurse (Community and public health)	14	43	33	10	57	43	81					
Nurse (Critical care)	34	40	20	6	74	26	35					
Nurse (Outpatients)	10	68	16	6	77	23	31					
Nurse (Ward)	30	46	20	4	76	24	84	0.027				
Care category: Care	15	45	33	7	60	40	608					
Care category: Public health	16	48	28	9	63	37	307					
Care category: Other	9	56	33	2	65	35	57	0.611				
Sex: Male	12	45	34	9	57	43	236		1.0			
Sex: Female	16	47	30	7	63	37	731	0.116	1.1	0.753	0.8	1.5
Age Q1: 21–32	18	51	26	5	69	31	250		1.0			
Age Q2: 33–40	13	52	30	5	65	35	225		0.9	0.416	0.6	1.3
Age Q3: 41–50	11	46	37	6	57	43	241		0.6	0.005	0.4	0.8
Age Q4: 51–87	15	39	33	13	54	46	239	0.002	0.5	<0.001	0.3	0.7

TABLE Q-30. Opinion shapers: The unfolding & frequently evolving science of SARS–CoV–2

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	23	62	11	4	85	15	932					
HCW: Physicians	23	65	10	3	87	13	447		1.0			
HCW: Nurses	25	58	14	3	83	17	224	0.104	0.7	0.102	0.4	1.1
HCW: Public Health Pros	18	59	16	7	77	23	88		0.5	**0.026**	0.3	0.9
HCW: Allied Pros	26	64	6	4	90	10	123		1.4	0.35	0.7	2.8
HCW: Other	10	66	20	4	76	24	50	**0.013**	0.6	0.181	0.3	1.3
Physician (General and family)	21	65	11	3	86	14	248					
Physician (Surgical)	22	69	7	2	91	9	45					
Physician (Medical)	24	65	8	2	89	11	133					
Physician (Emergency)	33	48	5	14	81	19	21	0.502				
Nurse (Community and public health)	21	53	24	3	74	26	68					
Nurse (Critical care)	35	45	13	6	81	19	31					
Nurse (Outpatients)	10	69	21	0	79	21	29					
Nurse (Ward)	29	62	6	4	90	10	84	0.055				
Care category: Care	24	63	10	3	87	13	602					
Care category: Public health	23	60	13	5	82	18	280					
Care category: Other	10	66	20	4	76	24	50	**0.031**				
Sex: Male	19	62	14	5	81	19	227		1.0			
Sex: Female	24	63	11	3	86	14	700	0.055	1.5	0.065	1.0	2.3
Age Q1: 21–32	24	66	9	1	90	10	232		1.0			
Age Q2: 33–40	20	68	10	2	89	11	220		0.9	0.738	0.5	1.6
Age Q3: 41–50	23	61	13	3	84	16	231		0.7	0.198	0.4	1.2
Age Q4: 51–87	22	56	14	8	78	22	233	**0.002**	0.5	**0.004**	0.3	0.8

TABLE Q-31. Opinion shapers: Actions and opinions of friends and family

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	5	24	49	23	29	71	958					
HCW: Physicians	5	20	47	28	25	75	448		1.0			
HCW: Nurses	5	29	51	15	34	66	240	**0.016**	1.7	**0.004**	1.2	2.4
HCW: Public Health Pros	2	26	47	25	28	72	92		1.2	0.461	0.7	2.0
HCW: Allied Pros	7	26	48	20	33	67	123		1.4	0.102	0.9	2.2
HCW: Other	2	25	56	16	27	73	55	0.152	1.1	0.767	0.6	2.1
Physician (General and family)	7	21	44	27	29	71	242					
Physician (Surgical)	2	18	54	26	20	80	50					
Physician (Medical)	3	20	48	29	23	77	132					
Physician (Emergency)	4	8	54	33	13	88	24	0.194				
Nurse (Community and public health)	0	21	63	16	21	79	80					
Nurse (Critical care)	14	33	44	8	47	53	36					
Nurse (Outpatients)	6	26	48	19	32	68	31					
Nurse (Ward)	6	36	44	14	42	58	81	**0.012**				
Care category: Care	6	23	47	24	29	71	606					
Care category: Public health	3	25	51	20	29	71	297					
Care category: Other	2	25	56	16	27	73	55	0.946				
Sex: Male	8	24	41	27	31	69	220		1.0			
Sex: Female	4	24	51	21	28	72	732	0.355	0.7	0.074	0.5	1.0
Age Q1: 21–32	5	28	47	20	33	67	243		1.0			
Age Q2: 33–40	5	24	52	18	30	70	229		0.9	0.497	0.6	1.3
Age Q3: 41–50	5	27	44	24	31	69	236		0.9	0.49	0.6	1.3
Age Q4: 51–87	5	17	51	27	22	78	235	**0.048**	0.5	**0.004**	0.4	0.8

