

Disaster Vulnerability in 3D

APPENDIX

Table 1. Model variables for all 3142 counties and for counties in the top decile according to the COVID-19 Vulnerability Index. Table entries are mean (SD).

	Top Decile Counties (N=308)	All Counties (N=3142)
Minority Race	52.99 (23.6)	23.50 (20.2)
Uninsured	15.62 (7.0)	10.08 (5.1)
Essential Workers	9.52 (2.6)	11.34 (2.9)
Over 65 Years	17.27 (5.1)	18.37 (4.6)
Current Smokers	19.71 (5.3)	17.87 (3.7)
Obese	35.37 (7.6)	33.43 (5.9)
Diabetes	12.54 (4.7)	10.49 (3.5)
Heart Disease (Deaths/1000)	48.87 (57.0)	34.25 (111.9)
COPD (Deaths/1000)	39.74 (16.1)	38.22 (13.0)
Pop Density (per sq mile)	694.18 (5164.5)	267.54 (1782.4)

Table 2. Demographic variables for all 3142 counties and for counties stratified by mail-in ballot access for 2020 general election. Table entries are mean (SD).

	Mail-in Ballots			All Counties (N=3142)
	Available on Request (N=91)	Not Available to Most (N=633)	Universal (N=2418)	
Minority Race	34.28 (20.7)	33.99 (22.6)	20.36 (18.4)	23.50 (20.2)
Uninsured	9.19 (2.9)	13.53 (5.0)	9.21 (4.8)	10.08 (5.1)
Essential Workers	10.94 (2.2)	11.36 (2.8)	11.35 (2.9)	11.34 (2.9)
Over 65 Years	17.53 (3.1)	17.27 (4.1)	18.68 (4.7)	18.37 (4.6)
Current Smokers	19.14 (3.4)	18.65 (3.3)	17.62 (3.7)	17.87 (3.7)
Obese	36.98 (5.3)	34.55 (6.4)	33.00 (5.7)	33.43 (5.9)
Diabetes	13.70 (3.8)	11.73 (3.7)	10.04 (3.3)	10.49 (3.5)
Heart Disease (Deaths/1000)	14.50 (14.0)	41.52 (185.5)	33.09 (85.0)	34.25 (111.9)
COPD (Deaths/1000)	42.41 (15.8)	41.02 (12.1)	37.31 (12.9)	38.22 (13.0)
Pop Density (per sq mile)	281.83 (848.5)	128.94 (285.0)	303.28 (2018.5)	267.54 (1782.4)

Table 3. Proportion of Each Vulnerability Decile that Were Early Adopters, Spring/Summer Adopters, Late Adopters or Very Late/Non-adopters of Mask Mandates. (10th decile is the most vulnerable decile and 1st decile is the least vulnerable.)

Mortality Rate Decile Ranking	Early Adopters	Spring/Summer Adopters	Late Adopters	Very Late/Non-Adopters
1st	0.28	0.18	0.44	0.10
2nd	0.14	0.20	0.52	0.14
3rd	0.08	0.18	0.52	0.22
4th	0.06	0.19	0.45	0.30
5th	0.05	0.21	0.42	0.32
6th	0.04	0.17	0.37	0.42
7th	0.04	0.23	0.32	0.41
8th	0.05	0.14	0.36	0.46
9th	0.03	0.15	0.33	0.50
10th	0.03	0.14	0.36	0.47

Table 4. Demographic variables for all 3142 counties and for counties stratified by timing of mask mandate adoption. Table entries are mean (SD).

