Sexual and Gender Minority U.S. Youth Tobacco Use: Population Assessment of Tobacco and Health (PATH) Study Wave 3, 2015−2016

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Introduction: Tobacco use disparities by sexual identity are well characterized among adults, but relatively less is known about tobacco use disparies in sexual minority youth. Moreover, no national study has reported tobacco use behaviors among gender minority (e.g., transgender) youth.

Methods: Data from Wave 3 (2015−2016) of the Population Assessment of Health Study from youth aged 14−17 years (*n*=7,772), analyzed in 2018, were stratified by transgender identity, sex, and sexual identity to describe tobacco product use.

Results: Transgender youth (*n*=79) were more likely to report ever use of tobacco products compared with nontransgender youth (electronic nicotine products, 40.2% vs 23.0%; cigarettes, 33.9% vs 14.1%; and smokeless tobacco, 21.5% vs 6.0%, respectively) and more likely to report past 30-day use of these products. Similarly, female sexual minority youth, compared with straight female youth, were more likely to report ever use of electronic nicotine products (37.9% vs 20.1%); cigarettes (28.9% vs 12.0%); cigars (11.3% vs 5.2%); hookah (12.7% vs 7.6%); and past 30-day use of electronic nicotine products, cigarettes, and cigars. Among male youth, sexual minority youth were more likely to report ever use of cigarettes compared with straight youth (25.1% vs 13.5%), but they did not differ in ever or past 30-day use of any other tobacco products.

Conclusions: Sexual minority youth and transgender youth are more likely to use tobacco products compared with their nonminority peers. Similar to patterns among adults, this is especially true for female sexual minority youth. This information is useful for developing communication and education efforts to prevent youth tobacco initiation in these high-risk groups.
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INTRODUCTION

Sexual and gender minority (SGM) youth face a number of health disparities[1−6] relative to their straight peers; these disparities are related to, among other things, the increased stress associated with bearing these minority identities.[7,8] Compared with their straight counterparts, sexual minority youth (SMY; e.g., gay, lesbian, bisexual) are at a higher risk of tobacco product use, are more likely to start smoking earlier, and smoke more frequently.[5,6,9−12] Patterns of tobacco use, however, are heterogeneous among sexual minority individuals, including notable sex differences wherein female sexual minorities exhibit particularly high risk of tobacco use.[13−19] Whereas tobacco use among SMY is known, no national study has reported tobacco use behaviors among gender minority (e.g., transgender) youth. This study is the first to use a nationally representative sample to characterize tobacco use behaviors across multiple product types and among both sexual and gender minority youth. This study aims to describe a sample of adolescents (aged

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14−17 years) stratified by transgender identity, sex, and sexual identity, in terms of measures of multiple forms of tobacco use, including ever use, past 30-day use, frequency, and age at first use.

METHODS

The Population Assessment of Tobacco and Health (PATH) Study is an ongoing, nationally representative, longitudinal cohort study of U.S. adults and youth (aged 12−17 years) that uses a stratified, address-based, area-probability sampling design. Data were collected in the household using audio computer−assisted self-interviews. This analysis included data from youth aged 14−17 years (*n*=7,772) collected in Wave 3 (October 2015−October 2016; overall weighted response rate, 83.3%) and analyzed in 2018. Youth aged <14 years were not asked SGM questions. The study was approved by Westat's IRB. Details regarding the PATH Study design and methods are published elsewhere,[20] and additional information is available at https://doi.org/10.3886/Series606.

Participants were given a brief description of transgender identity and asked: *Do you consider yourself to be transgender?* The responses were *yes* or *no*. Participants responding *yes* were coded as transgender. Sexual identity was assessed by asking: *Do you consider yourself to be. . .?* Response options were *straight, lesbian/ gay, bisexual,* or *something else*. Responses other than *straight* were categorized as sexual minorities. At the Wave they entered the study, participants were asked to identify their sex (*male* or *female*). Tobacco use behaviors were assessed for electronic nicotine product (ENPs), cigarettes, cigars, hookah, and smokeless tobacco products.