TABLE Q-32. Opinion shapers: Relationship between coverage rates and community transmission

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	12	63	19	6	75	25	723					
HCW: Physicians	12	63	19	5	76	24	334		1.0			
HCW: Nurses	9	65	20	5	74	26	188	0.745	0.9	0.636	0.6	1.4
HCW: Public Health Pros	13	60	20	8	73	28	80		0.8	0.455	0.5	1.4
HCW: Allied Pros	17	65	12	6	82	18	84		1.7	0.127	0.9	3.2
HCW: Other	5	57	24	14	62	38	37	0.203	0.5	**0.047**	0.2	1.0
Physician (General and family)	12	62	21	5	74	26	188					
Physician (Surgical)	15	67	15	3	82	18	33					
Physician (Medical)	13	67	14	5	80	20	97					
Physician (Emergency)	0	56	25	19	56	44	16	0.141				
Nurse (Community and public health)	8	61	28	3	69	31	61					
Nurse (Critical care)	3	73	20	3	77	23	30					
Nurse (Outpatients)	16	56	24	4	72	28	25					
Nurse (Ward)	11	69	12	8	80	20	65	0.528				
Care category: Care	12	64	18	6	76	24	459					
Care category: Public health	13	63	19	6	75	25	227					
Care category: Other	5	57	24	14	62	38	37	0.171				
Sex: Male	11	58	25	6	69	31	190		1.0			
Sex: Female	12	65	17	6	77	23	530	**0.021**	1.5	0.051	1.0	2.2
Age Q1: 21–32	8	67	20	5	75	25	170		1.0			
Age Q2: 33–40	13	66	14	6	80	20	172		1.3	0.307	0.8	2.2
Age Q3: 41–50	10	64	21	6	73	27	196		1.0	0.888	0.6	1.6
Age Q4: 51–87	16	57	20	7	73	27	174	0.457	1.0	0.886	0.6	1.6

TABLE Q-33. Opinion shapers: My own research on COVID–19 vaccines

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	27	61	9	3	88	12	960					
HCW: Physicians	29	60	8	3	89	11	447		1.0			
HCW: Nurses	26	63	9	2	89	11	235	0.825	0.9	0.653	0.5	1.5
HCW: Public Health Pros	25	61	10	4	86	14	97		0.7	0.24	0.4	1.3
HCW: Allied Pros	28	63	7	2	91	9	125		1.2	0.606	0.6	2.4
HCW: Other	20	55	21	4	75	25	56	**0.017**	0.3	**0.001**	0.2	0.7
Physician (General and family)	28	61	9	2	89	11	250					
Physician (Surgical)	27	60	11	2	87	13	45					
Physician (Medical)	34	59	5	2	93	7	129					
Physician (Emergency)	22	61	9	9	83	17	23	0.337				
Nurse (Community and public health)	22	70	8	0	92	8	76					
Nurse (Critical care)	26	53	16	5	79	21	38					
Nurse (Outpatients)	23	67	10	0	90	10	30					
Nurse (Ward)	30	59	7	4	89	11	81	0.218				
Care category: Care	29	60	8	3	89	11	604					
Care category: Public health	26	64	8	2	90	10	300					
Care category: Other	20	55	21	4	75	25	56	**0.006**				
Sex: Male	29	57	10	4	86	14	231		1.0			
Sex: Female	27	63	9	2	89	11	723	0.149	1.4	0.133	0.9	2.3
Age Q1: 21–32	26	61	10	3	87	13	248		1.0			
Age Q2: 33–40	25	63	11	0	89	11	236		1.2	0.5	0.7	2.1
Age Q3: 41–50	22	65	9	4	87	13	238		1.1	0.678	0.7	1.9
Age Q4: 51–87	35	56	7	3	90	10	223	0.692	1.5	0.174	0.8	2.7

