

Apr 4th, 1:40 PM - 1:55 PM

# Impact of Adverse Childhood Experiences on HIV Risk Behaviors using a Nationally Representative Sample from 2011 and 2012

Elaine Loudermilk

Megan Quinn

*East Tennessee State University*

Liang Wang

*East Tennessee State University*

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



Part of the [Epidemiology Commons](#)

---

Loudermilk, Elaine; Quinn, Megan; and Wang, Liang, "Impact of Adverse Childhood Experiences on HIV Risk Behaviors using a Nationally Representative Sample from 2011 and 2012" (2018). *Appalachian Student Research Forum*. 99.  
<https://dc.etsu.edu/asrf/2018/schedule/99>

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).

# **Impact of Adverse Childhood Experiences on HIV Risk Behaviors using a Nationally Representative Sample from 2011 and 2012**

**Elaine Loudermilk, MPH, Megan Quinn, DrPH, MSc, Liang Wang, MD, DrPH, MPH**  
**Department of Biostatistics & Epidemiology**  
**College of Public Health**



---

**EAST TENNESSEE STATE**  
**UNIVERSITY**

---

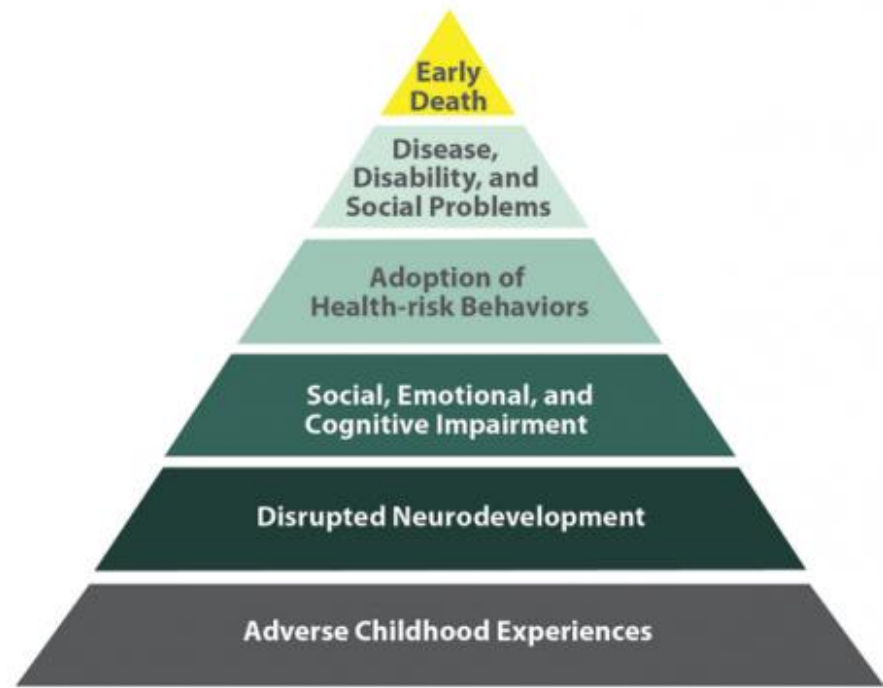
# Outline

- Background & current literature
- Research question
- Methodology
- Results
- Discussion
- Conclusion



# Adverse Childhood Experiences (ACEs)

- 2015
  - 683,000 victims of child abuse & neglect
    - 1,670 children died



Mechanism by Which Adverse Childhood Experiences Influence Health and Well-being Throughout the Lifespan



## BRFSS Adverse Childhood Experience (ACE) Module

Prologue: I'd like to ask you some questions about events that happened during your childhood. This information will allow us to better understand problems that may occur early in life, and may help others in the future. This is a sensitive topic and some people may feel uncomfortable with these questions. At the end of this section, I will give you a phone number for an organization that can provide information and referral for these issues. Please keep in mind that you can ask me to skip any question you do not want to answer. All questions refer to the time period before you were 18 years of age. Now, looking back before you were 18 years of age---

- 1) Did you live with anyone who was depressed, mentally ill, or suicidal?
- 2) Did you live with anyone who was a problem drinker or alcoholic?
- 3) Did you live with anyone who used illegal street drugs or who abused prescription medications?
- 4) Did you live with anyone who served time or was sentenced to serve time in a prison, jail, or other correctional facility?
- 5) Were your parents separated or divorced?
- 6) How often did your parents or adults in your home ever slap, hit, kick, punch or beat each other up?
- 7) Before age 18, how often did a parent or adult in your home ever hit, beat, kick, or physically hurt you in any way? Do not include spanking. Would you say—
- 8) How often did a parent or adult in your home ever swear at you, insult you, or put you down?
- 9) How often did anyone at least 5 years older than you or an adult, ever touch you sexually?
- 10) How often did anyone at least 5 years older than you or an adult, try to make you touch sexually?
- 11) How often did anyone at least 5 years older than you or an adult, force you to have sex?

