

Table 1
Participant Characteristics at Each Wave^a

Characteristic	Wave 2 (2006)	Wave 3 (2008)	Wave 4 (2010)	Wave 5 (2012)	Wave 6 (2014)
Participants, No. (%)	4464 (90)	4332 (88)	4169 (84)	3956 (79)	3537 (71)
Age, mean (SD), y	6.3 (0.5)	8.3 (0.4)	10.3 (0.8)	12.4 (0.5)	14.4 (0.5)
Male sex, No. (%)	2,276 (51)	2,212 (51)	2,132 (51)	2,020 (51)	1,798 (51)
BMI, No. (%)					
Underweight	224 (5)	233 (5)	235 (6)	260 (7)	207 (6)
Normal weight	3,373 (76)	3,044 (71)	2,720 (68)	2,549 (67)	2,194 (67)
Overweight	826 (19)	1012 (24)	1063 (26)	994 (26)	875 (27)
Has current asthma, No. (%)	721 (16)	713 (16)	681 (16)	624 (16)	500 (14)
Time spent in MVPA, median (IQR)	165 (75–300)	165 (90–300)	115 (65–187)	95 (47–164)	85 (35–150)

Abbreviations: BMI, body mass index; IQR, interquartile range; MVPA, moderate to vigorous physical activity.

^aLinear regression model adjusted for sex, socioeconomic status z score, and categorical BMI.

In summary, there was no evidence that children and adolescents with suspected asthma at the ages of 6, 8, 10, 12, and 14 years spent less time in MVPA. Combinations of high BMI and suspected asthma, SES z score and suspected asthma, or sex and suspected asthma did not appear to be detrimental for PA participation. These results suggest that children with suspected asthma across different age groups do not require more extensive targeting to promote PA because there is no evidence they are less active than their peers.

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Patterns of electronic cigarette use in youth with asthma: Results from a nationally representative sample



The prevalence of electronic cigarette (EC) use among youth in the United States is rising, with an estimated 4.3% of middle and 11.3% of high school students reporting EC use in 2016.¹ Harm perception and family tobacco use could be contributing factors.² Approximately 1 in 3 middle and high school students in the United States believe EC use is less harmful than cigarettes, regardless of smoking status.² Adolescents who currently use ECs or have a family member who uses tobacco products are more likely to endorse ECs as less harmful than cigarettes.^{2,3}

Youth diagnosed with asthma demonstrate increased cigarette smoking compared with healthy peers, but little is known about EC use patterns.⁴ Better understanding of EC use in youth with asthma is critical given their susceptibility to poor pulmonary outcomes associated with ECs.^{2,5–7} Only 3 studies using regional

samples have investigated EC use in this population, finding higher EC use rates among youth with asthma compared with peers, especially those living in nonmetropolitan and rural areas.⁶ EC use in youth with asthma also has been associated with increased odds of cigarette use, experiencing asthma attacks and worse asthma severity.^{5,6,8} With the increase in the prevalence of EC use among adolescents including those with asthma, it is important to identify the prevalence of and contributing factors for EC use in this population at a national level. The present study is the first to use a nationally representative sample to examine the prevalence, age at initiation, and lifetime use of EC in adolescents with asthma.

The present study included wave 1 data from the Population Assessment of Tobacco and Health (PATH) study, a longitudinal survey assessing the use of tobacco products in a nationally representative cohort (described elsewhere).⁹ Data for this report were analyzed in 2017 and limited analyses to youth 12 to 17 years old (N = 13,650). The PATH included questions about EC use, asthma-related vari-

ables (eg, diagnosis, asthma attacks), and harm perceptions regarding EC. Youth who endorsed EC use were categorized as current users (use within the past 30 days) or ever users. Youth who did not endorse using ECs were excluded ($n = 11,166$). Asthma status was determined if youth endorsed being previously diagnosed with asthma by a health professional.

We performed statistical analyses using SAS 9.4 (SAS Institute, Cary, North Carolina), calculating weighted proportions and Wilson confidence intervals (CIs) for categorical variables and means and SEs for continuous variables. The χ^2 tests determined statistical significance between asthma status groups. The local institutional review board determined this study exempt.

The sample included 1,859 youth, with 19% ($n = 353$) reporting an asthma diagnosis. Demographic characteristics for the total sample are described elsewhere.⁹ Importantly, EC use was similar for youth with and without asthma, with 11% reporting ever use and 3% reporting current use. EC use did not differ by demographic variables (ie, age, sex, race and ethnicity, education level) for youth with or without asthma. Youth who were older, male, or white or Hispanic reported higher rates of ever and current EC use compared with peers, regardless of asthma status. Among current users, individuals with asthma were more likely to own an EC than youth without asthma ($P = .035$). Parent ownership of ECs was similar for youth with and without asthma (Table 1).