TABLE Q-34. Opinion shapers: The country in which a vaccine is manufactured

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	10	38	41	11	48	52	904					
HCW: Physicians	11	35	41	13	46	54	428		1.0			
HCW: Nurses	12	45	35	8	57	43	214	**0.007**	1.7	**0.004**	1.2	2.4
HCW: Public Health Pros	10	39	39	12	49	51	92		1.2	0.361	0.8	2.0
HCW: Allied Pros	7	38	44	11	45	55	111		1.1	0.754	0.7	1.6
HCW: Other	3	37	54	5	41	59	59	0.051	0.9	0.632	0.5	1.5
Physician (General and family)	12	36	41	11	48	52	236					
Physician (Surgical)	11	43	41	5	55	45	44					
Physician (Medical)	8	34	42	17	42	58	125					
Physician (Emergency)	13	13	48	26	26	74	23	0.092				
Nurse (Community and public health)	15	39	41	5	54	46	74					
Nurse (Critical care)	10	45	38	7	55	45	29					
Nurse (Outpatients)	4	43	39	13	48	52	23					
Nurse (Ward)	13	51	29	7	64	36	75	0.459				
Care category: Care	11	38	39	12	49	51	565					
Care category: Public health	10	39	41	10	49	51	280					
Care category: Other	3	37	54	5	41	59	59	0.476				
Sex: Male	11	33	42	13	44	56	218		1.0			
Sex: Female	9	40	41	10	49	51	679	0.2	1.0	0.825	0.8	1.4
Age Q1: 21–32	12	36	44	8	48	52	231		1.0			
Age Q2: 33–40	9	42	40	9	51	49	221		1.2	0.421	0.8	1.7
Age Q3: 41–50	9	36	41	15	45	55	226		0.8	0.354	0.6	1.2
Age Q4: 51–87	10	39	39	12	49	51	209	0.578	1.0	0.873	0.7	1.5

TABLE Q-35. Opinion shapers: The potential cost of a COVID–19 vaccine

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	6	26	52	16	32	68	854					
HCW: Physicians	6	23	54	17	29	71	418		1.0			
HCW: Nurses	7	31	48	14	39	61	192	**0.022**	1.7	**0.007**	1.2	2.5
HCW: Public Health Pros	5	32	48	16	36	64	88		1.5	0.118	0.9	2.4
HCW: Allied Pros	5	24	53	18	29	71	99		1.1	0.844	0.6	1.7
HCW: Other	4	25	61	11	28	72	57	0.146	1.0	0.987	0.5	1.9
Physician (General and family)	8	28	51	13	36	64	227					
Physician (Surgical)	2	21	60	17	23	77	47					
Physician (Medical)	4	18	55	22	22	78	121					
Physician (Emergency)	9	0	70	22	9	91	23	**0.004**				
Nurse (Community and public health)	10	27	51	12	37	63	67					
Nurse (Critical care)	4	35	50	12	38	62	26					
Nurse (Outpatients)	0	38	46	17	38	63	24					
Nurse (Ward)	8	35	42	15	43	57	65	0.911				
Care category: Care	6	26	52	16	32	68	541					
Care category: Public health	6	27	51	16	34	66	256					
Care category: Other	4	25	61	11	28	72	57	0.69				
Sex: Male	8	23	52	17	31	69	212		1.0			
Sex: Female	6	27	53	15	32	68	636	0.67	0.9	0.585	0.6	1.3
Age Q1: 21–32	6	27	53	14	33	67	227		1.0			
Age Q2: 33–40	7	31	49	12	39	61	205		1.3	0.169	0.9	2.0
Age Q3: 41–50	5	27	50	18	32	68	211		0.9	0.544	0.6	1.3
Age Q4: 51–87	5	20	57	18	25	75	197	**0.033**	0.6	**0.048**	0.4	1.0

TABLE Q-36. Opinion shapers: Information I´ve seen on social media.