### Response Options

#### Questions 1-4

1=Yes  
2=No  
7=DK/NS  
9=Refused

#### Question 5

1=Yes  
2=No  
8=Parents not married  
7=DK/NS  
9=Refused

#### Questions 6-11

1=Never  
2=Once  
3=More than once  
7=DK/NS  
9=Refused

# HIV

- 2016
  - 40,000 new HIV diagnoses
- Risks:
  - Unprotected sex
  - Sharing needles/syringes

## HIV CAN BE TRANSMITTED THROUGH...



**Sexual  
Contact**



**Pregnancy, Childbirth  
& Breast Feeding**



**Injection  
Drug Use**



# Current Literature

- STDs increase with number of ACEs
- Increase in ACEs linked with increased HIV risk behaviors
- Child sexual abuse exposure led to multiple sexual partners and drug use



# How do ACEs impact HIV risks among adults in the US?



---

EAST TENNESSEE STATE  
UNIVERSITY

---



# Methodology

- Behavioral Risk Factor Surveillance System, 2011-2012
- Landline and cell phones for sampling
- ACE module:
  - Minnesota, Montana, Vermont, Washington, Wisconsin, Iowa, North Carolina, Tennessee



# Methodology

- Outcome-HIV risk (yes/no)
  - Intravenous drug use
  - Treated for STD or VD
  - Given/received money for sex
  - Anal sex without a condom



# Methodology

- Predictors-ACEs (yes/no)
  - 11 individual ACEs
- Compiled ACEs into 2 categories:
  - Abuse
  - Household Dysfunction



# Analysis Steps

- Weighted
- Descriptive statistics
  - Population by sociodemographic
  - Sociodemographic with HIV risk
  - ACEs with HIV risk
- Simple and Multiple Logistic Regression
  - 11 individual ACEs with HIV risk
  - Abuse & household dysfunction with HIV risk



# Descriptive Statistics



---

EAST TENNESSEE STATE  
UNIVERSITY

---

---

**Unweighted (N=151,289)**

HIV Risk - Yes: 2,914 (1.93%)  
HIV Risk - No: 139,902 (92.47%)

---

**Weighted (N=59,207,640)**

HIV Risk - Yes: 1,976,959 (3.34%)  
HIV Risk - No: 53,398,594 (90.19%)

---

	Demographic Category	HIV Risk Yes (%)	HIV Risk No (%)
Age	18-34	7.92	92.08
	35-54	2.71	97.29
	55+	0.85	99.15
Sex	Male	4.02	95.98
	Female	3.15	96.85
School	High school or below	4.06	95.94
	Some college or above	3.22	96.78
	<\$15,000	6.30	93.70
Income	\$15,000-<\$25,000	4.85	95.15
	\$25,000-<\$35,000	3.87	96.13
	\$35,000-<\$50,000	3.12	96.88
	>\$50,000	2.33	97.67
Marital Status	Married/widowed	1.45	98.55
	Divorced/Separated /Never Married	6.45	93.55
	White	2.96	97.04
Race	Black	6.26	93.74
	Hispanic	6.57	93.43
	Other	4.67	95.33

---

	N %	Weighted %	HIV Risk Yes (%)	HIV Risk No (%)
<b><u>Household dysfunction</u></b>				
Y	29,038 (19.19)	20.53	5.88	2.93
N	122,251 (80.81)	79.47	94.12	97.07
<b><u>Lived with anyone mentally ill, depressed or suicidal</u></b>				
Y	11,888 (15.75)	17.00	7.29	2.70
N	63,572 (84.25)	83.00	92.71	97.30
<b><u>Lived with parental alcoholic</u></b>				
Y	18,263 (24.14)	24.79	5.91	2.70
N	57,388 (75.86)	75.21	94.09	97.30
<b><u>Lived with parental drug abuser</u></b>				
Y	5,854 (7.74)	10.55	11.14	2.58
N	69,816 (92.26)	89.45	88.86	97.42
<b><u>Live with anyone who served time in prison</u></b>				
Y	3,860 (5.09)	7.93	11.18	2.82
N	71,964 (94.91)	92.07	88.82	97.18
<b><u>Parents were divorced or separated</u></b>				
Y	16,142 (21.34)	27.42	6.14	2.46
N	59,490 (78.66)	72.58	93.86	97.54
<b><u>Parents slapped, hit, kicked, punched or beat each other up</u></b>				
Y	11,505 (15.38)	16.97	6.32	2.92
N	63,313 (84.62)	83.03	93.68	97.08



