



Estimating Pooled Prevalence of Youth Tobacco Use Using Multiple U.S. National Surveys

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Agenda

Background &
Research Objectives

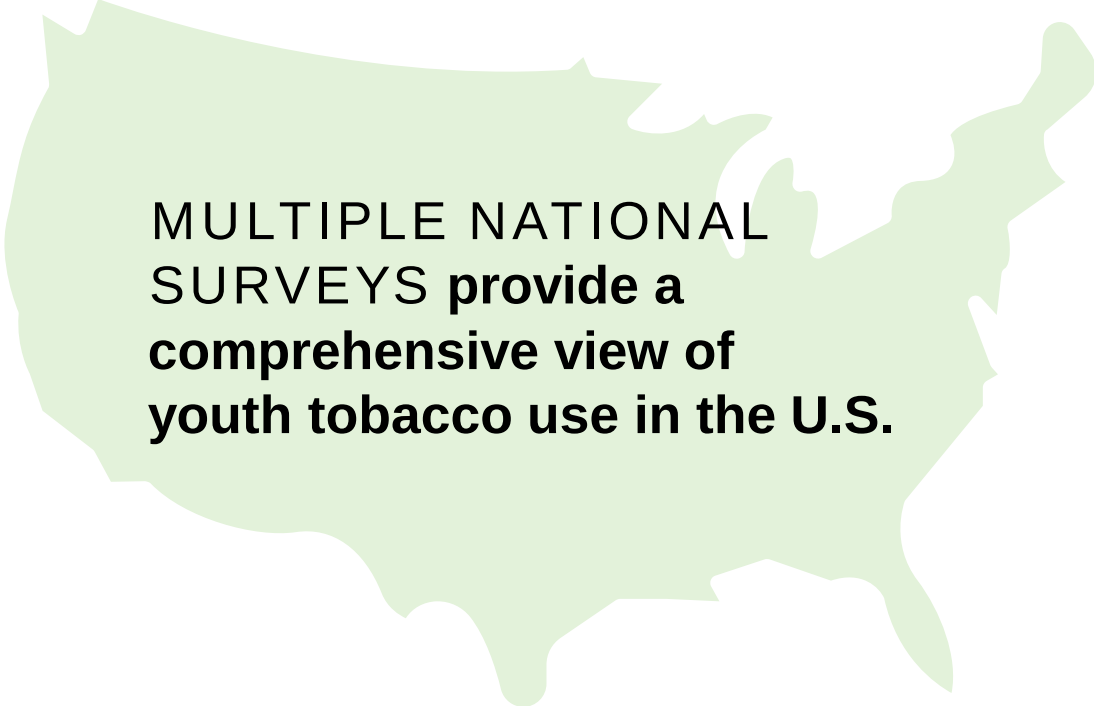
Methodology

Results

Discussion & Implications



Background



MULTIPLE NATIONAL SURVEYS provide a comprehensive view of youth tobacco use in the U.S.

DIFFERENCES IN:



Survey Design



Administration



Target Populations

contribute to variation in prevalence estimates

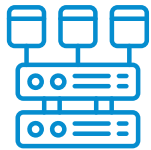


An integrated, pooled modeling approach enables estimation of prevalence for a standardized youth population across multiple national surveys



Objective, Purpose, and Research Question

OBJECTIVE



To estimate pooled prevalence of past 30-day tobacco use among U.S. youth aged 12-17 by integrating data from multiple nationally representative surveys using a harmonized analytical approach

PURPOSE



To provide a single, robust prevalence estimate that accounts for differences in survey design and sampling frames, enabling more comprehensive monitoring of youth tobacco use trends over time



What is the pooled prevalence of past 30-day e-cigarette, cigarette, cigar, smokeless tobacco, and nicotine pouch use among U.S. youth aged 12-17 across major national surveys and how does it vary by year after adjusting for survey design differences?



