



Views on the need to implement restriction policies to be able to address COVID-19 in the United States

Vivian Hsing-Chun Wang^{*}, José A. Pagán

Department of Public Health Policy and Management, School of Global Public Health, New York University, NY, New York, USA

ARTICLE INFO

Keywords:

COVID-19
Public health communication
Health promotion
Disease prevention

ABSTRACT

Several restriction policies implemented in many states in the United States have demonstrated their effectiveness in mitigating the spread of the coronavirus disease (COVID-19), but less is known about the differences in views on the restriction policies among different population segments. This study aimed to understand which different population groups of adults in the United States consider several key restriction policies as necessary to combat COVID-19.

Survey data from Wave 64 (March 19–24, 2020) of the Pew Research Center's American Trends Panel ($n=10,609$) and logistic regression were used to evaluate the association between socioeconomic and demographic characteristics, employment status, political party affiliation, news exposure, census region, and opinions about COVID-19 restriction policies. The policies included restricting international travel, imposing business closures, banning large group gatherings, cancelling entertainment events, closing schools, limiting restaurants to carry-out only, and postponing state primary elections.

Most survey respondents viewed COVID-19 restriction policies as necessary. Views on each restriction policy varied substantially across some population segments such as age, race, and ethnicity. Regardless of population segments, those who followed news closely or considered themselves Democrat/lean Democrat were more likely to consider all the policies as necessary than those not following the news closely or those who considered themselves Republican/lean Republican.

The effectiveness of key COVID-19 restriction policies is likely to vary substantially across population groups given that views on the need to implement these policies vary widely. Tailored health messages may be needed for some population segments given divergent views on COVID-19 restriction policies.

1. Introduction

More than 280,000 people have died in the United States (US) due to the coronavirus disease (COVID-19) and the number of deaths is projected to reach 340,000 or more by January in 2021. (COVID-19 projections, 2020) While early hotspot states such as New York and New Jersey overcame the first wave of COVID-19 cases, other states such as North Dakota, South Dakota, Wyoming, and Missouri are seeing a continuous growth in cases. (Coronavirus in the US: latest map and case count, 2020) A major challenge to reduce the spread of the virus is that COVID-19 is highly transmissible by asymptomatic individuals and, as such, the most effective preventive strategies include enforcing the use of face coverings, promoting social distancing, and discouraging large-

group gatherings. (Oran and Topol, 2020; Sen et al., 2020)

Many policy initiatives have been implemented to reduce the spread of the virus (e.g., limiting restaurants to takeout only and encouraging work from home for all non-essential workers) and it is now clear that reductions in the number of cases in earlier hotspots are directly related to the adoption of these key measures. (Guidelines: opening up America again, 2020) Although we know which prevention strategies work at the population level in states that have adopted these virus containment measures, we know much less about which individuals are likely to be more or less compliant with public health measures to contain COVID-19. Crafting effective health communication messages that appeal to different segments of the population is critical if we want to contain the spread of the virus and reduce its impact, particularly on vulnerable

Abbreviations: COVID-19, coronavirus disease; US, United States; Pew, Pew Research Center; ATP, American Trends Panel; NH, non-Hispanic; OR, adjusted odds ratio; CI, confidence interval.

^{*} Corresponding author.

E-mail address: vivianhchwang@nyu.edu (V.H.-C. Wang).

<https://doi.org/10.1016/j.ypmed.2020.106388>

Received 30 July 2020; Received in revised form 21 December 2020; Accepted 24 December 2020

Available online 26 December 2020

0091-7435/© 2020 Elsevier Inc. All rights reserved.

populations. To be effective, message framing to promote public actions should be not only consistently delivered but also address sociocultural variation and values across populations.(Briseño, 2020; Finset et al., 2020; Reynolds and Seeger, 2005) As we learn more about the characteristics of at-risk populations, tailored messages to target different population segments will likely increase the effectiveness of public health interventions to combat COVID-19.

The objective of this study is to use nationally representative survey data on US adults to understand which different population groups consider several key restriction policies as necessary to address COVID-19. These policies include restricting international travel, imposing business closures, banning large group gatherings, cancelling entertainment events, closing schools, limiting restaurants to carry-out only, and postponing state primary elections. Our goal is to evaluate the association between socioeconomic and demographic characteristics, employment status changes due to the pandemic, political party affiliation, news exposure, and census region, and the opinions of adults about each of these key COVID-19 restriction policies.

