

Vaccine Hesitancy in College Students

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Outline

- Introduction
- Applied Practical Experience- 3 parts
- MPH Core Competencies
- IDZ Emphasis Area Competencies
- References
- Acknowledgements

Introduction

- Vaccine hesitancy
- WHO “10 Threats to Global Health in 2019”
- WHO- “delay in acceptance of or refusal of vaccines despite the availability of vaccine services”
- 2018 survey done by WHO and United Nations Children’s Fund Joint Reporting Form, 74% of 194 countries surveyed listed vaccine hesitancy as a concern
- Young adults are less likely to get vaccinated

Applied Practical Experience

- Lafene Health Center
- Riley County Health Department (RCHD)
- Vaccine Hesitancy Survey

APE- Lafene Health Center

- Student health center on K-State campus
- Objective- To understand COVID-19 procedures from the time the patient enters the facility until the patient is released from quarantine/contact tracing.
- Activities-
 - Visited different departments and learned about COVID-19 protocols
 - Created an infographic for dissemination to students: “How to Protect Yourself and Others from COVID-19”



Lafene Health Center Front Entrance

Temperature Monitoring Station



Dry Hydrogen Peroxide Unit

APE- RCHD

- Public health department for Riley County
- Objectives- To help bring COVID-19 testing and vaccine clinics to Riley County residents at no charge
- Activities-
 - Testing sites- self-administered tests, registration, properly packaged and sent tests
 - Vaccine clinics- assisted healthcare team, vaccine cards, disseminated vaccine information/care sheets
 - Created two infographics: “Vaccines: Frequently Asked Questions” and “Quick Facts: COVID-19 Vaccine”



COVID-19 Testing Site and Vaccine Clinic at the Sunset Zoo

COVID-19 Testing Site at City Park



COVID-19 Testing Site and Vaccine Clinic at Cico Park

APE- Survey

- Objective- To investigate COVID-19 vaccine hesitancy on K-State campus
- Survey creation-
 - Qualtrics survey- IRB #10719
 - Summer 2021
 - 14 questions- qualitative and quantitative answer choices
 - Administered via email and K-State Today- anonymous link
 - Study population- undergraduate and graduate students

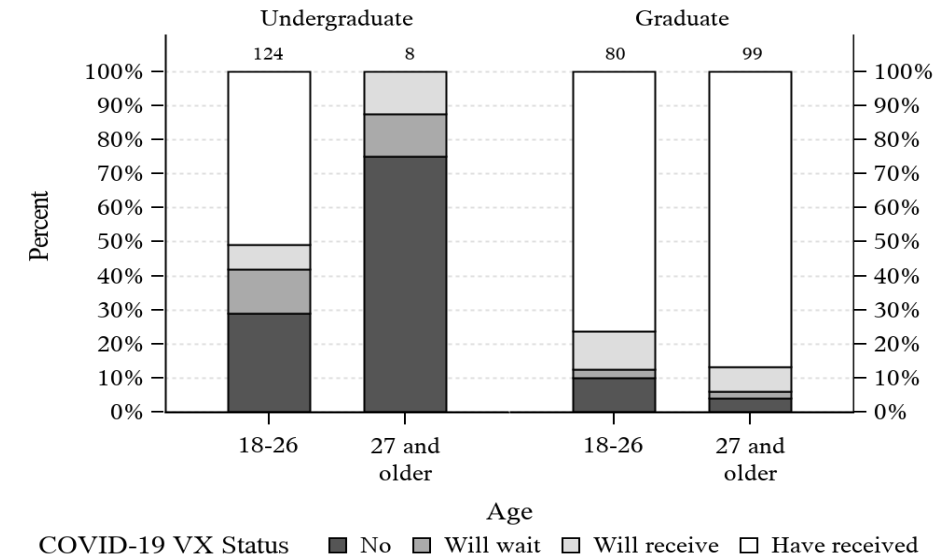
Survey Methods

- 345 total responses
 - Removal- 7 incomplete surveys, 1 unknown student status, and 26 not students
 - N=311 for analysis
- Quantitative analysis
 - Descriptive calculated in Excel
 - Statistical Analysis Software (SAS)
- Qualitative analysis
 - Written answers reviewed and removed if not applicable
 - NVivo- identified recurring patterns and emerging themes

