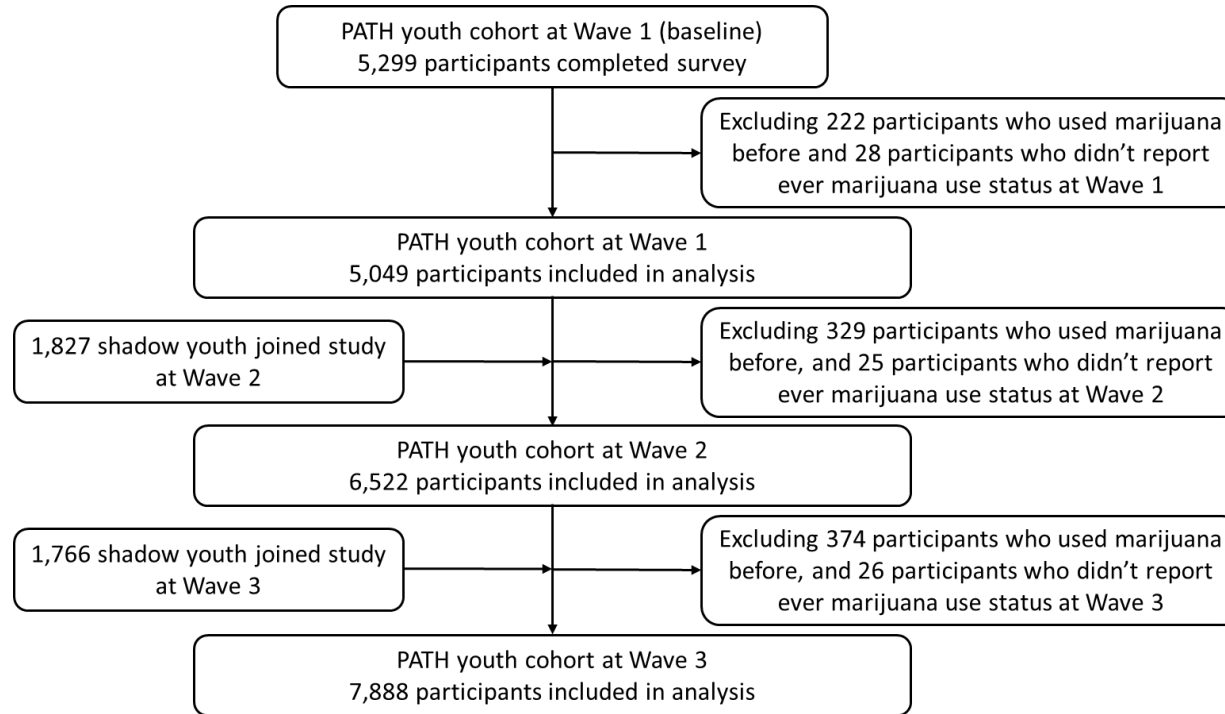


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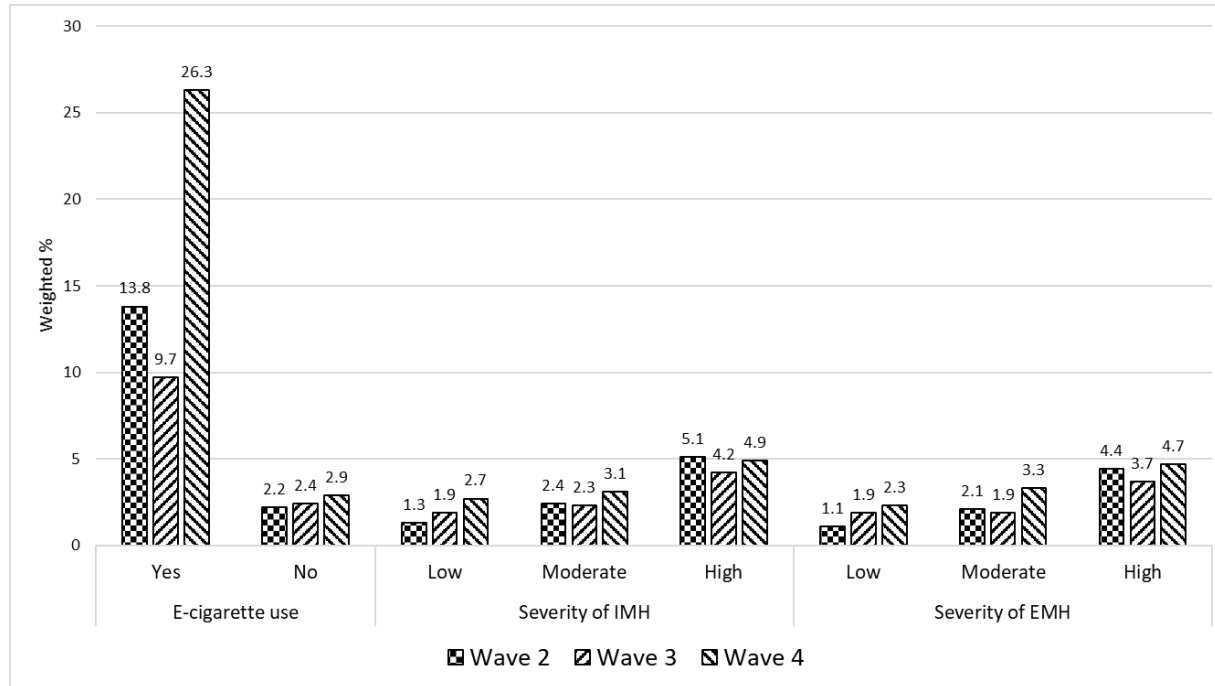
Appendix Figure 1. Flowchart for participants included in final analysis.



PATH, Population Assessment of Tobacco and Health Study.

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Appendix Figure 2. Weighted prevalence of past-30-day cannabis use at follow-up waves by baseline e-cigarette use and mental health conditions.



IMH, internalizing mental health problems; EMH, externalizing mental health problems.

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Appendix Table 1. Items for Internalizing and Externalizing Mental Health Problems

GAIN-SS Subscale^a	Items
Internalizing mental health problems	Feeling very trapped, lonely, sad, blue, depressed, or hopeless about the future.
	Sleep trouble - such as bad dreams, sleeping restlessly or falling asleep during the day.
	Feeling very anxious, nervous, tense, scared, panicked or like something bad was going to happen.
	Becoming very distressed and upset when something reminded you of the past.
Externalizing mental health problems	Lied or conned to get things you wanted or to avoid having to do something.
	Had a hard time paying attention at school, work, or home.
	Had a hard time listening to instructions at school, work, or home.
	Were a bully or threatened other people.
	Started physical fights with other people.
	Felt restless or the need to run around or climb on things.
Gave answers before the other person finished asking the question.	

^aGAIN-SS: Global Appraisal of Individual Needs – Short Screener.

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Appendix Table 2. Percentage of Ever Cannabis Use at Each Follow-Up Wave by Baseline Covariates

