

East Tennessee State University

## Digital Commons @ East Tennessee State University

---

Appalachian Student Research Forum

2023 ASRF Schedule

---

Apr 25th, 1:20 PM - 1:40 PM

### Routine Childhood Immunization in Appalachia: A 5-year review of the prevalence, pattern, and predictors of vaccine exemptions in Northeast Region Tennessee

Charles Olomofe

*East Tennessee State University*

Sarah Boop

*Tennessee Department of Health*

Billy Brooks

*East Tennessee State University*

David Kirschke

*Tennessee Department of Health*

Oluwafunmike Ruth Olomofe

*Federal Ministry of Justice, Abuja, Nigeria*

Follow this and additional works at: <https://dc.etsu.edu/asrf>

---

Olomofe, Charles; Boop, Sarah; Brooks, Billy; Kirschke, David; and Olomofe, Oluwafunmike Ruth, "Routine Childhood Immunization in Appalachia: A 5-year review of the prevalence, pattern, and predictors of vaccine exemptions in Northeast Region Tennessee" (2023). *Appalachian Student Research Forum*. 40. <https://dc.etsu.edu/asrf/2023/schedule/40>

This Oral Presentation is brought to you for free and open access by the Events at Digital Commons @ East Tennessee State University. It has been accepted for inclusion in Appalachian Student Research Forum by an authorized administrator of Digital Commons @ East Tennessee State University. For more information, please contact [digilib@etsu.edu](mailto:digilib@etsu.edu).



**EAST TENNESSEE STATE  
UNIVERSITY**

**Routine Childhood Immunization in Appalachia:  
Prevalence and predictors of vaccine exemptions in  
Northeast Region Tennessee**

Charles Olomofe  
ETSU College of Public Health  
Biostatistics and Epidemiology

# Background

- Routine childhood vaccination
- Reducing uptake and vaccine exemption



# Background

- Vaccine exemption (VE) refusal to vaccinate
- Medical and non-medical exemption
- 2009-2017 non-medical exemption increased from 1.2% to 2.0%