The distribution of youth reporting transgender identity, sexual identity, and sexual attraction was assessed overall and for sexual identity and attraction by sex. Patterns of use, including ever use, past 30-day use, age at first use, and frequency of use were examined by product and stratified by SGM constructs and by sex. Analyses were conducted using SAS, version 9.4, and SUDAAN, version 11.0. As recommended,[21] analyses used Wave 3 cross-sectional balanced repeated replicate weights (with Fay's adjustment of 0.3) to represent the U.S. youth; weights accounted for the sampling design and nonresponse bias. Of the 7,772 youth aged 14−17 years at

Table 1. Transgender Identity, Sexual Identity, and Sexual Attraction Among Youth Aged 14−17 Years Overall and by Sex, Wave 3 of the PATH Study (2015−2016)

Variable	N	Overall, % (95% CI) (*n*=7,772)	Female, % (95% CI) (*n*=3,753)	Male, % (95% CI) (*n*=3,997)
Transgender[a]	**7,708**	—	—	—
No	7,629	99.0 (98.7, 99.2)	—	—
Yes	79	1.1 (0.8, 1.3)	—	—
Female to male	19	22.7 (13.3, 35.9)	—	—
Male to female	9	12.7 (6.7, 22.9)	—	—
Gender nonconforming	25	37.7 (27.4, 49.3)	—	—
No	14	13.6 (8.0, 22.2)	—	—
Not sure/Don't know	12	13.3 (7.2, 23.1)	—	—
Sexual identity[b]	**7,646**	—	—	—
Straight	6,850	89.5 (88.6, 90.2)	84.0 (82.8, 85.2)	94.6 (93.6, 95.4)
Gay/Lesbian	116	1.6 (1.3, 1.9)	1.9 (1.4, 2.5)	1.3 (0.9, 1.8)
Bisexual	468	6.1 (5.6, 6.7)	9.8 (8.9, 10.8)	2.7 (2.2, 3.3)
Something else	212	2.9 (2.4, 3.3)	4.3 (3.5, 5.1)	1.5 (1.2, 2.0)
Sexual attraction[c]	**7,612**	—	—	—
Opposite sex only	5,770	75.5 (74.4, 76.6)	64.8 (63.0, 66.5)	85.6 (84.3, 86.8)
Mostly opposite sex	708	9.3 (8.6, 10.1)	13.8 (12.6, 15.0)	5.1 (4.5, 5.9)
Equally	381	5.0 (4.5, 5.5)	8.2 (7.4, 9.1)	2.0 (1.6, 2.6)
Mostly same sex	103	1.4 (1.2, 1.8)	2.0 (1.5, 2.6)	0.9 (0.7, 1.3)
Only same sex	85	1.2 (0.9, 1.5)	1.2 (0.9, 1.7)	1.1 (0.8, 1.6)
No attraction	565	7.6 (7.0, 8.2)	10.0 (9.0, 11.2)	5.2 (4.5, 6.1)

Source: Wave 3 of the PATH Study, 2015−2016.
Note: Participants' transgender identity was reported regardless of whether they reported their sex. Participants in sexual identity and sexual attraction subcategories were excluded if they did not report their sex.
[a]Participants were asked, *Do you consider yourself to be transgender?* Youth who responded *yes* were coded as transgender, and asked if they considered themselves *male-to-female, female-to-male,* or *gender nonconforming*. They could also respond *no* or *not sure*.
[b]Participants were asked if they considered themselves to be *straight, gay/lesbian, bisexual,* or *something else*.
[c]Participants were asked, *To whom have you felt sexually attracted, even if you did not take any action based on feeling attracted?* Response options were: *Only to females, never to males; mostly to females, and at least once to a male; about equally often to females and to males; mostly to males, and at least once to a female; only to males, never to females;* and *I have never felt sexually attracted to anyone at all*. Responses were categorized based on participant-reported sex.
PATH, Population Assessment of Health study.

Table 2. Patterns of Tobacco Product Use Among Youth Aged 14−17 Years by Transgender Identity, Sex, and Sexual Identity, Wave 3 of the PATH Study (2015−2016)