Covariates at corresponding baseline wave	Wave 1 % (95% CI)	Wave 2 % (95% CI)	Wave 3 % (95% CI)
Overall ever cannabis use at follow-up waves	5.9 (5.3, 6.6)	5.7 (5.0, 6.3)	7.7 (7.1, 8.3)
P30D e-cigarette use			
Yes	24.4 (10.5, 47.0)	19.9 (12.5, 30.3)	41.1 (31.7, 51.2)
No	5.8 (5.2, 6.5)	5.5 (4.9, 6.2)	7.2 (6.6, 7.8)
Internalizing mental health problems			
Low	3.9 (3.2, 4.8)	3.9 (3.3, 4.6)	5.9 (5.2, 6.8)
Moderate	6.0 (4.9, 7.4)	6.2 (5.1, 7.6)	7.9 (6.6, 9.3)
High	11.8 (9.6, 14.3)	10.0 (8.2, 12.1)	12.2 (10.8, 13.8)
Externalizing mental health problems			
Low	3.1 (2.4, 4.1)	3.3 (2.7, 4.2)	5.1 (4.4, 6.0)
Moderate	5.4 (4.3, 6.7)	5.4 (4.2, 6.8)	8.1 (6.8, 9.5)
High	10.9 (9.3, 12.7)	9.6 (8.2, 11.3)	11.7 (10.5, 13.0)
Age group, years			
12–14	5.8 (5.2, 6.6)	4.7 (4.1, 5.4)	5.6 (5.0, 6.2)
15–17	8.1 (4.5, 14.1)	9.1 (7.6, 10.8)	11.6 (10.4, 12.9)
Sex			
Male	5.5 (4.7, 6.5)	5.9 (5.1, 6.9)	7.2 (6.4, 8.0)
Female	6.3 (5.4, 7.4)	5.4 (4.6, 6.3)	8.2 (7.3, 9.2)
Race/ethnicity			
Non-Hispanic White	5.6 (4.8, 6.6)	6.0 (5.1, 7.1)	8.0 (7.1, 9.0)
Non-Hispanic Black	7.8 (5.5, 10.9)	4.8 (3.4, 6.8)	8.5 (6.8, 10.5)
Non-Hispanic other	2.7 (1.5, 4.9)	4.3 (2.5, 7.2)	5.3 (4.0, 7.1)
Hispanic	6.8 (5.7, 8.3)	5.8 (4.8, 7.0)	8.0 (6.8, 9.4)
Sexual orientation (ages ≥14 years)			
Straight/heterosexual	8.4 (7.1, 10.1)	8.0 (7.0, 9.1)	10.1 (9.1, 11.3)
Gay, lesbian, bisexual, or other	18.8 (9.4, 33.9)	14.6 (9.7, 21.3)	16.7 (13.1, 21.0)
P30D combustible tobacco use ^a			
Yes	32.8 (19.1, 50.2)	28.1 (15.8, 44.8)	39.0 (26.6, 53.1)
No	5.9 (5.2, 6.6)	5.5 (4.8, 6.2)	7.4 (6.9, 8.0)
P30D alcohol use			

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Yes	24.7 (15.8, 36.3)	17.5 (12.9, 23.2)	28.1 (23.1, 33.8)
No	5.6 (5.0, 6.3)	5.2 (4.6, 5.9)	6.8 (6.2, 7.3)
Parental education			
Less than high school	8.6 (7.0, 10.5)	5.1 (3.9, 6.6)	8.7 (7.4, 10.2)
High school graduate	7.4 (5.6, 9.6)	6.6 (5.1, 8.6)	7.3 (6.0, 8.9)
Some college or associate degree	5.7 (4.5, 7.2)	7.2 (6.0, 8.7)	8.8 (7.8, 10.0)
Bachelor's degree or higher	4.4 (3.5, 5.5)	4.4 (3.4, 5.7)	6.6 (5.6, 7.7)
State recreational cannabis law			
Legalized	9.1 (5.6, 14.4)	5.4 (3.2, 8.9)	8.2 (7.0, 9.6)
Not legalized	5.7 (5.1, 6.4)	5.7 (5.0, 6.4)	7.6 (6.9, 8.2)

^aCombustible tobacco included cigarette, cigar, cigarillo, and filtered cigar.

P30D, past-30-day.