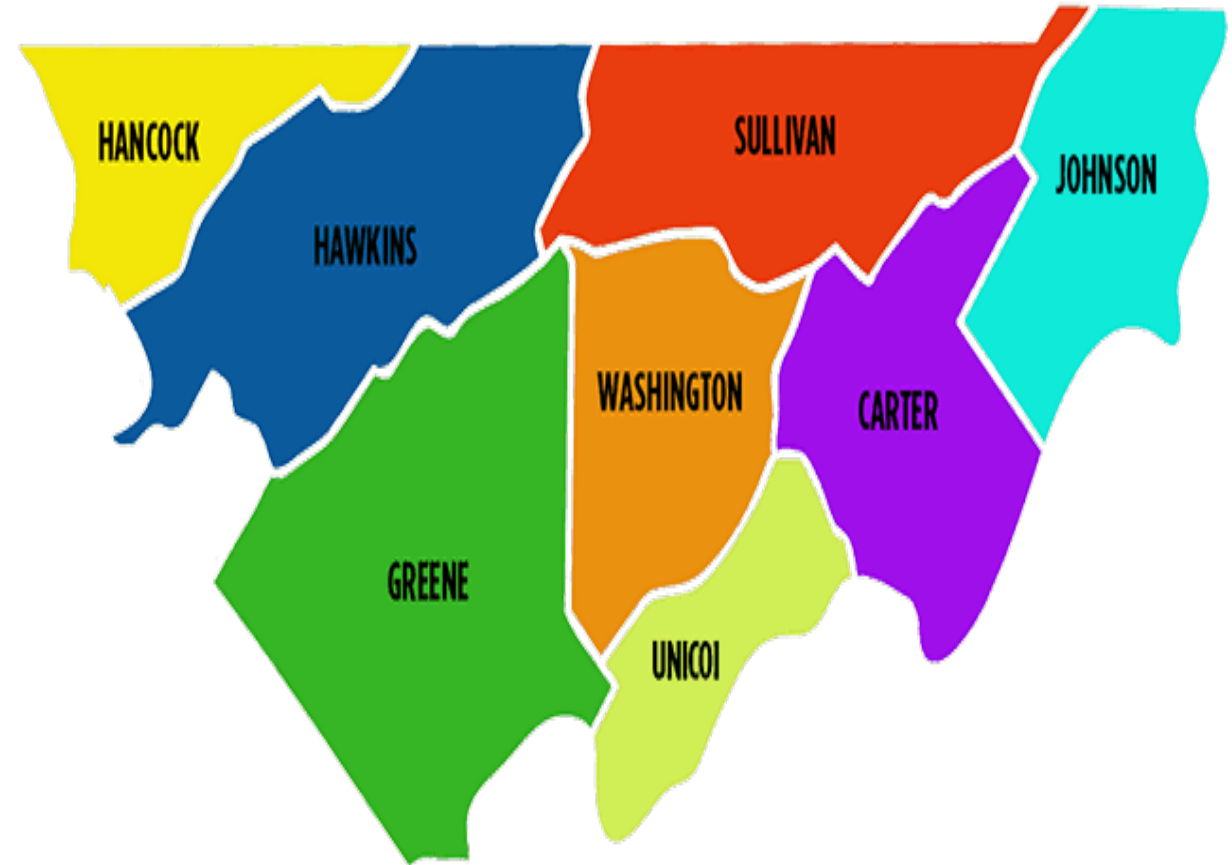
# Problem Statement

- The changing trend in vaccine uptake and vaccine exemption has both economic and medical implications
- Pertussis outbreak in Florida in 2013 -109 cases mainly unvaccinated students
- In 2019 over 1249 cases of measles recorded and 90% unvaccinated
- Hospitalization and medical and non-medical



# Rationale

- Tennessee conservative state
- Northeast region 1 of the 7
- Absent regional data analysis from TDH
- Analysis of risk factors



# Objectives



- Prevalence VE
- Pattern
- Predisposing factors



# Methods

- This cross-sectional study using secondary data
- Immunization data of children between 1-24 months in the Northeast region 2017- 2021 was retrieved.
- Random sample of children from the cohort was selected.
- Local public health staff locate each child. Confirm immunization histories with parents and healthcare provider
- SPSS for analysis





# Risk factors

- Exposure Variable: Race, maternal education, mother's age, enrollment in TennCare, and number of siblings
- Dependent variable: Vaccine exemption (yes/no)
- Chi-square test and multiple logistic regression model

