Additional Lives Saved During COVID-19?
How Vaccination Affects Willingness to go to the Doctor

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Dr. Florence Neymotin

Professor of Decision Sciences

Huizenga College of Business, NSU

Fort Lauderdale, FL, USA

Fneymotin@nova.edu

Dr. Louis R. Nemzer

Associate Professor of Physics

Halmos College of Natural Sciences, NSU

Fort Lauderdale, FL, USA

lnemzer@nova.edu

Outline

- Background & Motivation
- Data & Methodology
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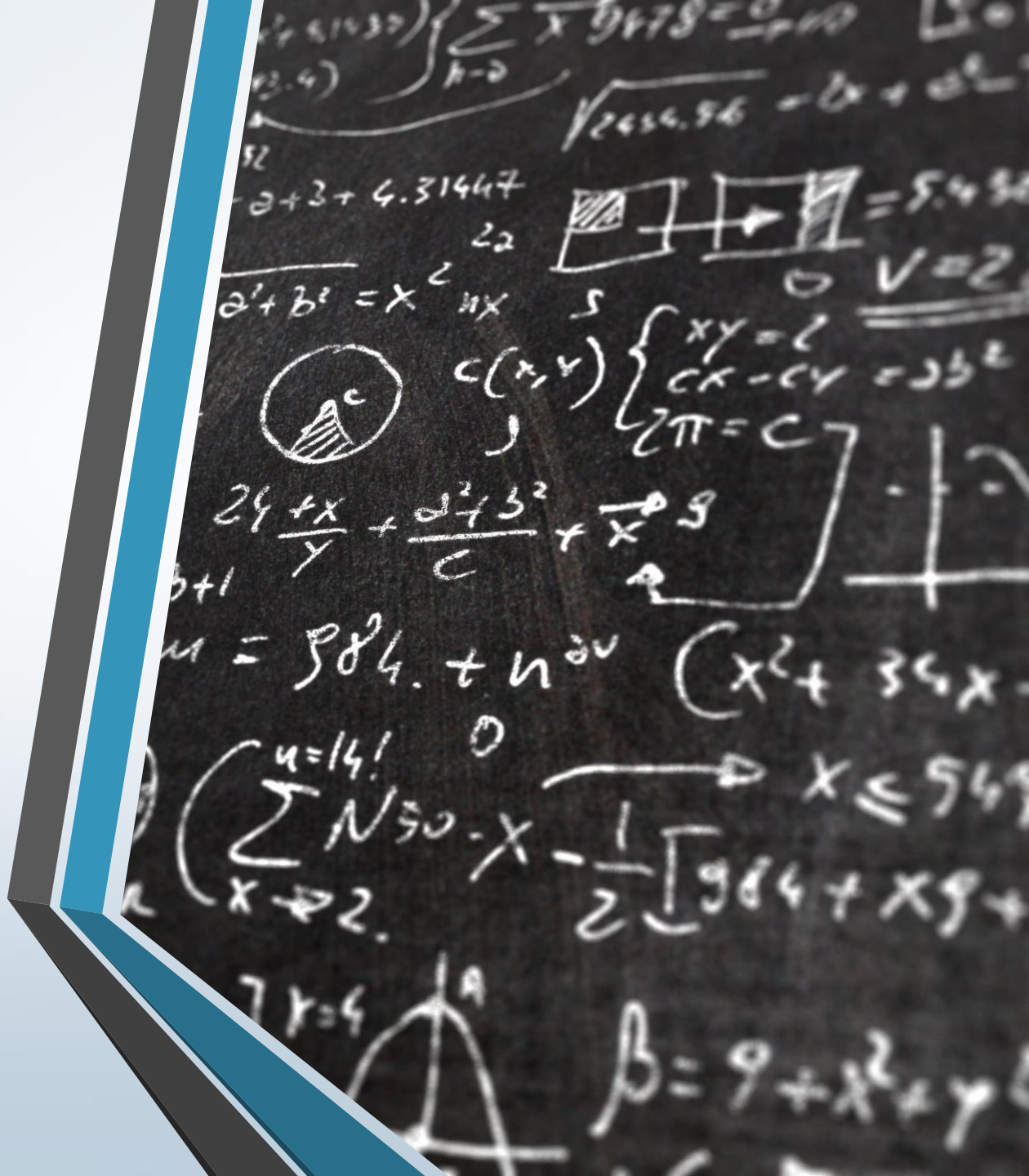