Variable	Transgender identity[a], % (95% CI) (n=7,708)		Sexual identity, % (95% CI) (n=7,646)			
			Female		Male	
	Yes (n=79)	No (n=7,629)	Sexual minority[b] (n=586)	Straight (n=3,102)	Sexual minority (n=210)	Straight (n=3,748)
Ever use of any tobacco product[c]	**53.6 (40.2, 66.5)**	**31.5 (30.2, 32.8)**	**46.9 (42.6, 51.3)**	**28.1 (26.3, 29.9)**	**41.3 (34.2, 48.7)**	**32.1 (30.5, 33.7)**
Past 30-day use >1 tobacco product[c]	**10.2 (5.2, 19.1)**	**3.5 (3.0, 4.1)**	**6.1 (4.3, 8.5)**	**2.5 (1.9, 3.2)**	6.3 (3.3, 11.7)	4.1 (3.4, 4.9)
Electronic nicotine product[d]						
Ever use	**40.2 (28.0, 53.7)**	**23.0 (21.9, 24.2)**	**37.9 (33.7, 42.2)**	**20.1 (18.4, 21.9)**	27.9 (21.9, 34.9)	23.3 (21.9, 24.8)
Age of first use,[e] mean (95% CI)	12.6 (11.0, 14.2)	13.5 (13.4, 13.6)	13.3 (12.9, 13.7)	13.7 (13.5, 13.9)	13.5 (12.7, 14.2)	13.5 (13.3, 13.7)
Past 30-day use	**17.4 (10.3, 27.7)**	**5.6 (4.9, 6.3)**	**10.4 (7.7, 13.8)**	**4.6 (3.7, 5.7)**	6.3 (3.4, 11.4)	6.0 (5.1, 7.0)
Frequency of use						
1−5 days	53.1[f] (24.7, 79.6)	60.5 (55.7, 65.0)	55.5 (39.3, 70.5)	68.8 (60.5, 76.0)	53.4[f] (20.9, 83.2)	56.7 (49.4, 63.7)
≥6 days	46.9[f] (20.4, 75.3)	39.5 (35.0, 44.3)	44.5 (29.5, 60.7)	31.2 (24.0, 39.5)	46.7[f] (16.8, 79.1)	43.3 (36.3, 50.6)
Cigarette						
Ever use	**33.9 (21.9, 48.4)**	**14.1 (13.2, 15.1)**	**28.9 (24.9, 33.2)**	**12.0 (10.7, 13.4)**	**25.1 (19.3, 32.0)**	**13.5 (12.3, 14.8)**
Age of first use,[e] mean (95% CI)	11.1 (9.8, 12.4)	12.2 (12.0, 12.3)	12.3 (11.8, 12.8)	12.4 (12.1, 12.7)	**12.6 (12.1, 13.0)**	**11.8 (11.6, 12.1)**
Past 30-day use	**17.6 (9.4, 30.4)**	**4.4 (3.9, 5.0)**	**12.1 (9.3, 15.5)**	**3.9 (3.2, 4.7)**	7.2 (4.0, 12.7)	3.8 (3.2, 4.6)
Frequency of use						
1−5 days	47.5[f] (19.8, 76.8)	51.4 (45.2, 57.6)	49.4 (35.5, 63.4)	58.9 (48.6, 68.4)	45.7[f] (20.0, 73.9)	44.5 (35.5, 53.9)
≥6 days	52.5[f] (23.2, 80.2)	48.6 (42.4, 54.8)	50.6 (36.6, 64.5)	41.1 (31.6, 51.4)	54.3[f] (26.1, 80.0)	55.5 (46.2, 64.5)
Any cigar[g]						
Ever use	16.1 (8.4, 28.7)	7.5 (6.8, 8.2)	**11.3 (8.8, 14.3)**	**5.2 (4.4, 6.1)**	13.2 (8.7, 19.7)	8.9 (7.8, 10.1)
Age of first use,[e] mean (95% CI)	12.0 (10.8, 13.1)	12.9 (12.6, 13.1)	12.8 (12.4, 13.3)	13.2 (12.8,13.5)	12.3 (11.0, 13.5)	12.8 (12.4, 13.1)
Past 30-day use	3.2 (1.0, 9.9)	1.7 (1.4, 2.0)	**3.2 (2.0, 5.0)**	**1.0 (0.7, 1.6)**	3.9 (1.8, 8.0)	2.0 (1.6, 2.6)
Frequency of use						
1−5 days	—[h]	72.64 (64.1, 79.8)	77.2[f] (42.6, 93.9)	74.1[f] (56.5, 86.3)	**93.5 (58.3, 99.3)**	**67.2 (54.9, 77.5)**
≥6 days	—[h]	27.36 (20.2, 36.0)	22.8[f] (6.1, 57.4)	25.9[f] (13.7, 43.5)	**6.5 (0.7, 41.7)**	**32.8 (22.5, 45.1)**
Hookah[i]						
Ever use	15.5 (8.3, 27.1)	7.5 (6.8, 8.2)	**12.7 (10.0, 16.0)**	**7.6 (6.5, 8.9)**	11.1 (7.0, 17.2)	6.4 (5.6, 7.3)
Age of first use,[e] mean (95% CI)	13.8 (12.5, 15.1)	13.7 (13.5, 13.8)	13.6 (13.2, 14.1)	13.8 (13.5, 14.0)	**14.0 (14.0, 14.0)**	**13.6 (13.3, 13.8)**
Past 30-day use	4.3 (1.1, 14.7)	0.9 (0.7, 1.2)	1.2 (0.6, 2.4)	0.9 (0.6, 1.4)	2.4 (0.8, 6.9)	0.9 (0.6, 1.3)
Smokeless tobacco[j]						
Ever use	**21.5 (12.1, 35.5)**	**6.0 (5.3, 6.7)**	4.0 (2.7, 6.1)	3.4 (2.8, 4.0)	8.0 (4.7, 13.4)	8.8 (7.8, 10.0)
Age of first use,[e] mean (95% CI)	12.0 (10.8, 13.2)	12.5 (12.1, 12.8)	12.5 (11.6, 13.4)	12.9 (12.3, 13.4)	12.1 (11.2, 13.1)	12.3 (11.9, 12.7)

