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Short communication

Examining current E-cigarette use among U.S. adults by groups stratified by demographic characteristics, 2014–2023

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ABSTRACT

Objective: This study explores current e-cigarette use from 2014 to 2023 among U.S. adults stratified by demographic groups.
Methods: Repeated, cross-sectional self-respondent data from the Tobacco Use Supplement to the Current Population Survey (TUS-CPS) from 2014 to 2015, 2018–2019 and 2022–2023 were analyzed. Self-response and replicate weights were applied for nationally representative estimates. Predicted marginals were used to obtain adjusted estimates; linear contrasts were used to assess trends.
Results: After adjusting for sex, age, race and ethnicity, employment, metropolitan status, region and education, current e-cigarette use among U.S. adults was stable between 2014 and 2015 (2.22%, 95% CI: 2.14,2.31) and 2018–2019 (2.33%, 95% CI: 2.21,2.45), but increased by 2022–2023 (3.13%, 95% CI: 2.96,3.31, $p < 0.01$). From 2014 to 2015 to 2022–2023, e-cigarette use increased for many groups including Black non-Hispanic adults (65.69% increase from 1.02% to 1.69%) and Hispanic adults (59.14% increase from 0.93% to 1.48%). In 2014–2015, 8.26% of all adults and 25.11% of those ages 18–24 who reported current e-cigarette use had never used cigarettes, which increased to 34.06% and 67.63%, respectively, in 2022–2023.
Conclusion: E-cigarette use increased among U.S. adults between 2014 and 2015 and 2022–2023. Several demographic groups experienced increases in current e-cigarette use that may be explained by declining e-cigarette prices and marketing tactics.

1. Introduction

Since their introduction to the U.S. market in 2007, the availability, price, nicotine strength and other features of e-cigarettes have changed dramatically (Ali et al., 2025; National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health, 2016). In the U.S., e-cigarette use among youth has declined since 2019 (Park-Lee et al., 2024), but e-cigarette use among adults increased during the same time period (Vahratian et al., 2025). Understanding changes in e-cigarette use prevalence over time, including by demographic characteristics and by tobacco use status, is critical to inform public health messaging and interventions. This paper aims to address the following research questions: a) How has U.S. adult e-cigarette use changed from 2014 to 2015 to 2022–2023? and b) Are there groups with higher e-cigarette use prevalence?

2. Methods

2.1. Study design and population

We examined repeated, cross-sectional self-respondent data from the U.S. Tobacco Use Supplement to the Current Population Survey (TUS-CPS) from years that included e-cigarette items (2014–2015; 2018–2019 and 2022–2023), 404,873 adults (National Cancer Institute, 2026a). Self-response and replicate weights were applied to generate nationally-representative estimates; Fay's adjustment was included as per recommendations for analysis of TUS-CPS. This study included analysis of publicly-available anonymized data and thus exempt from ethical review for human research studies.

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2.2. Measures

The main outcome of interest was current e-cigarette use, assessed with the question "Do you NOW use an e-cigarette every day, some days or not at all?" where answers of "every day" and "some days" were considered to be current use and "not at all" was considered to be no current use. Characteristics of those who report current e-cigarette use were examined including: age groups, use of e-cigarettes to quit cigarettes ("Do you use e-cigarettes to help you quit smoking cigarettes?") and combustible cigarette use status (never, current, former). Cigarette use status was derived from two items: "Have you smoked at least 100 cigarettes in your entire life?" and "Do you now smoke cigarettes every day, some days, or not at all?" Current cigarette smoking was defined as smoking 100 or more cigarettes in lifetime and currently smoking every day or some days. Former cigarette smoking was defined as smoking 100 or more cigarettes in lifetime and not at all for current smoking. Never smokers were those who had smoked less than 100 cigarettes in their lifetime, consistent with prior TUS-CPS reporting (National Cancer Institute, 2026b). In accordance with data suppression guidelines, thresholds of sample size <30 or relative standard error (RSE) >30% were not presented (National Cancer Institute, 2026c). Missingness was low across the sample for variables of interest (<2% per variable); respondents who were missing data for indicators of interest were excluded from the analytic sample.