Survey Results

COVID-19 Vaccination by Student Status and Age

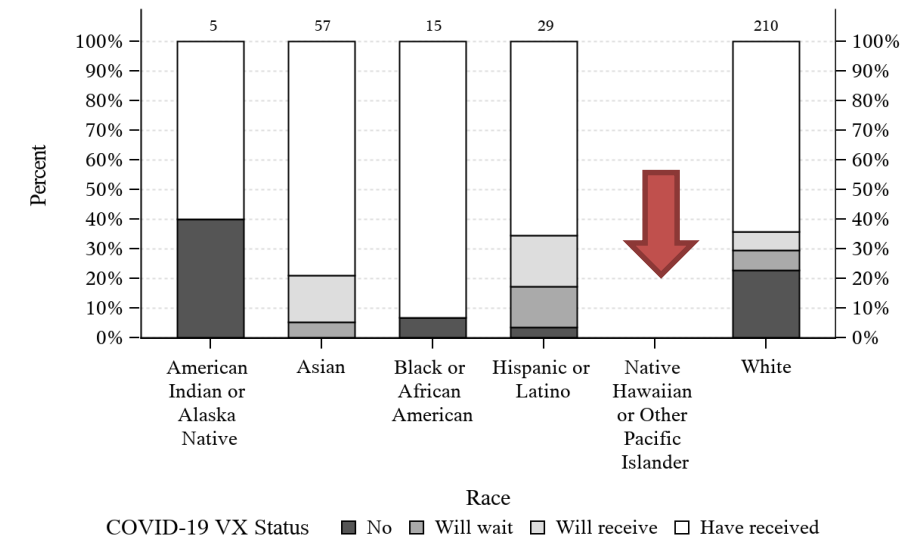
		COVID-19 Vaccination Status									
		n					%				
		No	Will wait	Will receive	Have received	Total	No	Will wait	Will receive	Have received	Total
Undergraduate	18-26	36	16	9	63	124	29	13	7	51	100
	27 and older	6	1	1	.	8	75	13	13	.	100
	Total	42	17	10	63	132	32	13	8	48	100
Graduate	18-26	8	2	9	61	80	10	3	11	76	100
	27 and older	4	2	7	86	99	4	2	7	87	100
	Total	12	4	16	147	179	7	2	9	82	100
Total	18-26	44	18	18	124	204	22	9	9	61	100
	27 and older	10	3	8	86	107	9	3	7	80	100
	Total	54	21	26	210	311	17	7	8	68	100



- Undergraduates in the 27 and older age group were more likely to be vaccine hesitant than undergraduates in the 18-26 age group (OR>1, p<0.05)
 - No student in this group selected “have received”
- Graduate students in the 18-26 age group were more likely to be vaccine hesitant than graduates in the 27 and older age group (OR>1) but the difference is not statistically significant (p>0.05)

COVID-19 Vaccination by Race/Ethnicity

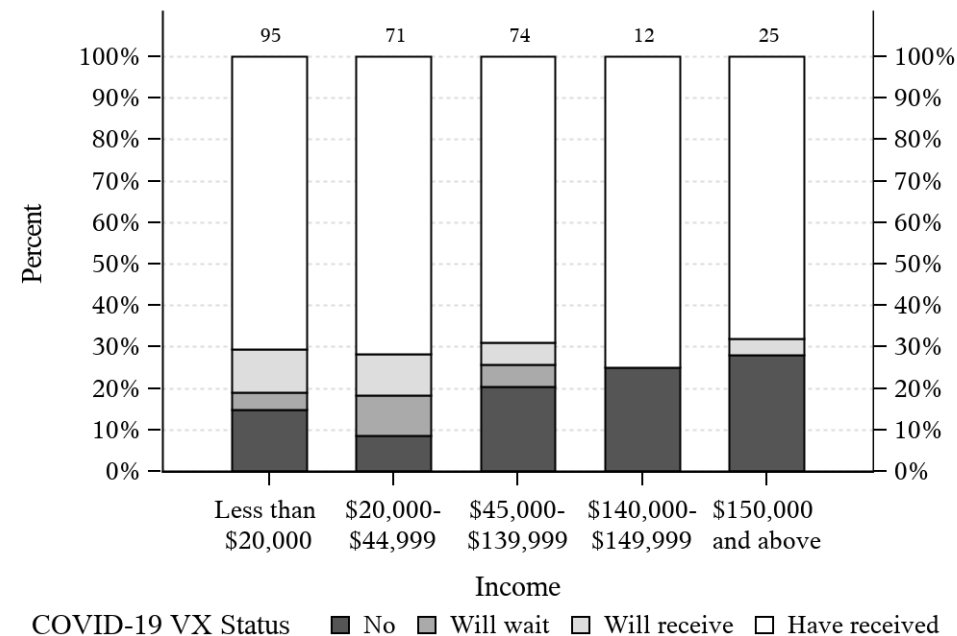
	COVID-19 Vaccination Status									
	n					%				
	No	Will wait	Will receive	Have received	Total	No	Will wait	Will receive	Have received	Total
American Indian or Alaska Native	2	0	0	3	5	40	0	0	60	100
Asian	0	3	9	45	57	0	5	16	79	100
Black or African American	1	0	0	14	15	7	0	0	93	100
Hispanic or Latino	1	4	5	19	29	3	14	17	66	100
Native Hawaiian or Other Pacific Islander	0	0	0	0	0
White	48	14	13	135	210	23	7	6	64	100
Total	52	21	27	216	316	16	7	9	68	100