Table 1
Characteristics of Ever and Current EC Users Among Adolescents With Asthma vs Without Asthma[†]

	Ever user ($n = 1,443$)			Current user ($n = 416$)		
	Asthma ($n = 274$), % (95% CI)	No asthma ($n = 1,169$), % (95% CI)	<i>P</i> value	Asthma ($n = 79$), % (95% CI)	No asthma ($n = 337$), % (95% CI)	<i>P</i> value
Age at initiation ^{i,p}			.885			.724
< 15 y	37.2 (31.4–43.4)	36.7 (33.9–39.5)		31.2 (22.1–42.1)	29.2 (24.5–34.4)	
15–17 y	62.8 (56.6–68.6)	63.3 (60.5–66.1)		68.8 (57.9–77.9)	70.8 (65.6–75.5)	
EC use in past 30 d (days) ^q	N/A	N/A		6.5 ± 0.9	5.8 ± 0.5	.432
ECs or cartridges used in entire life (n) ^{c,h,o}			.229			.189
< 1	55.1 (48.6–61.4)	49.6 (46.2–53.0)		35.1 (25.2–46.5)	31.5 (26.0–37.4)	
1	15.9 (11.7–21.2)	20.3 (17.6–23.4)		21.7 (14.0–32.0)	19.2 (15.0–24.1)	
2–10	19.9 (15.5–25.2)	22.5 (19.7–25.5)		23.1 (15.0–33.8)	35.1 (29.3–41.4)	
≥ 11	9.1 (6.1–13.3)	7.6 (6.2–9.4)		20.1 (12.8–30.2)	14.3 (10.8–18.6)	
Own an EC ^{b,n}			.233			.035
Yes	14.2 (10.1–19.6)	11.5 (9.8–13.5)		39.9 (29.7–51.2)	28.1 (23.5–33.2)	
No	85.8 (80.4–89.9)	88.5 (86.5–90.2)		60.1 (48.8–70.3)	71.9 (66.8–76.5)	
Parent or guardian owns an EC ^m			.928			.745
Yes	25.9 (20.5–32.2)	25.6 (22.6–28.9)		28.4 (19.2–39.9)	30.3 (25.0–36.2)	
No	74.1 (67.8–79.5)	74.4 (71.1–77.4)		71.6 (60.1–80.8)	69.7 (63.8–75.0)	
Likelihood of someone becoming addicted to ECs ^{c,e,i,q}			.019			.345
Very, somewhat, neither unlikely nor likely	68.1 (62.2–73.5)	60.0 (56.3–63.5)		72.4 (60.9–81.5)	66.0 (60.2–71.3)	
Somewhat, very likely	31.9 (26.5–37.8)	40.0 (36.5–43.7)		27.6 (18.5–39.1)	34.0 (28.7–39.8)	
Level of harmfulness of using ECs vs smoking cigarettes ^{c,g,k,r}			.948			.846
Less harmful	75.8 (69.3–81.2)	76.0 (72.9–78.8)		83.9 (73.8–90.6)	84.8 (80.5–88.3)	
About the same or more harmful	24.2 (18.8–30.7)	24.0 (21.2–27.1)		16.1 (9.4–26.2)	15.2 (11.7–19.5)	
Use ECs because they might be less harmful to me than cigarettes ^{d,g}						.175
Yes	N/A	N/A		74.4 (63.7–82.8)	80.6 (76.0–84.5)	
No	N/A	N/A		25.6 (17.2–36.3)	19.4 (15.5–24.0)	
Use ECs because they might be less harmful to people around me than cigarettes ^{d,g}						.157
Yes	N/A	N/A		73.1 (62.4–81.7)	79.0 (74.3–83.0)	
No	N/A	N/A		26.9 (18.3–37.6)	21.0 (17.0–25.7)	
Thoughts on how much people harm themselves when they use ECs ^{a,f,l,r}			.972			.716
No harm	21.6 (16.8–27.3)	21.1 (18.9–23.6)		28.5 (19.3–39.9)	28.3 (23.4–33.8)	
Little harm	46.9 (40.5–53.4)	46.5 (43.5–49.6)		47.3 (36.6–58.3)	51.4 (45.1–57.6)	
Some harm, a lot of harm	31.6 (25.9–37.8)	32.3 (29.4–35.4)		24.2 (15.3–36.1)	20.3 (16.3–24.9)	

Abbreviations: CI, confidence interval; EC, electronic cigarette; N/A, not applicable.

^aCurrent user, no asthma ($n = 333$).

^bCurrent user, no asthma ($n = 334$).