Background & Motivation

Background

- People were afraid to leave the house until there was a vaccine
- Missed medical care checkups and some procedures
  - may have had additional health impact due to non-visits
- We examine if (non-vaccinated) people skipped appointments more

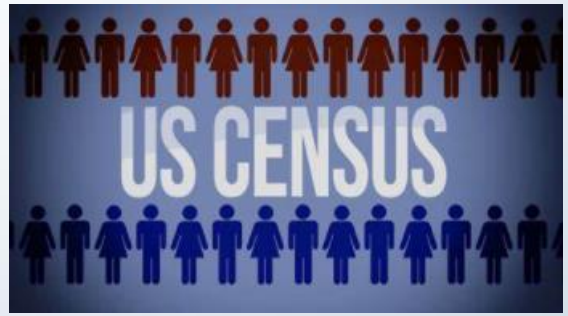
Motivation

- Unique data indicating willingness to get a vaccine once it is offered
- Control for supply side factors: COVID-19 cases
- Control for state of residence

Data & Methodology

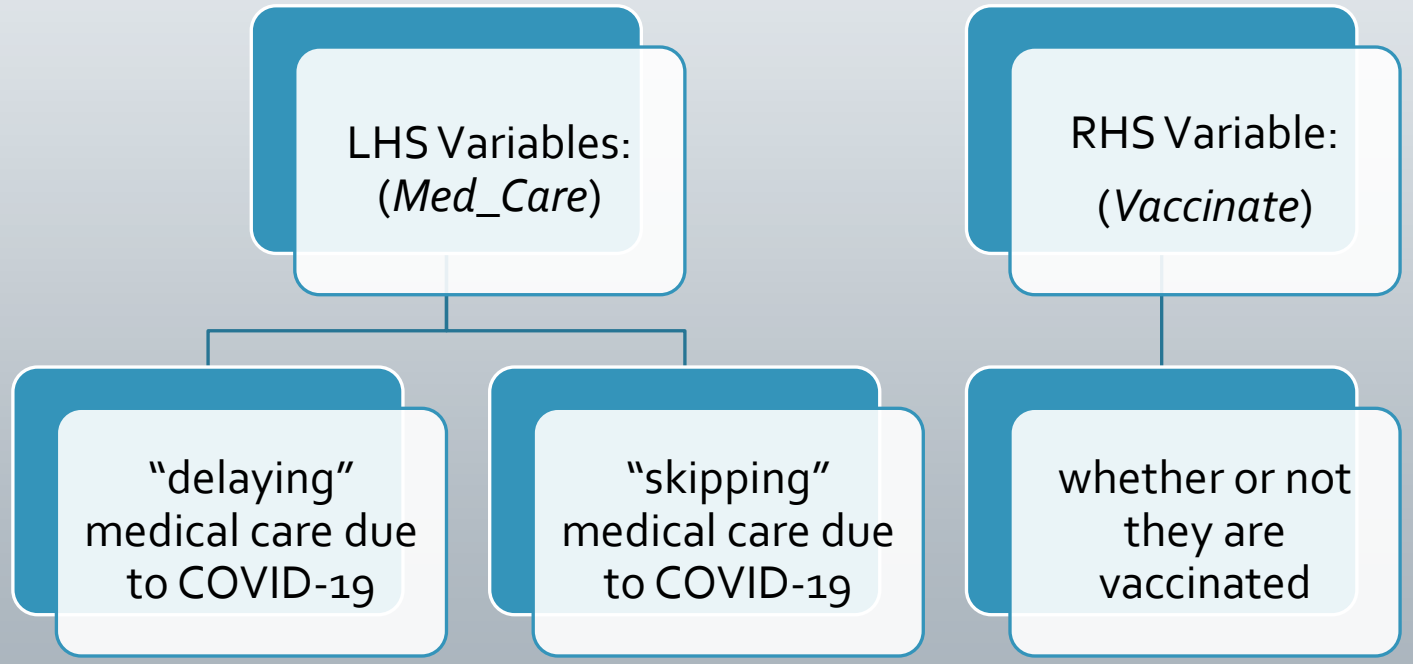
Data

- Census Household Pulse Survey Microdata employed for weeks 22-22
  - Goal of survey was understanding "continuing experience of COVID-19"
  - Random sampling with changing individuals each week of sampling
  - January-July, 2021