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Appendix Table 3. AORs of Ever Cannabis Use During Follow-Up Among Baseline Cannabis-Naïve Adolescents

Baseline characteristics	Model 1 No interaction AOR (95% CI)	Model 2 IMH interaction AOR (95% CI)	Model 3 EMH interaction AOR (95% CI)
P30D e-cigarette use			
Yes	3.24 (2.09, 5.02)	6.56 (3.77, 11.43)	5.79 (2.69, 12.46)
No	ref	ref	ref
Internalizing mental health problems (IMH)			
Low	ref	ref	ref
Moderate	1.11 (0.93, 1.32)	1.13 (0.95, 1.34)	1.11 (0.93, 1.32)
High	1.46 (1.18, 1.79)	1.53 (1.24, 1.89)	1.46 (1.18, 1.80)
Externalizing mental health problems (EMH)			
Low	ref	ref	ref
Moderate	1.55 (1.24, 1.93)	1.55 (1.24, 1.89)	1.58 (1.27, 1.98)
High	2.27 (1.85, 2.78)	2.27 (1.85, 2.78)	2.31 (1.87, 2.85)
P30D e-cigarette use X IMH			
Yes X High		0.21 (0.09, 0.48)	
Yes X Moderate		0.66 (0.27, 1.57)	
No X Low		ref	
P30D e-cigarette use X EMH			
Yes X High			0.49 (0.19, 1.26)
Yes X Moderate			0.41 (0.11, 1.46)
No X Low			ref
Age group, years			
12–14	ref	ref	ref
15–17	1.81 (1.56, 2.10)	1.81 (1.56, 2.10)	1.81 (1.56, 2.11)
Sex			
Male	1.02 (0.88, 1.21)	1.01 (0.85, 1.20)	1.02 (0.88, 1.17)
Female	ref	ref	ref
Race/ethnicity			
Non-Hispanic White	ref	ref	ref
Non-Hispanic Black	1.12 (0.89, 1.41)	1.12 (0.89, 1.41)	1.12 (0.89, 1.41)
Non-Hispanic other	0.67 (0.52, 0.87)	0.67 (0.52, 0.87)	0.67 (0.51, 0.87)

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Hispanic	1.02 (0.86, 1.21)	1.01 (0.85, 1.20)	1.02 (0.86, 1.21)
P30D combustible tobacco use^a			
Yes	2.97 (1.59, 5.54)	2.97 (1.64, 5.37)	2.90 (1.55, 5.41)
No	ref	ref	ref
P30D alcohol use			
Yes	3.25 (2.48, 4.27)	3.27 (2.49, 4.29)	3.27 (2.50, 4.29)
No	ref	ref	ref
Parental education			
Less than high school	ref	ref	ref
High school graduate	0.89 (0.72, 1.11)	0.90 (0.72, 1.12)	0.89 (0.72, 1.11)
Some college or associate degree	0.90 (0.73, 1.09)	0.89 (0.73, 1.09)	0.89 (0.73, 1.09)
Bachelor's degree or higher	0.65 (0.54, 0.79)	0.65 (0.54, 0.79)	0.65 (0.54, 0.79)
State recreational cannabis law			
Legalized	1.22 (0.96, 1.53)	1.23 (0.97, 1.54)	1.22 (0.97, 1.54)
Not legalized	ref	ref	ref

Note: Boldface indicates statistical significance ($p < 0.05$).

^aCombustible tobacco included cigarette, cigar, cigarillo, and filtered cigar.

P30D, past-30-day..

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Appendix Table 4. Subgroup Analysis for Adjusted Associations Among Adolescent Never Used Cannabis at Baseline

Baseline e-cigarette using status	Ever cannabis use for low internalizing problems	Ever cannabis use for moderate internalizing problems	Ever cannabis use for high internalizing problems
	AOR ^a (95% CI)	AOR ^a (95% CI)	AOR ^a (95% CI)
P30D e-cigarette use			
Yes	5.84 (3.09, 11.03)	5.25 (2.31, 11.92)	1.49 (0.73, 3.08)
No	ref	ref	ref

Note: Boldface indicates statistical significance ($p < 0.05$).

^aControlling for wave, sex, age, race/ethnicity, parental education, past-year externalizing mental health problems, P30D combustible tobacco use, P30D alcohol use, state-level cannabis legalization status at baseline.

P30D, past-30-day.

