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The association between e-cigarette use characteristics and combustible cigarette consumption and dependence symptoms: Results from a national longitudinal study

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Abstract

Background—Existing longitudinal surveys focused on the association between ever use of e-cigarettes and combustible cigarette consumption, making it difficult to infer what characteristics of e-cigarette use could potentially change combustible cigarette use behavior, which may have long-term health consequences. Although e-cigarettes' efficacy of alleviating dependence symptoms was supported by studies conducted in laboratory settings, whether the results can be translated into symptom reduction in the real world and over time is an open question.

Methods—This study conducted secondary analysis on the Waves 1–2 data of the Population Assessment of Tobacco and Health (PATH) Study to examine the association between e-cigarette use characteristics (frequency, flavoring, and voltage adjustment) and combustible cigarette use outcomes (frequency, quantity, and symptoms), using the Heckman 2-step selection procedure with the selection bias controlled. The inclusion criteria ensured that we followed an adult cohort of exclusive combustible cigarette users at Wave 1.

Results—The result shows that higher frequency of e-cigarette use was associated with lower combustible cigarette consumption and dependence symptoms, controlling for the corresponding baseline cigarette use variable and other confounders. Given the frequency of e-cigarette use, the feature of voltage adjustment was not significantly associated with any of the cigarette use outcomes. Flavoring, on the other hand, was associated with lower quantity of cigarette use.

Conclusions—Exclusive smokers who start using e-cigarettes do indeed change the frequency and quantity with which they smoke cigarettes. E-cigarette use may also help reduce dependence symptoms.

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Keywords

electronic cigarette; flavoring; consumption; symptom; longitudinal

1. Introduction

E-cigarettes have been hypothesized to be a potential harm reduction device, like nicotine patches, in that if smokers can substitute vaping for some or all of their consumption of combustible cigarettes, they will absorb a smaller amount of toxins into their systems. Yet, some longitudinal studies following smokers for about a year did not find a significant association between e-cigarette use and reduction in combustible cigarette consumption (Grana et al., 2014; Wills et al., 2017). A six-wave longitudinal survey of college students from the fall of freshman year to the fall of senior year, however, showed that among those who reported current cigarette smoking but no history of e-cigarette use at Wave 1, trying e-cigarettes during Waves 2–5 was a significant predictor of persistence of cigarette smoking at Wave 6 (Sutfin et al., 2015). A common limitation of these studies is that they defined e-cigarette use as ever use (even once), making it difficult to infer what levels of e-cigarette consumption could potentially influence combustible cigarette use. In fact, some longitudinal studies involving e-cigarette consumption levels in the analysis were able to establish the hypothesized association. Brose et al. (2015) conducted a web-based survey on a general population sample of adult smokers in Great Britain and followed them up a year later. They found that compared with non-use, daily e-cigarette use at baseline was associated with increased cessation attempts, but not with cessation at follow-up; non-daily use was not associated with cessation attempts or cessation. Further, Biener and Hargraves (2015) conducted telephone interviews with a population-based sample of adult smokers in two US metropolitan areas at baseline and a two-year follow-up, showing that intensive users (used daily for at least 1 month) of e-cigarettes were more likely than non-users to report smoking cessation (abstinence for at least 1 month); no such relationship was found for intermittent users (more than once or twice but not daily for a month or more).