2. Methods

2.1. Study sample

The Pew Research Center's (Pew) American Trends Panel (ATP) is a nationally representative probability sample panel of noninstitutionalized adults in the US. ATP members participate in self-administered surveys (in English or Spanish) once or twice monthly. The periodic surveys include questions that assess the opinions, experiences and behaviors of ATP survey participants in a wide variety of subjects. ATP members ($N=29,908$) were recruited through landline, cellphone and address-based sample surveys since January 2014. Details about the ATP sampling methodology are described elsewhere.(Keeter, 2019) Included in our study sample were participants ($N=11,537$) of the survey administered between March 19 and March 24, 2020 (Wave 64). Our final sample included 10,609 US adults 18 years of age and over with no missing data in the variables of interest.

2.2. Measures

ATP Wave 64 included a question on the views of respondents about COVID-19 restriction policies: *Thinking about some steps that have been announced in some areas to address the coronavirus outbreak, in general do you think each of the following have been necessary or unnecessary?* Survey participants responded whether each of the following seven policies were *necessary* or *unnecessary*: a. *Restricting international travel to the US*, b. *Requiring most businesses other than grocery stores and pharmacies to close*, c. *Asking people to avoid gathering in groups of more than ten*, d. *Cancelling major sports and entertainment events*, e. *Closing K-12 schools*, f. *Limiting restaurants to carry-out only*, and g. *Postponing upcoming state primary elections* (Cronbach's $\alpha = 0.79$).

We included a set of variables that may be associated with the COVID-19 restriction policies listed above. Predictors/covariates included socioeconomic and demographic characteristics (age group (18–29, 30–49, 50–64, 65+), sex, race/ethnicity (non-Hispanic (NH) white, NH black, Hispanic, other), family income category (2018 earnings adjusted for differences in purchasing power by geographic region and household size (<\$30,000, \$30–\$74,999, \$75,000+)), education level (college graduate and above, some college, high school or less), marital status (married, living with a partner, divorced, separated, widowed, never been married), and presence of children under the age of 12 in the household), political party affiliation, news exposure (how closely the participants were following COVID-19 related news), employment status change due to the pandemic (whether someone in the household had lost a job or taken a pay cut), and census region (Northeast, Midwest, South, West).

2.3. Statistical analysis

We first used descriptive statistics (stratum-specific counts and percentages (%)) to summarize socioeconomic and demographic characteristics, employment status change due to the pandemic, political party affiliation, news exposure, census region, and views on COVID-19 restriction policies of US adults. We then examined the differences in views of US adults about COVID-19 restriction policies by the predictors/covariates described above. The differences in the distributions were evaluated using Chi-square tests. Logistic regression was used to examine the association between socioeconomic and demographic characteristics, employment status change due to the pandemic, political party affiliation, news exposure, and census region, and each COVID-19 restriction policy. Adjusted odds ratios (ORs) were reported with 95% confidence intervals in brackets. A p -value <0.05 was considered statistically significant. Analyses were conducted using Stata 16.1 (StataCorp, College Station, TX).

3. Results

Table 1 presents the characteristics of respondents to the Pew ATP survey of US adults conducted during March 19–24, 2020. Among the 10,609 respondents included in our final sample, one in five survey participants were 65 years of age or older (19.4%) and more than half were female (51.3%). About two-thirds were NH whites (64.0%), 11.5% NH blacks, 15.8% Hispanics, and 8.7% belonged to other racial/ethnic groups. Survey respondents were about equally distributed across income groups and education levels. Most participants were either married (46.6%) or never been married (46.6%), and a quarter (24.7%) of them had children under 12 years of age. More than half of survey participants (52.8%) were registered or self-identified as Democrat or lean Democrat whereas 43.9% of survey participants were Republican or lean Republican. More than half of survey respondents had been following news on COVID-19 very closely (57.2%). About one in five survey respondents (19.6%) were laid off or lost a job due to the pandemic while more than a quarter (27.2%) had a pay cut due to reduced hours or demand for their work as a result of the pandemic. More than a third of the survey participants (38.2%) reside in the South, 17.3% in the Northeast, 21.0% in the Midwest, and 23.5% in the West.

Table 2 reports the views of survey respondents on whether COVID-19 restriction policies were necessary to address the coronavirus outbreak. The vast majority of survey respondents believed that COVID-19 made it necessary to restrict international travel to the US (95.1%), cancel major sports and entertainment events (91.3%), close K-12 schools (90.3%), ask people to avoid gathering in groups of more than 10 people (88.0%), and limit restaurants to carry-out only (85.8%). On the other hand, 28.0% of survey respondents believed it was unnecessary to require most businesses other than grocery stores and pharmacies to close and 29.4% believed it was unnecessary to postpone state primary elections.