- Right-Hand-Side Control Variables
  - *HadCovid*: previously had COVID-19
  - *HlthIns*: whether or not had health insurance, and whether public or private insurance
  - *Cases*: state-level measures of number of current COVID-19 cases
  - *Time*, *State* and *Regional* controls (Booleans)
  - *Demographics*: gender, race, education, age (and age-squared), number of kids at home, marital status

Data (cont.)


LHS Variables: (*Med_Care*)
"delaying" medical care due to COVID-19
"skipping" medical care due to COVID-19
RHS Variable: (*Vaccinate*)
whether or not they are vaccinated

Methodology

$$Med\_Care_i = f(Vaccinate_i, Demographics_i, Region_i, State_i, Time_i, Cases_{by_{State_i}} HlthIns_i, HadCovid_i)$$

- Marginal Probit Model (LPM OLS also employed)
- Rerun analysis with ONLY people who were either vaccinated or else planned to once available
- Stratify by age, gender, race, and time frame

Results

Fig. 1: Fraction who Skip or Delay Care, or Vaccinate
(Over Survey Week)

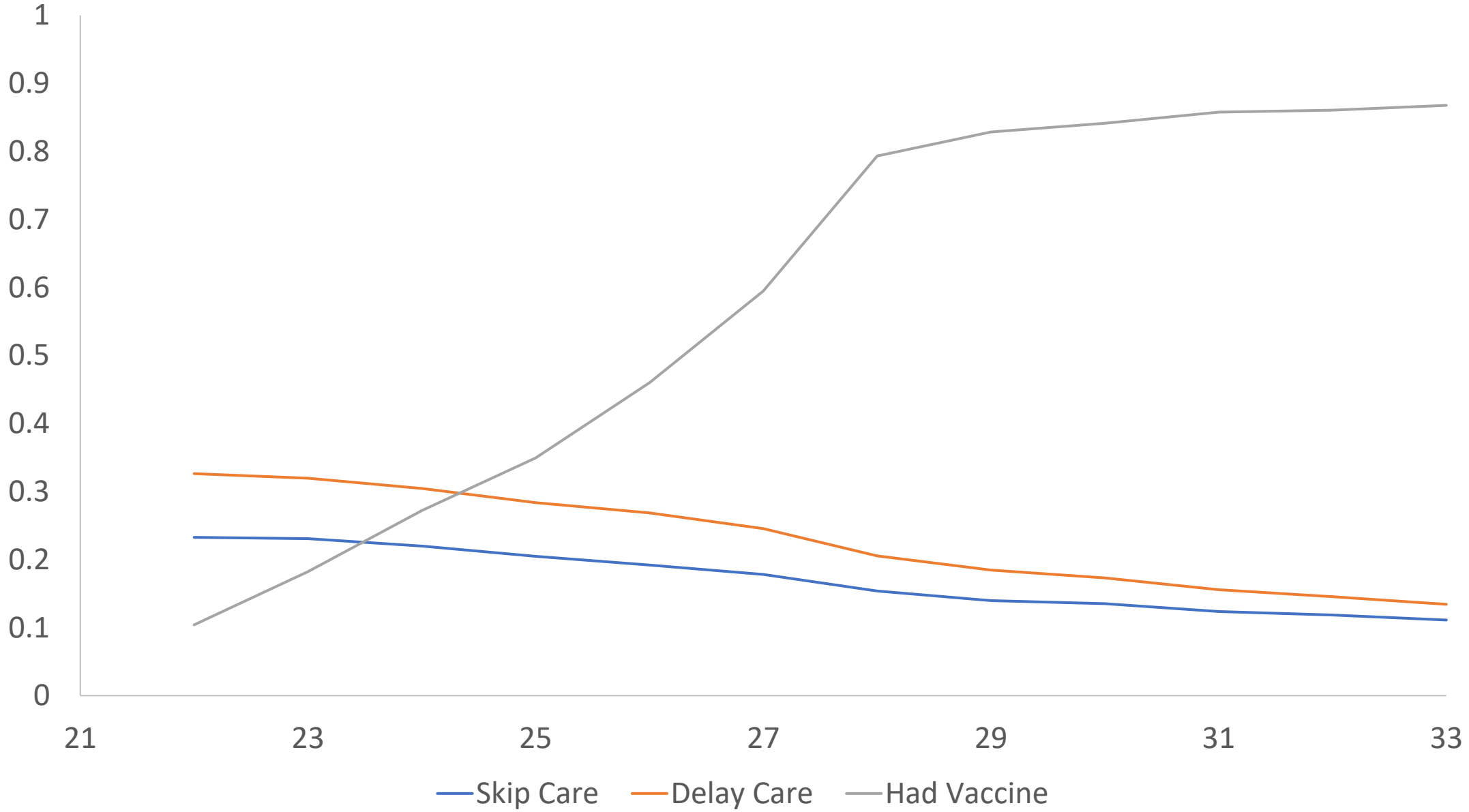


Table 1: Sample Traits by Vaccination

	Full Sample	*Plan Vaccine*	*Had Vaccine*	p-value
Hispanic	9.54%	9.79%	8.59%	[0.000]**
White	74.57%	76.16%	76.08%	[0.488]
Black	7.41%	5.47%	6.76%	[0.000]**
Asian	5.00%	5.69%	5.53%	[0.009]**
Other Race	3.48%	2.89%	3.04%	[0.001]**
Female	59.56%	55.87%	59.48%	[0.000]**
Age	53.86	53.55	56.36	[0.000]**
Number Kids	0.60	0.54	0.51	[0.000]**