Methodology

Data Sources

Survey*	Time	Mode
National Youth Tobacco Survey (NYTS)	2014-2024	School
Monitoring the Future (MTF) Restricted-Use Files (RUF)	2014-2024	School
National Survey on Drug Use and Health (NSDUH)	2014-2024	Household
Population Assessment of Tobacco and Health (PATH)	Wave 1 – Sep 2013 - Dec 2014 Wave 2 – Oct 2014 - Oct 2015 Wave 3 – Oct 2015 - Oct 2016 Wave 4 – Dec 2016 - Jan 2018 Wave 4.5 – Dec 2017 - Dec 2018 Wave 5 – Dec 2018 - Nov 2019 Wave 5.5 – Dec 2019 - Dec 2020 Wave 6 – Mar-Nov 2021 Wave 7 – Jan 2022 - Apr 2023 Wave 7.5 – Apr-Dec 2023 Wave 8 – Jan-Dec 2024	Household
ALCS Underage Tobacco Use Survey (UTUS)	Q2 2020-2024	Household

OUTCOME: Past 30-day tobacco use prevalence

Surveys were harmonized to a common target population of youth aged 12-17 (UTUS restricted to ages 13-17)

APPROACH



- Extracted design-based prevalence and 95% CIs from each survey
- Derived effective sample sizes (ESS) using logit-scale SE from reported CIs

MODEL



- Binomial Generalized Linear Mixed Model (GLMM) with logit link
- Fixed effects: Year, Mode (School vs. Household), Year*Mode
- Random Intercept: Survey (captures persistent survey differences)
- Estimation: Laplace approximation and robust SEs (sandwich)

OUTPUT

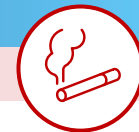


- Mode-adjusted pooled prevalence by year (primary)
- Household- and school-standardized pooled prevalence by year

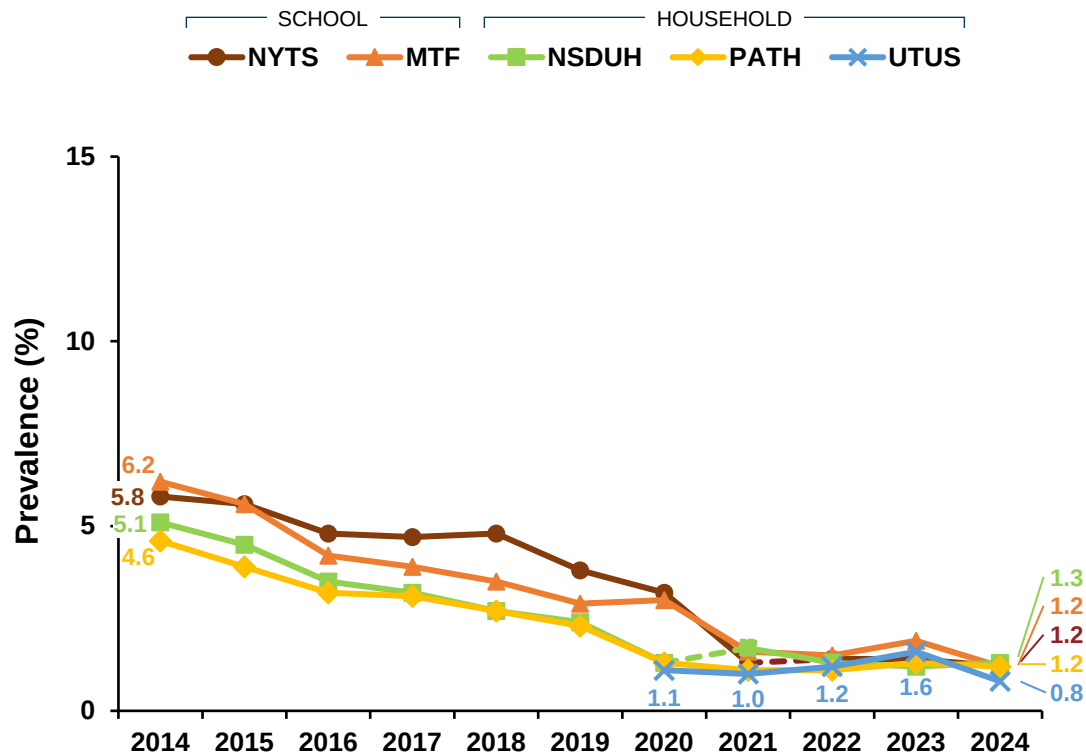
Note: CI – Confidence Interval; SE – Standard Error. *Several surveys underwent methodological changes during the study period. These changes may affect the comparability of estimates across years and were not explicitly accounted for in the pooled modeling approach.