Table 3 reports the logistic regression results examining the association between socioeconomic and demographic characteristics, employment status change due to the pandemic, political party affiliation, news exposure and each COVID-19 restriction policy. Compared to adults between 18 and 29 years of age, adults age 65 years of age and over were more likely to view restricting international travel as necessary (OR=1.94, 95% confidence interval (CI)=1.07–3.50), more likely to view cancellation of major sports and entertainment events as necessary (OR=1.78, 95% CI=1.13–2.80), and more likely to view closing K-12 schools as necessary (OR=1.75, 95% CI=1.11–2.75) to address the coronavirus outbreak. Adults ages 50–64 and 65+ years were less likely to view postponing primary elections as necessary to combat the coronavirus outbreak compared to adults 18 to 29 years of age ((OR=0.76, 95% CI=0.58–0.99) and (OR=0.71, 95% CI=0.53–0.95), respectively).

Compared to male respondents, female respondents were more likely

Table 1

Characteristics of US adults: Pew's ATP Survey, March 19–24, 2020 (N=10,609).

Characteristic	%
Age group	
18–29	20.0
30–49	34.7
50–64	25.9
65+	19.4
Sex	
Male	48.7
Female	51.3
Race/ethnicity	
NH white	64.0
NH black	11.5
Hispanic	15.8
Other	8.7
Family income	
<\$30,000	30.2
\$30–\$74,999	35.9
\$75,000+	33.9
Education	
College graduate and above	36.2
Some college	31.7
High school or less	32.1
Marital status	
Married	46.6
Living with a partner	10.3
Divorced	11.1
Separated	2.2
Widowed	5.2
Never been married	46.6
Children under the age of 12 in the household	
No	75.3
Yes	24.7
Party affiliation	
Republican or lean Republican	43.9
Democrat or lean Democrat	52.8
Don't know/refused/no lean	3.4
How closely have you been following news on COVID-19?	
Not closely	7.8
Less closely	35.0
Very closely	57.2
Has the following happened to you or someone in your household because of COVID-19?	
a. Been laid off or lost a job	
No, has not happened	80.4
Yes, has happened	19.6
b. Had to take a cut in pay due to reduced hours or demand for your work	
No, has not happened	72.8
Yes, has happened	27.2
Census region	
Northeast	17.3
Midwest	21.0
South	38.2
West	23.5

to view as necessary restrictions of international travel to the US (OR=1.43, 95% CI=1.05–1.95), closing most businesses (OR=1.60, 95% CI=1.38–1.87), avoiding groups larger than 10 people (OR=1.49, 95% CI=1.20–1.85), closing K-12 schools (OR=1.35, 95% CI=1.07–1.69), limiting restaurants to carry-out only (OR=1.79, 95% CI=1.47–2.17), and postponing state primary elections (OR=1.54, 95% CI=1.34–1.76). Compared to NH whites, NH blacks were less likely to view as necessary avoiding groups larger than 10 people (OR=0.62, 95% CI=1.42–2.69), the cancellation of major sports and entertainment events (OR=0.56, 95% CI=0.36–0.89), and closing K-12 schools (OR=0.65, 95% CI=0.43–1.00). However, Hispanics were more likely to view the closing of most businesses (OR=1.45, 95% CI=1.13–1.85), avoiding group events larger than 10 people (OR=1.87, 95% CI=1.25–2.77), closing K-12 schools (OR=1.76, 95% CI=1.14–2.69), and postponing state primary elections (OR=1.67, 95% CI=1.31–2.12) as necessary COVID-19 restriction policies compared to NH whites.

Table 2

Views of US adults on COVID-19 restriction policies: Pew's ATP Survey, March 19–24, 2020 (N=10,609)

	%
Restricting international travel to the US	
Unnecessary	4.9
Necessary	95.1
Requiring most businesses other than grocery stores and pharmacies to close	
Unnecessary	28.0
Necessary	72.0
Asking people to avoid gathering in groups of more than ten	
Unnecessary	12.0
Necessary	88.0
Cancelling major sports and entertainment events	
Unnecessary	8.7
Necessary	91.3
Closing K-12 schools	
Unnecessary	9.7
Necessary	90.3
Limiting restaurants to carry-out only	
Unnecessary	14.2
Necessary	85.8
Postponing upcoming state primary elections	
Unnecessary	29.4
Necessary	70.6

Families earning more than \$30,000 a year were more likely to view requiring most businesses to close as necessary to address the coronavirus outbreak compared to families earning less than \$30,000 a year (\$30,000–\$74,999 (OR=1.37, 95% CI=1.11–1.69) and \$75,000 and above (OR=1.34, 95% CI=1.07–1.67)). Families earning \$75,000 or more a year were more likely to view avoiding gathering in groups (OR=1.39, 95% CI=1.02–1.90) and limiting restaurants to carry-out only (OR=1.35, 95% CI=1.01–1.80) as necessary measures to address the coronavirus outbreak compared to families earning less than \$75,000 a year.

