

# E-Cigarettes and Smoking Cessation Among Pregnant Women: Insights from a Secondary Analysis of a Randomized Controlled Trial

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## INTRODUCTION

Ever use of electronic cigarettes (e-cigarettes) among U.S. adult smokers has increased rapidly in recent years, from 9.8% in 2010 to over 32% in 2012. Currently, there is a scarcity of data to help guide decisions regarding the potential harm and benefits of e-cigarettes. To our knowledge, only three randomized trials to date have examined the efficacy of these devices for smoking cessation. However, previous observational studies has found positive relationship between e-cigarette use and cigarette reduction or cessation, even among smokers who had no intention to quit. This study examines whether pregnant smokers who used e-cigarettes are more likely to quit smoking than those who had never used e-cigarettes.

## AIMS

- 1) To investigate the relationship between dual e-cigarette usage during pregnancy and smoking cessation outcomes among Quit4Baby randomized trial participants

## METHODS

Figure 1 – Recruitment Flowchart



### Eligibility Criteria:

- Age 14 or above
- Cellphone for personal use
- Willing to receive text messages
- Currently pregnant
- Have smoked at least a cigarette in the past 2 weeks

16 women were excluded from this analysis due to pregnancy status (have given birth at 1 month follow-up). Previous research has shown that 60-75% of women relapsed to smoking after pregnancy.

Data were drawn from the Quit4Baby study, a text-message-based smoking cessation randomized controlled trial. The sample was comprised of 481 participants with complete follow-up data at 1 month follow-up. Linear and logistics regression models to control for confounds were conducted to evaluate the association between e-cigarette use and smoking cessation outcomes.

## RESULTS

Table 1 – Baseline Sample Characteristics (N=481)

		E-Cig Dual User (N = 82)		Cigarette Only (N = 399)		All (N = 481)	
		N	% or M (SD)	N	% or M (SD)	N	% or M (SD)
<b>Sociodemographic Characteristics</b>							
Age		82	26.05 (5.40)	399	26.23 (5.86)	481	26.20 (5.78)
Ethnicity	White	62	75.61	245	61.40	307	63.96
	Black/ African American	11	13.41	98	24.57	109	22.71
Education	No High School Diploma	18	21.95	113	28.32	131	27.23
	High School Graduate	25	30.49	134	33.58	159	33.06
	Some College	33	40.24	114	28.57	147	30.56
Work Status	Not at all	49	59.76	275	68.92	324	67.78
Health Insurance	Medicaid/Medicare	67	81.71	319	79.95	386	80.58
Marital Status	Single, Never married	29	35.37	158	39.60	187	38.96
	Living Significant Others	27	32.93	131	32.83	158	32.92
	Married	16	19.51	78	19.55	94	19.58
Household Income	Up to \$15,000	43	52.44	221	55.39	264	56.05
Mobile Phone Ownership	Smartphone	68	82.93	342	85.71	410	85.24
Alcohol, E-Cigs & Marijuana	Alcohol Usage (=No)	76	92.68	362	90.73	438	91.44
	Marijuana Usage (=No)	72	87.80	356	89.22	428	89.17
	E-cigarette Usage (=Yes)	82	100	0	0	82	17.05
<b>Smoking Characteristics</b>							
# Cigarettes Smoked Per Day At Baseline		82	8.45 (8.01)	399	7.10 (5.60)	481	7.33 (6.09)
Fagerstrom Test for Cigarette Dependence	Total Score (1-10)	79	2.87 (2.10)	395	2.38 (1.80)	474	2.47 (1.86)