Income: <$25K	10.01%	9.18%	7.83%	[0.000]**
Income: $25K-$35K	8.52%	7.90%	7.59%	[0.001]**
Income: $35K-$50K	10.72%	10.21%	9.94%	[0.003]**
Income: $50K-$75K	17.55%	16.95%	17.36%	[0.000]**
Income: $75K-$100K	14.57%	14.17%	15.06%	[0.000]**
Income: $100K-$150K	18.49%	19.03%	19.71%	[0.000]**
Income: $150K-$200K	9.15%	9.89%	10.11%	[0.019]*
Income: >$200K	10.99%	12.68%	12.41%	[0.007]**
Educ: <H.S.	0.67%	0.67%	0.45%	[0.000]**
Educ: Some H.S.	1.44%	1.37%	0.95%	[0.000]**
Educ: H.S. Degree	11.50%	10.06%	9.37%	[0.000]**
Educ. Some College	21.37%	20.34%	19.05%	[0.000]**
Educ: AA Degree	10.54%	9.03%	10.03%	[0.000]**
Educ: B.S. Degree	28.87%	31.97%	29.97%	[0.000]**
Educ: Post-B.S. Degree	25.60%	26.56%	30.18%	[0.000]**
Married now	58.89%	59.48%	61.20%	[0.000]**
Previous Married	22.74%	20.94%	22.87%	[0.000]**
Always single	18.37%	19.58%	15.93%	[0.000]**
Northeast Region	15.69%	18.06%	16.10%	[0.000]**
South Region	31.67%	29.36%	31.41%	[0.000]**
Midwest Region	20.31%	20.06%	20.05%	[0.901]
West Region	32.32%	32.52%	32.45%	[0.579]
Had Covid	11.28%	10.65%	8.95%	[0.000]**
Public Health Insur.	42.27%	39.05%	45.54%	[0.000]**
Private Health Insur.	81.15%	83.45%	83.51%	[0.673]

Note: p-values for difference-of-means ttests between "planning" and "having gotten" a vaccine are shown along with statistical significance. * indicates significance at the 5% level, and ** indicates significance at the 1% level.