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	4	26	41	28	30	70	950					
HCW: Physicians	3	19	43	36	21	79	440		1.0			
HCW: Nurses	8	35	41	16	43	57	248	<0.001	2.9	<0.001	2.0	4.2
HCW: Public Health Pros	1	27	32	40	28	72	90		1.6	0.098	0.9	2.6
HCW: Allied Pros	6	29	42	23	35	65	115		2.1	0.002	1.3	3.3
HCW: Other	2	37	47	14	39	61	57	<0.001	2.4	0.006	1.3	4.3
Physician (General and family)	3	21	43	33	24	76	239					
Physician (Surgical)	0	24	43	33	24	76	49					
Physician (Medical)	2	14	43	41	16	84	129					
Physician (Emergency)	0	9	43	48	9	91	23	0.127				
Nurse (Community and public health)	4	30	49	18	34	66	80					
Nurse (Critical care)	11	40	34	14	51	49	35					
Nurse (Outpatients)	3	35	42	19	39	61	31					
Nurse (Ward)	13	38	38	13	50	50	88	0.122				
Care category: Care	4	24	41	30	28	72	605					
Care category: Public health	4	29	40	27	33	67	288					
Care category: Other	2	37	47	14	39	61	57	0.12				
Sex: Male	4	20	38	38	24	76	217		1.0			
Sex: Female	4	28	42	26	32	68	727	0.023	1.1	0.565	0.8	1.6
Age Q1: 21–32	6	32	37	25	38	62	251		1.0			
Age Q2: 33–40	4	25	48	23	29	71	216		0.7	0.09	0.5	1.1
Age Q3: 41–50	3	27	41	29	30	70	234		0.6	0.03	0.4	1.0
Age Q4: 51–87	3	20	41	36	23	77	233	0.006	0.5	<0.001	0.3	0.7

TABLE Q-38. Influenza: I would take the flu vaccine if offered

	STRONGLY AGREE (%)	AGREE (%)	DIS-AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI-SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	42	35	18	5	77	23	958					
HCW: Physicians	51	33	14	3	84	16	458		1.0			
HCW: Nurses	30	37	26	7	67	33	227	<0.001	0.4	<0.001	0.3	0.6
HCW: Public Health Pros	47	37	10	6	84	16	94		1.0	0.933	0.6	1.9
HCW: Allied Pros	34	35	22	9	69	31	122		0.5	0.001	0.3	0.7
HCW: Other	23	46	23	9	68	32	57	<0.001	0.5	0.035	0.3	1.0
Physician (General and family)	49	37	11	3	86	14	256					
Physician (Surgical)	44	29	23	4	73	27	48					
Physician (Medical)	56	28	14	2	84	16	132					
Physician (Emergency)	55	23	23	0	77	23	22	0.128				
Nurse (Community and public health)	41	28	27	4	69	31	74					
Nurse (Critical care)	14	43	31	11	57	43	35					
Nurse (Outpatients)	34	34	21	10	69	31	29					
Nurse (Ward)	28	41	25	6	68	32	79	0.622				
Care category: Care	45	35	16	4	79	21	608					
Care category: Public health	40	34	19	7	74	26	293					
Care category: Other	23	46	23	9	68	32	57	0.07				
Sex: Male	46	36	16	3	82	18	245		1.0			
Sex: Female	40	35	18	6	75	25	707	0.041	0.8	0.264	0.5	1.2
Age Q1: 21–32	37	42	17	4	79	21	241		1.0			
Age Q2: 33–40	41	39	16	4	80	20	231		1.0	0.915	0.7	1.6
Age Q3: 41–50	39	38	18	5	77	23	232		0.9	0.597	0.6	1.4
Age Q4: 51–87	50	24	18	7	75	25	238	0.547	0.8	0.321	0.5	1.2