2.3. Statistical analysis

Predicted marginals were used to obtain adjusted prevalence estimates (with 95% confidence intervals [CI]) for current e-cigarette use among groups stratified by demographic characteristics. Linear contrasts were used to assess trends over time as appropriate; when linear trends were non-significant quadratic trends were assessed. Weighted prevalence estimates and chi-square tests were used to examine characteristics among those who used e-cigarettes. All analyses were conducted in SAS 9.4 and SUDAAN 11.0.

3. Results

Nationally, after adjusting for sex, age, race and ethnicity, employment status, metropolitan status, region and education, reported current use of e-cigarettes among U.S. adults was stable between 2014 and 2015 (2.22%, 95% CI: 2.14,2.31) and 2018–2019 (2.33%, 95% CI: 2.21,2.45) but increased by 2022–2023 (3.13%, 95% CI: 2.96,3.31, $p < 0.01$) (Table 1).

Younger adults ages 18–24 (6.54%, 95% CI: 5.78,7.39) had the highest adjusted current e-cigarette use during 2022–2023, followed by those ages 25–34 (5.71%, 95% CI: 5.26,6.20); use was also higher among unemployed individuals (5.47%, 95% CI:4.50,6.65) (Table 1). Groups with the largest relative change in current e-cigarette use from 2014 to 2015 to 2022–2023 include: ages 18–24 (a 115.84% relative

Table 1
Adjusted Predicted Marginals[a] and Trend Analyses for Current E-Cigarette Use in the U.S. Population by Demographic Groups, TUS-CPS 2014–2023.