- American Indian or Alaska Native students are more likely to be hesitant than Asian students and Black or African American students (OR>1, p<0.05)
- Asian students are less likely to be hesitant than White students (OR<1, p<0.05)
- Black or African American students are less likely to be hesitant than Hispanic or Latino students (OR<1, p<0.05) and White students (OR<1, p<0.05)
- No students self-identified as Native Hawaiian or Other Pacific Islander

COVID-19 Vaccination by Income

	COVID-19 Vaccination Status									
	n					%				
	No	Will wait	Will receive	Have received	Total	No	Will wait	Will receive	Have received	Total
Less than \$20,000	14	4	10	67	95	15	4	11	71	100
\$20,000-\$44,999	6	7	7	51	71	8	10	10	72	100
\$45,000-\$139,999	15		4	51	74	20	5	5	69	100
\$140,000-\$149,999	3	.	.	9	12	25	.	.	75	100
\$150,000 and above	7	.	1	17	25	28	.	4	68	100
Total	45	15	22	195	277	16	5	8	70	100



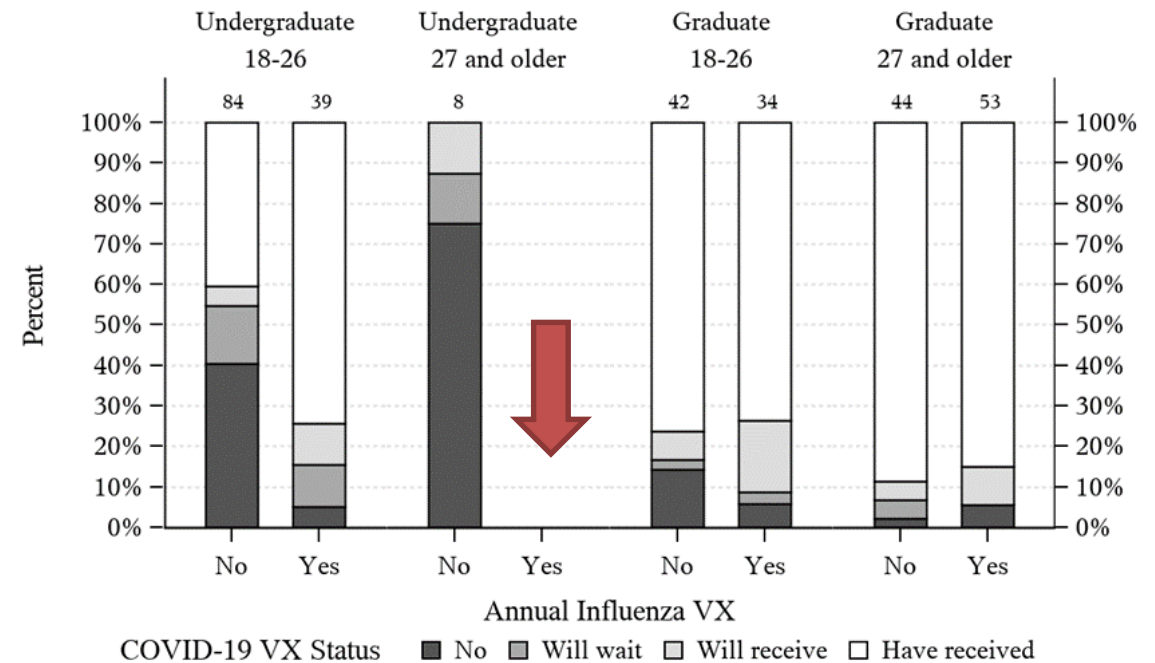
- No difference was seen between the income levels (OR=1, $p>0.05$)
- No student selected these choices: “will wait” and “will receive” in the \$140,000-\$149,999 income level as well as “will wait” in the \$150,000 and above income level.