TABLE Q-40. Influenza: I would recommend the flu vaccine to friends and family

	STRONGLY AGREE (%)	AGREE (%)	DIS- AGREE (%)	STRONGLY DISAGREE (%)	AGREE OR STRONGLY AGREE (%)	DISAGREE OR STRONGLY DISAGREE (%)	N	CHI- SQUARE P-VALUE	LOGISTIC REGRESSION ADJUSTED ODDS RATIO	P-VALUE	LOWER BOUND	UPPER BOUND
All	45	43	10	3	87	13	932					
HCW: Physicians	51	40	7	2	92	8	453		1.0			
HCW: Nurses	36	47	14	3	83	17	211	**0.001**	0.5	**0.008**	0.3	0.8
HCW: Public Health Pros	51	40	7	2	91	9	92		1.0	0.909	0.4	2.1
HCW: Allied Pros	36	40	19	5	76	24	120		0.3	**<0.001**	0.2	0.5
HCW: Other	29	54	11	7	82	18	56	**<0.001**	0.6	0.249	0.3	1.4
Physician (General and family)	52	41	5	2	93	7	254					
Physician (Surgical)	38	44	17	2	81	19	48					
Physician (Medical)	55	38	6	1	93	7	130					
Physician (Emergency)	52	43	5	0	95	5	21	**0.043**				
Nurse (Community and public health)	46	45	7	1	92	8	71					
Nurse (Critical care)	28	55	17	0	83	17	29					
Nurse (Outpatients)	41	44	7	7	85	15	27					
Nurse (Ward)	29	47	21	3	76	24	76	0.097				
Care category: Care	47	42	9	2	89	11	590					
Care category: Public health	43	42	12	3	85	15	286					
Care category: Other	29	54	11	7	82	18	56	0.139				
Sex: Male	48	40	9	2	89	11	236		1.0			
Sex: Female	43	44	10	3	87	13	690	0.522	0.9	0.81	0.6	1.6
Age Q1: 21–32	41	50	8	2	91	9	232		1.0			
Age Q2: 33–40	41	47	9	3	88	12	233		0.7	0.271	0.4	1.3
Age Q3: 41–50	44	43	11	1	87	13	221		0.8	0.381	0.4	1.4
Age Q4: 51–87	54	32	11	3	86	14	230	0.513	0.6	0.136	0.4	1.2

Annex D. Survey Pilot Additional Information

PAHO
Pan American Health Organization
World Health Organization
REGIONAL OFFICE FOR THE Americas

SURVEY PILOT

"Concerns, attitudes, and intended practices of healthcare workers to COVID-19 vaccination in the Caribbean"

PILOT OBJECTIVE

To improve the quality of the survey "Concerns, attitudes, and intended practices of healthcare workers to COVID-19 vaccination in the Caribbean," to ensure questions and response options are understood as intended, are well-adapted to a local context, and measure what they are designed to measure.

METHODS

Cognitive interviewing (CI) was used to pilot the survey. CI is a process for "improving the quality of a survey, to ensure questions and response options are understood as intended, are well-adapted to a local context, and measure what they are designed to measure"(*3*).

Participants for CI were recruited from the target population. The main investigators scheduled separate interviews with a total of seven participants from two countries, Barbados and Dominica, and followed the steps detailed below for each survey item (each survey

question and its corresponding response options), one item at a time.

The seven cognitive interviews with healthcare workers were conducted via video conference. The interviewers were Dr. E. Benjamin Puertas, M.D., M.P.H., Dr.P.H., Subregional Advisor Human Resources for Health, Subregional Program for the Caribbean, PAHO/WHO; Dr. Karen Broome-Toppin, M.D., Advisor Immunization, Subregional Program for the Caribbean, PAHO/WHO; Mrs. Fiona Harris-Glenville, R.N., Dr.P.H Candidate, Intern Human Resources for Health, Subregional Program for the Caribbean, PAHO/WHO; Dr. Nina Rise, M.D., M.P.H Candidate, Intern Human Resources for Health, Subregional Program for the Caribbean, PAHO/WHO. The interviewers introduced the purpose of the survey and survey pilot and explained the process of the survey pilot interview to the interviewees. For each question, interviewees identified the Likert scale answer best representing their personal attitude ("Strongly agree"; "Agree"; "Don't know"; "Disagree"; "Strongly disagree"). Nine questions had been preidentified by the research team as containing words or terms that could potentially be misinterpreted and/or interpreted differently among interviewees (Table D.1).

TABLE D.1. Questions identified for probing

Question 8	Overall, vaccines are **safe**.
Question 9	Overall, vaccines are **effective**.
Question 11	The information I receive about vaccines from public health authorities/my healthcare provider is **reliable** and **trustworthy**.
Question 13	New vaccines carry more **risk** than older vaccines.
Question 15	I am concerned about **serious adverse effects** of vaccines.
Question 17	I am confident in the **scientific approval** process for a new coronavirus (COVID-19) vaccine.
Question 18	I would be willing to participate in a **vaccine trial** for a coronavirus (COVID-19) vaccine.
Question 25	I want to gain **natural immunity** to the virus that causes COVID-19.
Question 32	The relationship between **coverage rates** and **community transmission**.*

The words and terms highlighted in bold are the those identified as having a potential for misinterpretation.

*Question 32 is to be understood in the context that, "The relationship between coverage rates and community transmission contributed to my opinion on the COVID-19 vaccine."