E-cigarettes are novel products that allow users to customize them in a variety of ways (e.g., adding flavorings and adjusting voltage), so traditional quantity/frequency measures may not be sufficient to characterize e-cigarette consumption. A unique characteristic of e-cigarettes is the great flexibility to add a variety of flavorings which may be safe for ingestion but could have adverse respiratory toxic effects (Barrington-Trimis et al., 2014; Lerner et al., 2015). Litt et al. (2016) found that flavoring had significant effects on the smoking behavior of cigarette smokers asked to adopt e-cigarettes for 6 weeks: the largest drop in cigarette smoking occurred among those assigned menthol e-cigarettes. Research also showed that tobacco or menthol flavors produced very strong feeling for sensation fulfillment (i.e., throat hit) that is very similar to the effect of smoking (Li et al., 2016). Another study indicated that adolescents and young adults who mixed together multiple flavors were more likely to use e-cigarettes to quit smoking (Camenga et al., 2016). Furthermore, ex-smoking e-cigarette users who used more advanced e-cigarette devices allowing them to control the voltage were found to have higher levels of dependence symptomatology (Foulds et al., 2015). Thus, flavoring and voltage adjustment are both important characteristics of e-

cigarette consumption that could be potentially associated with combustible cigarette consumption and dependence symptoms.

Malas et al. (2016) conducted a systematic review of 62 published studies and concluded that the evidence in support of e-cigarettes' effectiveness on smoking cessation was very low to low, and the evidence on smoking reduction was very low to moderate. The same review, however, found that e-cigarettes' efficacy of alleviating smoking withdrawal symptoms and cravings was supported by the majority of studies conducted in laboratory settings, which do not always translate into symptom and craving reduction in the real world and over time. In fact, a recent study (Jorenby et al., 2017) took a further step toward such translation. The study recruited 74 dual users (cigarettes + e-cigarettes) and 74 exclusive smokers and conducted 26-day ecological momentary assessment with two ad lib use intervals. Participants were asked to reduce their cigarette consumption by 75% for one week and later to abstain completely for three days. Dual users were allowed to vape as much as they wanted. The results showed that dual users quadrupled their use of e-cigarettes during smoking reduction periods and were significantly more likely to maintain 100% reduction. More importantly, e-cigarettes reduced withdrawal symptoms especially among women.

Taken together, the field needs more studies examining the association between e-cigarette use characteristics (e.g., consumption level, flavoring) and longitudinal changes in combustible cigarette consumption and dependence symptoms in real world settings. Furthermore, given most national surveys on e-cigarette and combustible cigarette use are cross-sectional, the recent release of the second wave data of the Population Assessment of Tobacco and Health (PATH) Study (USDHHS, 2017) provides a great opportunity to address this research question using longitudinal data from a representative sample of the general population. The present study conducted secondary analysis on the PATH data to fill in this knowledge gap. We followed an adult cohort of exclusive smokers at Wave 1, and examined the association between e-cigarette use characteristics and combustible cigarette consumption and dependence symptoms at Wave 2. We adopted the Heckman 2-step selection procedure (Heckman, 1979) to deal with the potential selection bias that may contribute to the difference between smokers who used e-cigarettes and those who did not at Wave 2.

2. Material and Methods

2.1. Data and Study Sample

The PATH study is an annual longitudinal survey conducted by the NIH and FDA on a national sample of 45,971 tobacco users and non-users (Wave 1: 2013–2014; Wave 2: 2014–2015). It has the most comprehensive collection of tobacco and e-cigarette related questions among all the existing national surveys. The present study used the Waves 1–2 data from the adult cohort. This secondary analysis included 2,727 exclusive smokers who (1) had smoked cigarettes in past 12 months at Wave 1; (2) had smoked at least 100 or more cigarettes in their lifetime at Wave 1; (3) did not use any other tobacco products or e-cigarettes in past 12 months at Wave 1; and (4) did not use other tobacco products except combustible or e-cigarettes in past 12 months at Wave 2. These inclusion criteria ensured that we could follow a cohort of exclusive combustible cigarette users at Wave 1 and examine the association

between e-cigarette use characteristics and combustible cigarette consumption and dependence symptoms at Wave 2, controlling for the levels of cigarette consumption and dependence symptoms at Wave 1.