	Mask Mandate Adoption				All Counties (N=3142)
	Early (N=248)	Late (N=1281)	Spring/ Summer (N=563)	Very Late (N=1041)	
Minority Race	24.90 (21.2)	22.85 (20.4)	28.83 (20.2)	20.83 (18.7)	23.50 (20.2)
Uninsured	6.76 (3.0)	9.91 (5.0)	9.25 (4.0)	11.45 (5.5)	10.08 (5.1)
Essential Workers	10.86 (2.9)	11.57 (2.8)	10.81 (2.6)	11.49 (3.0)	11.34 (2.9)
Over 65 Years	18.08 (4.6)	17.92 (4.1)	18.68 (5.3)	18.85 (4.6)	18.37 (4.6)
Current Smokers	16.67 (3.2)	18.45 (3.5)	16.69 (3.0)	18.04 (3.9)	17.87 (3.7)
Obese	31.22 (5.8)	34.26 (5.7)	31.60 (6.3)	33.96 (5.6)	33.43 (5.9)
Diabetes	9.42 (2.3)	10.94 (3.5)	10.10 (3.5)	10.40 (3.7)	10.49 (3.5)
Heart Disease (Deaths/1000)	19.60 (183.6)	28.22 (122.1)	18.97 (42.3)	53.12 (99.2)	34.25 (111.9)
COPD (Deaths/1000)	30.57 (10.1)	40.51 (13.5)	34.25 (11.0)	39.66 (12.7)	38.22 (13.0)
Pop Density (per sq mile)	1320.45 (5845.0)	154.84 (460.0)	431.23 (1256.9)	65.89 (165.2)	267.54 (1782.4)

Table 5: Survey Sample Demographics

Responses collected between 09/23/20 and 10/02/20	Total Sample
	n = 2,037
	n (%)
DEMOGRAPHIC INFORMATION	
Age in years (Mean, SD)	45.95 (17.74)
Gender	
Woman	1043 (51.20)
Man	974 (47.82)
Other	20 (0.98)
Race/Ethnicity	
White only	1422 (69.81)
Black only	285 (13.99)
Asian only	187 (9.18)
Hispanic (any race)	70 (3.43)
Other or more than one race	73 (3.58)
Income by Poverty %	
0-99% of the FPL	229 (11.24)
100 - 149% of the FPL	259 (12.71)
150 - 199% of the FPL	224 (11.00)
200 - 299% of the FPL	375 (18.41)
300 - 399% of the FPL	362 (17.77)
400+ % of the FPL	588 (28.87)
Education	
Less than high school degree	39 (1.91)
High school degree or equivalent	395 (19.39)
Some college but no degree	334 (16.40)
Associates degree	193 (9.47)
Bachelor's degree	489 (24.01)
Masters degree	443 (21.75)
Advanced degree	114 (7.07)
Marital Status	
Married	1144 (56.16)
Never Married	547 (26.85)
Divorced	196 (9.62)
Widowed	124 (6.09)
Separated	26 (1.28)

Child under 18 living at home	
Yes	895 (43.94)
Political viewpoint	
Liberal	716 (35.15)
Moderate	710 (34.86)
Conservative	611 (30.00)
Describe the area you live	
Urban	971 (47.67)
Rural	757 (37.16)
Suburban	309 (15.17)

MEASURES OF FINANCIAL STABILITY

In the past 6 months, received...	
govt. food assistance (SNAP, food stamps, WIC, etc.)	718 (35.25)
govt. unemployment benefits	612 (30.04)
Are you currently caught up on rent/house payments?	
Yes	1185 (58.17)
No	429 (21.06)
I'm not currently renting or making payments on a house	408 (20.03)
I don't know	15 (0.74)

HEALTH

Self described as high risk for COVID-19	
Yes	796 (39.08)
Knows someone personally who has been	
Diagnosed with COVID-19	916 (44.97)
Died or been seriously ill due to COVID-19	589 (28.93)
Frequency of getting flu shot over the last 5 years	
Every year	806 (39.57)
Almost every year	382 (18.75)
About every other year	166 (8.15)
Only once	182 (8.93)
Never	501 (24.59)
Considers MMR vaccine to be safe	
Yes	1415 (69.46)
No	261 (12.81)
I'm not sure	361 (17.72)