Pooled Prevalence Estimates of Cigarette Use Among Youth Ages 12-17 Across National Surveys

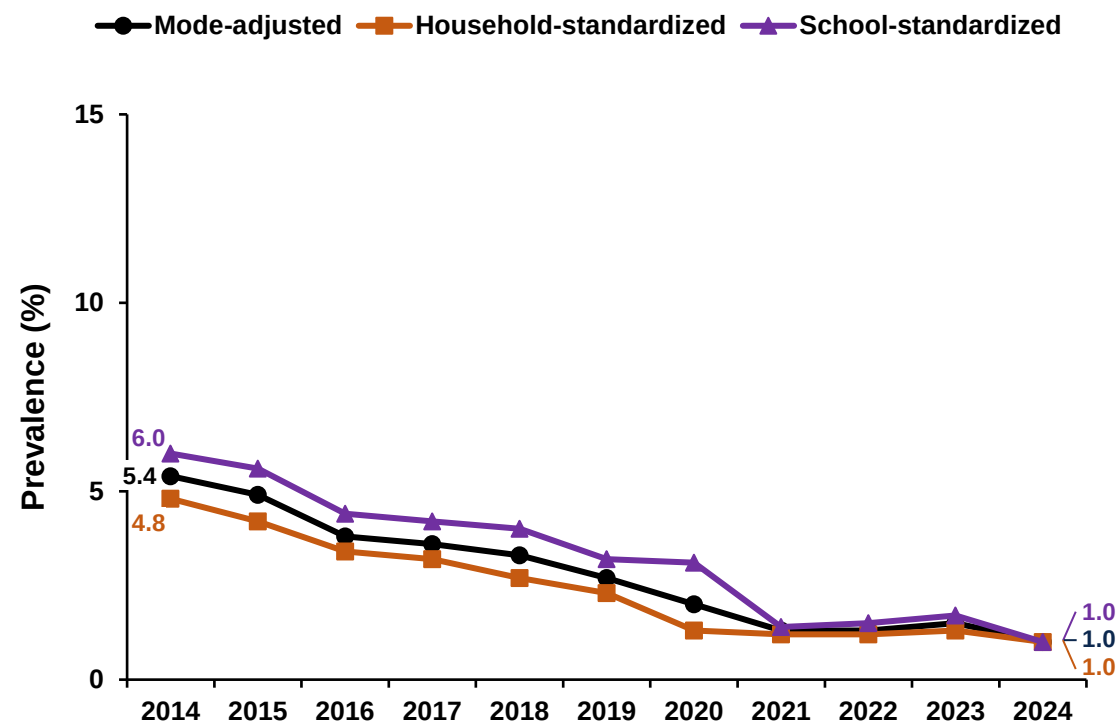
CIGARETTE USE



Individual Survey Prevalence Estimates, 2014-2024



Pooled Prevalence Estimates, 2014-2024



Source: ALCS analysis of NYTS, MTF RUF, NSDUH, UTUS (13-17-year-olds) 2020-2024, and PATH Waves 1-8. Dashed lines represent methodological changes that preclude comparison between years.