		2014–2015[b] (weighted sample = 78,482,363)	2018–2019[c] (weighted sample = 81,372,697)	2022–2023[d] (weighted sample = 83,728,907)	Linear Contrast[e]	Percent Change[f] from 2014 to 2015 to 2022–2023[e]
Variable	Item	Weighted % (95%CI)	Weighted % (95%CI)	Weighted % (95%CI)	*p*-value	
Overall E-Cigarette Use		2.22 (2.14, 2.31)	2.33 (2.21, 2.45)	3.13 (2.96, 3.31)	p < 0.01	40.99%
Sex	Male	2.53 (2.41, 2.66)	2.70 (2.54, 2.88)	3.27 (3.06, 3.48)	p < 0.01	29.25%
	Female	2.16 (2.04, 2.28)	1.88 (1.75, 2.02)	2.75 (2.53, 2.98)	p < 0.01	27.31%
Age	18–24	3.03 (2.67, 3.43)	4.64 (4.13, 5.22)	6.54 (5.78, 7.39)	p < 0.01	115.84%
	25–34	3.42 (3.16, 3.70)	3.71 (3.38, 4.07)	5.71 (5.26, 6.20)	p < 0.01	66.96%
	35–44	2.82 (2.58, 3.07)	2.32 (2.07, 2.61)	3.09 (2.79, 3.43)	p < 0.01	9.57%
	45–54	2.20 (2.03, 2.38)	1.59 (1.40, 1.81)	1.74 (1.50, 2.01)	$p = 0.12$[g]	−20.91%
	55+	1.42 (1.31, 1.55)	1.04 (0.93, 1.17)	0.85 (0.75, 0.97)	p < 0.01	−40.14%
Race and Ethnicity	White (NH) [h]	3.16 (3.01, 3.32)	3.17 (2.99, 3.36)	4.03 (3.79, 4.29)	p < 0.01	27.53%
	Black (NH) [h]	1.02 (0.86, 1.21)	0.90 (0.72, 1.11)	1.69 (1.42, 2.01)	p < 0.01	65.69%
	Hispanic	0.93 (0.79, 1.10)	1.11 (0.95, 1.31)	1.48 (1.27, 1.73)	p < 0.01	59.14%
	Other (NH) [h]	2.30 (1.95, 2.71)	1.98 (1.63, 2.41)	3.18 (2.70, 3.75)	p < 0.01	38.26%
Employment Status	Employed	2.34 (2.22, 2.46)	2.39 (2.24, 2.55)	3.19 (2.99, 3.40)	p < 0.01	36.32%
	Unemployed	3.45 (2.96, 4.02)	3.79 (3.07, 4.67)	5.47 (4.50, 6.65)	p < 0.01	58.55%
	Retired	1.32 (1.15, 1.52)	1.22 (1.02, 1.47)	1.62 (1.28, 2.05)	p < 0.01	22.73%
	Disabled	4.51 (4.03, 5.04)	3.60 (3.04, 4.26)	3.89 (3.20, 4.71)	p < 0.01	−13.75%
	Other	2.01 (1.77, 2.28)	1.80 (1.52, 2.14)	2.12 (1.78, 2.53)	p < 0.01	5.47%
Metropolitan Status[i]	Metropolitan	2.37 (2.27, 2.48)	2.32 (2.20, 2.46)	2.98 (2.81, 3.17)	p < 0.01	25.74%
	Non-metropolitan	2.21 (2.01, 2.44)	2.12 (1.87, 2.40)	3.20 (2.81, 3.64)	p < 0.01	44.80%
Region[j]	Northeast	1.98 (1.76, 2.22)	2.23 (1.99, 2.51)	2.51 (2.21, 2.85)	p < 0.01	26.77%
	Midwest	2.43 (2.24, 2.64)	2.20 (1.98, 2.44)	3.10 (2.78, 3.44)	p < 0.01	27.57%
	South	2.57 (2.40, 2.75)	2.36 (2.16, 2.56)	3.08 (2.84, 3.33)	p < 0.01	19.84%
	West	2.15 (1.99, 2.33)	2.33 (2.13, 2.55)	3.20 (2.90, 3.53)	p < 0.01	48.84%
Education	<12 years	2.94 (2.58, 3.36)	2.75 (2.30, 3.29)	3.92 (3.21, 4.78)	p < 0.01	33.33%
	12 years (HS)	3.15 (2.97, 3.36)	3.08 (2.85, 3.33)	4.08 (3.72, 4.47)	p < 0.01	29.52%
	13–15 years	3.05 (2.86, 3.25)	2.94 (2.73, 3.16)	3.97 (3.65, 4.32)	p < 0.01	30.16%
	16+ years (college or more)	0.97 (0.87, 1.08)	1.16 (1.04, 1.30)	1.36 (1.23, 1.52)	p < 0.01	40.21%

Table Notes:
a. Predicted marginals have been adjusted for sex, age, race and ethnicity, employment status, metropolitan status, region and education.
b. 2014–2015 unweighted sample = 159,596.
c. 2018–2019 unweighted sample = 133,865.
d. 2022–2023 unweighted sample = 111,412.
e. *P*-values come from linear contrasts.
f. Percent change = (new value – old value) / old value x 100%.
g. No significant linear trend for ages 45–54 (p = 0.12); evidence of quadratic trend (p = 0.03).
h. NH is used as an abbreviation for non-Hispanic.
i. Metropolitan Status defined by Census Metropolitan Statistical Areas (MSAs); those without identified metropolitan status were excluded from analytic sample.
j. Defined by U.S. Census Regions.

increase, a 3.51% a percentage point [PP] increase), Black non-Hispanic individuals (+65.69%, +0.67 PP), ages 25–34 (+66.96%, +2.29PP), Hispanic individuals (+59.14%, +0.55PP) and unemployed individuals (+58.55%, +2.02PP). All groups had a significant linear trend ($p < 0.05$) between 2014 and 2015 and 2022–2023 other than adults ages 45–54. Adults ages 45–54 were assessed for a quadratic trend between 2014 and 2015 and 2022–2023 which was significant ($p = 0.03$). Adults ages 45–54 and 55+ and those who were disabled all showed lower adjusted prevalence of e-cigarette use in 2022–2023 than in 2014–2015.