COVID-19 Vaccination by Influenza Vaccination Status, Student Status, and Age

			COVID-19 Vaccination Status									
			n					%				
			No	Will wait	Will receive	Have received	Total	No	Will wait	Will receive	Have received	Total
Undergraduate	18-26	No	34	12	4	34	84	40	14	5	40	100
		Yes	2	4	4	29	39	5	10	10	74	100
		Total	36	16	8	63	123	29	13	7	51	100
	27 and older	No	6	1	1	.	8	75	13	13	.	100
		Total	6	1	1	.	8	75	13	13	.	100
	Total	No	40	13	5	34	92	43	14	5	37	100
		Yes	2	4	4	29	39	5	10	10	74	100
		Total	42	17	9	63	131	32	13	7	48	100
	Graduate	18-26	No	6	1	3	32	42	14	2	7	100
			Yes	2	1	6	25	34	6	3	18	100
			Total	8	2	9	57	76	11	3	12	100
		27 and older	No	1	2	2	39	44	2	5	5	100
			Yes	3	.	5	45	53	6	.	9	100
			Total	4	2	7	84	97	4	2	7	100
		Total	No	7	3	5	71	86	8	3	6	100
			Yes	5	1	11	70	87	6	1	13	100
			Total	12	4	16	141	173	7	2	9	100
Total	18-26	No	40	13	7	66	126	32	10	6	52	100
		Yes	4	5	10	54	73	5	7	14	74	100
		Total	44	18	17	120	199	22	9	9	60	100
	27 and older	No	7	3	3	39	52	13	6	6	75	100
		Yes	3	.	5	45	53	6	.	9	85	100
		Total	10	3	8	84	105	10	3	8	80	100
	Total	No	47	16	10	105	178	26	9	6	59	100
		Yes	7	5	15	99	126	6	4	12	79	100
		Total	54	21	25	204	304	18	7	8	67	100

COVID-19 Vaccination by Influenza Vaccination Status, Student Status, and Age

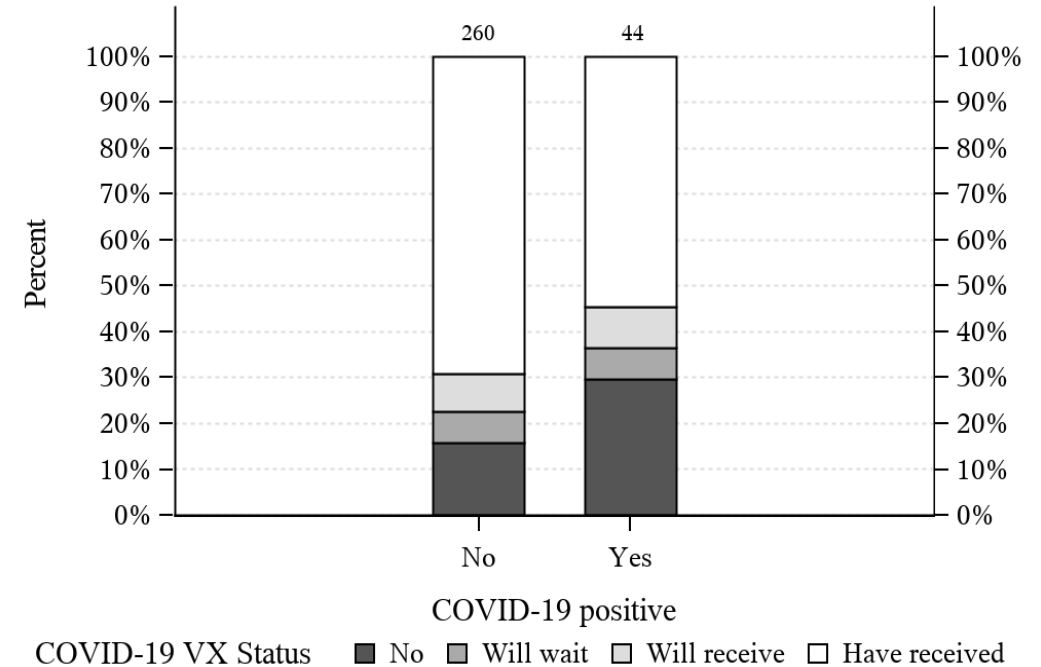
- Undergraduates in the 18-26 age group that receive an Influenza vaccine every year are less likely to be hesitant to the COVID-19 vaccine than those who do not receive an Influenza vaccine every year ($OR < 1$, $p < 0.05$)
- Undergraduates in the 27 and older age group that do not receive an Influenza vaccine every year are likely to be hesitant to the COVID-19 vaccine
- No undergraduates in the 27 and older age group responded “yes” to getting an Influenza vaccine every year
- No difference was found in vaccine hesitancy in the graduate students in either age group whether they get an Influenza vaccine or not ($OR = 1$, $p > 0.05$)