These questions were subjected to the following cognitive interviewing steps:

1. Ask the respondent the question (including response options) and allow them to answer.
2. Ask the respondent about the question they just answered, using probes to understand if …
   - The question is easy to understand and it makes sense:
     "In your own words, what is this question asking?" or *"what does this question mean to you?"* to check the item was well understood.
   - The ideas or words in the question and response options are easy to understand:
     Ask generally, "*Did this question make sense to you? Why/why not?"* or probe around specific words or concepts that may be difficult to understand. *"What do you think of when you hear the phrase 'getting vaccines'?"*

- The response options make sense and allow for meaningful answers:
  "Do the response options fit in with the sort of answer you want to give?"

- There are any response options that are missing:
  "*Was there anything missing from the list of response options*?" to check the options are adequate.

- The question and response options are relevant in the country or region:
  Ask generally, "*Did the response options offered make sense to you? Why/why not?"* or probe around specific words or concepts that could be interpreted differently *"What do you think of when you hear the phrase 'vaccination clinic'?"*

Interviewees were encouraged to share their opinions on any question in the questionnaire as well as the questionnaire as a whole. Their opinions were recorded in a "General comments" section of the survey pilot.

RESULTS
Overall, interviewees reported that the questions were "clear," and the tool was "understandable," "straightforward," and "thorough" (Table D.2).

TABLE D.2.   Compilation of general comments

I.1	Not familiar with the abbreviation HCW (Question 5). Thought the questions were relevant, but the survey altogether lengthy. Recommends an "unsure" or "undecided" option on the Likert scale in addition to "don't know."
I.2	Interviewee requested further explanation about question #12. Thought the questions were clear and straight to the point.
I.3	As a healthcare worker, I am strongly for the vaccine. I have already been vaccinated myself. Good questionnaire. Questions were clear.
I.4	The survey is straightforward and understandable.
I.5	-
I.6	Offer definitions of certain terms: Coverage rates and Community transmission.
I.7	The questionnaire is pretty thorough and clear.

The majority of words or terms that were probed (safe; effective; reliable, trustworthy; risk; adverse effects; scientific approval; vaccine trial; natural immunity) were well understood, with interviewees demonstrating a clear and coherent comprehension of the meaning of the words/terms. Two of seven interviewees were unsure of the meaning of the terms "coverage rates" and "community transmission" used in Question 32.

IMPLICATIONS
As a result of the uncertainty among some of the interviewees regarding the meanings of "coverage rates" and "community transmission," the investigators decided to modify Question 32 in the tool, providing the respondents with a pop-up box containing the World Health Organization (WHO) definitions of the terms (Table D.3).

TABLE D.3.   WHO definitions of "vaccination coverage rates" and "community transmission"

Vaccination coverage rates	The proportion of a target population that has been vaccinated with a certain dose of the vaccine in a certain time period.
Community transmission	Experiencing larger outbreaks of local transmission defined through an assessment of factors including, but not limited to: large numbers of cases not linkable to transmission chains; large numbers of cases from sentinel lab surveillance; and/or multiple unrelated clusters in several areas of the country/territory/area.

For the complete report, please write to Dr. E. Benjamin Puertas, PAHO Advisor in Human Resources for Health in the Caribbean: puertasb@paho.org.

Annex E. Messaging for Caribbean Healthcare Workers Based on Survey Results Concerns, Attitudes, and Intended Practices of HCWs to COVID-19 Vaccination in the Caribbean

Messaging for Caribbean Healthcare Workers Based on Survey Results

Concern	Objective	Topline messages	Supporting messages
The vaccine doesn't work, I'll have to continue with protective measures anyway.	- Reinforce efficacy of vaccines in preventing severe illness and death. - Remind public health measures aren't for forever.	- All vaccines against COVID-19 that have been listed by WHO are extremely safe and effective at preventing death and severe illness. - WHO recommends that people who are fully vaccinated should continue to follow public health measures like masking and physical distancing until more people are protected against COVID-19. - Vaccination for everyone who is eligible is key to ending the pandemic.	- All vaccines go through clinical trial phases with tens of thousands of people of different ages and ethnicities before they are approved for use in the population. These trials aim to ensure the safety and ability of the vaccine to protect against the disease. - Only those vaccines that are safe and have proven to be effective at preventing the disease are approved to be used in the population. - Although data show us that vaccines work well in preventing people from getting sick, researchers are still learning about how well the vaccines stop the spread of COVID-19 between people. This is why WHO still recommends public health measures that have been used since the start of the pandemic to stop the spread of the virus. - Real-world data are showing us that the vaccines are extremely effective and safe.

