Published in final edited form as:

Tob Control. 2016 September ; 25(5): 571–574. doi:10.1136/tobaccocontrol-2015-052325.

The influence of menthol, e-cigarettes and other tobacco products on young adults' self-reported changes in past year smoking

Cristine D Delnevo^{1,2}, Andrea C Villanti^{3,4}, Olivia A Wackowski^{1,2}, Daniel A Gundersen^{1,5}, and Daniel P Giovenco¹

¹Center for Tobacco Studies, Rutgers School of Public Health, New Brunswick, New Jersey, USA

²Rutgers Cancer Institute of New Jersey, New Brunswick, New Jersey, USA

³The Schroeder Institute for Tobacco Research and Policy Studies, American Legacy Foundation, Washington DC, USA

⁴Department of Health, Behavior and Society, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA

⁵Department of Family Medicine, Rutgers Robert Wood Johnson Medical School, New Brunswick, New Jersey, USA

Abstract

Objective—Progression to regular smoking often occurs during young adulthood. This study examines self-reported changes in past year smoking among young adults and the potential influence of tobacco products on these trajectories.

Methods—Respondents to the 2011 National Young Adult Health Survey who smoked 100 cigarettes in their lifetime (n=909) described smoking behaviour at the time of the survey and 1 year prior. Cigarette smoking trajectories were categorised as: no change, quit, decreased smoking or increased smoking. Participants were also asked about current use of menthol cigarettes and other tobacco products (ie, cigars, smokeless tobacco, hookah) and ever use of e-cigarettes.

Results—Most young adults (73.1%) reported stable cigarette smoking behaviours, while 8.2% reported having quit, 5.8% reported that they smoke on fewer days, 5% progressed from someday to daily smoking and 8% increased from not at all to current smoking. The youngest smokers (18–20) had significantly higher odds (adjusted OR (AOR) =2.6) of increasing cigarette use over the past year compared to those aged 30–34, as did blacks versus whites (AOR=2.35). Menthol cigarette use nearly doubled (AOR=1.87) the odds of increased smoking behaviour. E-cigarette

Correspondence to: Daniel P Giovenco, 335 George Street, Suite 2100, New Brunswick, NJ 08903, USA; d.giovenco@rutgers.edu.
Twitter Follow Cristine Delnevo at @lozzola

Contributors CDD conceptualised the study, and took primary responsibility for data analysis and manuscript writing. ACV, OAW, DAG and DPG substantially contributed to writing and editing the manuscript.

Competing interests None declared.

Ethics approval Rutgers Institutional Review Board.

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement Additional, unpublished data are available by request from the primary author.

and other tobacco product (OTP) use were not associated with increasing smoking but OTP use was negatively associated with remaining quit from cigarettes.

Conclusions—Young adulthood is a critical period for smoking interventions, particularly among those most vulnerable to increasing smoking behaviours (ie, black and younger young adults). Policy efforts to restrict menthol cigarettes may reduce young adult smoking progression.

INTRODUCTION

Young adulthood is a developmental period critical to the establishment of health or risk behaviours that persist through adulthood. The many transitions inherent to young adulthood also result in an increased susceptibility to smoke,¹ which has been exploited by the tobacco industry.² Despite modest reductions in cigarette smoking prevalence among young adults in the past decade, this age group has among the highest prevalence of current smoking, and initiation rates remain stable. Furthermore, a substantial proportion of smokers transition to regular smoking during young adulthood.^{13–6}

Young people are heavy consumers of menthol cigarettes.⁷ Menthol's appeal to young, inexperienced smokers is due in part to its ability to mask the harshness of tobacco smoke, making cigarettes easier to smoke.⁸ As such, recent studies have examined the role of menthol cigarettes in smoking progression among youth.^{9,10} Others have expressed concern that electronic cigarettes (e-cigarettes) may also serve as a gateway to nicotine addiction and subsequent cigarette use among adolescents.^{11,12} The purpose of the current study was to examine reported changes in past year cigarette use among young adults and the potential influence of menthol cigarette use, e-cigarette use and other tobacco product use on such changes.

METHODS

This study uses cross-sectional data from the 2011 National Young Adult Health Survey (NYAHS), a stratified random-digit-dial (RDD) cell phone survey of participants aged 18–34 years, which includes questions on tobacco attitudes and behaviours. Weighted estimates generated from the NYAHS are representative of young adults in the USA. Details about the survey's design are reported elsewhere.¹³ Data presented here are from 909 young adults aged 18–34 years who indicated that they had smoked 100 cigarettes in their lifetime at the time of the survey (31.7% of the unweighted sample). The subsample was 51.3% male. Age was collected as a continuous variable but collapsed into groups that correspond with post-stratification weighting. With respect to age, 12.6% were 18–20 years old, 25% were 21–24 years old, 34% were 25–29 years old, and 28.4% were between 30 and 34 years old. The subsample of lifetime cigarette smokers was predominately white (66.1%); 12.6% were Hispanic/Latino, 8.1% were black/non-Hispanic and 13.2% reported another race/ethnicity.