COVID-19 Vaccination by Previous COVID-19 Infection

	COVID-19 Vaccination Status									
	n					%				
	No	Will wait	Will receive	Have received	Total	No	Will wait	Will receive	Have received	Total
No	41	18	21	180	260	16	7	8	69	100
Yes	13	3	4	24	44	30	7	9	55	100
Total	54	21	25	204	304	18	7	8	67	100

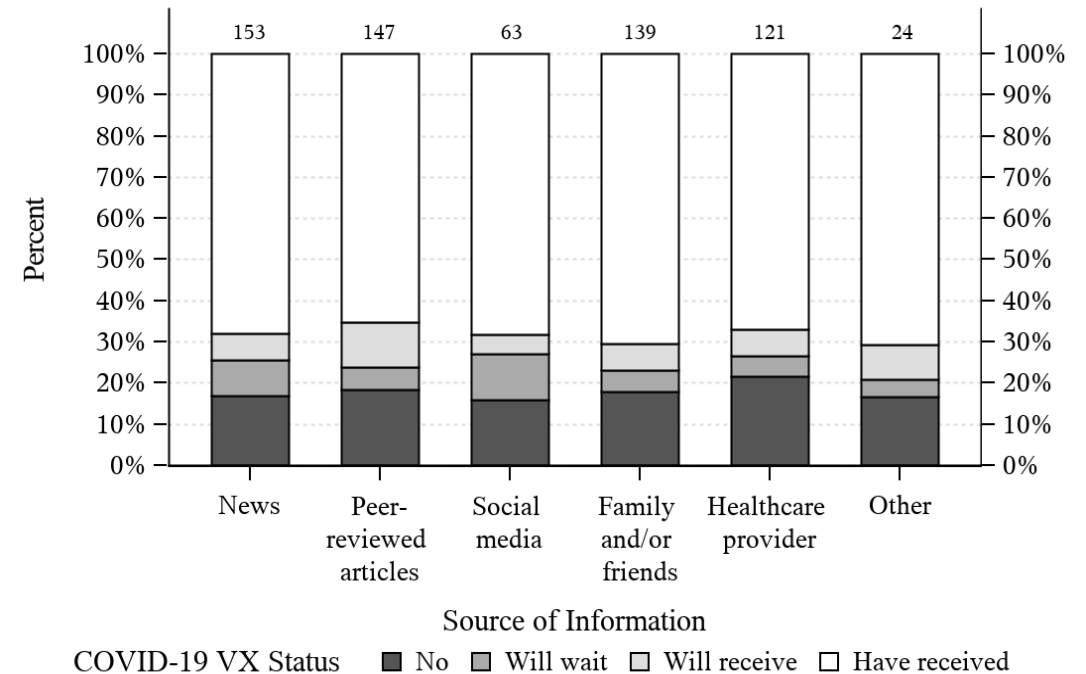
- Students who had a previous COVID-19 infection are more likely to be vaccine hesitant than those who have not had a previous COVID-19 infection (OR>1, p<0.05)



COVID-19 Vaccination by Sources of Information

	COVID-19 Vaccination Status									
	n					%				
	No	Will wait	Will receive	Have received	Total	No	Will wait	Will receive	Have received	Total
News	26	13	10	104	153	17	8	7	68	100
Peer-reviewed articles	27	8	16	96	147	18	5	11	65	100
Social media	10	7	3	43	63	16	11	5	68	100
Family and/or friends	25	7	9	98	139	18	5	6	71	100
Healthcare provider	26	6	8	81	121	21	5	7	67	100
Other	4	1	2	17	24	17	4	8	71	100
Total	118	42	48	439	647	18	6	7	68	100