Table 2. Patterns of Tobacco Product Use Among Youth Aged 14–17 Years by Transgender Identity, Sex, and Sexual Identity, Wave 3 of the PATH Study (2015–2016) (*continued*)

Variable	Transgender identity[a], % (95% CI) (*n*=7,708)		Sexual identity, % (95% CI) (*n*=7,646)			
			Female		Male	
	Yes (*n*=79)	No (*n*=7,629)	Sexual minority[b] (*n*=586)	Straight (*n*=3,102)	Sexual minority (*n*=210)	Straight (*n*=3,748)
Past 30-day use	**5.7 (2.9, 11.2)**	**1.6 (1.2, 2.0)**	0.5 (0.2, 1.4)	0.4 (0.2, 0.8)	2.1 (0.9, 4.9)	2.8 (2.2, 3.6)
Frequency of use, days						
1–5 days	—[h]	48.5 (40.4, 56.8)	—[h]	79.8 (44.7, 95.1)	—[h]	44.1 (35.5, 53.1)
≥6 days	—[h]	51.5 (43.2, 59.7)	—[h]	20.2 (4.9, 55.3)	—[h]	55.9 (46.9, 64.5)

Source: Wave 3 of the PATH Study, 2015–2016.

Note: Boldface indicates statistical significance (*p*<0.05) between transgender and nontransgender individuals or between sexual minority estimate and straight estimate, within sex, for each category (sexual identity; sexual attraction). Frequencies reflect unweighted data and percentage-weighted data. Significance testing for comparisons between SGM youth and their straight counterparts used weighted chi-square tests, except for analyses comparing age of first use, which used weighted linear regression.

[a]Participants were asked, *Do you consider yourself to be transgender? (yes, no).*

[b]Participants who reported a sexual identity of *lesbian/gay, bisexual,* or *something else* were categorized into the sexual minority group.

[c]Includes all tobacco products in this table, plus dissolvables, bidis, kreteks, and pipe tobacco.

[d]Electronic nicotine products were defined as "e-cigarettes, vape pens, personal vaporizers and mods, e-cigars, e-pipes, e-hookahs, and hookah pens."

[e]Participants who provided exact age in response to *How old were you when you first tried [tobacco product], even one or two [times/puffs]?* Responses of 5 years old and younger were treated as missing (between 0.3% and 4% of unweighted samples of product ever-users).

[f]Estimate should be interpreted with caution because it has low statistical precision. It is based on a denominator sample size of <50 or the coefficient of variation of the estimate or its complement is larger than 30%.

[g]Includes traditional cigars, cigarillos, and filtered cigars. Follow-up questions (past 30-day, age of first use, and frequency) were asked about subtypes separately, and responses were collated across types as follows: past 30-day use of any of the subtypes, age of first use of first subtype, and number of days used in past 30 days was summed across subtypes.

[h]Estimates derived from denominators of five or less were suppressed. Between-group comparisons were not made between groups with estimates that were suppressed.

[i]Hookah was defined as "a type of water pipe, sometimes also called a 'narghile' pipe" and referred to as hookah in the instrument. Frequency of use is not presented because the number of days used in the past 30 days was not assessed for hookah.