Among adults who currently used e-cigarettes in 2014–2015, 18.43% (95% CI: 16.66,20.34) were ages 18–24, 23.60% (95% CI: 22.06,25.21) were 25–34, 18.65% (95% CI: 17.37,20.01) were 35–44, 18.33% (95% CI: 17.09,19.63) were 45–54 and 20.99% (95% CI: 19.55,22.50) were ages 55 and older (Table 2). By 2022–2023 this distribution had changed markedly: 30.98% (95% CI: 28.54,33.53) of adults who reported current e-cigarette use were ages 18–24, 32.41% (95% CI: 30.32,34.58) were ages 25–34, 17.17% (95% CI: 15.66,18.80) were ages 35–44, 9.40% (95% CI: 8.16,10.81) were ages 45–54 and 10.04% (95% CI: 8.90,11.30) were ages 55 or older.

In 2014–2015, 8.40% of adults who reported current e-cigarette use had not used 100 cigarettes in their lifetime and were not asked about use of e-cigarettes to quit cigarettes, which increased to 34.14% in 2022–2023. In 2014–2015, 70.68% indicated they were using e-cigarettes to quit cigarettes, which decreased to 44.46% in 2022–2023.

In 2014–2015, 8.26% (95% CI: 7.07,9.62) of adults who reported current e-cigarette use indicated they had never smoked cigarettes; this increased to 34.06% (95% CI: 31.69,36.50) by 2022–2023 (+312.35%, +25.80PP). Concurrent use of e-cigarettes and cigarettes, sometimes referred to as dual use, decreased from 65.58% (95% CI: 63.57,67.54) in 2014–2015 to 25.14% in 2022–2023 (95% CI: 23.30,27.07; −61.67%, −40.44PP). Former cigarette use among adults who reported current e-cigarette use increased from 26.16% (95% CI: 24.52,27.86) in 2014–2015 to 40.81% (95% CI: 38.60,43.05) in 2022–2023 (+56.00%, +14.65PP).

Finally, we examined the distribution of cigarette smoking status among adults who reported current e-cigarette use, by age group, sex, and race and ethnicity. Due to small sample sizes in the 45–54 and 55+ age groups, these groups were combined for reporting of cigarette smoking status by age to ensure data met presentation standards (National Cancer Institute, 2026c). Among adults ages 18–24 who reported current e-cigarette use, 25.11% (95% CI: 19.97,31.06) indicated in 2014–2015 they had never smoked cigarettes, compared to 67.63% (95% CI: 63.04,71.91) in 2022–2023 (+169.33%, +42.52PP). Among adults ages 25–34, there was a similar pattern: 9.25% (95% CI: 7.11,11.94) of those who reported current e-cigarette use reported in 2014–2015 they had never smoked cigarettes, compared to 30.24% (95% CI: 26.77,33.96) in 2022–2023 (+226.92%, +20.99PP). There were increases in never cigarette smoking among adults who reported current e-cigarette use for all other age groups as well as a similar percent relative increase (>150%), but the absolute percentages were considerably lower than those seen in younger groups. When assessing former cigarette smoking among adults who currently use e-cigarettes, those ages 18–24 were the only group that stayed relatively stable (2014–2015: 20.48%, 95% CI: 15.75,26.18 and 2022–2023: 18.06%, 95% CI: 14.59,22.14) between 2014 and 2015 and 2023–2023; all older age groups experienced increases. Concurrent use of e-cigarettes and cigarettes declined across all age groups. Patterns were similar across sex, and race and ethnicity.