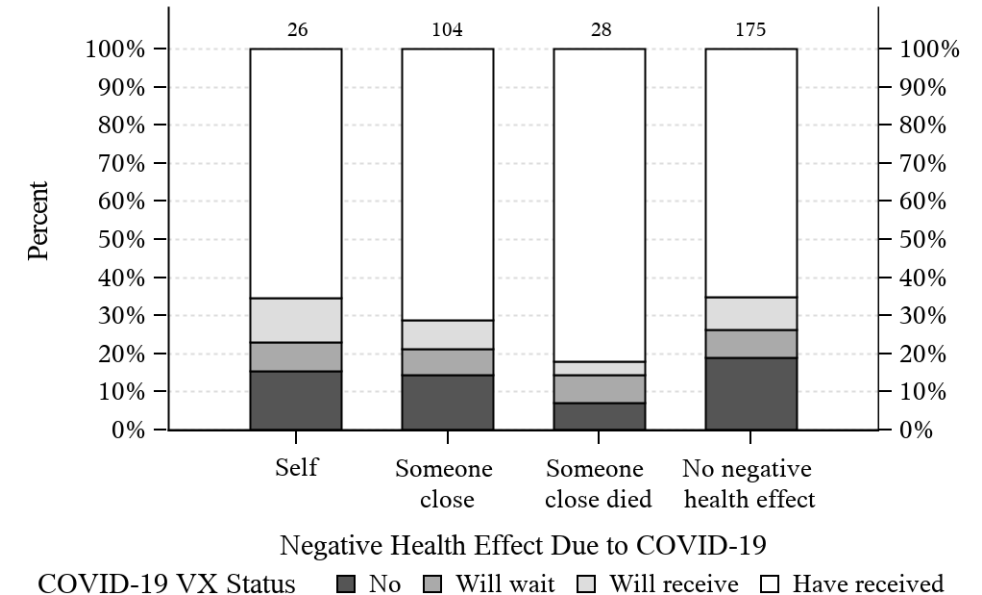
- Sources of information had no effect on COVID-19 vaccine hesitancy (OR=1, $p>0.05$)



COVID-19 Vaccination by Negative Health Effect

	COVID-19 Vaccination Status									
	n					%				
	No	Will wait	Will receive	Have received	Total	No	Will wait	Will receive	Have received	Total
Self	4	2	3	17	26	15	8	12	65	100
Someone close	15	7	8	74	104	14	7	8	71	100
Someone close died	2	2	1	23	28	7	7	4	82	100
No negative health effect	33	13	15	114	175	19	7	9	65	100
Total	54	24	27	228	333	16	7	8	68	100

- Students are less likely to be vaccine hesitant when someone close to them has died as compared to having no negative health effects (OR<1), but it is not statistically different ($p>0.05$)
- No difference was seen in the other negative health effect groups

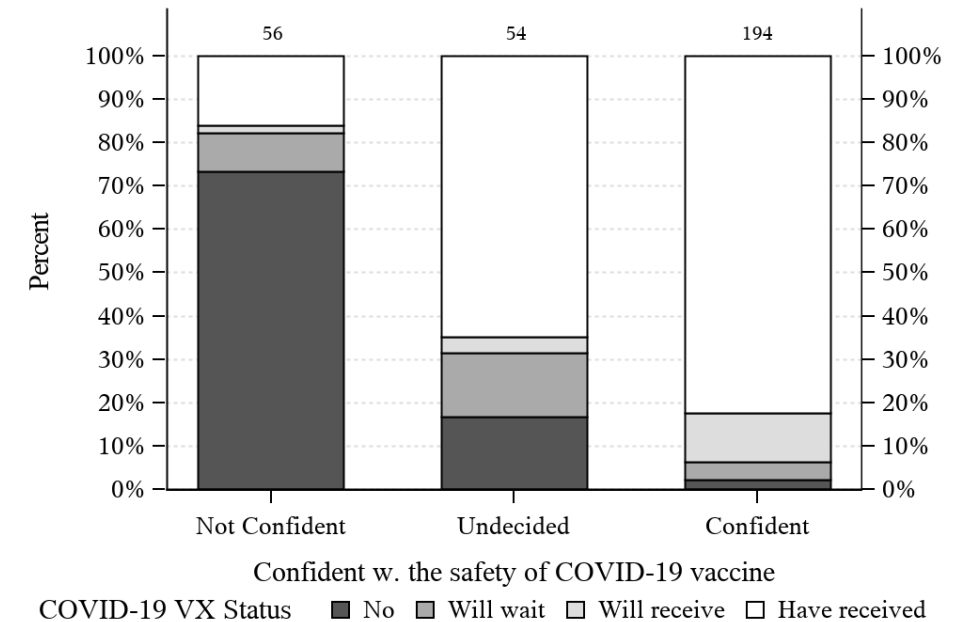


COVID-19 Vaccination Status and Confidence in Vaccine Safety

	COVID-19 VX Status									
	n					%				
	No	Will wait	Will receive	Have received	Total	No	Will wait	Will receive	Have received	Total
Not Confident	41	5	1	9	56	73	9	2	16	100
Undecided	9	8	2	35	54	17	15	4	65	100
Confident	4	8	22	160	194	2	4	11	82	100
Total	54	21	25	204	304	18	7	8	67	100

vaccine, while non-hesitant students are more likely to be confident or undecided about the vaccine