	N %	Weighted %	HIV Risk Yes (%)	HIV Risk No (%)
<b><u>Abuse</u></b>				
Y	29,577 (19.55)	20.69	5.62	2.99
N	121,712 (80.45)	79.31	94.38	97.01
<b><u>Parents slapped, hit, kicked, physically hurt you in any way</u></b>				
Y	11,434 (15.18)	16.46	7.32	2.75
N	63,871 (84.82)	83.54	92.68	97.25
<b><u>Parents swore, insulted or put you down</u></b>				
Y	24,122 (32.26)	34.94	5.79	2.29
N	50,645 (67.74)	65.06	94.21	97.71
<b><u>Child sexual abuse</u></b>				
Y	12.06	11.44	8.34	2.85
N	87.94	88.56	91.66	97.15
<b><u>Forced to touch sexually</u></b>				
Y	5,459 (7.28)	7.19	8.97	3.04
N	69,565 (92.72)	92.81	91.03	96.96
<b><u>Forced touch sexually</u></b>				
Y	7,795 (10.39)	9.78	8.45	2.95
N	67,197 (89.61)	90.22	91.55	97.05
<b><u>Forced sex</u></b>				
Y	3,105 (4.14)	4.34	12.17	3.06
N	71,924 (95.86)	95.66	87.83	96.94





# Simple Logistic Regression



---

EAST TENNESSEE STATE  
UNIVERSITY

---

<b>ACEs</b>	<b>OR</b>	<b><u>Unadjusted</u> 95% Confidence Limits</b>	<b>P-value</b>
Lived with anyone mentally ill, depressed or suicidal	2.83	2.61-3.08	<0.0001
Lived with parental alcoholic	2.27	2.09-2.45	<0.0001
Lived with parental drug abuser	4.74	4.35-5.15	<0.0001
Live with anyone who served time in prison	4.33	3.95-4.75	<0.0001
Parents were divorced or separated	2.59	2.40-2.80	<0.0001
Parents slapped, hit, kicked, punched or beat each other up	2.24	2.06-2.44	<0.0001
Parents slapped, hit, kicked, physically hurt you in any way	2.80	2.57-3.04	<0.0001
Parents swore, insulted or put you down	2.62	2.42-2.83	<0.0001
Forced to have sex	4.39	3.92-4.92	<0.0001
Forced to touch them sexually	3.15	2.84-3.49	<0.0001
Forced touch sexually	3.03	2.76-3.33	<0.0001



---

<b>ACEs</b>	<b>OR</b>	<b><u>Unadjusted</u> 95% Confidence Limits</b>	<b>P-value</b>
Abuse	1.93	1.82-2.05	<0.0001
Household dysfunction	2.07	1.95-2.20	<0.0001

---



# Multiple Logistic Regression



---

EAST TENNESSEE STATE  
UNIVERSITY

---

---

**Adjusted Model: N=58,622**

<b>ACEs</b>	<b>OR</b>	<b>95% Confidence Limits</b>	<b>P-value</b>
Lived with anyone mentally ill, depressed or suicidal	1.12	1.12-1.13	0.0684
Lived with parental alcoholic	1.15	1.11-1.12	0.0816
Lived with parental drug abuser	1.74	1.72-1.75	<0.0001
Live with anyone who served time in prison	1.34	1.33-1.35	<0.0001
Parents were divorced or separated	1.07	1.07-1.08	0.2193
Parents slapped, hit, kicked, punched or beat each other up	0.84	0.83-0.85	0.0105
Parents slapped, hit, kicked, physically hurt you in any way	1.52	1.51-1.53	<0.0001
Parents swore, insulted or put you down	1.30	1.29-1.31	<0.0001
Forced to have sex	1.70	1.68-1.72	<0.0001
Forced to touch them sexually	1.14	1.13-1.15	0.2629
Forced touch sexually	1.40	1.39-1.42	0.0023

---



		<b><u>Adjusted Model: N=58,622</u></b>		
<b>Socioeconomic Status</b>		<b>OR</b>	<b>95% Confidence Limits</b>	<b>P-value</b>
Age	18-34		Reference	
	35-54	0.41	0.41-0.41	<0.0001
	55+	0.21	0.21-0.21	<0.0001
Sex	Male vs Female	1.44	1.43-1.45	<0.0001
Married	Currently Married/Widowed		Reference	
	Other	2.31	2.30-2.33	<0.0001
School	Some college or above vs others			
Income	<\$15,000		Reference	
	\$15,000-<\$25,000	1.24	1.23-1.25	<0.0001
	\$25,000-<\$35,000	1.35	1.34-1.36	<0.0001
	\$35,000-<\$50,000	1.11	1.10-1.12	<0.0001
	>\$50,000	0.87	0.86-0.88	<0.0001
Race	White		Reference	
	Black	1.55	1.54-1.57	<0.0001
	Hispanic	1.30	1.29-1.32	<0.0001
	Other	1.21	1.20-1.23	<0.0001