4. Discussion

Overall, e-cigarette use increased among U.S. adults between 2014 and 2015 and 2022–2023; increases were particularly concentrated among younger, non-Hispanic Black, Hispanic, and unemployed adults which aligns with other research (U.S. Department of Health and Human Services, 2024; Vahratian et al., 2025). All groups except for those ages 45–54 showed a significant linear trend between 2014 and 2015 and 2022–2023; those ages 45–54 showed a significant quadratic trend in this time period. Additionally, between 2014 and 2015 and 2022–2023, study findings indicate younger adults were increasingly disproportionately using e-cigarettes. Male adults had higher e-cigarette use prevalence than female adults at all three timepoints, although both sex groups significantly increased from 2014 to 2015 to 2022–2023. Furthermore, adults who report current e-cigarette use are disproportionately younger (ages 18–24 or 25–34) than the average U.S. population distribution; according to 2023 Census estimates (U.S. Census Bureau. Vintage, 2023), 11.66% of all U.S. adults were ages 18–24, 17.38% were ages 25–34, 16.94% were ages 35–44, 15.45% were ages 45–54 and 38.58% were ages 55 and older. Increases in young adult use may reflect continued use among the aging cohort of youth who were in high school during the youth vaping epidemic that peaked in 2019, although it is not possible to know from these data when adults ages 18–24 in the 2022–2023 TUS-CPS began vaping. Certain other population groups have experienced increases in current e-cigarette use that may be explained by additional factors. For example, recent studies have shown that e-cigarettes continue to include stronger concentrations of nicotine and proportionally lower prices, resulting in increased affordability (Ali et al., 2025; Diaz et al., 2025). Additionally, targeted marketing by the tobacco industry (Do et al., 2024; Grilo et al., 2021; National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health, 2016) including on social media (National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health, 2016) could explain increases in reported current use by these groups (Ali et al., 2025; Diaz et al., 2025).

Compared across time, more adults who currently use e-cigarettes report former or never cigarette smoking than previously, suggesting that a growing proportion of adults who never used cigarettes are currently using e-cigarettes. Additionally, whereas nearly 2 in 3 adults who used e-cigarettes also smoked cigarettes in 2014–2015, this declined to 1 in 4 by 2022–2023. Taken together, these findings illustrate that, compared to previously, more adults who currently use e-cigarettes are former or never cigarette smokers, and there is less concurrent use of both e-cigarettes and cigarettes.

This study identifies trends with differing public health implications. First, increases in current e-cigarette use among adults who report never use of cigarettes, particularly young adults, represent a concerning trend. No tobacco product is safe (United States Food and Drug Administration, 2026a), and nicotine adversely harms brain development through about age 25 (National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health, 2016). Conversely, the reductions observed in concurrent use of e-cigarettes and cigarettes represent an encouraging trend, as dual use is associated with increased negative health outcomes (Mohapatra et al., 2025) and toxicant exposure (Xue et al., 2025). Increases in the proportion of adults who currently use e-cigarettes reporting former cigarette use are also encouraging if these adults are using e-cigarettes to transition completely away from cigarette smoking.

No e-cigarettes have been approved by the Food and Drug Administration for smoking cessation purposes and e-cigarette use is not risk-free. As of May 2026, FDA has authorized 45 e-cigarettes to be marketed (United States Food and Drug Administration, 2026b), based on their assessment of those products' risks and benefits for people who use tobacco products and who do not use tobacco products. Adults who smoke may reduce their exposure to many harmful chemicals if they use authorized e-cigarettes as a complete substitute for all cigarettes and other burned tobacco products (Lindson et al., 2025; U.S. Food and Drug Administration, 2026). If e-cigarettes are used as a partial substitute for some cigarettes, however, they may prolong harm. A recent meta-analysis and systematic review (Chang et al., 2021) concluded that reducing the number of cigarettes consumed to fewer than 10 per day does not significantly change all-cause-mortality, all-cancer risk, and smoking-related cancer risk, despite some reductions in lung cancer and

Table 2
Characteristics of Individuals who Currently Use E-Cigarettes in the U.S., TUS-CPS 2014–2023.