Compared to survey respondents with a high school education, respondents with some college education were less likely to view closing most businesses (OR=0.81, 95% CI=0.67–0.99) and postponing primary elections (OR=0.79, 95% CI=0.66–0.95) as necessary to respond to COVID-19. Respondents with a college degree or higher were more likely to view cancelling major sports and entertainment events as necessary (OR=1.45, 95% CI=1.04–2.02). Survey participants who were divorced were less likely to view as necessary the need to postpone primary elections (OR=0.79, 95% CI=0.63–0.99) to combat COVID-19. Compared to those with children under the age of 12 years in the household, those without were more likely to view postponing primary elections as necessary (OR=1.24, 95% CI=1.03–1.50).

Democrat (or lean Democrat) survey respondents were less likely to view restricting international travel to the US as necessary (OR=0.62, 95% CI=0.43–0.90) and more likely to view all other restriction policies as necessary compared to Republican (or lean Republican) survey respondents (i.e., closing most businesses (OR=2.62, 95% CI=2.23–3.08), avoiding large group gatherings (OR=2.98, 95% CI=2.33–3.81), cancelling sports and entertainment events (OR=3.37, 95% CI=2.52–4.51), closing K-12 schools (OR=2.91, 95% CI=2.24–3.79), providing carry-out only for restaurants (OR=2.95, 95% CI=2.36–3.68) and postponing state primary elections (OR=1.31, 95% CI=1.13–1.52). Respondents who did not identify a specific party affiliation or party leaning had similar perceptions towards restriction policies as respondents who identified as a Democrat or lean Democrat.

Compared to respondents who were not closely following COVID-19 news, respondents following the news less closely or very closely were more likely to find all the policies under consideration necessary to combat COVID-19. Facing a job loss or experiencing a pay cut (by the respondent or someone in their household) were not associated with finding as necessary the seven restriction policies considered to combat

Table 3

Factors associated with views of US adults about COVID-19 restriction policies: Pew's ATP Survey, March 19–24, 2020 (N=10,609).