Table 6: Demographic Influences on Attitudes About Reopening K-12 Schools

	Do you think reopening K-12 schools is a risk worth taking? (Yes/No/I don't know)	
	Yes	
	n (row %)	
Race		*p-val < 0.0001
White	951 (66.88)	
Hispanic	32 (45.71)	
Black	139 (48.77)	
Asian	116 (62.03)	
Other/2+	32 (43.84)	
FPL		p-val < 0.0001
<100%	119 (51.97)	
100-149%	121 (46.72)	
150-199%	124 (55.36)	
200-299%	213 (56.80)	
300-399%	246 (67.96)	
400+%	447 (76.02)	
Trust in the government to provide full and honest information about COVID-19		p-val < 0.0001
A great deal	387 (82.87)	
A fair amount	474 (69.30)	
Not very much	252 (54.19)	
Not at all	146 (37.82)	
No opinion	11 (31.43)	

*Note: All p-values derived from Chi-square test for difference in proportions

Table 7: Demographic Influences on Willingness to Allow Vaccine Prioritization for Vulnerable Populations and Support of Aggressive Public Health Measures to Limit the Spread of COVID-19

	...should high risk groups like the elderly and people with preexisting conditions be given priority to receive that vaccine before other people? (Yes/No)	...should high risk groups like racial minorities and low-income people be given priority to receive that vaccine before other people? (Yes/No)	How much do you support aggressive public health measures to protect high risk groups by limiting the spread of COVID-19? (Strongly, Somewhat, Not really, Not at all)	...should essential workers like doctors and nurses be given priority to receive that vaccine before other people? (Yes/No)*	...should essential workers like hospital janitors be given priority to receive that vaccine before other people? (Yes/No)*	How much do you support aggressive public health measures to protect essential workers by limiting the spread of COVID-19? (Strongly, Somewhat, Not really, Not at all)
	Yes n (row %)	Yes n (row %)	Strongly/Somewhat n (row %)	Yes n (row %)	Yes n (row %)	Strongly/Somewhat n (row %)
Age	**p-val = 0.0717	p-val = 0.1582	p-val = 0.5184	p-val <0.0001	p-val = 0.0024	p-val = 0.4174
Under 65	651 (81.48)	563 (71.63)	1386 (87.44)	677 (85.05)	686 (86.95)	1396 (88.08)
65 or older	193 (86.94)	153 (66.52)	401 (88.72)	221 (95.67)	209 (94.57)	405 (89.60)
Race	p-val <0.0001	p-val = 0.0001	p-val = 0.4753	p-val = 0.0007	p-val = 0.3510	p-val = 0.5915
White	612 (86.44)	531 (74.37)	1250 (87.90)	640 (89.76)	634 (89.42)	1258 (88.47)
Hispanic	21 (70.00)	24 (60.00)	61 (87.14)	26 (81.25)	33 (86.84)	58 (82.86)
Black	101 (70.63)	79 (55.63)	251 (88.07)	112 (77.24)	117 (83.57)	251 (88.07)
Asian	80 (80.00)	61 (70.11)	166 (88.77)	85 (89.47)	83 (90.22)	168 (89.84)
Other/2+	30 (75.00)	21 (63.64)	59 (80.82)	35 (83.33)	28 (90.32)	66 (90.41)
FPL	p-val <0.0001	p-val = 0.0013	p-val = 0.0008	p-val = 0.0015	p-val <0.0001	p-val = 0.0185
<100%	73 (68.22)	75 (61.48)	184 (80.35)	97 (78.23)	83 (79.05)	188 (82.10)