	2014–2015 Unweighted Sample = 3698 Weighted Sample = 1,838,104		**2018–2019** Unweighted Sample = 2697 Weighted Sample = 1,865,057		**2022–2023** Unweighted Sample = 2804 Weighted Sample = 2,524,262		**Chi-square[a]**	**Percent Change from 2014 to 2015 to 2022–2023[b]**
	Unweighted n	Weighted %, 95% CI	Unweighted n	Weighted %, 95% CI	Unweighted n	Weighted %, 95% CI		
Age Group								
18–24	390	18.43 (16.66, 20.34)	451	27.50 (25.13, 30.00)	536	30.98 (28.54, 33.53)	F = 44.96, p < 0.01	68.10%
25–34	843	23.60 (22.06, 25.21)	747	27.85 (25.79, 30.01)	958	32.41 (30.32, 34.58)		37.33%
35–44	765	18.65 (17.37, 20.01)	508	16.22 (14.45, 18.16)	597	17.17 (15.66, 18.80)		−7.94%
45–54	715	18.33 (17.09, 19.63)	397	12.27 (10.88, 13.80)	312	9.40 (8.16, 10.81)		−48.72%
55+	985	20.99 (19.55, 22.50)	594	16.16 (14.70, 17.74)	401	10.04 (8.90, 11.30)		−52.17%
Use of E-Cigarettes to Quit Cigarettes ("Do you use e-cigarettes to help you quit smoking cigarettes?")								
Not Applicable (have not smoked 100 cigarettes in lifetime, were not asked)	239	8.40 (7.19, 9.79)	437	23.09 (20.80, 25.55)	735	34.14 (31.77, 36.60)		306.43%
Yes	2615	70.68 (68.47, 72.80)	1690	57.47 (54.76, 60.13)	1427	44.46 (42.04, 46.92)	F = 81.29, p < 0.01	−37.10%
No	771	20.92 (19.10, 22.86)	562	19.44 (17.58, 21.45)	634	21.39 (19.65, 23.24)		2.25%
Cigarette Use Status[d]								
Never Cigarette Use	239	8.26 (7.07, 9.62)	437	23.03 (20.75, 25.49)	735	34.06 (31.69, 36.50)		312.35%
Current Cigarette Use	2484	65.58 (63.57, 67.54)	1138	39.14 (36.87, 41.45)	781	25.14 (23.30, 27.07)	F = 157.80, p < 0.01	−61.67%
Former Cigarette Use	975	26.16 (24.52, 27.86)	1122	37.83 (35.62, 40.09)	1288	40.81 (38.60, 43.05)		56.00%
Cigarette Use Status By Age Among Adults Who Reported Current E-Cigarette Use								
18–24	Unweighted n	Weighted %, 95% CI	Unweighted n	Weighted %, 95% CI	Unweighted n	Weighted %, 95% CI		
Never Cigarette Use	100	25.11 (19.97, 31.06)	219	53.16 (46.58, 59.63)	339	67.63 (63.04, 71.91)		169.33%
Current Cigarette Use	215	54.41 (47.92, 60.76)	126	25.35 (20.38, 31.06)	84	14.31 (11.10, 18.26)	F = 27.02, p < 0.01	−73.70%
Former Cigarette Use	75	20.48 (15.75, 26.18)	106	21.49 (16.87, 26.97)	113	18.06 (14.59, 22.14)		−11.82%
25–34								
Never Cigarette Use	78	9.25 (7.11, 11.94)	135	19.74 (16.73, 23.14)	280	30.24 (26.77, 33.96)		226.92%
Current Cigarette Use	547	64.42 (60.22, 68.41)	283	40.09 (36.24, 44.07)	209	22.20 (19.10, 25.64)	F = 52.88, p < 0.01	−65.54%
Former Cigarette Use	218	26.33 (22.93, 30.04)	329	40.17 (36.06, 44.42)	469	47.56 (43.58, 51.57)		80.63%
35–44								
Never Cigarette Use	31	4.03 (2.63, 6.15)	38	9.07 (6.36, 12.78)	69	11.61 (8.67, 15.39)		188.09%
Current Cigarette Use	512	65.50 (61.65, 69.16)	224	42.43 (37.30, 47.73)	198	32.08 (27.88, 36.59)	F = 27.20, p < 0.01	−51.02%
Former Cigarette Use	222	30.47 (26.94, 34.24)	246	48.50 (43.06, 53.96)	330	56.31 (51.34, 61.15)		84.80%
45 + [e]								
Never Cigarette Use	30	1.77 (1.15, 2.71)	45	5.08 (3.67, 7.01)	47	6.72 (4.62, 9.67)		279.66%
Current Cigarette Use	1210	71.56 (69.12, 73.88)	505	49.66 (45.62, 53.71)	290	41.17 (36.80, 45.68)	F = 44.03, p < 0.01	−42.47%
Former Cigarette Use	460	26.68 (24.47, 29.01)	441	45.26 (41.42, 49.15)	376	52.11 (47.60, 56.59)		95.31%
Cigarette Use Status By Sex Among Adults Who Reported Current E-Cigarette Use								
Male								
Never Cigarette Use	141	10.59 (8.81, 12.69)	258	23.47 (20.39, 26.85)	383	30.91 (27.70, 34.31)		191.88%
Current Cigarette Use	1111	60.25 (57.55, 62.90)	606	38.21 (35.06, 41.47)	425	26.94 (24.52, 29.50)	F = 68.87, p < 0.01	−55.29%
Former Cigarette Use	523	29.15 (26.95, 31.45)	638	38.32 (35.30, 41.43)	704	42.15 (39.00, 45.37)		44.60%
Female								
Never Cigarette Use	98	5.58 (4.38, 7.09)	179	22.40 (19.03, 26.18)	352	38.04 (34.40, 41.82)		581.72%
Current Cigarette Use	1373	71.69 (69.09, 74.15)	532	40.48 (37.37, 43.67)	356	22.86 (20.23, 25.72)	F = 118.51, p < 0.01	−68.11%