Predictor variable	Restricting international travel to the US		Requiring most businesses other than grocery stores and pharmacies to close	Asking people to avoid gathering in groups of more than ten			Cancelling major sports and entertainment events		Closing K-12 schools		Limiting restaurants to carry-out only		Postponing upcoming state primary elections		
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	
Age group															
18–29 (ref)															
30–49	0.79	[0.49,1.25]	0.89		[0.70,1.14]	0.84	[0.61,1.16]	1.14	[0.78,1.66]	1.04	[0.73,1.49]	0.74	[0.53,1.04]	0.82	[0.64,1.05]
50–64	1.47	[0.87,2.49]	0.86		[0.66,1.12]	1.04	[0.74,1.48]	1.23	[0.83,1.81]	1.09	[0.73,1.62]	0.72	[0.50,1.02]	0.76	[0.58,0.99]
65+	1.94	[1.07,3.50]	1.07		[0.80,1.43]	1.35	[0.91,2.01]	1.78	[1.13,2.80]	1.75	[1.11,2.75]	1.07	[0.72,1.59]	0.71	[0.53,0.95]
Sex															
Male (ref)	1.00	[1.00,1.00]													
Female	1.43	[1.05,1.95]	1.60		[1.38,1.87]	1.49	[1.20,1.85]	1.26	[0.98,1.61]	1.35	[1.07,1.69]	1.79	[1.47,2.17]	1.54	[1.34,1.76]
Race/Ethnicity															
White non-Hispanic (ref)															
Black non-Hispanic	0.99	[0.55,1.79]	1.17		[0.87,1.58]	0.62	[0.42,0.92]	0.56	[0.36,0.89]	0.65	[0.43,1.00]	0.99	[0.66,1.49]	0.83	[0.65,1.07]
Hispanic	1.72	[0.95,3.10]	1.45		[1.13,1.85]	1.87	[1.25,2.77]	1.37	[0.91,2.06]	1.76	[1.14,2.69]	1.36	[0.98,1.90]	1.67	[1.31,2.12]
Other	1.11	[0.64,1.93]	0.95		[0.71,1.26]	1.18	[0.75,1.86]	1.01	[0.59,1.71]	0.91	[0.59,1.40]	1.16	[0.79,1.71]	1.25	[0.93,1.68]
Family income															
<\$30,000 (ref)															
\$30–\$74,999	1.15	[0.72,1.82]	1.37		[1.11,1.69]	1.26	[0.94,1.67]	1.20	[0.86,1.66]	1.24	[0.91,1.69]	1.25	[0.95,1.65]	1.02	[0.83,1.24]
\$75,000+	0.87	[0.57,1.34]	1.34		[1.07,1.67]	1.39	[1.02,1.90]	1.19	[0.83,1.71]	1.08	[0.78,1.49]	1.35	[1.01,1.80]	0.87	[0.71,1.08]
Education															
High school or less (ref)															
Some college	1.14	[0.73,1.78]	0.81		[0.67,0.99]	1.02	[0.78,1.34]	0.95	[0.70,1.29]	1.20	[0.90,1.60]	1.06	[0.82,1.35]	0.79	[0.66,0.95]
College grad and above	0.93	[0.61,1.43]	0.96		[0.79,1.17]	1.25	[0.95,1.66]	1.45	[1.04,2.02]	1.26	[0.94,1.69]	1.14	[0.89,1.46]	0.89	[0.74,1.08]
Marital status															
Married (ref)															
Living with a partner	1.07	[0.60,1.92]	0.84		[0.64,1.12]	0.75	[0.51,1.10]	0.69	[0.44,1.08]	0.74	[0.49,1.13]	0.78	[0.53,1.14]	0.79	[0.61,1.03]
Divorced	1.01	[0.55,1.84]	0.88		[0.69,1.13]	1.09	[0.74,1.60]	0.81	[0.54,1.22]	0.98	[0.67,1.42]	0.91	[0.66,1.26]	0.79	[0.63,0.99]
Separated	1.98	[0.82,4.79]	0.66		[0.36,1.20]	1.85	[0.82,4.18]	1.03	[0.43,2.47]	1.03	[0.48,2.21]	1.01	[0.49,2.09]	1.07	[0.62,1.85]
Widowed	0.61	[0.28,1.33]	1.04		[0.72,1.49]	0.86	[0.52,1.42]	0.70	[0.39,1.27]	0.62	[0.36,1.05]	0.77	[0.48,1.23]	0.74	[0.54,1.01]
Never been married	0.67	[0.45,1.00]	0.92		[0.73,1.15]	0.88	[0.65,1.19]	0.73	[0.50,1.04]	0.75	[0.53,1.05]	0.89	[0.66,1.20]	0.88	[0.70,1.09]
Do you have children under the age of 12 in the household?															
No (ref)															
Yes	1.35	[0.89,2.06]	1.04		[0.84,1.27]	1.01	[0.78,1.32]	1.08	[0.79,1.48]	1.04	[0.78,1.39]	1.15	[0.88,1.49]	1.24	[1.03,1.50]
Political party affiliation															
Rep/lean Rep (ref)															
Dem/lean Dem	0.62	[0.43,0.90]	2.62		[2.23,3.08]	2.98	[2.33,3.81]	3.37	[2.52,4.51]	2.91	[2.24,3.79]	2.95	[2.36,3.68]	1.31	[1.13,1.52]
DK/refused/no lean	0.33	[0.13,0.82]	2.04		[1.25,3.35]	2.34	[1.26,4.35]	2.16	[1.03,4.50]	1.80	[0.90,3.59]	1.96	[1.06,3.65]	1.92	[1.18,3.11]
How closely have you been following news on COVID-19?															
Not closely (ref)															
Less closely	2.14	[1.28,3.58]	2.29		[1.69,3.10]	2.84	[2.01,4.00]	2.33	[1.58,3.43]	2.61	[1.80,3.78]	2.14	[1.52,3.02]	1.98	[1.46,2.66]
Very closely	3.68	[2.22,6.08]	4.57		[3.39,6.17]	7.33	[5.24,10.27]	5.72	[3.82,8.57]	5.43	[3.76,7.84]	4.97	[3.52,7.00]	2.73	[2.04,3.66]
Has the following happened to you or someone in your household because of COVID-19?															
a. Been laid off or lost a job															

(continued on next page)

Table 3 (continued)

Predictor variable	Restricting international travel to the US		Requiring most businesses other than grocery stores and pharmacies to close		Asking people to avoid gathering in groups of more than ten		Cancelling major sports and entertainment events		Closing K-12 schools		Limiting restaurants to carry-out only		Postponing upcoming state primary elections	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
No, has not happened (ref)														
Yes, has happened	1.33	[0.85,2.05]	1.15											
b. Had to take a cut in pay due to reduced hours or demand for your work														
No, has not happened (ref)														
Yes, has happened	0.93	[0.65,1.32]	0.96											
Census region														
Northeast (ref)														
Midwest	1.39	[0.84,2.30]	0.76											
South	1.53	[0.95,2.49]	0.75											
West	1.08	[0.66,1.79]	0.59											

Note. OR = adjusted odds ratio; 95% CI = 95% confidence intervals; outcomes by each of the seven listed restriction policies are modeled by using logistic regression, adjusted for covariates included in the study: age group, sex, race/ethnicity, family income, education, marital status, presence of children under the age of 12 in the household, political party affiliation, news exposure, employment status change due to the pandemic, and census region.