NYAHS participants meeting the 100-cigarette threshold reported their current cigarette use as well as their smoking behaviour 1 year ago with standard response options.¹⁴ Cigarette smoking trajectories from 1 year ago were categorised as: (1) maintained current smoking level (ie, either smoked “every day” at both time points or “some days” at both time points); (2) remained quit (ie, reported “not at all” smoking for both time points); (3) quit (ie,

smoked “some days” or “every day” 1 year ago but “not at all” currently); (4) decreased smoking from “every day” to “some days”; (5) increased smoking from “some days” to “every day” and (6) increased via relapse or initiation. The latter category captured participants who reported that they smoked “not at all” a year ago and now reported every day or someday smoking; since it is unknown when participants reached the 100 cigarettes in a lifetime threshold, this could reflect failed cessation or initiation. Participants were also asked about their current use of menthol cigarettes if a current smoker, menthol use in the year before they quit if a former smoker, current use of other tobacco products (“OTPs”; ie, cigars, smokeless tobacco and/or hookah/water pipe) and ever use of e-cigarettes.

Sample weights were applied to adjust for non-response and the varying probabilities of selection. SUDAAN statistical software, which corrects for the complex sample design, was used to generate 95% CIs for prevalence estimates. Multivariate logistic regression was used to assess the independent association of factors predictive of increased smoking over 1 year (ie, groups 5 and 6), controlling for age, gender and race/ethnicity. Adjusted ORs and their 95% CIs are presented.

RESULTS

Of 909 young adults who reported ever smoking 100 cigarettes in their lifetimes, 47.1% reported they currently smoke every day, 21.6% said some days and 31.1% said not at all. When these ever smokers were asked to describe their smoking behaviour 1 year ago, 49.1% said every day, 20% said some days and 30.9% said not at all. Although the results at each time point looked comparatively similar, individual changes in smoking behaviour were noted in 26.9% of the sample with 8.2% having quit, 5.8% reporting that they smoke on fewer days, 5% increasing from some day to daily smoking, and 8% increasing from not at all to current smoking (by relapsing or initiating smoking; table 1). In total, 13% of the sample reported increases in past year smoking behaviours.

Notably, blacks reported the highest rates of increased smoking behaviours over the past year. Among black smokers, 13.2% increased from some day to daily smoking, a rate more than double that of other racial/ethnic groups. By age group, participants aged 18–20 years reported the least stable smoking behaviours. A combined 29% of this group increased their smoking behaviours, either via increasing from some day to daily smoking or through relapse or initiation. Conversely, the oldest age group (ie, 30–34) had significantly higher rates of remaining quit than any other age group. No significant differences were observed by gender (table 1).

Overall, 39% reported that they smoked menthol cigarettes, 24% reported that they have tried an e-cigarette and 25.5% reported current use of OTP. As shown in table 1, significant differences in smoking trajectories existed by menthol and current OTP status, but not ever e-cigarette use. The prevalence of increasing smoking behaviours was approximately twice as high among menthol versus non-menthol smokers. Likewise, current OTP users were more likely to have maintained or increased their smoking compared to those who do not currently use other tobacco products, and were significantly less likely to remain quit from smoking.

In the multivariable model (table 2), significant correlates of increasing smoking behaviour were age, race/ethnicity and menthol cigarette use. The youngest smokers, those aged 18–20 years, had more than twofold greater odds of increasing their cigarette use over the past year compared to those aged 30–34 years (adjusted OR (AOR)=2.6, 95% CI 1.18 to 5.75). Blacks were significantly more likely than whites to report increased cigarette use (AOR=2.35, 95% CI 1.06 to 5.20) and menthol cigarette use nearly doubled the odds of increased smoking behaviour (AOR=1.87, 95% CI 1.06 to 3.30), even after adjusting for age, gender and race/ethnicity.