2.2. Measures

2.2.1. Primary Outcome Variables—We examined three outcome measures for combustible cigarette use at Wave 2 that are likely to be associated with long-term health consequences: frequency, quantity, and dependence symptoms. They served as the outcome variables of the second step of the Heckman procedure. The frequency was measured by the item: “On how many of the past 30 days did you smoke cigarettes?”. The quantity was measured by the item: “On average, on those days you smoked, how many cigarettes did you usually smoke each day?”. In terms of dependence symptoms, we used 10 items in the PATH study with the same ordinal scale of 1(not true of me at all) to 5 (extremely true of me): eight of the items were adopted from the Wisconsin Inventory of Smoking Dependence Motives (e.g., I find myself reaching for cigarettes without thinking about it); the rest two items were adopted from the Nicotine Dependence Syndrome Scale (e.g., I would find it really hard to stop smoking). Interested readers may refer to Strong et al. (2017) for details about the items and associated psychometric information. We used the mean score of these 10 items as the severity score for cigarette use related dependence symptomatology. The Cronbach alpha for this measure was 0.94 with the bivariate correlations between items ranged 0.48–0.80.

2.2.2. Use of E-cigarette at Wave 2—We defined the e-cigarette users at Wave 2 as those who used e-cigarettes some days or every day in the past 30 days. This variable was measured as a binary variable and used as the outcome variable in the first step of the Heckman procedure.

2.2.3. Characteristics of E-cigarette Use—At Wave 2, three characteristics of e-cigarette use were available from most e-cigarette users on a comparable scale: frequency, flavoring, and the device with the feature of voltage adjustment. The frequency item was: “On how many of the past 30 days did you use an e-cigarette?”. The flavoring was measured by the item: “In the past 30 days, was any of the e-cigarettes/e-cigarette cartridges/e-liquid you used flavored to taste like menthol, mint, clove, spice, fruit, chocolate, alcohol drinks, candy or other sweets?”. The item for voltage adjustment was: “Can you change the voltage on your e-cigarette?”.

2.2.4. Control Variables—In the statistical model for each of the outcome variables of cigarette use at Wave 2, we controlled for the corresponding variable at Wave 1, early onset status of smoking (onset age <18), lifetime alcohol use (Y/N), and lifetime marijuana use (Y/N). In addition to substance use, we controlled for sociodemographic variables at Wave 1 including age, gender, ethnicity/race, education level, and employment, which are commonly adjusted for in epidemiological studies.

2.3. Statistical Analysis

To examine differences between smokers who use e-cigarettes and those who did not at Wave 2, we conducted independent sample t tests on continuous variables and Chi-square tests on categorical variables. We then applied the Heckman two-step selection procedure (Heckman, 1979) to conduct the primary analysis that estimated the effects of the three e-cigarette use characteristics, controlling for the potential selection bias that may contribute to the difference between smokers who used e-cigarettes and those who did not at Wave 2. The first step of the Heckman procedure employed a logistic regression to examine the factors which may influence whether a smoker used e-cigarettes or not. The second step of the procedure involved three linear regression models that estimated the effects of the three e-cigarette use characteristics, controlling for cigarette and other substance use and sociodemographic variables at Wave 1. Notably, a term named Mill's ratio was generated from the first-step model, and its inverse was then included as an additional covariate in the second-step regressions to correct for the aforementioned selection bias. Based on Heckman's theory, after this correction, the sample can be considered as if it was randomly selected in the second-step model. All parameters were estimated with Wave 2 survey sample weights and the balanced repeated replication method (Fay=0.3) was used to calculate the standard errors.