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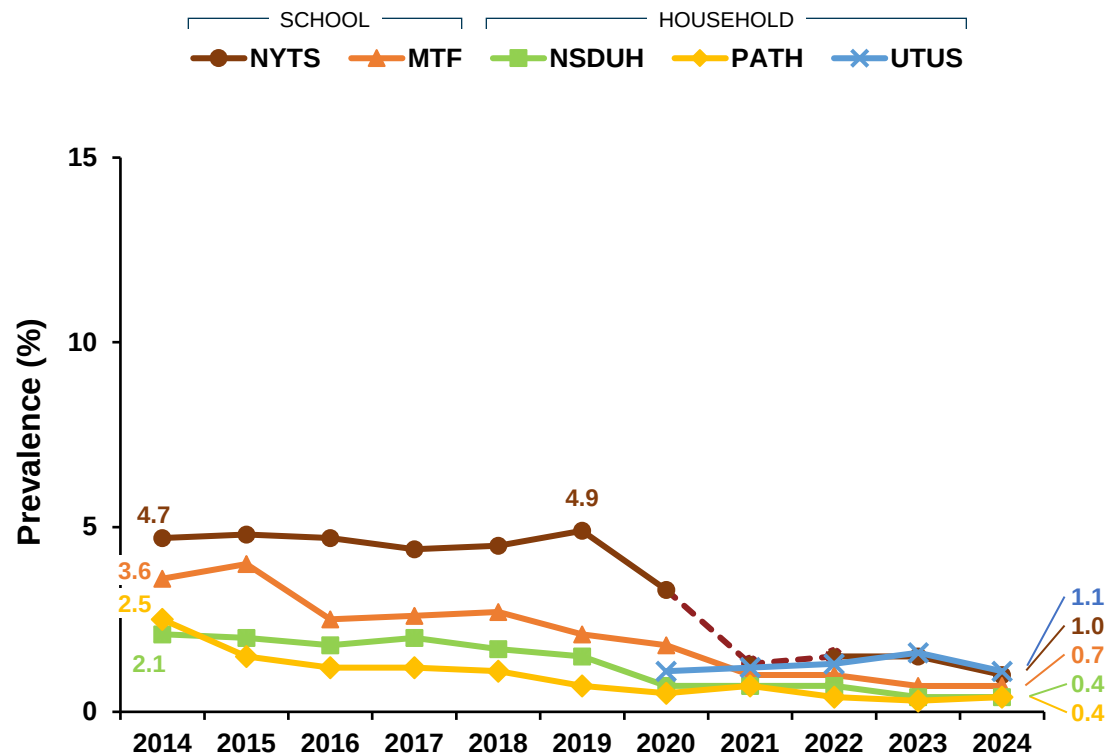
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Pooled Prevalence Estimates of Cigar Use Among Youth Ages 12-17 Across National Surveys