DISCUSSION

This study identifies patterns of progression in cigarette use behaviours among young adults. Increased smoking behaviour was more likely among the youngest participants, and among blacks and menthol smokers. This is consistent with previous research that a substantial proportion of smokers transition to regular smoking after the age of 18 years, and that this behaviour may be more common among blacks.^{15–18} Our findings are also consistent with the premise that menthol facilitates progression to regular use.⁹ Moreover, although not significantly different, it should be noted that a higher proportion of non-menthol smokers remained quit over the past year compared to menthol smokers, consistent with previous studies on reduced cessation success among menthol smokers.^{19,20} It is important to note that almost as many young adults either quit or cut down on smoking as their counterparts who increased smoking. Indeed, previous research suggests that young adult “occasional” smokers are equally likely to quit or progress to heavy smoking.¹⁵ Given the unstable nature of young adult smoking behaviour, recent policy efforts to increase the tobacco age of sale to 21 years, such as those passed in New York City, may be beneficial.²¹

Our data did not support an association between ever e-cigarette use or current OTP use and increased cigarette use over a 1-year period when controlling for all covariates. However, we did find that OTP use was negatively associated with remaining quit from cigarettes; the prevalence of remaining quit was almost three times higher among those who were not current OTP users versus current OTP users.

There are several limitations to this study. First, these data do not measure prospective change, but recall broad categories of smoking behaviour 1 year ago. To the extent that recall bias influenced our measure of smoking transition, we would expect increased use to be underestimated consistent with social desirability to report the same or less smoking over time among participants. Second, our sample required ever smokers to meet a high threshold of 100 lifetime cigarettes, meaning that the transitions reported here are those of experienced smokers, not experimenters. Thus, we do not directly address experimentation and initiation, which have been shown to be increasing in this age group.^{4–6} Third, our measure of e-cigarette use only captured experimentation. Recent research has highlighted that patterns of e-cigarette use can vary from experimentation, current use and established use.²² An additional limitation of the cross-sectional data is that they cannot capture the temporal relationship between use of these tobacco products and smoking progression (eg, whether product preference preceded or followed changes in smoking patterns).

Nearly three-quarters of young adult ever smokers maintained their smoking status over a 1-year period while 13% increased their cigarette use, a behaviour highest among the youngest group, and among blacks and menthol smokers. These findings are consistent with the research literature that menthol smoking is associated with progression to regular use,⁹ as well as raises a concern regarding the role of menthol cigarettes in cessation outcomes.

Acknowledgments

Funding This study was supported by a grant from the National Institutes of Health (R01CA149705).

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What this paper adds

- Previous research has documented associations between use of menthol cigarettes and smoking initiation, as well as difficulty quitting.
- Less is known about the role that menthol, e-cigarettes and other tobacco products play in the smoking trajectories of young adults.
- This study examines predictors of increased smoking behaviours over 1 year among a nationally representative sample of young adults.

Reported changes in past year cigarette smoking among young adult smokers by tobacco product use, National Young Adult Health Survey, 2011 (n=909)