100-149%	95 (72.52)	81 (63.28)	225 (86.87)	96 (80.67)	114 (81.43)	228 (88.03)
150-199%	107 (83.59)	59 (61.46)	193 (86.16)	97 (88.18)	94 (82.46)	199 (88.84)
200-299%	147 (84.48)	144 (71.64)	323 (86.13)	165 (89.67)	169 (88.48)	327 (87.20)
300-399%	164 (86.77)	127 (73.41)	329 (90.88)	173 (89.64)	164 (97.04)	330 (91.16)
400+%	258 (88.36)	230 (77.70)	533 (90.65)	270 (90.91)	271 (93.13)	529 (89.97)
Education	p-val <0.0001	p-val <0.0001	p-val <0.0001	p-val = 0.0001	p-val <0.0001	p-val <0.0001
HS or less	161 (77.03)	133 (59.11)	356 (82.03)	171 (80.28)	180 (81.45)	363 (83.64)
Some college/Assoc.	207 (77.53)	174 (66.92)	442 (83.87)	227 (84.70)	225 (86.87)	447 (84.82)
Bachelor	219 (83.59)	160 (70.48)	436 (89.16)	238 (90.49)	204 (90.27)	437 (89.37)
Master or Adv.	257 (90.81)	249 (81.91)	553 (94.21)	262 (92.58)	286 (94.08)	554 (94.38)

*Note: Over the entire sample (n = 2,037) differences between responses to vaccine prioritization questions between "doctors and nurses" framing and "hospital janitors" framing was not statistically significant (Chi-square p-value = 0.4544).

Table 8: Influences on Vaccine Hesitancy**Defining "Vaccine Hesitant"****total sample = 2,037**

How willing would you be to receive an FDA-approved COVID-19 vaccine next year? (Very willing/Somewhat willing/Not willing)

Willing (Very or somewhat willing)	n = 1534 (75.31%)
Vaccine Hesitant (Not willing)	n = 503 (24.69%)

Vaccine Hesitancy

by Demographic Information	Vaccine Hesitant (n = 503) n (row %)	*p-value
Age		0.002
Under 65 years old	366 (23.09)	
65 years old or older	137 (30.31)	
Gender		0.0005
Woman	372 (35.67)	
Man	126 (12.94)	
Other	5 (25.00)	
Race/Ethnicity		0.0005
White only	274 (19.27)	
Black only	133 (46.67)	
Asian only	41 (21.93)	
Hispanic (any race)	29 (41.43)	
Other or more than one race	26 (35.62)	
Income by Poverty %		0.0005
0-99% of the FPL	93 (40.61)	
100 - 149% of the FPL	100 (38.61)	
150 - 199% of the FPL	70 (31.25)	
200 - 299% of the FPL	101 (26.93)	
300 - 399% of the FPL	67 (18.51)	
400+ % of the FPL	72 (12.24)	
Education		0.0005
High School or Less	155 (35.71)	
Some College/Assoc.	196 (37.19)	
Bachelor's Degree	96 (19.63)	
Masters or Advanced Degree	56 (9.54)	
Marital Status		0.0005
Married	191 (16.70)	
Never Married	189 (34.55)	
Widowed/Divorced/Separated	123 (35.55)	
Child under 18 living at home		<0.0001

Yes	144 (16.09)	
No	359 (31.44)	
Political viewpoint		0.0005
Liberal	129 (18.02)	
Moderate	210 (29.58)	
Conservative	164 (26.84)	
Describe the area you live		0.0005
Urban	167 (17.20)	
Rural	229 (30.25)	
Suburban	107 (34.63)	
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by Financial Stability		
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In the past 6 months, received...		
govt. food assistance		<0.0001
Yes	131 (18.25)	
No/I don't know	372 (28.20)	
govt. unemployment benefits		<0.0001
Yes	96 (15.69)	
No/I don't know	407 (28.56)	
Caught up on rent/house payments		0.0005
Yes	341 (28.78)	
Not currently renting or making payments	93 (22.79)	
No/I don't know	69 (15.54)	
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by Health Information		
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Self-describe as high risk for COVID-19		<0.0001
Yes	141 (17.71)	
No	356 (29.16)	
Is a health care worker		0.0001
Yes	40 (15.38)	
No	463 (26.06)	
Knows someone personally who has been...		
Diagnosed with COVID-19		0.0390
Yes	206 (22.49)	
No	297 (26.49)	
Died or been seriously ill due to COVID-19		<0.0001
Yes	98 (16.64)	
No	405 (27.97)	
Frequency of getting flu shot over the last 5 years		0.0005
Every year	114 (14.14)	
Almost every year	40 (10.47)	
About every other year	34 (20.48)	