Figure 2 – Impact of E-Cigarette on Cigarettes Smoked Per Day

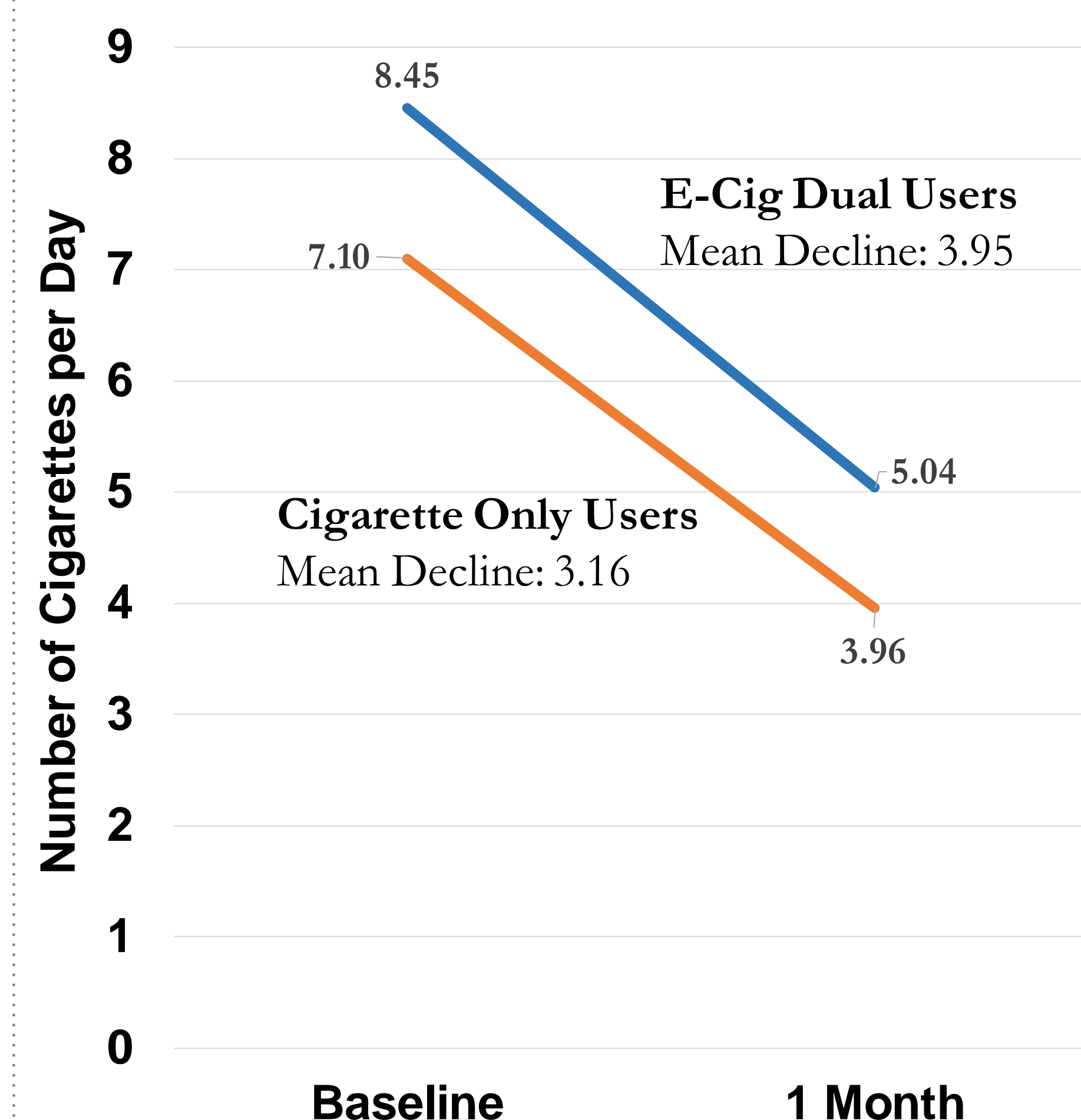
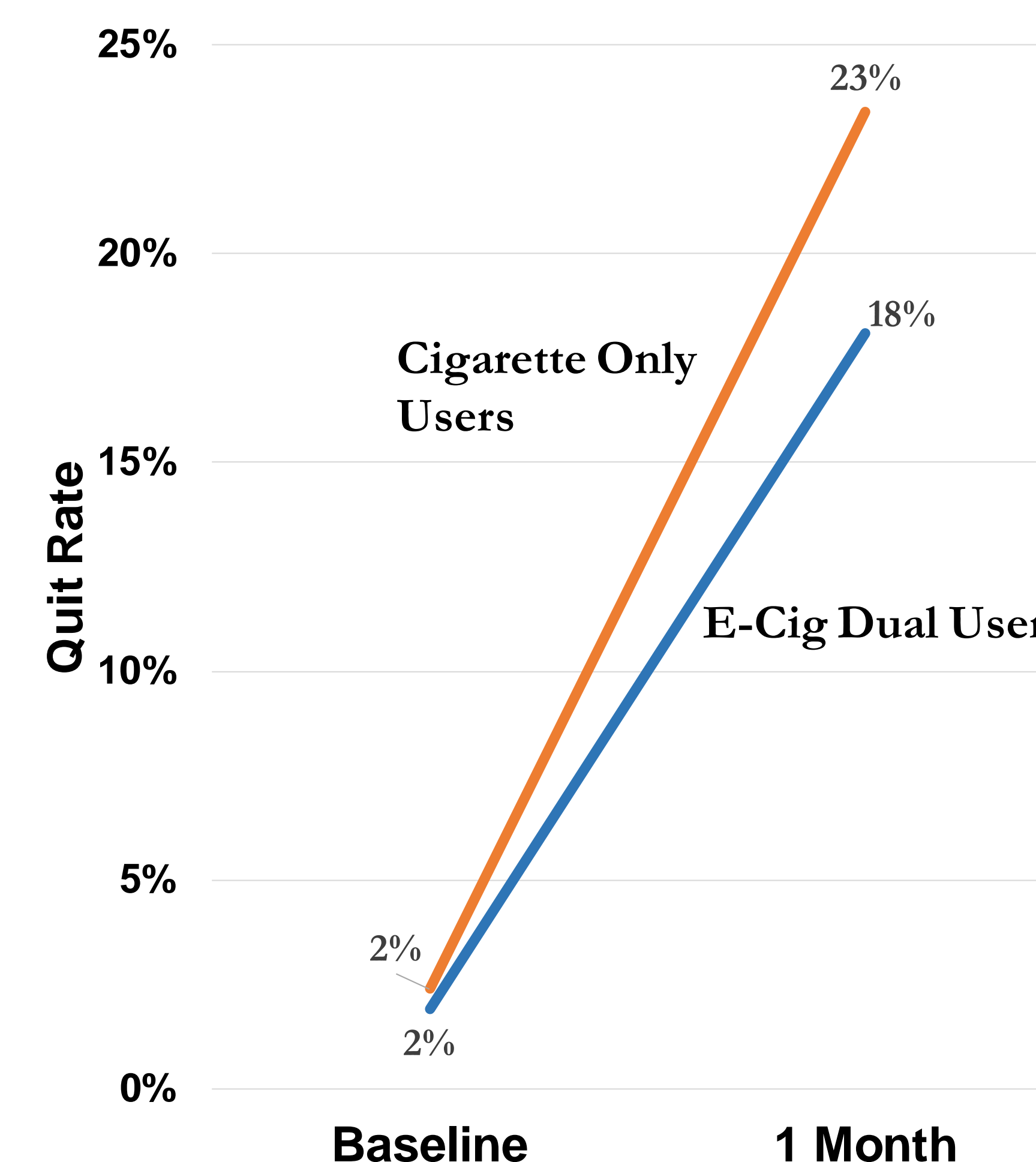


