

# Smoking during Pregnancy: Do Residential Fathers Moderate the Effects of Childhood Adversity on Cotinine Levels?

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## Background

Although the rates of smoking during pregnancy has declined considerably over time from a high of 34% in 1965 (Hongxia et al. 2018), 7.2% of US women continued to smoke during pregnancy in 2016 (Drake et al., 2018). Smoking during pregnancy increases the risk of preterm birth, stillbirth, neonatal mortality, and sudden infant death syndrome (Cnattingius, 2004).

Predictors of smoking during pregnancy includes age, marital status and childhood adversity (Harville et al., 2010). Childhood adversity has been associated with poor maternal/child health outcomes and maternal marital status (Raatikainen et al., 2005; Smith et al., 2016).

In 2017, roughly 35% of all births were non-marital births (Hamilton et al., 2018). Many of the non-marital births occur in cohabitating households, which may confer similar protective benefits for maternal and child health. The purpose of this study was to examine whether a residential father during pregnancy moderated the effect of ACEs on levels of cotinine present in saliva.

### Research Questions

- **R1: Do pregnant women who live with a residential father smoke less than women who do not live in a household with a residential father?**
- **R2: Are ACEs associated with cotinine levels?**
- **R3: Is the effect of ACEs on smoking stronger for pregnant women who do not live with the baby's father?**

## Methods

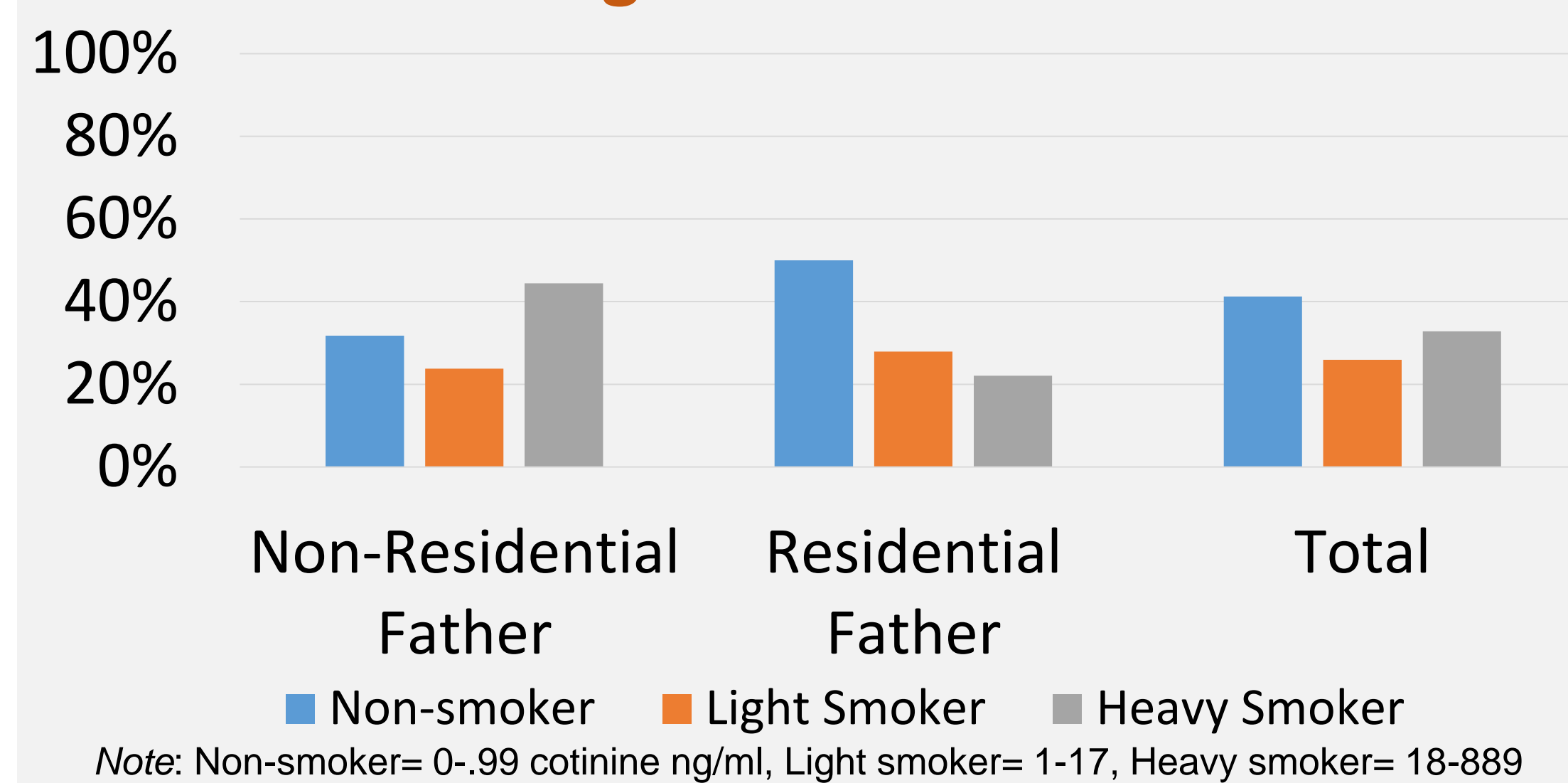
- The data comes from a large IRB-approved study following 177 pregnant girls and women (ages 15-40) from two prenatal clinics serving high proportions of Medicaid patients.
- Women were recruited primarily during their 1<sup>st</sup> trimester (roughly 10 weeks gestation). Biomarkers were collected at study enrollment.
- Participants completed online surveys about their pregnancy, including prenatal bonding and sociodemographic information.
- Analytic sample includes participants with complete data (n=131).
- **Variables:**
  - **Dependent: Cotinine (ng/mL)**
  - **Independent: ACEs & Residential father in the household**
  - **Control: Age, Pregnancy intention, Total number of pregnancies, Indoor smoke exposure, Race/ethnicity, Welfare receipt, & Father support.**