Only once	47 (25.82)	
Never	268 (53.49)	
Considers MMR vaccine to be safe		0.0005
Yes	240 (16.96)	
No	98 (37.55)	
I'm not sure	165 (45.71)	

by Trust in Government

How much do you trust _____ to provide full and honest information about COVID-19?

the government		0.0005
A great deal	31 (6.64)	
A fair amount	120 (17.54)	
Not very much	144 (30.97)	
Not at all	189 (48.96)	
No opinion	19 (54.29)	
President Trump		0.0005
A great deal	68 (14.98)	
A fair amount	76 (17.67)	
Not very much	66 (23.16)	
Not at all	254 (31.95)	
No opinion	39 (53.42)	
the CDC		0.0005
A great deal	83 (11.35)	
A fair amount	179 (23.25)	
Not very much	122 (35.99)	
Not at all	84 (61.31)	
No opinion	35 (58.33)	
your state government		0.0005
A great deal	71 (12.43)	
A fair amount	143 (18.01)	
Not very much	141 (35.25)	
Not at all	108 (51.92)	
No opinion	40 (62.50)	
your local government		0.0005
A great deal	50 (10.55)	
A fair amount	178 (20.14)	
Not very much	134 (31.60)	
Not at all	100 (54.05)	
No opinion	41 (58.57)	
medical professionals like your doctor(s)		0.0005

A great deal	168 (16.12)	
A fair amount	204 (28.49)	
Not very much	65 (38.01)	
Not at all	33 (58.93)	
No opinion	33 (63.43)	
public health professionals like Dr. Fauci		0.0005
A great deal	127 (14.42)	
A fair amount	153 (22.27)	
Not very much	113 (40.79)	
Not at all	66 (60.55)	
No opinion	44 (53.01)	

by Trust in Media

How much do you trust _____ to provide full and honest information about COVID-19?

mass media (such as newspapers, TV, or radio)		0.0005
A great deal	30 (7.56)	
A fair amount	123 (16.58)	
Not very much	144 (29.88)	
Not at all	164 (48.09)	
No opinion	42 (56.00)	
Fox News		0.0005
A great deal	30 (6.62)	
A fair amount	130 (21.21)	
Not very much	110 (28.50)	
Not at all	181 (38.92)	
No opinion	52 (43.33)	
The Wall Street Journal		0.0005
A great deal	34 (8.95)	
A fair amount	110 (15.76)	
Not very much	101 (25.90)	
Not at all	154 (50.83)	
No opinion	104 (39.10)	
NPR (National Public Radio)		0.0005
A great deal	44 (10.38)	
A fair amount	107 (15.53)	
Not very much	111 (29.29)	
Not at all	135 (49.82)	
No opinion	106 (38.69)	
CNN		0.0005
A great deal	71 (12.22)	

	A fair amount	120 (19.05)	
	Not very much	86 (25.44)	
	Not at all	176 (48.62)	
	No opinion	50 (39.68)	
	What is your primary source of trusted, useful information about COVID-19?		0.0005
	Friends and family	80 (40.82)	
	President Trump	47 (25.27)	
	State and local officials	57 (24.57)	
	Public health professionals like Dr. Fauci	177 (23.17)	
	Social media	37 (19.27)	
views	Commentators who share my political	27 (47.37)	
etc.)	Mass media (newspapers, TV, radio,	78 (19.02)	
	To your knowledge, where did COVID-19 come from?		0.0005
people	China, by spreading from animals to	192 (19.26)	
	China, engineered in Chinese labs	207 (28.43)	
	Russia, engineered in Russian labs	5 (25.00)	
	Bill Gates and other elites	12 (18.18)	
	Big pharmaceutical companies	9 (23.68)	
	COVID-19 is not real	11 (45.83)	
	Other	67 (40.85)	

*p-values derived from Fisher's exact test for count data