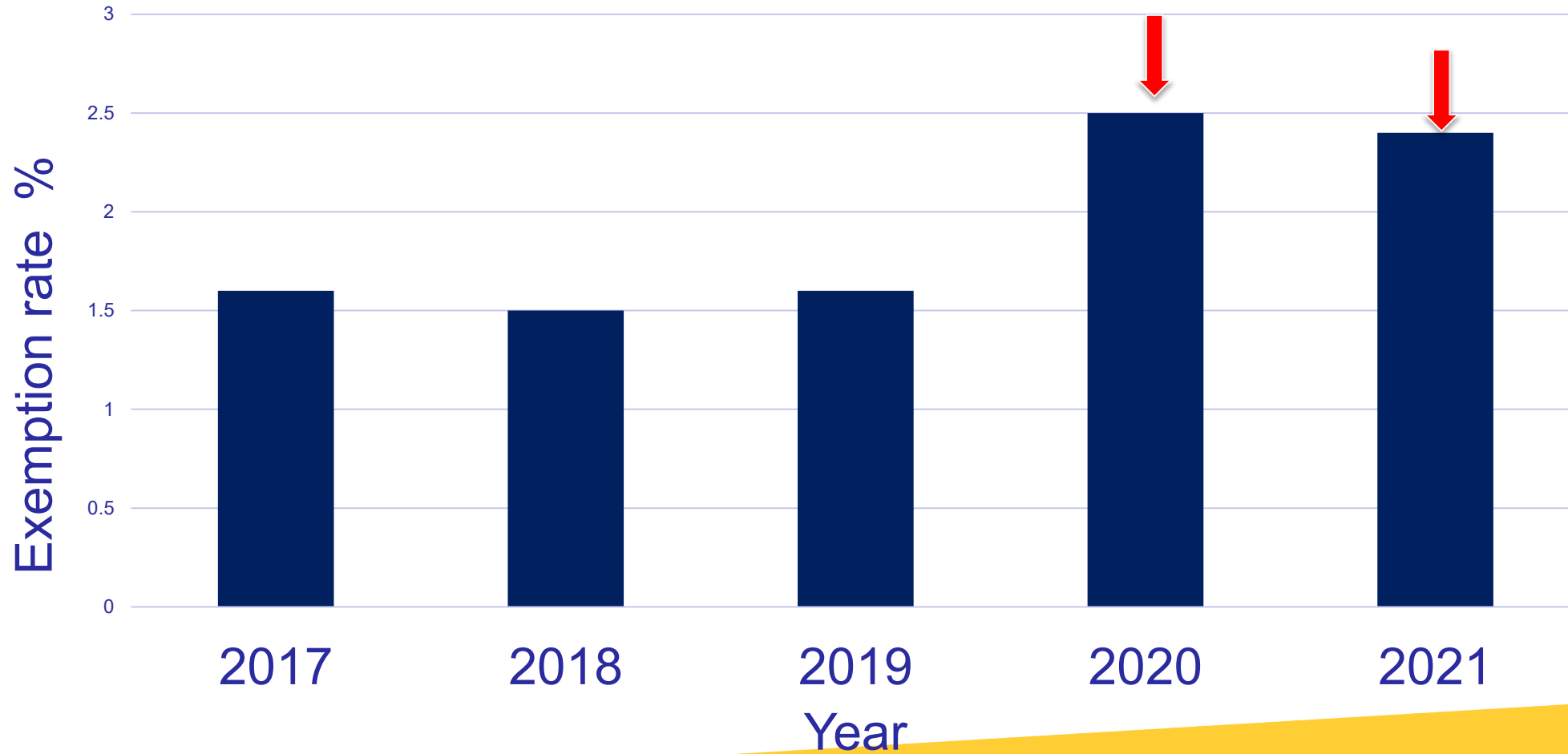


# Results

<b>Variable</b>	<b>Frequency N = 614</b>	<b>Percentage (%)</b>
<b>Mothers Age (in years)</b>		
< 18	10	1.6
18-30	446	72.6
31-40	152	24.8
>40	6	1.0
<b>Child Race</b>		
Non-white	39	6.4
White	575	93.6
<b>Has the child ever been on TennCare?</b>		
No	202	32.9
Yes	412	67.1
<b>Has the parent chosen not to vaccinate child? (n=607)</b>		
No	595	98.0
Yes	12	2.0

# Results

## Vaccine Exemption rate in Northeast Region



# Results

	Chose to vaccinate				
Variable	No n (%)	Yes n (%)	Total N	$\chi^2$	<i>p</i> value
<b>Race</b>					
<b>White</b>	12 (2.1)	558 (97.9)	570	0.795	1.000 <sup>F</sup>
<b>Others</b>	0 (0.0)	37 (100.0)	37		
<b>TennCare attendance</b>					
<b>Yes</b>	6 (1.5)	401 (98.5)	407	1.611	0.223 <sup>F</sup>
<b>No</b>	6 (3.0)	194 (97.0)	200		
<b>Mother's education</b>					
<b>HS or GED and below</b>	3 (1.1)	272 (98.9)	275	2.037	0.154
<b>College and above</b>	9 (2.7)	323 (97.3)	332		

# Results

Variable	B	p value	OR	95% CI	
				Lower	Upper
<b>TennCare attendance</b>					
Yes	-0.561	0.417	0.571	0.148	2.209
No <sup>REF</sup>			1		
<b>Mother's education</b>					
HS or GED and below <sup>REF</sup>			1		
College and above	0.862	0.246	2.368	0.552	10.171
<b>Mother's age (years)</b>					
≤ 30 <sup>REF</sup>			1		
> 30	-0.520	0.479	0.594	0.141	2.508
<b>Race</b>					
White	-17.278	0.998	0.000	0.000	.
Other <sup>REF</sup>			1		

# Discussion

- Increased vaccine exemption in 2020 and 2021. COVID-19 pandemic may be implicated
- Bivariate and multivariate analysis, no statistically significant association was found.
- Further studies may be necessary



# Strength

- Included all birth cohorts within the period (2017-2021). This makes the outcome representative of the population.
- Demonstrated the impact of COVID-19 on vaccine exemption in the region.
- Critical for policy and planning



# Limitation

- Unavailability of variables such as religion, cultural beliefs, and political affiliations in dataset
- Low racial diversity
- Low sample size





# Conclusion

- Increasing vaccine exemption rate
- Action is necessary to avoid catastrophic health outcomes



# Acknowledgments

Many thanks to the co-authors for their commitment, encouragement, and support towards this paper  
Dr. Brooks, Dr Kirschke, Sarah Boop, Barr Olomofe.



# References

1. Bednarczyk RA, King AR, Lahijani A, Omer SB. Current landscape of nonmedical vaccination exemptions in the United States: impact of policy changes. *Expert Rev Vaccines*. 2019;18(2):175-190. doi:10.1080/14760584.2019.1562344
2. Constable C, Blank NR, Caplan AL. Rising rates of vaccine exemptions: Problems with current policy and more promising remedies. *Vaccine*. 2014;32(16):1793-1797. doi:10.1016/j.vaccine.2014.01.085
3. Delamater PL, Leslie TF, Yang YT. Examining the spatiotemporal evolution of vaccine refusal: nonmedical exemptions from vaccination in California, 2000–2013. *BMC Public Health*. 2018;18(1):458. doi:10.1186/s12889-018-5368-y
4. Pierik R. On religious and secular exemptions: A case study of childhood vaccination waivers. *Ethnicities*. 2017;17(2):220-241. doi:10.1177/1468796817692629
5. Salmon DA, Siegel AW. Religious and Philosophical Exemptions from Vaccination Requirements and Lessons Learned from Conscientious Objectors from Conscription. *Public Health Rep*. 2001;116:7.
6. Shui IM, Weintraub ES, Gust DA. Parents Concerned About Vaccine Safety: Differences in Race/Ethnicity and Attitudes. *Am J Prev Med*. 2006;31(3):244-251. doi:10.1016/j.amepre.2006.04.006
7. Hoekstra EJ, LeBaron CW, Megaloeconomou Y, et al. Impact of a Large-Scale Immunization Initiative in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). *JAMA*. 1998;280(13):1143-1147. doi:10.1001/jama.280.13.1143
8. Patel M. National Update on Measles Cases and Outbreaks — United States, January 1–October 1, 2019. *MMWR Morb Mortal Wkly Rep*. 2019;68. doi:10.15585/mmwr.mm6840e2