(*continued on next page*)

Table 2 (*continued*)

	2014–2015 Unweighted Sample = 3698 Weighted Sample = 1,838,104		2018–2019 Unweighted Sample = 2697 Weighted Sample = 1,865,057		2022–2023 Unweighted Sample = 2804 Weighted Sample = 2,524,262		Chi-square[a]	Percent Change from 2014 to 2015 to 2022–2023[b]
	Unweighted n	Weighted %, 95% CI	Unweighted n	Weighted %, 95% CI	Unweighted n	Weighted %, 95% CI		
Former Cigarette Use	452	22.73 (20.57, 25.05)	484	37.12 (34.05, 40.29)	584	39.11 (35.68, 42.64)		72.06%
Cigarette Use Status By Race and Ethnicity Among Adults Who Reported Current E-Cigarette Use								
White, NH[f]								
Never Cigarette Use	162	6.53 (5.35, 7.94)	315	20.82 (18.30, 23.59)	504	31.01 (28.47, 33.68)		374.89%
Current Cigarette Use	2087	66.45 (64.34, 68.49)	933	38.77 (36.33, 41.27)	600	25.27 (23.29, 27.35)	$F = 172.67$, $p < 0.01$	−61.97%
Former Cigarette Use	827	27.02 (25.24, 28.88)	966	40.41 (37.92, 42.94)	1042	43.72 (41.23, 46.24)		61.81%
Black, NH[f]								
Never Cigarette Use	–	–	–	–	63	51.57 (42.18, 60.23)		n/a
Current Cigarette Use	140	65.01 (56.70, 72.49)	51	42.97 (32.12, 54.54)	48	25.78 (18.62, 34.52)	$F = 12.09$, $p < 0.01$	−60.34%
Former Cigarette Use	39	22.23 (15.80, 30.35)	35	29.57 (20.69, 40.31)	43	22.65 (16.14, 30.83)		1.89%
Hispanic								
Never Cigarette Use	36	19.83 (13.88, 27.53)	62	35.12 (27.59, 43.46)	100	38.16 (30.36, 46.63)		92.44%
Current Cigarette Use	124	54.96 (46.85, 62.82)	82	39.77 (31.58, 48.57)	71	25.17 (19.00, 32.53)	$F = 7.88$, $p < 0.01$	−54.20%
Former Cigarette Use	55	25.20 (19.50, 31.92)	60	25.11 (18.94, 32.49)	105	36.67 (29.79, 44.14)		45.52%
Other, NH[f]								
Never Cigarette Use	–	–	35	24.82 (17.27, 34.30)	68	36.94 (28.38, 46.41)		n/a
Current Cigarette Use	133	68.60 (60.55, 75.66)	72	39.05 (30.49, 48.35)	62	23.50 (16.65, 32.08)	$F = 13.80$, $p < 0.01$	−65.74%
Former Cigarette Use	54	20.97 (15.46, 27.79)	61	36.13 (28.08, 45.04)	98	39.56 (31.76, 47.94)		88.65%