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Appendix Table 5. AORs of P30D Cannabis Use at Follow-Up Among Baseline Cannabis-Naïve Adolescents

Baseline characteristics	Model 1 Without interaction AOR (95% CI)	Model 2 IMH interaction AOR (95% CI)	Model 3 EMH interaction AOR (95% CI)
P30D e-cigarette use			
Yes	4.77 (2.92, 7.81)	14.58 (7.28, 29.19)	7.48 (2.95, 18.96)
No	ref	ref	ref
Internalizing mental health problems (IMH, continuous)	1.07 (0.99, 1.16)	1.10 (1.02, 1.19)	1.07 (0.99, 1.16)
Externalizing mental health problems (EMH, continuous)	1.13 (1.06, 1.20)	1.13 (1.06, 1.20)	1.14 (1.07, 1.22)
P30D e-cigarette use X IMH			
Yes X >0		0.60 (0.44, 0.82)	
No X 0		ref	
P30D e-cigarette use X EMH			
Yes X >0			0.88 (0.69, 1.12)
No X 0			ref
Age group, years			
12–14	ref	ref	ref
15–17	1.70 (1.35, 2.14)	1.67 (1.33, 2.11)	1.69 (1.34, 2.14)
Sex			
Male	0.91 (0.73, 1.14)	0.91 (0.73, 1.14)	0.92 (0.73, 1.14)
Female	ref	ref	ref
Race/ethnicity			
Non-Hispanic White	ref	ref	ref
Non-Hispanic Black	1.08 (0.74, 1.57)	1.07 (0.74, 1.55)	1.08 (0.74, 1.56)
Non-Hispanic other	0.52 (0.34, 0.81)	0.52 (0.34, 0.81)	0.52 (0.34, 0.81)
Hispanic	0.87 (0.66, 1.13)	0.85 (0.65, 1.10)	0.86 (0.66, 1.12)
P30D combustible tobacco use^a			
Yes	2.19 (1.05, 4.58)	2.23 (1.09, 4.54)	2.16 (1.04, 4.50)
No	ref	ref	ref
P30D alcohol use			
Yes	3.35 (2.32, 4.84)	3.41 (2.36, 4.94)	3.37 (2.33, 4.86)
No	ref	ref	ref
Parental education			

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Less than high school	ref	ref	ref
High school graduate	0.72 (0.49, 1.06)	0.73 (0.50, 1.06)	0.72 (0.49, 1.06)
Some college or associate degree	0.81 (0.63, 1.04)	0.79 (0.61, 1.01)	0.81 (0.63, 1.04)
Bachelor's degree or higher	0.59 (0.43, 0.82)	0.58 (0.42, 0.81)	0.59 (0.43, 0.82)
State recreational cannabis law			
Legalized	1.32 (0.95, 1.82)	1.35 (0.98, 1.86)	1.32 (0.96, 1.82)
Not legalized	ref	ref	ref

Note: Boldface indicates statistical significance ($p < 0.05$).

^aCombustible tobacco included cigarette, cigar, cigarillo, and filtered cigar.

P30D, past-30-day.

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Appendix Table 6. Percentage of P30D E-Cigarette Use at Baseline by Internalizing and Externalizing Mental Health Conditions

Covariates at corresponding baseline wave	Wave 1 % (95% CI)	Wave 2 % (95% CI)	Wave 3 % (95% CI)
Internalizing mental health problems			
Low	0.4 (0.2, 0.7)	0.6 (0.3, 0.9)	1.3 (0.9, 1.7)
Moderate	0.5 (0.2, 1.2)	0.6 (0.4, 1.1)	0.9 (0.6, 1.4)
High	1.4 (0.8, 2.5)	1.9 (1.2, 3.1)	2.4 (1.7, 3.3)
Externalizing mental health problems			
Low	0.2 (0.1, 0.7)	0.5 (0.3, 0.9)	1.1 (0.8, 1.6)
Moderate	0.5 (0.2, 1.1)	0.6 (0.3, 1.1)	1.2 (0.7, 1.8)
High	1.2 (0.7, 1.9)	1.6 (1.0, 2.4)	2.1 (1.6, 2.1)