Source: Author Calculations Using the Census Household Pulse Survey

Table 2a: Vaccination and Medical Care by Controls

	Full Sample	*Hispanic*	*White*	*Black*	*Asian*	*Other Race*		
Skip Care	17.21%	22.25%	16.08%	20.42%	15.86%	25.13%		
Delay Care	23.22%	28.75%	22.08%	23.79%	25.25%	30.80%		
Had Vaccine	57.61%	51.95%	58.77%	52.55%	63.61%	50.39%		
	Male	*Female*	*Age <30*	*Age 30-50*	*Age 50-70*	*Age 70+*		
Skip Care	15.33%	18.49%	17.24%	18.86%	17.79%	13.12%		
Delay Care	20.33%	25.18%	25.79%	26.00%	23.43%	17.25%		
Had Vaccine	57.72%	57.53%	42.37%	50.40%	59.06%	72.97%		
	Income: <$25K	*Income: $25K-$35K*	*Income $35K-$50K*	*Income $50K-$75K*	*Income: $75K-$100K*	*Income: $100K-$150K*	*Income: $150K-$200K*	*Income >$200K*
Skip Care	26.24%	21.84%	20.18%	17.81%	16.24%	14.48%	13.10%	12.01%
Delay Care	30.16%	26.75%	25.61%	23.46%	22.39%	21.16%	20.51%	19.87%
Had Vaccine	45.09%	51.38%	53.42%	57.01%	59.52%	61.41%	63.59%	65.02%
	Educ: <H.S.	*Educ: Some H.S.*	*Educ H.S. Degree*	*Educ. Some College*	*Educ: A-A Degree*	*Educ B.S. Degree*	*Educ: Post-B.S. Degree*	
Skip Care	23.27%	21.84%	16.94%	20.44%	19.28%	15.54%	15.56%	
Delay Care	26.21%	24.41%	19.95%	24.93%	23.77%	22.66%	23.48%	
Had Vaccine	38.71%	38.05%	46.99%	51.39%	54.81%	59.79%	67.83%	
	Married now	*Previous Married*	*Always single*	*Northeast Region*	*South Region*	*Midwest Region*	*West Region*	
Skip Care	15.63%	19.98%	18.85%	16.29%	17.45%	14.98%	18.79%	
Delay Care	21.77%	24.75%	26.09%	23.23%	23.02%	20.17%	25.29%	
Had Vaccine	59.87%	57.96%	49.92%	59.09%	57.14%	56.85%	57.83%	
	No Covid	*Had Covid*	*No Pub. Health Insur.*	*Yes Pub. Health Insur.*	*No Priv. Health Insur.*	*Yes Priv. Health Insur.*		
Skip Care	16.97%	18.46%	16.49%	18.35%	21.93%	16.07%		
Delay Care	23.10%	23.55%	23.44%	22.85%	25.97%	22.61%		
Had Vaccine	59.26%	45.83%	55.03%	62.91%	50.60%	59.45%		

Results

Increase in Vaccination co-occurs with decrease in delaying or skipping care

Differences in "plan to" vs. "had vaccine": explained by vaccine rollout (age, etc.)

Higher Vaccination: older; white or Asian; more education or income; ever been married; Northeast; never previously had COVID-19; health insurance

More Skip/Delay Care: lower income, education, or age; Women and (non-Asian) minorities; non-Private health insurance; Previously had COVID-19

Table 2b: Vaccination and Medical Care by Age

Both Male and Female & no response

	Age <30	*Age 30-50*	*Age 50-70*	*Age 70+*
Skip Care	24.43%	28.03%	26.65%	20.65%
Delay Care	34.79%	37.78%	34.98%	27.78%
Had Vaccine	51.23%	58.05%	66.39%	78.03%

Male Only

	Age <30	*Age 30-50*	*Age 50-70*	*Age 70+*
Skip Care	19.41%	24.45%	24.37%	19.98%
Delay Care	28.40%	33.50%	31.68%	25.72%
Had Vaccine	39.60%	50.31%	57.92%	73.60%

Female Only

	Age <30	*Age 30-50*	*Age 50-70*	*Age 70+*
Skip Care	27.71%	30.15%	28.22%	21.28%
Delay Care	38.96%	40.31%	37.25%	29.73%
Had Vaccine	44.25%	50.46%	59.83%	72.42%

Source: Author calculations using the 2020-2021 Census Household Pulse Survey

Table 2c: Vaccination and Medical Care Usage by Race

Both Male and Female & no response

	Total	*Hispanic*	*White*	*Black*	*Asian*	*Other*
Skip Care	26.02%	29.43%	25.20%	29.67%	21.77%	34.08%
Delay Care	34.82%	37.32%	34.42%	34.51%	32.01%	41.62%
Had Vaccine	64.66%	59.65%	65.66%	59.97%	71.06%	57.68%