3. Results

3.1. Descriptive Statistics

Table 1 shows descriptive statistics of all the variables used in the regression analysis based on the entire sample of 2,727 exclusive cigarette users at Wave 1. About 9% of the participants used e-cigarettes at Wave 2 while the others did not. Table 1 also shows descriptive statistics by the groups and testing results of group differences. The smokers who used e-cigarettes at Wave 2 tended to have a higher percentage of early onset of smoking (82% vs. 73%), higher frequency (28 vs. 25 days) and quantity (15 vs. 12 cigarettes) of smoking, and dependence symptoms (3.24 vs. 2.96) at Wave 1. They also had a higher percentage of lifetime alcohol (90% vs. 85%) and marijuana use (56% vs. 48%). There was, however, no significant group difference in cigarette use outcomes at Wave 2. In terms of sociodemographic variables, the e-cigarette users tended to belong to younger groups (18–44), have a higher percentage of being non-Hispanic White (87% vs. 70%), college educated (48% vs. 42%), and employed (64% vs. 57%).

3.2. Characteristics Associated with E-cigarette Use

Table 2 shows regression results from the Heckman 2-step procedure. The first step logistic regression examined the characteristics that were associated with e-cigarette use at Wave 2. Cigarette smokers aged 55 and older, compared with young adults aged 18–24, had lower odds of using e-cigarettes at Wave 2. Non-Hispanic Black cigarette smokers, compared with Non-Hispanic White smokers, had lower odds of using e-cigarettes at Wave 2.

3.3. Associations between E-cigarette Use Characteristics and Combustible Cigarette Use Outcomes

Table 2 also shows regression results of the second step Heckman procedure with each column corresponding to the model fitted on a cigarette use outcome at Wave 2. The first column of the second step procedure indicates that controlling for the frequency of smoking at Wave 1, higher e-cigarette use frequency was associated with lower smoking frequency at Wave 2, whereas being Hispanic or other race, compared with being Non-Hispanic White, was associated with higher smoking frequency. The second column of the second step procedure shows that given the quantity of smoking at Wave 1, higher frequency of e-cigarette use was associated with lower quantity of smoking at Wave 2. Additionally, use of flavored e-cigarettes was associated with lower quantity of cigarette use at Wave 2. The third column of the second step procedure indicates that controlling for dependence symptoms at Wave 1, higher frequency of e-cigarette use was associated with lower symptomatology of smoking at Wave 2. In addition, participants who were employed had lower dependence symptoms.

4. Discussion

This study conducted secondary analysis on the newly releases longitudinal data from a population sample of exclusive cigarette users (at baseline) to examine the association between e-cigarette use characteristics and combustible cigarette consumption and dependence symptoms a year later. The main result shows that higher frequency of e-cigarette use was associated with lower combustible cigarette consumption (both frequency and quantity) as well as lower dependence symptoms, controlling for the corresponding baseline cigarette use variable and other confounders.

Although the smokers who used e-cigarettes at Wave 2 tended to have higher levels of cigarette consumption and dependence symptoms at Wave 1 than those who did not use e-cigarettes, such group differences in the cigarette use outcomes disappeared at Wave 2. This change can also be seen in the regression analysis, which shows that higher frequency of e-cigarette use may lower cigarette consumption and dependence symptoms. Furthermore, the finding that these dual users (i.e., using combustible and electronic cigarettes) were more likely to initiate smoking earlier (onset age <18) and use alcohol or marijuana in comparison to exclusive smokers is consistent with existing literature based on cross-sectional data, which shows that dual users were more likely than exclusive users to have substance use or mental health problems (Conway et al., 2018; Leventhal et al., 2016). Nevertheless, using the longitudinal data of PATH, this study demonstrates that this high-risk group may benefit from using e-cigarettes to reduce combustible cigarette consumption and dependence symptoms.

The finding that e-cigarette users tended to be younger, Non-Hispanic White, and more highly educated is consistent with the prevalence rates for these subgroups reported by another recent survey of the U.S. adult population (Wilson & Wang, 2017). E-cigarettes are customizable (e.g., adding flavors) and have novel characteristics (e.g., USB rechargeability), and thus are particularly appealing to young adults or college students (Lee et al., 2017). Young adults or college students are also more likely to be motivated to use e-

cigarettes by the taste, flavor, or positive sensory experiences (Lee et al., 2017; Cooper et al., 2016; Temple et al., 2017). Further, e-cigarettes have been advertised as a healthier alternative to combustible cigarettes in the market. Although our study shows the potential of this novel product as a harm reduction device among exclusive smokers, its opposite potential as the “gateway drug” to combustible cigarettes remains a growing concern, especially about young people’s use behaviors.