ACEs	OR	Adjusted (N=58,622)	
		95% Confidence Limits	P-value
Abuse	1.42	1.30-1.55	<0.0001
Household dysfunction	1.41	1.29-1.54	<0.0001



		<b>Adjusted (N=58,622)</b>		
<b>Socioeconomic Status</b>		<b>OR</b>	<b>95% Confidence Limits</b>	<b>p-value</b>
Age	18-34		Reference	
	35-54	0.44	0.41-0.48	<0.0001
	55+	0.17	0.15-0.19	<0.0001
Sex	Male vs Female	0.14	1.07-0.22	0.0001
Married	Currently Married/Widowed		Reference	
	Other	2.40	2.22-2.61	<0.0001
	School Some college or above vs others			
Income	<\$15,000		Reference	
	\$15,000-<\$25,000	0.94	0.85-1.04	0.2093
	\$25,000-<\$35,000	0.92	0.81-1.03	0.1502
	\$35,000-<\$50,000	0.81	0.72-0.92	0.0006
	>\$50,000	0.69	0.62-0.77	<0.0001
Race	White		Reference	
	Black	1.48	1.34-1.62	<0.0001
	Hispanic	1.48	1.32-1.67	<0.0001
	Other	1.14	0.99-1.31	0.0741





# Discussion

- Living with parent who abused drugs increased HIV risks by 74%
  - OR: 1.74,  $P < 0.0001$
- Forced to have sex as a child increased HIV risks by 70%
  - OR: 1.70,  $P < 0.0001$
- Age was protective against HIV risks (MLR)
  - OR: 0.21,  $P < 0.0001$
- Divorced, separated, or never married was positively associated with HIV risks
  - OR: 2.31,  $P < 0.0001$



# Strengths & Limitations

- Cross-sectional data
- ACE questions refer to before the age of 18
- BRFSS HIV risks from adults ages 18 or older



# Conclusion

- Exposure to certain ACEs increased odds of HIV risks
- Longitudinal studies needed to confirm causality
- Education and prevention measures necessary



# References

- Tennessee Department of Health. (2015). Adverse Childhood Experiences in Tennessee. Retrieved from [https://www.tn.gov/content/dam/tn/tccy/documents/ace/Tennessee%20ACE\\_Final%20Report%20with%20Authorization%20\(1\).pdf](https://www.tn.gov/content/dam/tn/tccy/documents/ace/Tennessee%20ACE_Final%20Report%20with%20Authorization%20(1).pdf).
- Centers for Disease Control and Prevention. (2017). Behavioral Risk Factor Surveillance System: Child Abuse and Neglect Prevention. <https://www.cdc.gov/violenceprevention/childabuseandneglect/index.html>.
- Centers for Disease Control and Prevention. (2017). BRFSS Adverse Childhood Experience (ACE) Module. Retrieved from [https://www.cdc.gov/violenceprevention/acestudy/pdf/BRFSS\\_Adverse\\_Module.pdf](https://www.cdc.gov/violenceprevention/acestudy/pdf/BRFSS_Adverse_Module.pdf).
- Centers for Disease Control and Prevention. (2018). HIV Transmission. Retrieved from <https://www.cdc.gov/hiv/basics/transmission.html>.
- Hillis S.D., Anda R.F., Felitti V.J., Marchbanks P.A. Adverse childhood experiences and sexual risk behaviors in women: a retrospective cohort study. *Fam. Plan. Perspect.* 2001;33(5):206–211.
- Hillis S.D., Anda R.F., Felitti V.J., Marchbanks P.A. Adverse childhood experiences and sexual risk behaviors in women: a retrospective cohort study. *Fam. Plan. Perspect.* 2001;33(5):206–211.
- Senn T.E., Carey M.P., Venable P.A. Childhood and adolescent sexual abuse and subsequent sexual risk behavior: evidence from controlled studies, methodological critique, and suggestions for research. *Clin. Psychol. Rev.* 2008;28(5):711–735.
- Whetten K., Reif S., Toth M., Jain E., Leserman J., Pence B.W. Relationship between trauma and high-risk behavior among HIV-positive men who do not have sex with men (MDSM) *AIDS Care.* 2012;24(11):1453–1460.



# Acknowledgements



---

COLLEGE *of*  
PUBLIC HEALTH

---

EAST TENNESSEE STATE UNIVERSITY

Department of Biostatistics & Epidemiology

Drs. Megan Quinn and Liang Wang



# Questions?

Contact Elaine Loudermilk  
Email: [loudermilke@etsu.edu](mailto:loudermilke@etsu.edu)