Male Only

	Total	*Hispanic*	*White*	*Black*	*Asian*	*Other*
Skip Care	23.21%	26.50%	22.62%	25.15%	20.53%	30.24%
Delay Care	30.91%	33.37%	30.62%	29.38%	29.32%	36.62%
Had Vaccine	57.72%	51.96%	58.51%	55.52%	63.27%	49.56%

Female Only

	Total	*Hispanic*	*White*	*Black*	*Asian*	*Other*
Skip Care	27.95%	31.30%	27.00%	31.67%	23.03%	36.49%
Delay Care	37.50%	39.86%	37.09%	36.78%	34.73%	44.78%
Had Vaccine	57.53%	51.95%	58.94%	51.13%	63.95%	50.94%

Source: Author calculations using the 2020-2021 Census Household Pulse Survey

Results (Summary Statistics)

- Age strongly related to vaccination
- Gender explains vaccination differences
  - Race mitigates a big part of this effect
- Highest vax: Asian, followed by White, Black, Hispanic, and Other-race individuals.

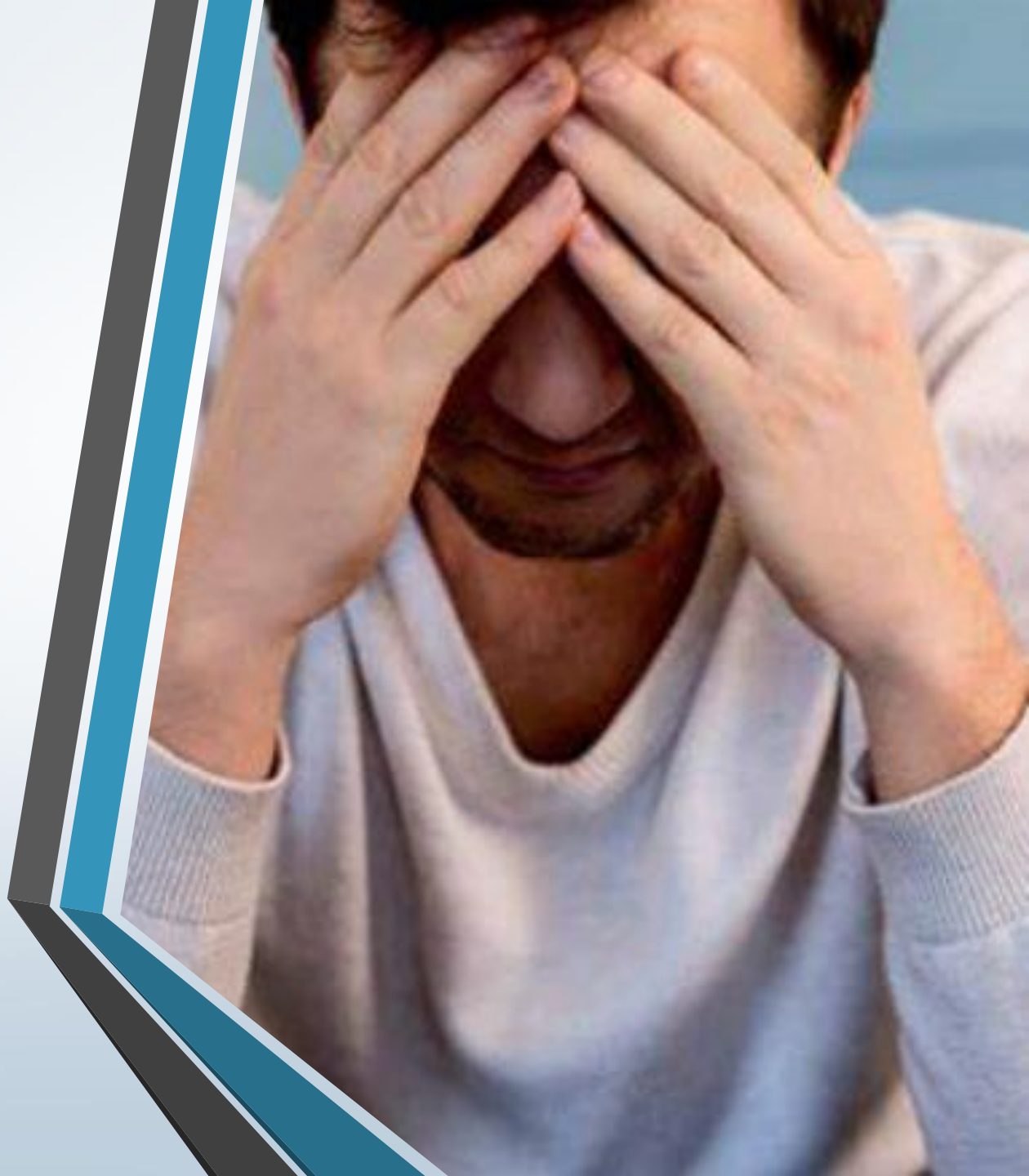


Table 3a: Effect on "Delaying Medical Care" of Having Gotten the Vaccine

Vaccination Status Subset: NO		Full Sample	Male	Female	Hispanic	White	Black	Asian	Other Race	Week 22-27	Week 28-32	Age<30	Age 30-50	Age 50-70	Age 70+
	OLS	-0.016	-0.009	-0.024	-0.005	-0.017	-0.022	-0.028	0.007	-0.032	0.009	0.002	-0.014	-0.012	-0.020
		[0.002]**	[0.002]**	[0.003]**	[0.005]	[0.002]**	[0.005]**	[0.007]**	[0.008]	[0.003]**	[0.002]**	[0.005]	[0.003]**	[0.002]**	[0.003]**
	N	583394	264363	387189	50030	447743	38643	26667	20311	302951	280443	34664	199965	240539	108226
	Marg. P	-0.014	-0.006	-0.022	-0.004	-0.014	-0.022	-0.026	0.006	-0.033	0.009	0.003	-0.013	-0.011	-0.016
		[0.003]**	[0.002]*	[0.003]**	[0.005]	[0.002]**	[0.005]**	[0.007]**	[0.720]	[0.003]**	[0.002]**	[0.005]	[0.004]**	[0.002]**	[0.003]**
		583394	264363	387189	50030	447743	38643	26667	20309	302951	280443	34664	199965	240539	108226