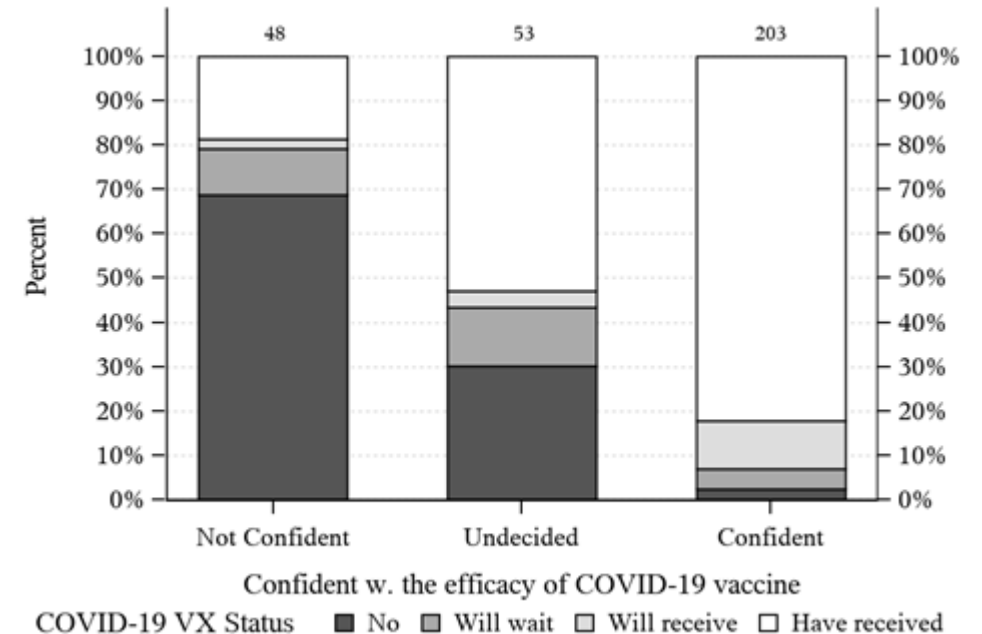
- Vaccination status and level of confidence in safety are moderately associated (Kendall's Tau-b=0.53 and Stuart's Tau-c=0.41)



COVID-19 Vaccination Status and Confidence in Vaccine Efficacy

	COVID-19 VX Status									
	n					%				
	No	Will wait	Will receive	Have received	Total	No	Will wait	Will receive	Have received	Total
Not Confident	33	5	1	9	48	69	10	2	19	100
Undecided	16	7	2	28	53	30	13	4	53	100
Confident	5	9	22	167	203	2	4	11	82	100
Total	54	21	25	204	304	18	7	8	67	100

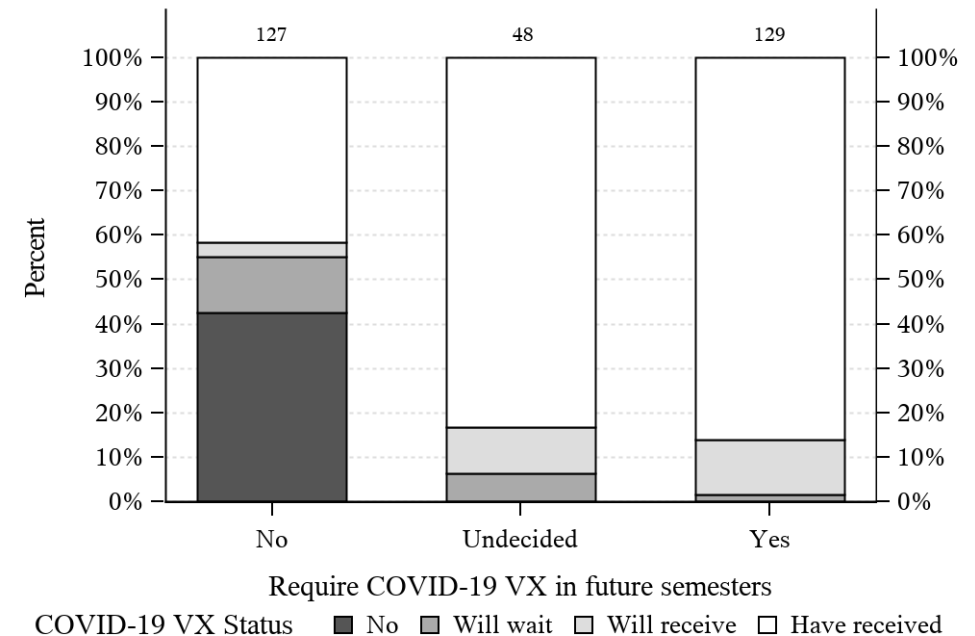
- Hesitant students are more likely to be not confident, while non-hesitant students are more likely to be confident or undecided about the vaccine
- Vaccination status and level of confidence in efficacy are moderately associated (Kendall's Tau-b=0.52, Stuart's Tau-c=0.39)