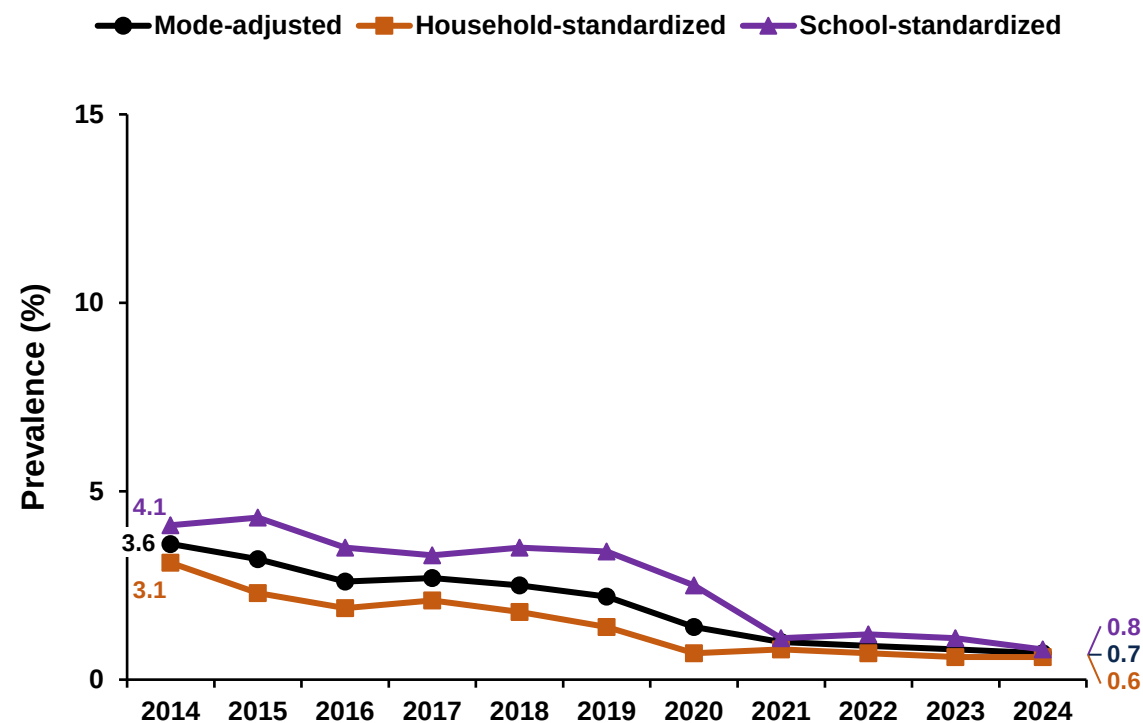
CIGAR USE



Individual Survey Prevalence Estimates, 2014-2024



Pooled Prevalence Estimates, 2014-2024



Source: ALCS analysis of NYTS, MTF RUF, NSDUH, UTUS (13-17-year-olds) 2020-2024, and PATH Waves 1-8. Dashed lines represent methodological changes that preclude comparison between years.



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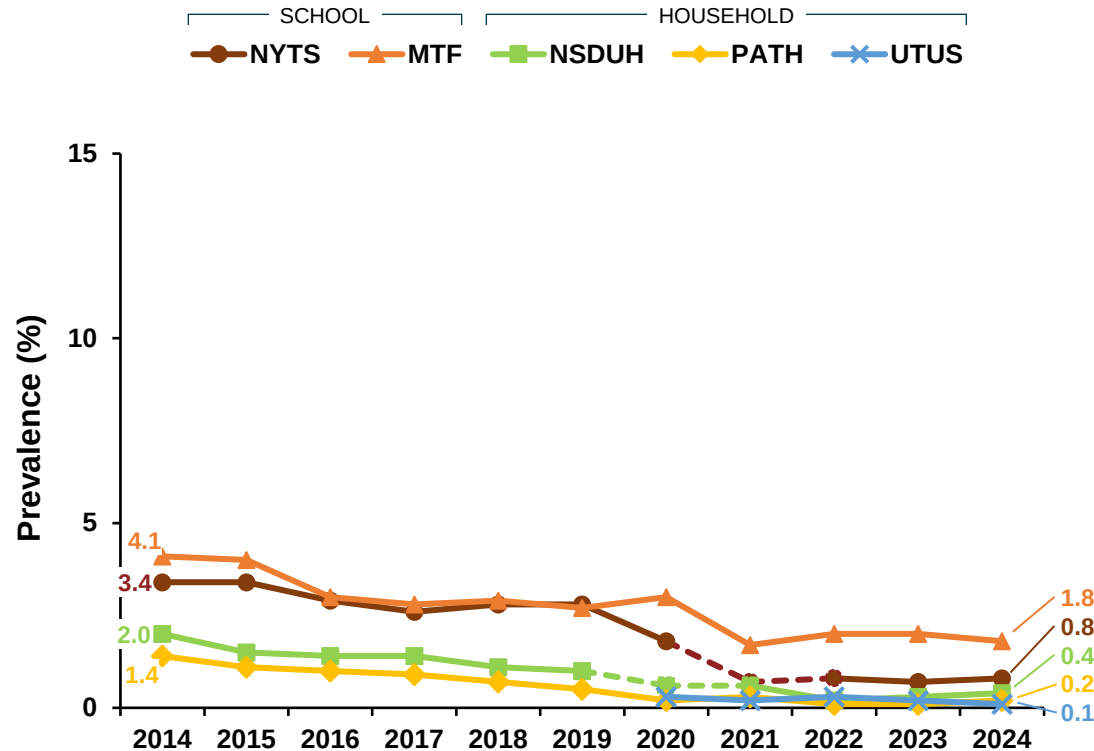
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Pooled Prevalence Estimates of Smokeless Tobacco Use Among Youth Ages 12-17 Across National Surveys