Vaccination Status Subset: YES															
	OLS	-0.053	-0.040	-0.063	-0.039	-0.057	-0.035	-0.047	-0.029	-0.057	-	-0.066	-0.074	-0.045	-0.030
		[0.003]**	[0.004]**	[0.003]**	[0.008]**	[0.003]**	[0.007]**	[0.007]**	[0.019]	[0.003]**	-	[0.008]**	[0.004]**	[0.004]**	[0.005]**
	N	464593	216689	303786	37299	363037	26668	23441	14148	226066	238527	23340	144228	197159	99866
	Marg. P	-0.044	-0.030	-0.055	-0.036	-0.046	-0.031	-0.043	-0.028	-0.058	-	-0.064	-0.068	-0.038	-0.022
		[0.003]**	[0.004]**	[0.003]**	[0.007]**	[0.003]**	[0.006]**	[0.007]**	[0.018]	[0.003]**	-	[0.008]**	[0.004]**	[0.004]**	[0.004]**
		464593	216689	303786	37290	363037	26668	23441	14146	226066	238527	23340	144228	197159	99866

Note: Each column shows a different subsetting of the regressions (by gender, age group, race, and whether it was the first or latter part of the data), which were run both using a linear(ized) Ordinary Least Squares regression as well as using a Marginal Probit Model. The bottom panel only focuses on individuals who have been vaccinated or plan to do so when eligible, and the top panel does not make this additional restriction. Hence, the table includes results from 56 separate regressions. All of these regressions additionally control for a series of demographic characteristics including education, age and age^2, gender, race, income, number of children in the household, marital status, state, # COVID-19 cases in the state, the presence/type of health insurance, whether the individual had COVID-19 previously, and Booleans for the week in question. coefficients are shown with standard errors in brackets beneath. * indicates significance at the 5% level, and ** indicates significance at the 1% level.