## Results

### Sample Descriptive Statistics

	Total(n=131)		Non-Residential Father(n=63)		Residential Father(n=68)	
	M/%	SD	M/%	SD	M/%	SD
Residential Father	52%					
Cotinine	62.58	134.00	85.07	159.68	41.74	101.63
ACEs	2.84	2.81	2.43	2.54	3.22	3.02
Age	25.30	5.61	25.63	5.87	24.99	5.39
Unintended Pregnancy	56%		70%		43%	
Pregnancy Total	2.58	1.37	2.81	1.38	2.37	1.34
Indoor Smoke Exposure	17%		16%		18%	
Race/Ethnicity						
White	42%		35%		49%	
Black	29%		44%		15%	
Hispanic	14%		11%		16%	
Native American	15%		10%		21%	
Welfare Receipt	67%		62%		72%	
Father Support Scale	31.43	7.04	28.86	8.03	33.81	4.94

### Smoking Status by Residential Father Living in the Household



**R1:** Cotinine values for women not living with their baby's father are more than double the average for women living in a household with a residential father.

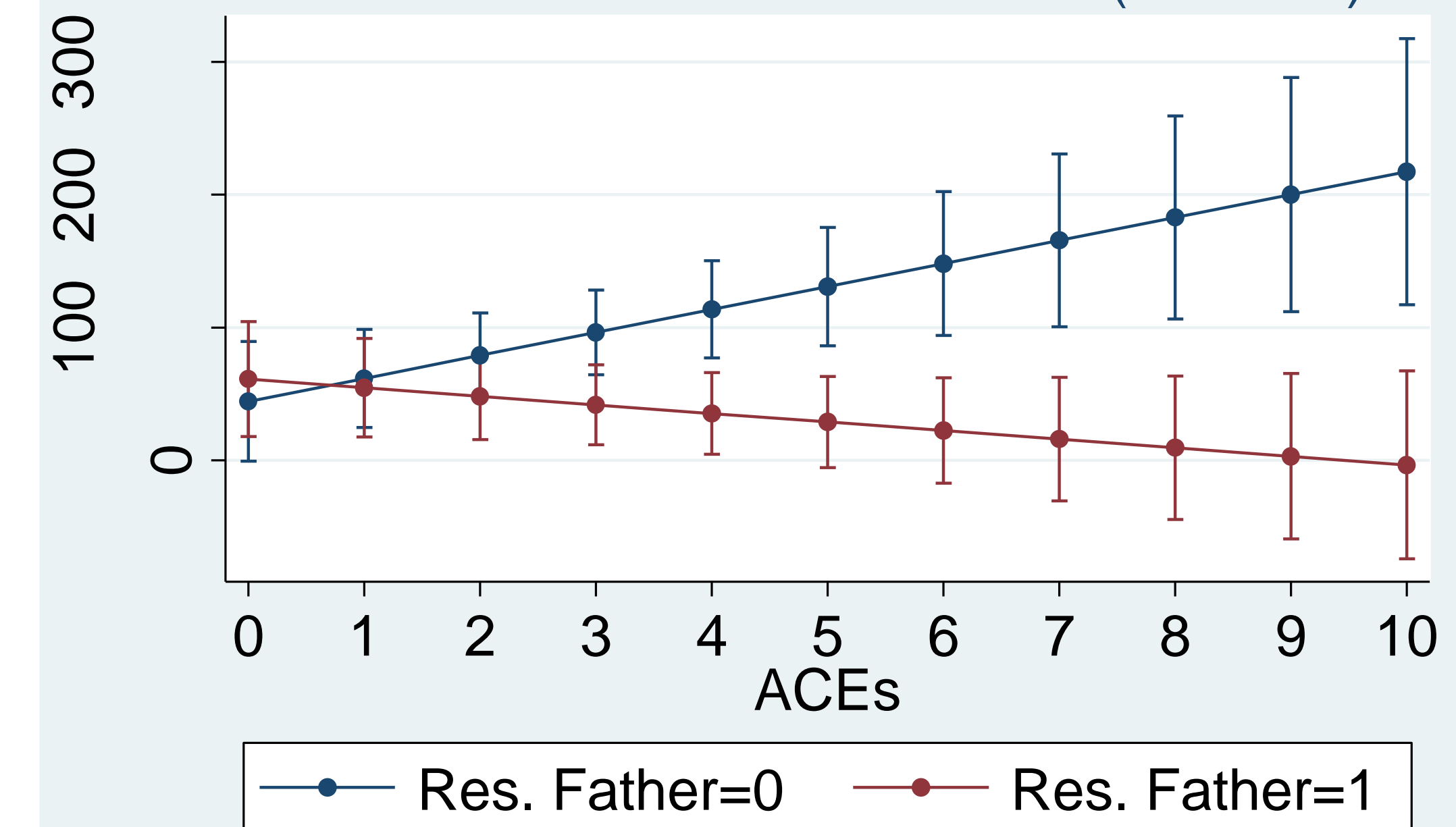
	M1: Full Model		M2: Interaction-ACEs & Residential Father	
	b	SE	b	SE
ACEs (Centered)	1.98	(4.04)	17.29**	(6.43)
Residential Father	-51.64*	(24.63)	-50.66*	(23.85)
Age	8.98***	(2.42)	8.99***	(2.34)
Unintended Pregnancy	19.27	(23.00)	34.99	(22.87)
Pregnancy Total	-1.90	(10.07)	-1.64	(9.75)
Race/Ethnicity (ref cat= white)				
Black	-22.45	(27.44)	-6.45	(27.09)
Hispanic	-20.13	(34.51)	-21.97	(33.41)
Native American	50.24	(32.28)	49.99	(31.24)
Indoor Smoke Exposure	54.30	(29.26)	40.67	(28.68)
Welfare	68.55**	(23.72)	75.61**	(23.08)
Father Support Scale	-.44	(1.77)	.52	(1.75)
Res. Father X ACEs (Centered)			-23.75**	(7.92)
Intercept	-183.40*	(90.90)	-225.82*	(95.07)
N	131		131	
adj. R <sup>2</sup>	.220		.269	

Standard errors in parentheses  
\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

**R2:** ACEs are not associated with significantly higher cotinine levels on its own, rather the effects are conditional upon living with a residential father.

## Results

### Moderating Effect of Residential Fathers on ACEs for Cotinine Estimates (95% CIs)



**R3:** The conditional effects of a residential father matters for ACEs scores 3 and higher. Women with high ACEs had significantly higher levels of cotinine if they did not live with their baby's father.

## Conclusion

Childhood adversity increases the risk of poor maternal/child health outcomes. One of the mechanisms of poor health outcomes includes risky health behaviors (smoking). Our results show that childhood adversity on its own is not significantly associated with higher levels of cotinine, but this may be a reflection of a sample that is already high-risk for smoking (**R1**). We find that women who do not live in a household with a residential father have significantly higher levels of cotinine (**R2**), especially if they have high ACEs (**R3**). Our study controls for socioeconomic resources and father support, which suggests residential fathers buffer the effects of childhood adversity above and beyond financial and emotional support.

## Future Studies

- Future research should examine potential mechanisms for the conditional effects of ACEs on cotinine levels by residential fathers living in the household.
- Lastly, it is possible that women who maintain a stable relationship (in spite of high ACEs) are able to abstain from smoking in part because of internal psychological characteristics which encourage healthy relationships and behavior.



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