Table Notes:

[a] P-values from Chi-Square.

[b] Percent change = (new value – old value) / old value x 100%.

[c] Flavored e-cigarette use ("When you use an e-cigarette is it usually flavored?") was asked in 2014–2015 and 2018–2019 but not in 2022–2023.

[d] Cigarette use status was derived from: "Have you smoked at least 100 cigarettes in your entire life?" and "Do you now smoke cigarettes every day, some days, or not at all?" Current cigarette smoking was defined as smoking 100 or more cigarettes in lifetime and currently smoking every day or some days; former cigarette smoking was defined as smoking 100 or more cigarettes in lifetime and not at all for current smoking; never smokers were defined as smoking less than 100 cigarettes in lifetime.

[e] Due to small sample sizes in the 45–54 and 55+ age groups, these two were combined into one 45+ group for reporting cigarette smoking status by age to ensure data met presentation standards.

[f] NH is used as an abbreviation for non-Hispanic.

[g] – indicates that cell needed to be suppressed due to guidelines, sample size <30 or relative standard error (RSE) >30%.

cardiovascular disease risk. Our finding that dual use of e-cigarettes and cigarettes is prominent, but decreasing, suggest that continued interventions to support complete cessation of all cigarette smoking are warranted.

This study is subject to limitations. First, this study did not assess concurrent use of e-cigarettes with other non-cigarette tobacco products (e.g., cigar products, hookah, smokeless tobacco, nicotine pouches). Next, numerous potential factors including COVID-19; local, state, and federal policy interventions; industry marketing tactics; and media campaigns likely influenced behaviors but were not assessed in this study. Additionally, repeated cross-sectional surveys such as TUS-CPS cannot be used to assess the temporality of product use, which makes assessments of cigarette use status among adults who report current e-cigarette use more complex to evaluate. Given that the long-term health consequences of e-cigarettes are unknown, complete cessation of all tobacco products, including e-cigarettes, will reduce health risks. This study's notable strengths include the use of predicted marginals, which are more precise than direct adjustment as they account for multiple covariates simultaneously. An additional strength is this study's assessment of trends over time in a large, nationally-representative, repeated cross-sectional survey.

5. Conclusions

Between 2014 and 2015 and 2022–2023, e-cigarette use increased among U.S. adults, with marked increases in certain groups stratified by demographic characteristics. In 2022–2023, adults who reported current e-cigarette use were disproportionately young and more likely to report never or former cigarette smoking compared to 2014–2015. Longitudinal studies on the trajectories of different groups of U.S. adults using e-cigarettes are warranted to help inform strategies to prevent tobacco use across the lifespan and to support smoking and other tobacco product cessation.

Data sharing statement

All data used in this analysis came from the publicly available Tobacco Use Supplement to the Current Population Survey (TUS-CPS). More information can be found at the National Cancer Institute website: https://cancercontrol.cancer.gov/brp/tcrb/tus-cps.

CRediT authorship contribution statement

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original draft, Software, Formal analysis, Conceptualization. **Jamie Cordova:** Writing – review & editing, Writing – original draft, Validation, Software, Conceptualization. **Margaret Mahoney:** Writing – review & editing, Writing – original draft, Conceptualization. **Kristy Marynak:** Writing – review & editing, Writing – original draft, Conceptualization. **Jeremy Morton:** Writing – review & editing, Writing – original draft, Conceptualization.

Disclaimer

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