Table 3b: Effect on "Skipping Medical Care" of Having Gotten the Vaccine

Vaccination Status Subset: NO		**Full Sample**	**Male**	**Female**	**Hispanic**	**White**	**Black**	**Asian**	**Other Race**	**Week 22-27**	**Week 28-32**	**Age<30**	**Age 30-50**	**Age 50-70**	**Age 70+**
delay subset	*OLS*	**-0.021**	**-0.014**	**-0.027**	**-0.017**	**-0.021**	**-0.026**	**-0.029**	-0.012	**-0.028**	**-0.013**	0.003	**-0.019**	**-0.020**	**-0.017**
		[0.001]**	**[0.002]****	**[0.002]****	**[0.004]****	**[0.002]****	**[0.004]****	**[0.006]****	[0.007]	**[0.002]****	**[0.002]****	[0.005]	**[0.002]****	**[0.002]****	**[0.004]****
	N	**583954**	**264551**	**387457**	**50076**	**448152**	**38721**	**26679**	20324	**303199**	**280755**	34658	**199997**	**240728**	**108571**
delay subset	*Marg. P*	**-0.019**	**-0.012**	**-0.026**	**-0.017**	**-0.019**	**-0.026**	**-0.027**	-0.013	**-0.029**	**-0.010**	0.002	**-0.020**	**-0.018**	**-0.013**
		[0.002]**	**[0.002]****	**[0.002]****	**[0.004]****	**[0.002]****	**[0.005]****	**[0.006]****	[0.007]	**[0.002]****	**[0.002]****	[0.005]	**[0.002]****	**[0.002]****	**[0.004]****
		583954	**264551**	**387457**	**50076**	**448152**	**38721**	**26679**	20324	**303199**	**280755**	34658	**199997**	**240728**	**108571**
Vaccination Status Subset: YES															
notget subgroup	*OLS*	**-0.034**	**-0.023**	**-0.041**	**-0.017**	**-0.036**	**-0.043**	**-0.031**	-0.022	**-0.036**	-	**-0.027**	**-0.041**	**-0.034**	**-0.020**
		[0.002]**	**[0.003]****	**[0.002]****	**[0.005]****	**[0.002]****	**[0.008]****	**[0.010]****	[0.013]	**[0.002]****	-	**[0.008]****	**[0.003]****	**[0.003]****	**[0.005]****
	N	**465041**	**216827**	**304006**	**37320**	**363374**	**26735**	**23449**	14163	**226259**	238782	**23331**	**144235**	**197301**	**100174**
not get subgroup	*Marg. P*	**-0.028**	**-0.018**	**-0.034**	**-0.015**	**-0.028**	**-0.039**	**-0.029**	-0.021	**-0.036**		**-0.025**	**-0.037**	**-0.028**	**-0.014**
		[0.003]**	**[0.003]****	**[0.003]****	**[0.005]****	**[0.002]****	**[0.008]****	**[0.010]****	[0.012]	**[0.003]****		**[0.009]****	**[0.003]****	**[0.003]****	**[0.005]****
		465041	**216827**	**304006**	**37311**	**363374**	**26735**	**23449**	14161	**226259**	238782	**23331**	**144235**	**197301**	**100174**

Note: Each column shows a different subsetting of the regressions (by gender, age group, race, and whether it was the first or latter part of the data), which were run both using a linear(ized) Ordinary Least Squares regression as well as using a Marginal Probit Model. The bottom panel only focuses on individuals who have been vaccinated or plan to do so when eligible, and the top panel does not make this additional restriction. Hence, the table includes results from 56 separate regressions. All of these regressions additionally control for a series of demographic characteristics including education, age and age^2, gender, race, income, number of children in the household, marital status, state, # COVID-19 cases in the state, the presence/type of health insurance, whether the individual had COVID-19 previously, and Booleans for the week in question. coefficients are shown with standard errors in brackets beneath. * indicates significance at the 5% level, and ** indicates significance at the 1% level.

Results

- Negative relationship between vaccination and delaying or skipping care
- True for most stratifications: age, gender, race, time
  - Little effect for the under-30 group
  - Difficult to interpret the later time period b/c most vaccinated by then
- True for both full sample and for subsets where "intent" is non-vax group

Concluding Remarks

Conclusion

- Vaccination negatively related to delaying care for most robustness tests
- Should use time to vaccination when calculating costs of the pandemic
  - Due to decreased medical care at that time.

Thanks for Listening!!