Concern	Objective	Topline messages	Supporting messages
The vaccines were developed too quickly and we don't know enough about them yet.	- Reinforce safety of vaccines. - Remind that corners were not cut and data are reliable.	- Vaccine safety is always a top priority, and this is no different for COVID-19 vaccines. - Unprecedented collaboration between researchers and partners at the global level allowed COVID-19 vaccines to be developed quickly. - Red tape was cut, but not corners. - The technology used to develop these vaccines has been used for decades for other treatments that we use routinely.	- All vaccines – including those against COVID-19 – go through clinical trial phases with tens of thousands of people of different ages and ethnicities before they are approved for use in the population. These trials aim to ensure the safety and ability of the vaccine to protect against the disease. - The COVID-19 vaccines were not created overnight, but rather were developed following decades of research on other coronaviruses like SARS and MERS, and using technology that has long been used for other medical treatments (like mRNA platforms being used for cancer treatment). - Because of the seriousness of the pandemic, developing vaccines against COVID-19 has been a global priority. - Real-world data are showing us that the vaccines are extremely effective and safe.
I'm scared of side effects from the vaccines, especially long term.	- Reinforce safety of vaccines. - Remind that corners were not cut and data are reliable.	- Minor side effects are normal with any vaccine and go away after a few days. - Medical researchers have determined that the benefits of the vaccine far outweigh the minor possibility of potentially associated serious risks.	- Real-world data and follow-up of people who participated in the clinical trials for the vaccines show that the vaccines are extremely effective and safe. - There is a small risk of a serious side effect for any vaccine, just like there are risks of side effects for any medication. - After you are vaccinated, the components of the vaccine are broken down by your body quickly; the vaccine does not linger in your body and cannot cause long-term damage. - The vaccines do not enter your cells' nuclei and cannot alter your DNA, causing long-term damage.[1]

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1 This bullet and the one before it are in response to qualitative answers expressing concerns about the vaccines causing long-term effects, potentially through entering people's DNA.

Concern	Objective	Topline messages	Supporting messages
I don't want the vaccine that's available to me/ I don't trust the vaccine manufacturer.	- Reinforce efficacy of vaccines in preventing severe illness and death.	- The best vaccine is the one that is available to you first. - Data have shown us that **all** approved vaccines are extremely safe and effective at preventing serious disease and death. - Waiting for your "favorite" or preferred vaccine puts you at risk for longer.	- The sooner you are vaccinated with any of the approved vaccines, the sooner you can be protected from a serious case of COVID-19 and death. - All of the approved vaccines can help us fight the pandemic. - All vaccine manufacturers must follow the same processes for getting authorization by WHO; there are no exceptions. This includes presenting detailed data on their safety and efficacy. Only vaccines that have proved these will be approved.
I don't trust my government's/ WHO's handling of the pandemic and the vaccine rollout.[2]	- Reinforce global collaboration efforts for the development of the vaccines. - Show personal reasons why trusted individuals have chosen to be vaccinated.	- Data have shown us that **all** approved vaccines are extremely safe and effective at preventing serious disease and death. - Safety monitoring continues after vaccines are introduced in the population. - The vaccines are a result of global collaboration to fight the pandemic.	- For main and supporting messages, suggest using a trusted leader (according to the target audience) to deliver them. - For supporting messages, suggest adding personal reasons why this leader chose to get vaccinated.
I don't need a vaccine because my religion will protect me.	- Remind people of the moral obligation to get vaccinated to protect others.	- Getting vaccinated is the most effective way to protect you from COVID-19. - Getting vaccinated helps your community by keeping health services functioning. - We have a moral duty to get vaccinated.	- Health services have been overwhelmed because of the pandemic. When fewer people are hospitalized due to COVID-19, health services can focus on providing other services. - The socioeconomic effects of the pandemic have also hurt people, including by worsening their health. - Getting vaccinated is doing our part to protect our communities, help our health systems, and support people's individual economies. - Note: Include specific messages using religious denomination to explain the need for COVID-19 vaccines.

2   Suggest that these messages be shared via trusted spokespersons (local leaders, community health workers, religious leaders, local media, other healthcare workers, etc.).