COVID-19. Compared to the respondents living in the Northeast region, respondents in the other regions were less likely to view as necessary the need to close most businesses (Midwest (OR=0.76, 95% CI=0.60–0.97), South (OR=0.75, 95% CI=0.60–0.93), and West (OR=0.59, 95% CI=0.46–0.74)) and postpone state primary elections (Midwest (OR=0.73, 95% CI=0.59–0.91) and West (OR=0.51, 95% CI=0.41–0.63)).

4. Discussion

Most respondents to the nationally representative Pew ATP Wave 64 survey conducted in mid-March 2020 viewed a series of key restriction policies as necessary to address the coronavirus outbreak. Restricting international travel to the US, cancelling major sports and entertainment events, closing K-12 schools, asking people to avoid gathering in groups of more than 10 people, and limiting restaurants to carry-out only were all considered as policies that are necessary to combat the coronavirus. Only three of every 10 respondents believed it was unnecessary to require most businesses other than grocery stores and pharmacies to close. Three of every 10 respondents also believed it was unnecessary to postpone state primary elections.

Adults 65 years of age and over were more likely to view as necessary the need to restrict international travel, cancel major sports and entertainment events, and close K-12 schools compared to adults 18 to 29 years of age. Adults 50 years of age and over were less likely to view postponing primary elections as necessary compared to adults 18 to 29 years of age. Compared to male respondents, female respondents were more likely to view as necessary restrictions of international travel to the US, closing most businesses, avoiding group events, closing K-12 schools, limiting restaurants to carry-out only, and postponing state primary elections. NH blacks were less likely to view as necessary the cancellation of major entertainment events, avoiding group events, and closing schools, whereas Hispanics were more likely to view as necessary the closing of most businesses, avoiding group events, closing K-12 schools, and postponing state primary elections compared to NH whites.

Families earning more than \$30,000 a year were more likely to view requiring most businesses to close as necessary compared to families earning less than \$30,000 a year. Families earning more than \$75,000 a year were more likely to view avoiding gathering in groups and limiting restaurants to carry-out only as necessary compared to families earning less than \$30,000 a year.

Survey respondents who are Democrat or lean Democrat were less likely to view restricting international travel to the US as necessary and more likely to view all other restriction policies as necessary compared to survey respondents who are Republican or lean Republican. Respondents following the news on COVID-19 were more likely to find as necessary the seven policies considered to combat COVID-19 compared to survey participants not following the news closely. Employment and income losses were not associated with finding necessary the restriction policies considered to combat COVID-19.

Our results point out that there is substantial variation in how different segments of the population view COVID-19 restriction policies. People following the news on COVID-19 seem to be more open to supporting wide-ranging restrictive policies in the sense that they deemed the policies considered in the survey as necessary to stop coronavirus outbreaks. Political party affiliation was the only factor to be consistently associated with finding COVID-19 restriction policies as necessary or unnecessary—with Democrats viewing all the restriction policies considered except restricting international travel to the US as necessary to combat COVID-19 compared to Republicans.

Our findings also suggest that socioeconomic and demographic groups are likely to react to restriction policies in many different ways. This is policy relevant and useful as we think of practical ways to craft effective health communication messages now and in the future. The sex difference in response to the restriction policies observed in this data set is consistent with other recent findings. Compared to men, women are

more likely to recognize COVID-10 as a threat to health (Galasso et al., 2020) and take precautions on mitigating the risk of COVID-19 infection, including limiting social gatherings and putting on personal protective equipment. (Fan et al., 2020) While women have lower infection and mortality rates due to COVID-19, they are more likely to be affected by the restriction measures associated with the closure of businesses and schools. (Alon et al., 2020) Compared to other age groups, voter turnout is usually higher among those 65 years of age and over. (Mirsa, 2019) who are more likely impacted by federal-level policies associated with retirement and Medicare benefits, and less affected by potential barriers to voting due to relocation that is more common among other age groups. (Brandon, 2020)

Compared to NH whites, NH black and Hispanic populations have a higher COVID-19 infection rate and are more than four times as likely to be hospitalized as a result. (COVID-19 Forecasts: Deaths, 2020) The Hispanic population was more likely to consider restriction policies as necessary. The Health Belief Model suggests that individual health behavior is informed by knowledge and perceptions. (Janz and Becker, 1984) but in the context of COVID-19, following safety measures like closing nonessential businesses and avoiding large gatherings means possible job loss or a pay cut especially for low-wage workers in the short term. For Hispanic populations that overwhelmingly contribute to the workforce in the food industry that has been hit hard by the pandemic, their perception of restriction and safety measures may be in conflict with their actions that are determined by the need to remain gainfully employed. Our findings from data early in the pandemic showed that employment status did not contribute to differences in the views of the restriction policies, but the results may now differ after a longer time period into the pandemic given the inconsistent responses at the federal and state levels.