^cCurrent user, no asthma ($n = 335$).

^dCurrent user, no asthma ($n = 336$).

^eCurrent user, asthma ($n = 76$).

^fCurrent user, asthma ($n = 77$).

^gCurrent user, asthma ($n = 78$).

^hEver user, no asthma ($n = 1,147$).

ⁱEver user, no asthma ($n = 1,150$).

^jEver user, no asthma ($n = 1,151$).

^kEver user, no asthma ($n = 1,152$).

^lEver user, no asthma ($n = 1,160$).

^mEver user, no asthma ($n = 1,163$).

ⁿEver user, no asthma ($n = 1,165$).

^oEver user, asthma ($n = 266$).

^pEver user, asthma ($n = 267$).

^qEver user, asthma ($n = 268$).

^rEver user, asthma ($n = 269$).

^sCurrent user ($n = 411$).

[†]Those with missing values for EC use and asthma diagnosis were excluded.

For harm perception, ever users with asthma (95% CI 26.5–37.8) were less likely to believe that someone could become addicted to ECs compared with youth without asthma (95% CI 36.5–43.7, $P = .019$; Table 1). Most youth across groups reported that ECs were less harmful than cigarettes (75.8%–84.8%). Among all current users, most endorsed EC use because they perceived ECs as less harmful to themselves (74.4%–80.6%) and others around them (73.1%–79.0%) compared with cigarettes. Most youth across groups reported that EC use poses “little harm” to the consumer (46.5%–51.4%).

The present study characterized the prevalence of and factors contributing to EC use in adolescents with asthma. This is the first study to use a nationally representative sample and examine beliefs and perceptions of EC in youth with asthma. Despite being at risk for more adverse pulmonary outcomes of EC use, youth with asthma use at similar rates as healthy peers. Although this finding contradicts previous literature, which found that youth with asthma are more likely to use ECs than healthy peers,^{5,6} it remains worrisome that youth with asthma have such high rates of use. This discrepancy might be due to differences in geographic sampling, with previous studies using regional rather than national samples. Similar to peers, youth with asthma are more likely to initiate EC use in later adolescence and endorse use if older, male, or white or Hispanic. Interestingly, current EC users with asthma were more likely to own an EC compared with peers but endorsed similar rates of parent EC ownership.

Harm perceptions in the 2 groups are a potential source for educational interventions. Although youth with and without asthma reported similar harm perceptions related to EC, adolescents with asthma were less likely to endorse the likelihood of addiction related to ECs. Youth in the 2 groups perceived ECs as less harmful to themselves and others, despite limited literature describing the short- and long-term risks of EC use. These perceptions could contribute to youth with asthma deciding to use ECs despite their increased risk for adverse pulmonary outcomes.

Health professionals should assess for EC use in adolescents with asthma and provide education on the addictive potential of ECs and its impact on pulmonary functioning. Future research should investigate asthma-related morbidity outcomes associated with EC use and additional contributory factors to EC use in youth with asthma (eg, peer use). Examining pulmonary outcomes related to exposure to parental EC use in youth with asthma is needed. Study limitations include the cross-sectional design, not examining EC use in combination with other tobacco products, and not examining associations with asthma-related variables because of the small

number of participants with asthma. Despite these limitations, this study provides a foundation for understanding the expanding patterns of EC use in youth with asthma based on a nationally representative sample.

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Mannose-binding lectin deficiency associated with numerous paraspinal neurofibromas



Mannose-binding lectin (MBL) is a protein found in plasma that is part of the innate immune system and can activate the complement cascade.¹ It is typically involved with antimicrobial and proinflammatory functions.²

Genetic variants of MBL are common in the human population and are present in up to 40%. These individuals are typically heterozygotic and occasionally can yield decreased levels of MBL in serum and have an increased risk of infection and tumors, especially in those with other immunologic deficits.^{1,3}

An association has been reported between MBL deficiency and solid ovarian and spindle cell tumors and possibly increased rates

of stomach cancers.^{4–6} There has not been an association with paraspinal tumors.

We present the case of a 36-year-old woman with MBL deficiency and multiple paraspinal neurofibromas. The patient reported back pain after a motor vehicle accident and magnetic resonance imaging displayed numerous paraspinal tumors that initially appeared to be schwannomas. Histopathology yielded a diagnosis of neurofibromas. Genetic test results for mutations or deletion of the NF1 and NF2 genes were negative. The patient underwent surgery in 2005 and 2006 to remove the largest masses. Annual lumbar magnetic resonance images showed that many of these surgically removed masses recurred and new tumors developed.

After several years of experiencing multiple upper respiratory infections (1 infection per month), the patient was evaluated for