	Maintained		Remained quit		Quit		Daily to someday		Someday to daily		Relapsed or initiated		p Value*
	Per cent	95% CI	Per cent	95% CI	Per cent	95% CI	Per cent	95% CI	Per cent	95% CI	Per cent	95% CI	
Overall	50.1	(45.4 to 54.8)	23.0	(19.3 to 27.1)	8.2	(5.8 to 11.4)	5.8	(3.0 to 8.2)	5.0	(4.2 to 8.0)	8.0	(5.9 to 10.6)	
Sex													
Male	50.9	(44.5 to 57.3)	20.9	(16.0 to 26.7)	7.6	(4.5 to 12.6)	7.3	(4.1 to 12.7)	5.6	(3.5 to 9.0)	7.7	(5.4 to 11.0)	
Female	49.2	(42.3 to 56.1)	25.5	(20.1 to 31.6)	8.9	(5.7 to 13.5)	2.3	(0.8 to 6.0)	6.0	(3.9 to 9.3)	8.2	(5.1 to 12.9)	0.370
Age group, years													
18-20	49.4	(37.2 to 61.7)	5.6	(2.3 to 13.0)	12.1	(6.4 to 21.5)	4.1	(1.8 to 9.1)	12.5	(7.0 to 21.5)	16.3	(9.4 to 26.9)	
21-24	54.2	(44.3 to 63.8)	16.3	(10.5 to 24.2)	4.4	(2.4 to 8.1)	11.0	(4.7 to 23.5)	6.3	(3.3 to 11.8)	7.9	(4.5 to 13.5)	
25-29	52.1	(44.5 to 59.6)	21.1	(16.4 to 26.8)	10.8	(6.2 to 18.0)	4.8	(2.2 to 7.7)	4.2	(2.2 to 7.7)	7.0	(3.8 to 12.7)	
30-34	45.8	(37.3 to 54.6)	33.4	(25.6 to 42.3)	7.1	(3.6 to 13.5)	1.7	(0.7 to 3.9)	5.3	(2.7 to 10.2)	6.7	(3.9 to 11.5)	<0.0001
Race/ethnicity													
White, NH	47.4	(41.6 to 53.2)	28.6	(23.5 to 34.3)	9.1	(6.0 to 13.4)	4.4	(2.6 to 7.2)	4.2	(2.7 to 6.4)	6.5	(4.2 to 9.7)	
Black, NH	52.4	(37.5 to 66.8)	12.3	(4.8 to 28.3)	6.4	(3.0 to 13.2)	1.8	(0.3 to 8.9)	13.2	(6.6 to 24.8)	14.0	(6.9 to 26.3)	
Hispanic/Latino	53.9	(40.8 to 66.5)	11.9	(7.0 to 19.7)	6.0	(1.7 to 19.2)	11.2	(3.8 to 28.7)	6.2	(2.6 to 13.7)	10.8	(5.5 to 20.1)	
Other, NH	57.1	(44.3 to 69.0)	18.6	(10.7 to 30.2)	6.9	(2.4 to 18.2)	2.0	(0.7 to 5.6)	8.4	(3.2 to 20.4)	7.2	(3.2 to 15.4)	0.027
Tobacco product use													
Menthol	45.7	(38.0 to 53.6)	19.0	(13.9 to 25.6)	9.8	(5.6 to 16.5)	5.8	(2.4 to 13.5)	8.3	(5.2 to 13.1)	11.4	(2.4 to 13.5)	
Non-menthol	52.9	(47.1 to 58.6)	25.5	(20.7 to 31.0)	7.2	(4.7 to 10.8)	4.5	(2.6 to 7.7)	4.2	(2.7 to 6.5)	5.7	(2.6 to 7.7)	0.047
Ever e-cigarette	51.0	(45.9 to 56.0)	21.9	(18.1 to 26.3)	8.2	(5.7 to 11.7)	5.5	(3.3 to 9.1)	6.0	(4.3 to 8.4)	7.4	(3.3 to 9.1)	
Never e-cigarette	43.7	(31.7 to 56.6)	30.6	(20.4 to 43.0)	8.2	(3.3 to 18.7)	1.6	(0.4 to 5.8)	4.3	(1.3 to 13.6)	11.7	(0.4 to 5.8)	0.192
Current OTP	58.3	(49.0 to 67.0)	10.6	(7.1 to 15.4)	5.0	(2.4 to 10.3)	8.1	(3.1 to 19.6)	7.2	(3.9 to 12.8)	10.9	(3.1 to 19.6)	
No OTP	47.5	(42.1 to 53.0)	27.2	(22.5 to 32.4)	9.3	(6.4 to 13.4)	3.8	(2.2 to 6.4)	5.2	(3.5 to 7.6)	7.0	(2.2 to 6.4)	<0.0001

* p Value from χ^2 tests of independence between groups.

OTP, other tobacco products (cigars, smokeless tobacco and/or hookah/water pipes); NH, non-Hispanic.

Table 2

Prevalence and AOR for increased smoking behaviour over 1 year period among lifetime smokers, National Young Adult Health Survey, 2011 (n=909)

	Per cent	AOR	95% CI
Sex			
Male	13.3	0.82	(0.49 to 1.37)
Female	14.2	1.00	<i>ref.</i>
Age group, years			
18–20	28.9	2.60	(1.18 to 5.75)
21–24	14.2	0.94	(0.45 to 1.94)
25–29	11.2	0.89	(0.44 to 1.78)
30–34	12.0	1.00	<i>ref.</i>
Race/ethnicity			
White, NH	10.6	1.00	<i>ref.</i>
Black, NH	27.2	2.35	(1.06 to 5.20)
Hispanic/Latino	17.0	1.32	(0.62 to 2.80)
Other, NH	15.5	1.37	(0.65 to 2.90)
Smokes menthol cigarettes			
Yes	19.7	1.87	(1.06 to 3.30)
No	9.9	1.00	<i>ref.</i>
Ever smoked e-cigarettes			
Yes	13.4	0.87	(0.42 to 1.81)
No	16.0	1.00	<i>ref.</i>
Currently use non-cigarette tobacco products [*]			
Yes	18.1	1.39	(0.78 to 2.45)
No	12.2	1.00	<i>ref.</i>
OVERALL	13.7		

Bolded values signify statistically significant findings at the $p < .05$ level.

^{*} Past 30-day use of cigars, smokeless tobacco and/or hookah/water pipes.

AOR, adjusted OR; NH, non-Hispanic.