Our findings based on survey data early in the pandemic could inform the adoption of other future measures that go beyond the implementation of restrictive measures to mitigate the spread of COVID-19. People that do not find it necessary to adopt restrictive policy measures to prevent COVID-19 outbreaks are presumably also individuals who perceive the risk of infection as low. As a result, a lower perception of risk could lead to lower participation rates in key initiatives to address COVID-19 such as contact tracing measures or vaccine uptake now and in the future. Our study suggests that there is likely to be substantial but, yet, predictable variation in areas such as participation in contact tracing and vaccine uptake across different segments of the population.

Lastly, most of the conversation around the spread of the coronavirus has focused on the biological factors such as the incubation period and the onset of symptoms. (Lauer et al., 2020) An often quoted figure for communities, states, and countries is the number of secondary infections resulting from a primary infection. (Ives and Bozzuto, 2020) Although it is important to know how contagious COVID-19 can be for different locations and populations, the spread of ideas about the disease could be even more relevant. In other words, “we are infected by the idea of a disease long before the disease itself” and, as such, understanding how people perceive restrictive policies and risks is critically important to close the gap between the spread of COVID-19 and the spread of ideas and perceptions about COVID-19. (Krakauer and West, 2020) This is particularly important as we attempt to optimize our response to COVID-19 by closing disparities in the actual impact of the coronavirus while simultaneously closing disparities in the spread of ideas and perceptions about it. With vaccine development and approval, tasks at hand for public health officials are becoming more complex given the need to juggle different prevention and treatment strategies to manage COVID-19 outbreaks. In addition to logistics in vaccine distribution and uptake, vaccine hesitancy, pandemic fatigue and misinformation in the media are some of the challenges faced by local, state and national leaders. The need to anticipate and develop communication strategies to successfully address the pandemic is critical. (Bosman et al., 2020; French et al., 2020)

Our study has several strengths and limitations. The large sample size of the Pew's ATP Wave 64 survey allowed us to understand the general opinion of survey respondents from many demographic and socioeconomic groups related to COVID-19 restriction policies. However, the views of respondents about COVID-19 restriction policies were limited to survey participants stating that the steps taken to address the pandemic had been necessary or unnecessary. It is likely that survey respondents have a continuum of support or perspectives about each policy. The survey also had limited information on factors such as country of origin and immigration status—important variables related to COVID-19 outcomes given the disproportionate impact of the pandemic on key immigrant groups. Moreover, the ATP Wave 64 survey included many questions that allowed us to understand not only the opinion of respondents about policy restrictions to address the coronavirus outbreak but also the association between socioeconomic/demographic factors and questions on COVID-19 restrictions. Our results are based on data collected early in the pandemic and, as such, there are limitations on how the data could be used to explain current COVID-19 trends. Still, our findings can inform planning activities for future pandemics and highlight the importance and role of public opinion surveys to understand responses to policy measures at different levels.

5. Conclusions

A uniform approach to the implementation of statewide restriction orders seem to have been effective in the early stage of the COVID-19 pandemic, but a few months into the pandemic has also taught us that COVID-19 impacts socioeconomic and demographic groups in many different ways. Opinions about which policy initiatives are necessary to effectively address COVID-19 also vary substantially across different segments of the population. As states and localities implement strategies to resume economic activity, it is important that we prioritize resources and tailor health messages to reach every population segment, particularly vulnerable populations most affected by COVID-19.

Funding

This research study did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Financial disclosure

No financial disclosures were reported by the authors of this paper.

Conflicts of interest

None.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgments

The authors equally contributed to the manuscript. No financial disclosures were reported by the authors of this paper.

References

- Alon, T.M., Doepeke, M., Olmstead-Rumsey, J., Tertilt, M., 2020. The impact of COVID-19 on gender equality. *Nat. Bur. Econ. Res.* <https://doi.org/10.3386/w26947>.
- Bosman, J., Mervosh, S., Santora, M., 2020. As the coronavirus surges, a new culprit emerges: pandemic fatigue. *New York Times*. <https://www.nytimes.com/2020/10/17/us/coronavirus-pandemic-fatigue.html>, 2020. (Accessed 7 December 2020).