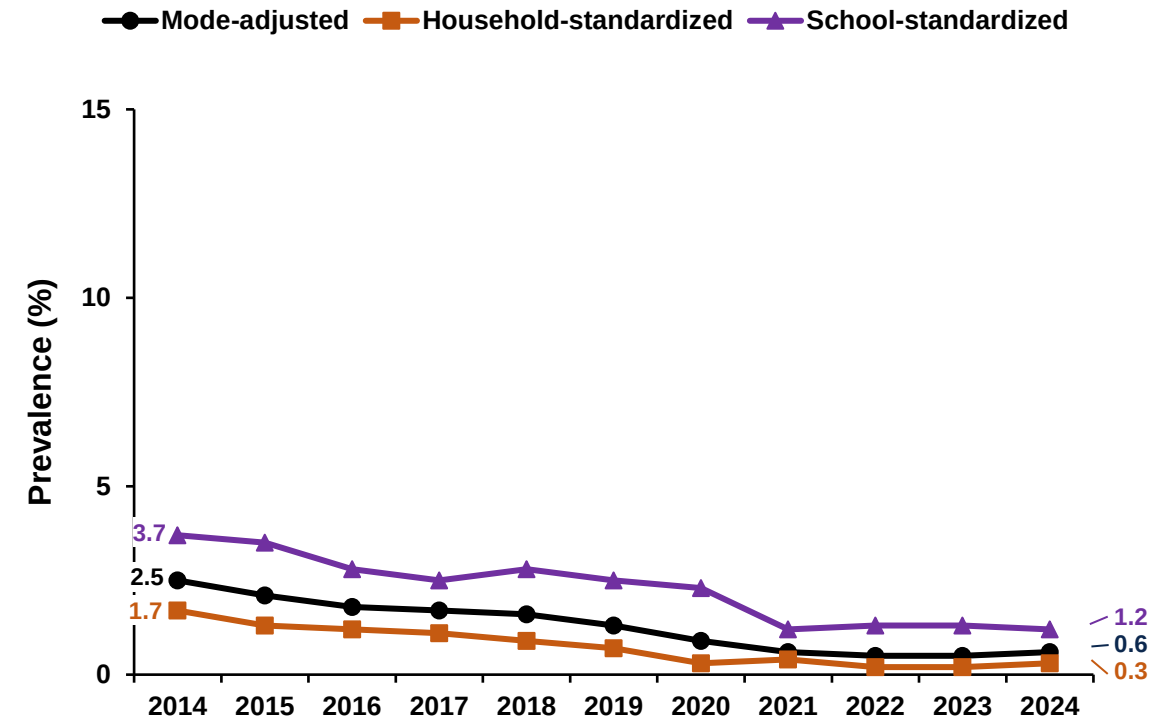
SMOKELESS TOBACCO USE



Individual Survey Prevalence Estimates, 2014-2024



Pooled Prevalence Estimates, 2014-2024



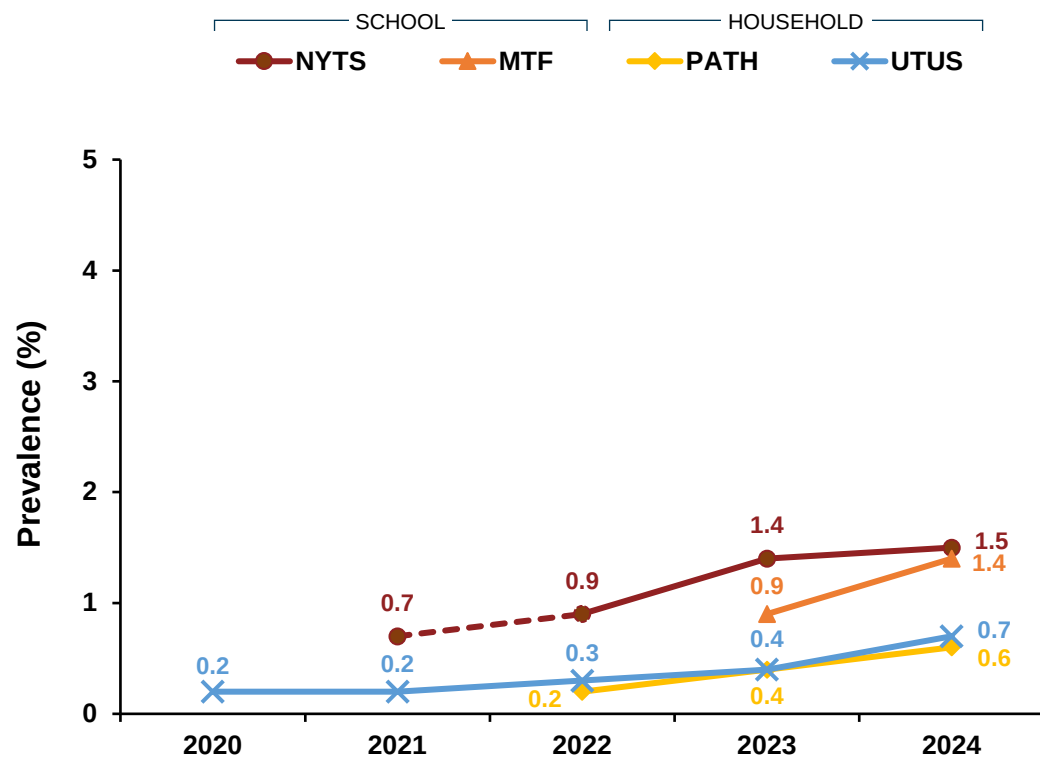
Source: ALCS analysis of NYTS, MTF RUF, NSDUH, UTUS (13-17-year-olds) 2020-2024, and PATH Waves 1-8. Dashed lines represent methodological changes that preclude comparison between years.

Pooled Prevalence Estimates of Nicotine Pouch Use Among Youth Ages 12-17 Across National Surveys