[j]Smokeless tobacco and snus were assessed separately and combined. Smokeless tobacco examples included loose snus, moist snuff, dip, spit, and chewing tobacco. Snus was described as "a type of smokeless tobacco that comes in a small pouch that you put under your lip." Ever use and past 30-day use were defined as use of at least one of the subtypes; frequency was assessed using a sum of days used in past 30 days across both smokeless and snus.

PATH, Population Assessment of Health study; SGM, sexual and gender minority.

Wave 3, a total of 7,708, 7,646, and 7,612 subjects provided responses to the transgender identity, sexual identity, and attraction items, respectively. Analyses comparing SGM youth with their straight counterparts used weighted chi-square tests, with the exception of analyses comparing age of first use, which used weighted linear regression.

RESULTS

As shown in Table 1, 1.1% identified as transgender. Overall, 10.6% (95% CI=9.8, 11.4) identified as a sexual minority; this was more common among female (16.0%, 95% CI=14.8, 17.2) than male youth (5.5%, 95% CI=4.6, 6.4) (data not shown). In terms of sexual attraction, 25.2% (95% CI=23.6, 26.9) of female and 9.2% (95% CI=8.2, 10.2) of male youth reported nonexclusive/same-sex attraction (not shown). Appendix Table 1 (available online) provides demographic characteristics by each SGM construct.

Transgender youth (*n*=79) were more likely to report ever use of any tobacco product and past 30-day use of more than one tobacco product compared with non-transgender youth (*n*=7,629) (53.6% vs 31.5% and 10.2% vs 3.5%, respectively; Table 2). This pattern held for ever use of ENPs (40.2% vs 23.0%), cigarettes (33.9% vs 14.1%), and smokeless tobacco (21.5% vs 6.0%), as well as for past 30-day use of these products.

Female SMY (*n*=586) were more likely to report ever use of any product (46.9% vs 28.1%) compared with their straight counterparts (*n*=3,102; Table 2). Similarly, female SMY were also more likely to report ever use of four of the five product categories compared with their straight peers (ENPs [37.9% vs 20.1%], cigarettes [28.9% vs 12.0%], cigars [11.3% vs 5.2%], and hookah [12.7% vs 7.6%]) and more likely to report past 30-day use of ENPs, cigarettes, and cigars.

Male SMY (*n*=210) were more likely to report ever use of any tobacco product and ever cigarette use compared with their straight counterparts (*n*=3,748) (41.3% vs 32.1% and 25.1% vs 13.5%, respectively). No other group differences emerged for ever or past 30-day use. Among cigar users, male SMY were less likely to report use on six or more of the past 30 days compared with straight males (6.5% vs 32.8%); they also reported an older age of first use of cigarettes and hookah. Additional analyses using sexual attraction, instead of sexual identity, to stratify straight versus minority groups showed similar patterns of results (Appendix Table 2, available online).

DISCUSSION

This study showed that SGM youth were more likely to use tobacco products compared with their nonminority peers. Similar to sexual minority adults, this was especially evident among female SMY.[13,16,22] In contrast, male SMY differed from their majority peers only in prevalence of ever use of cigarettes. A recent study using data from the National Youth Risk Behavior Survey suggests this pattern of elevated risk among female relative to male youth, SMY is evident across a number of substance use behaviors.[23] Finally, with the exception of male cigar use, the authors did not detect differences in use frequency. In contrast to previous findings from a national survey of adults,[16] this study found no group differences in the age of first use among female youth, but straight male youth were more likely to report earlier first use of cigarettes and hookah compared with male SMY.

This study revealed striking disparities among transgender youth, who were more likely to report ever use of any tobacco product and past 30-day use of ENPs, cigarettes, and smokeless tobacco compared with their nontransgender peers. This is the first study to establish elevated tobacco use among transgender youth, which may contribute to disparities observed among transgender adults.[15,24]

Limitations

Precise measurement of SGM constructs is inherently challenging and imperfect; it is possible that these measures may have miscategorized some individuals. Results may also be affected by systematic nonresponse to SGM questions. As with any study of small minority populations, sample size may have limited the ability to detect group differences and precluded examination of heterogeneity within the sexual minority category (e.g., differences by sexual identity).

CONCLUSIONS

Disparities in tobacco product use by SGM status are evident in adolescence and are particularly pronounced among female SMY and transgender youth, who are at particular risk for the use of multiple tobacco products and poly-use. This information is useful for developing communication and education efforts targeted to these high-risk groups to prevent youth tobacco initiation.

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SUPPLEMENTARY MATERIALS

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