This study shows that among those smokers who used e-cigarettes at Wave 2, being Hispanic or other race, compared with being Non-Hispanic White, was associated with higher smoking frequency. In fact, a recent study examining e-cigarette use frequency by race/ethnicity among U.S. adults found that the frequency among Hispanics was lower in comparison to Non-Hispanic Whites (Sharapova et al., 2018). This implies that Hispanics may be less likely to substitute combustible cigarette consumption with e-cigarette consumption. A possible explanation of this racial/ethnic difference is that Non-Hispanic Whites may be more likely to perceive e-cigarettes as less harmful than combustible cigarettes and thus tend to be more highly motivated to reduce smoking by increasing the frequency of vaping (Pearson et al., 2012).

Although recent national surveys like the PATH have gradually developed more items related to characteristics of e-cigarette use, we only included frequency, flavoring, and voltage adjustment in the analysis, because the other characteristics were either incomparable across different types of products or difficult to answer for most users. Our results show that given the frequency of e-cigarette use, the feature of voltage adjustment was not significantly associated with any of the cigarette use outcomes. Flavoring, on the other hand, was associated with lower quantity of cigarette use. This result is consistent with previous findings showing that flavoring may reduce smoking (Camenga et al., 2016; Litt et al., 2016). Although PATH inquired about the use of six specific flavors, most flavors were used by very few participants except for menthol/mint and fruit, which were not significantly associated with cigarette use outcomes in exploratory analysis and thus were not included in the final models.

An important characteristic of e-cigarette consumption, the quantity, was not included in these analyses because the quantity item in PATH had different units across various types of users: the number of e-cigarettes for those using disposable e-cigarettes/unknown (22%); the number of e-cigarette cartridges for those using non-fillable cartridges (24%); and the number of milliliters of e-liquid for those using refillable cartridge/tank (54%). Another important characteristic that was not included in these analyses is nicotine concentration because this question could be difficult to answer for many users, particularly for those using earlier generations of e-cigarettes (disposable, non-fillable cartridges) or those who borrowed others’ e-cigarettes. As a result, there were a lot of missing data for this item (65%). Moreover, although we examined the effect of voltage adjustment in the analysis, the corresponding item in PATH inquired about whether the device’s voltage could be regulated instead of whether the user actually did so. Future studies may focus on users’ behaviors that could potentially lead to negative outcomes.

Given that the data collection of PATH was conducted in 2013–2014 (Wave 1) and 2014–2015 (Wave 2), the results reported in this study may not reflect recent changes in e-cigarette use in the U.S. Although the delay in release of publicly accessible data is a common cost for secondary analysis studies on national survey data, the recent release of the Wave 2 data has provided the benefit of investigating longitudinal changes in cigarette consumption and dependence symptomatology. Such a benefit outweighs the cost. An additional limitation of the PATH is that the relevant items for e-cigarette use characteristics were only available in the timeframe of past 30 days, making it impossible to examine more distal temporal relationships between e-cigarette use characteristics and combustible cigarette consumption or symptoms. For example, Lechner et al. (2015) showed that increased duration of e-cigarette use was associated with fewer cigarette smoked per day. It is, however, impossible for our study to test such a research hypothesis because we do not have information about the participants' e-cigarette use prior to the past 30 days of Wave 2 assessment since the Wave 1 assessment.