COVID-19 Vaccination Status and University Requirement Opinion

	COVID-19 VX Status									
	n					%				
	No	Will wait	Will receive	Have received	Total	No	Will wait	Will receive	Have received	Total
No	54	16	4	53	127	43	13	3	42	100
Undecided	.	3	5	40	48	.	6	10	83	100
Yes	.	2	16	111	129	.	2	12	86	100
Total	54	21	25	204	304	18	7	8	67	100

- Hesitant students are more likely to say no, while non-hesitant students are more likely to say yes or are undecided
- Vaccination status and opinion are moderately associated (Kendall's Tau-b=0.45, Stuart's Tau-c=0.38)



Qualitative Results

COVID-19 Vaccine Hesitancy Theme	Frequency (# of times theme was identified)		
Perception of not being at risk	8		
Mistrust	7		
Concern of vaccine long-term effects	7		
Prior COVID-19 infection	5		
Concern of health risks	5		
		COVID-19 Vaccine Non-Hesitancy Theme	Frequency (# of times theme was identified)
		Protecting myself and others	7
		Moral obligation	6
		Work or school related	5
		A wish to return to normal	5
		Influenza Vaccine Non-Hesitancy Theme	Frequency (# of times theme was identified)
		Work or school related	3
		Protecting myself and others	2
		Trust in Influenza Vaccine	2
		Trust in research process	2

Survey Conclusions

- COVID-19 vaccine hesitancy was found on K-State campus
- Several factors did affect vaccine hesitancy:
 - Age and student status, race/ethnicity, Influenza vaccination status, and previous COVID-19 infection
- Other factors did not affect vaccine hesitancy:
 - Income, sources of information, and negative health effects
- Hesitant students are less confident in the safety and efficacy of the COVID-19 vaccine than non-hesitant students
- Hesitant students are more likely to say “no” to universities requiring the vaccine for attendance in future semesters than non-hesitant students
- Major vaccine hesitancy themes:
 - Perception of not being at risk, mistrust, concern of vaccine long-term effects, prior COVID-19 infection, and concern of health risks
- Major vaccine non-hesitancy themes:
 - Protecting myself and others, moral obligation, work or school related, and a wish to return to normal

Study Limitations

- Question groups with no responses
- Variables with no responses
 - Ex. Native Hawaiian or Other Pacific Islander
- Questions with multiple responses allowed
- Questions with less responses than the others
- Income reporting accuracy
- Did not address gender as a factor of vaccine hesitancy

MPH Foundational Competencies

Number and Competency		Description
3	Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate	Attained by analyzing the survey results with Qualtrics, Microsoft Excel and NVivo
4	Interpret results of data analysis for public health research, policy, or practice	Attained by interpreting analysis results for use in KPHA and Research and the State posters, as well as in the ILE report
18	Select communication strategies for different audiences and sectors	Attained by creating infographics to be used by Lafene and RCHD as educational outreach materials for patients and/or the public
19	Communicate audience-appropriate public health content, both in writing and through oral presentation	Attained by creating posters and orally presenting at the KPHA conference and Research and the State poster session
21	Perform effectively on interprofessional teams	Attained by working with members at Lafene Health Center, RCHD, and those who helped me with my report/project along the way

IDZ Emphasis Area Competencies

MPH Emphasis Area: Infectious Diseases and Zoonoses		
Number and Competency		Description
1	Pathogens/pathogenic mechanisms	Creation of an infographic related to measures to take to reduce transmission of COVID-19 such as washing your hands, wearing a mask, and practicing safe social distancing.
2	Host response to pathogens/immunology	Creation of two infographics sharing information related to possible vaccine side-effects
3	Environmental/ecological influences	Investigation of vaccine hesitancy
4	Disease surveillance	Evaluation of the vaccination status related to COVID-19 of students on K-State campus. Worked with the RCHD to bring COVID-19 testing and vaccine clinics also allowed for an overall view of the COVID-19 pandemic in our county.
5	Disease vectors	Creation of a COVID-19 infographic regarding keeping yourself and others safe from COVID-19 which included tips such as hand washing, wearing a mask in public, and using hand sanitizer.

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Thank you!

Questions?