- Brandon, E., 2020. Why older citizens are more likely to vote. US News World Rep. <https://money.usnews.com/money/retirement/aging/articles/why-older-citizens-are-more-likely-to-vote>, 2020. (Accessed 9 October 2020).
- Briseño, L., 2020. CERC overview for COVID-19. Center Dis. Control Prevent. https://emergency.cdc.gov/cerc/training/webinar_20200406.asp, 2020. (Accessed 22 June 2020).
- Coronavirus in the US: latest map and case count, 2020. New York Times. October 9. Available at: <https://www.nytimes.com/interactive/2020/us/coronavirus-us-cases.html> (Accessed October 9, 2020).
- COVID-19 Forecasts: Deaths, 2020. Centers for Disease Control and Prevention. October 8. <https://www.cdc.gov/coronavirus/2019-ncov/covid-data/investigations-discovery/hospitalization-death-by-race-ethnicity.html> (Accessed October 9, 2020).
- COVID-19 projections, 2020. Institute for Health Metrics and Evaluation. Available at: <https://covid19.healthdata.org/united-states-of-america?view=total-deaths&tab=trend> (Accessed December 7, 2020. Accessed December 3, 2020).
- Fan, Y., Orhun, A.Y., Turjeman, D., 2020. Heterogeneous actions, beliefs, constraints and risk tolerance during the COVID-19 pandemic. National Bureau of Economic Research, 27211. <https://doi.org/10.3386/w27211>. https://www.nber.org/system/files/working_papers/w27211/w27211.pdf, 2020. (Accessed 10 October 2020). Report No.27211.
- Finset, A., Bosworth, H., Butow, P., et al., 2020. Effective health communication - a key factor in fighting the COVID-19 pandemic. Patient Educ. Couns. 103 (5), 873–876. <https://doi.org/10.1016/j.pec.2020.03.027>.
- French, J., Deshpande, S., Evans, W., Obregon, R., 2020. Key guidelines in developing a pre-emptive COVID-19 vaccination uptake promotion strategy. Int. J. Environ. Res. Public Health 17 (16), 5893.
- Galasso, V., Pons, V., Profeta, P., Becher, M., Brouard, S., Foucault, M., 2020. Gender differences in COVID-19 related attitudes and behavior: evidence from a panel survey in eight OECD countries. Nat. Bur. Econ. Res. <https://doi.org/10.3386/w27359>. https://www.nber.org/system/files/working_papers/w27359/w27359.pdf, 2020. (Accessed 10 October 2020) (0898–2937).
- Guidelines: opening up America again. <https://www.whitehouse.gov/openingamerica/>. Published April 16, 2020. (Accessed Jun 22, 2020).
- Ives, A.R., Bozzuto, C., 2020. State-by-State estimates of R0 at the start of COVID-19 outbreaks in the USA. medRxiv. <https://doi.org/10.1101/2020.05.17.20104653>.
- Janz, N.K., Becker, M.H., 1984. The health belief model: a decade later. Health Educ. Q. 11 (1), 1–47. <https://doi.org/10.1177/109019818401100101>.
- Keeter, S., 2019. Growing and Improving Pew Research Center's American Trends Panel. February 27. Available at: <https://www.pewresearch.org/methods/2019/02/27/growing-and-improving-pew-research-centers-american-trends-panel/> (Accessed May 31, 2020).
- Krakauer, D., West, G., 2020. The damage we're not attending to: scientists who study complex systems offer solutions to the pandemic. Nautilus. <http://nautil.us/issue/87/risk/the-damage-were-not-attending-to>, 2020. (Accessed 11 July 2020). Published July 8.
- Lauer, S.A., Grantz, K.H., Bi, Q., et al., 2020. The incubation period of coronavirus disease 2019 (COVID-19) from publicly reported confirmed cases: estimation and application. Ann. Intern. Med. 172 (9), 577–582. <https://doi.org/10.7326/M20-0504>.
- Mirsa, J., 2019. Voter Turnout Rates Among All Voting Age and Major Racial and Ethnic Groups Were Higher Than in 2014. Censusgov. April 23. Available at: <https://www.census.gov/library/stories/2019/04/behind-2018-united-states-midterm-election-turnout.html#:~:text=In%202018%2C%20among%20those%20age%20age%20group%20voted>. Accessed October 9, 2020).
- Oran, D.P., Topol, E.J., 2020. Prevalence of asymptomatic SARS-CoV-2 infection: a narrative review. Ann. Intern. Med. <https://doi.org/10.7326/M20-3012>.
- Reynolds, B., Seeger, M.W., 2005. Crisis and emergency risk communication as an integrative model. J. Health Commun. 10 (1), 43–55.
- Sen, S., Karaca-Mandic, P., Georgiou, A., 2020. Association of stay-at-home orders with COVID-19 hospitalizations in 4 states. JAMA 323 (24), 2522–2524. <https://doi.org/10.1001/jama.2020.9176>.