In spite of the aforementioned limitations, this study fills in the current knowledge gap by examining the association between e-cigarette use characteristics and combustible cigarette consumption and dependence symptoms using longitudinal data from a general population sample. The analysis involved multiple characteristics of e-cigarette use (including frequency, flavoring, and voltage adjustment) as well as multiple outcomes of combustible cigarette use (including frequency, quantity, and dependence symptoms). Given that existing longitudinal studies usually considered ever use of e-cigarettes or smoking initiation/cessation, the contribution of this study is unique. The findings illustrate that smokers who start using e-cigarettes do indeed change the frequency and quantity with which they smoke combustible cigarettes. E-cigarette use may also help reduce dependence symptoms associated with smoking. Future research is needed to examine whether this decrease in smoking consumption and dependence symptoms leads to ultimate cessation.

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Table 1

Descriptive statistics of the variables of Population Assessment of Tobacco and Health (PATH) used in the analysis.

	unweighted *n* (weighted %) or mean (*SD*)						
	Overall (*n*=2,727)		P30D e-cigarette use at Wave 2 (Heckman Step 1 outcome)				*p*-value [a]
			Did not use 90.77% (*n*=2,467)		Used 9.23% (*n*=260)		
1. E-cigarette use in P30D (Wave 2)							
Frequency (days) [b]	1.19	0.11	N/A	N/A	12.86	0.73	N/A
Flavored	145	4.94	N/A	N/A	145	53.47	N/A
Voltage adjustment	75	2.63	N/A	N/A	75	34.56	N/A
2. Cigarette related covariates (Wave 1)							
Onset age <18	2,020	73.67	1,805	72.79	215	82.31	<0.01**
Frequency (days) in P30D [b]	24.95	0.32	24.66	0.36	27.84	0.51	<0.01**
Quantity in P30D [b]	12.66	0.27	12.45	0.28	14.68	0.65	<0.01**
Dependence symptoms [b]	2.99	0.03	2.96	0.03	3.24	0.08	<0.01**
3. Other lifetime substance use (Wave 1)							
Alcohol	2,325	85.21	2,093	84.69	232	90.25	0.03*
Marijuana	1,364	48.98	1,218	48.32	146	55.50	0.05*
4. Sociodemographics at W1							
Age							<0.01**
18–24	182	3.96	159	3.75	23	5.97	
25–34	455	15.66	403	15.10	52	21.11	
35–44	538	18.89	462	17.78	76	29.83	
45–54	669	25.62	610	25.94	59	22.51	
55 and older	883	35.87	833	37.42	50	20.58	
Male	1,131	45.00	1,042	45.58	89	39.32	0.10
Race/Ethnicity							<0.01**
Non-Hispanic White	1,854	71.23	1,633	69.58	221	87.48	
Non-Hispanic Black	371	12.61	358	13.46	13	4.28	
Hispanic	342	10.84	326	11.44	16	4.99	

	unweighted *n* (weighted %) or mean (*SD*)						
	Overall (*n*=2,727)		P30D e-cigarette use at Wave 2 (Heckman Step 1 outcome)				*p*-value [a]
			Did not use 90.77% (*n*=2,467)		Used 9.23% (*n*=260)		
Other	160	5.32	150	5.53	10	3.25	
Education							0.04 *
Less than high school	505	17.36	472	17.96	33	11.47	
High school	999	40.43	899	40.45	100	40.25	
College and above	1,223	42.20	1,096	41.59	127	48.29	
Employed	1,559	57.51	1,395	56.89	164	63.56	0.03 *
5. Cigarette outcomes (Wave 2)							
Frequency (# of days smoked in P30D) [b]	23.17	0.30	23.30	0.32	21.95	0.84	0.14
Quantity (# of cigarettes smoked in P30D) [b]	11.51	0.25	11.56	0.27	11.03	0.67	0.45
Dependence symptoms [b]	2.85	0.03	2.85	0.03	2.91	0.09	0.56

* $p<0.05$;

** $p<0.01$; P30D: Past 30 Days

[a] Based on independent sample t tests for continuous variables (i.e., frequency and quantity of cigarette use and dependence symptoms), and chi-square tests for all other nominal categorical variables to test the differences between the group without using e-cigarettes and the group using e-cigarettes in P30D at Wave 2.