Concern	Objective	Topline messages	Supporting messages
COVID-19 is not a problem in my country. We don't need a vaccine.	- Increase risk perception for COVID-19 at the individual and health system level.	- In a globalized world, it is very easy for disease to spread across country borders. - COVID-19 will not be defeated until everyone is safe. - Our public health response must not leave anyone or any country behind.	- PAHO encourages people to get vaccinated against COVID-19 with whichever vaccine is offered to them by their national health authorities when they are eligible.
I have allergies.	- Clarify that people with allergies can still be vaccinated.	- People with allergies can take the COVID-19 vaccine unless they have had a severe allergic reaction (anaphylaxis) to any component of the COVID-19 vaccine. - Anyone with severe allergic reactions to foods, oral medications, latex, pets, insects, and environmental triggers may still get vaccinated against COVID-19.	- People with a severe allergic reaction (anaphylaxis) to any vaccine or injectable (intramuscular or intravenous) medication should consult with their health provider to assess risk prior to receiving the COVID-19 vaccine. - People with severe allergies require a 30-minute observation period after vaccination, while all others must be observed for 15 minutes. Vaccine clinics have safety protocols in place to respond to any adverse reactions. - Only a very small percentage of the population is severely allergic to the components of the COVID-19 vaccines.
I'm breastfeeding.	- Clarify that breastfeeding persons can still be vaccinated.	- There is no contraindication for breastfeeding persons to be vaccinated against COVID-19. - The vaccines against COVID-19 are safe for both the breastfeeding person and the child.	- Persons who are breastfeeding can still get vaccinated against COVID-19 when it is their turn. - Discontinuing breastfeeding is not recommended, as this offers substantial health benefits to lactating women and their breastfed children.

Concern	Objective	Topline messages	Supporting messages
I'm pregnant.	- Clarify guidance on pregnancy and vaccination.[3]	- Vaccination against COVID-19 is recommended for pregnant women. - There is no evidence that suggests vaccination would cause harm to the mother or unborn baby during pregnancy.	- Pregnant women are at risk of contracting COVID-19, but because their immune systems change throughout pregnancy, pregnant women are more vulnerable to respiratory infections such as COVID-19. - If pregnant women do become ill, they tend to develop more severe symptoms whose treatment may require longer hospitalization in intensive care units, greater need for ventilatory support, and a higher chance of dying when compared with non-pregnant women of the same age and ethnicity. - Note: This messaging may need to be adjusted based on the country's guidelines.
I have chronic disease or other health issues.	- Clarify that people with health issues can still be vaccinated.	- Vaccines have been found to be safe and effective in people with various underlying medical conditions that are associated with increased risk of severe disease. These include high blood pressure; diabetes; asthma; pulmonary, liver, or kidney disease; and chronic infections that are stable and controlled. - People with chronic conditions are at higher risk for complications from COVID-19 and should get vaccinated as soon as they can.	- COVID-19 vaccines have been tested in large, randomized controlled trials that include people of a broad age range, both sexes, different ethnicities, and those with known medical conditions. The vaccines have shown a high level of efficacy across all populations. - Those who should consult with a doctor before vaccination include people with a compromised immune system, older people with severe frailty, people with a history of severe allergic reaction to vaccines, people living with HIV who have weakened immune systems,[4] and those who are pregnant or breastfeeding.

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3 See more information at: https://www.who.int/news-room/events/detail/2021/05/05/default-calendar/update-on-covid-19-vaccination-in-pregnant-women-and-children

4 People living with HIV (PLHIV) have been included in the clinical trials for four of the five vaccines with EUL approval (the exception is Sinopharm). All five are recommended for PLHIV. Vaccine efficacy for this population is comparable to that found among HIV-negative persons. Safety data are scarce and not specific to PLHIV. Nonetheless, the benefits of vaccination far outweigh the risks. Unless PLHIV have a weakened immune system (i.e., poorly controlled CD4 count), there are no recommendations to consult a physician before receiving a COVID-19 vaccine.

Concern	Objective	Topline messages	Supporting messages
I've already had COVID-19, I don't need a vaccine.	- Clarify that people who have had COVID-19 should still be vaccinated.	- [People who have already been infected with SARS-CoV-2 should still get vaccinated] unless told otherwise by their health care provider.	- It is still not known how long the immunity from the disease lasts. - Some people get infected with SARS-CoV-2 a second time, which makes getting vaccinated even more important. - Even if you had a previous infection, the vaccine acts as a booster that strengthens the immune response.