Figure 3 – Impact of E-Cigarette on Smoking Cessation (7 Day Point Abstinence)



## SUMMARY OF RESULTS

### Study Sample Characteristics

1. Study sample is predominately white pregnant women with a high school diploma, GED or less and are generally low- income.
2. 21.83% of pregnant smokers reported past 30-day use of e-cigarette at baseline or 1 month. E-cigarette users differed from non-users on baseline characteristics including lower Fagerstrom score, and lower self-efficacy to quit smoking.

### E-Cigarette Impact on Cigarettes Smoked Per Day

1. At 1 month follow-up, a larger decline in cigarette smoked per day was observed in e-cigarette users (mean decline = 3.95 cigarettes) compared to non-users (mean decline = 3.16 cigarettes); however, it was not statistically significant.

### E-Cigarette Impact on Smoking Cessation

1. Compared with pregnant smokers who never used e-cigarettes during pregnancy, smokers who ever used e-cigarettes were less likely to quit smoking for 30 days at 1 month follow-up after controlling for intervention effect (AOR=0.466; 95% CI = 0.191, 1.135; p = 0.09) and approached the level of significance.

## CONCLUSIONS & FUTURE DIRECTIONS

The current findings of e-cigarette's impact on smoking behaviors among pregnant women in the U.S. are mixed. It is notable that e-cigarette dual users in our sample have a higher baseline cigarette dependence and a lower self-efficacy level to quit smoking. Future intervention should consider the role of e-cigarette during program design and pilot testing. The longitudinal effect of e-cigarette and relative reduction of cigarettes smoked per day should be explored in future analyses.

## REFERENCES

- Goniewicz, M. L., Lingas, E. O., & Hajek, P. (2013). Patterns of electronic cigarette use and user beliefs about their safety and benefits: an internet survey. *Drug and alcohol review, 32*(2), 133-140.
- Pearson, J. L., Stanton, C. A., Cha, S., Niaura, R. S., Luta, G., & Graham, A. L. (2015). E-cigarettes and smoking cessation: insights and cautions from a secondary analysis of data from a study of online treatment-seeking smokers. *Nicotine & Tobacco Research, 17*(10), 1219-1227.
- Zhu, S. H., Gamst, A., Lee, M., Cummings, S., Yin, L., & Zoreff, L. (2013). The use and perception of electronic cigarettes and snus among the US population. *PLoS one, 8*(10), e79332.

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