[b] Data presented as mean and SD.

Note: The sample size or frequency is unweighted; all the other numbers in the table are weighted.

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Table 2

The Heckman two-step procedure examining the association between e-cigarette use characteristics and combustible cigarette use outcomes.

	Heckman 1st step		Heckman 2nd step					
	P30D e-cigarette use at Wave 2 (Unweighted n=2,301; weighted N=10,936,793)		# of days smoked at Wave 2 (Unweighted n=203; weighted N=988,650)		# of cigarettes smoked at Wave 2 (Unweighted n=198; weighted N=966,820)		Dependence symptoms at Wave 2 (Unweighted n=168; weighted N=813,836)	
	Odds Ratio	95% CI	Beta	SE	Beta	SE	Beta	SE
1. E-Cigarette use in P30D at Wave 2								
Frequency (days)	N/A	N/A	−0.43**	0.09	−0.29**	0.05	−0.01*	0.01
Flavored	N/A	N/A	−2.19	2.15	−2.89*	1.44	0.05	0.17
Voltage adjustment	N/A	N/A	−1.05	1.69	0.08	1.22	−0.07	0.19
2. Cigarette related covariates at Wave 1								
Onset age <18	1.31	0.89, 1.93	−3.63	3.77	−1.64	2.33	0.37	0.23
Frequency (days) in P30D	1.04	0.99, 1.09	−0.30	0.52	N/A	N/A	N/A	N/A
Quantity in P30D	1.00	0.98, 1.02	N/A	N/A	0.36**	0.10	N/A	N/A
Dependence symptoms	1.09	0.92, 1.30	N/A	N/A	N/A	N/A	0.70**	0.10
3. Other lifetime substance use at Wave 1								
Alcohol	0.99	0.54, 1.81	−0.65	2.99	−0.62	1.57	0.04	0.27
Marijuana	1.05	0.72, 1.53	−0.11	1.78	−0.62	1.33	0.06	0.14
4. Sociodemographics at Wave 1								
Age								
18–24 (ref)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
25–34	0.83	0.46, 1.50	4.36	4.82	0.32	1.74	0.41	0.33
35–44	1.27	0.70, 2.30	−1.42	4.15	−0.39	2.54	0.40	0.37
45–54	0.62	0.32, 1.21	9.31	6.52	3.12	2.62	0.32	0.29
55 and older	0.42**	0.24, 0.72	15.38	10.74	1.87	3.69	0.13	0.51
Male	0.91	0.64, 1.31	0.57	2.37	0.32	1.11	−0.04	0.15
Ethnicity/Race								
Non-Hispanic White (ref)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Non-Hispanic Black	0.37**	0.20, 0.67	13.11	10.62	−1.56	4.12	−0.02	0.65

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	Odds Ratio	95% CI	Beta	SE	Beta	SE	Beta	SE
Hispanic	0.58	0.28, 1.22	11.82*	5.77	1.08	2.38	−0.35	0.46
Other	0.78	0.34, 1.79	15.41**	5.63	3.99	2.39	0.40	0.31
Education Level								
Less than High (ref)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
High	1.30	0.75, 2.26	−5.75	3.71	−5.06	2.60	−0.51	0.30
College and above	1.56	0.89, 2.74	−5.04	4.64	−3.47	3.08	−0.39	0.39
Employed	0.99	0.74, 1.33	−1.15	1.80	−0.27	1.11	−0.38*	0.15
Inverse Mill's ratio	N/A	N/A	−15.94	10.90	−2.92	4.11	0.39	0.56

*$p<0.05$;

**$p<0.01$

Note: All numbers in the table are weighted (except the unweighted *n*).

P30D: past 30 days. CI: confidence interval. SE: standard error.