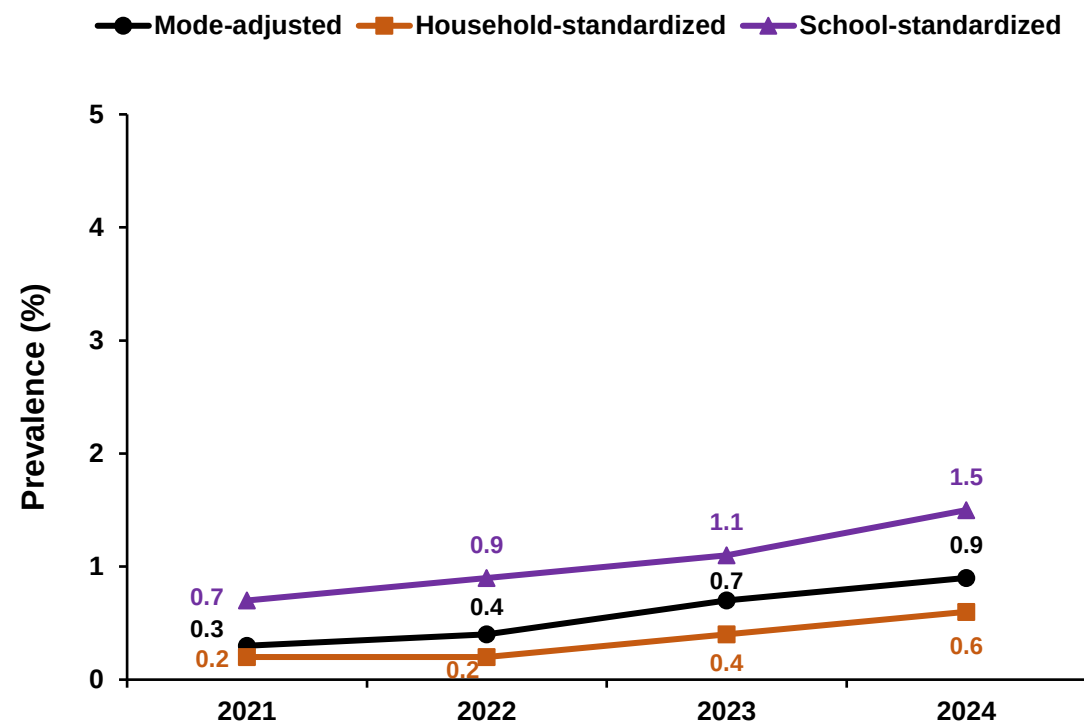
NICOTINE POUCH USE



Individual Survey Prevalence Estimates, 2020-2024



Pooled Prevalence Estimates, 2021-2024



Source: ALCS analysis of NYTS, MTF RUF, UTUS (13-17-year-olds) 2020-2024, and PATH Waves 1-8.

Missing data reflect years or survey waves for which data were unavailable. Dashed lines represent methodological changes that preclude comparison between years.



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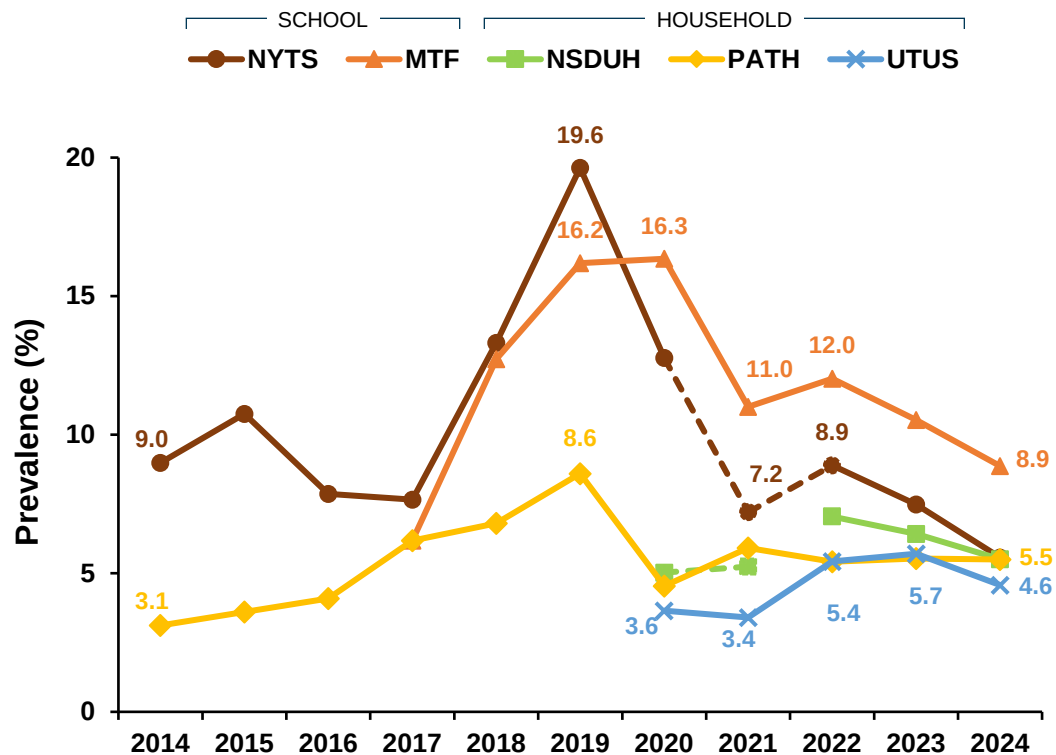
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Pooled Prevalence Estimates of E-cigarette Use Among Youth Ages 12-17 Across National Surveys

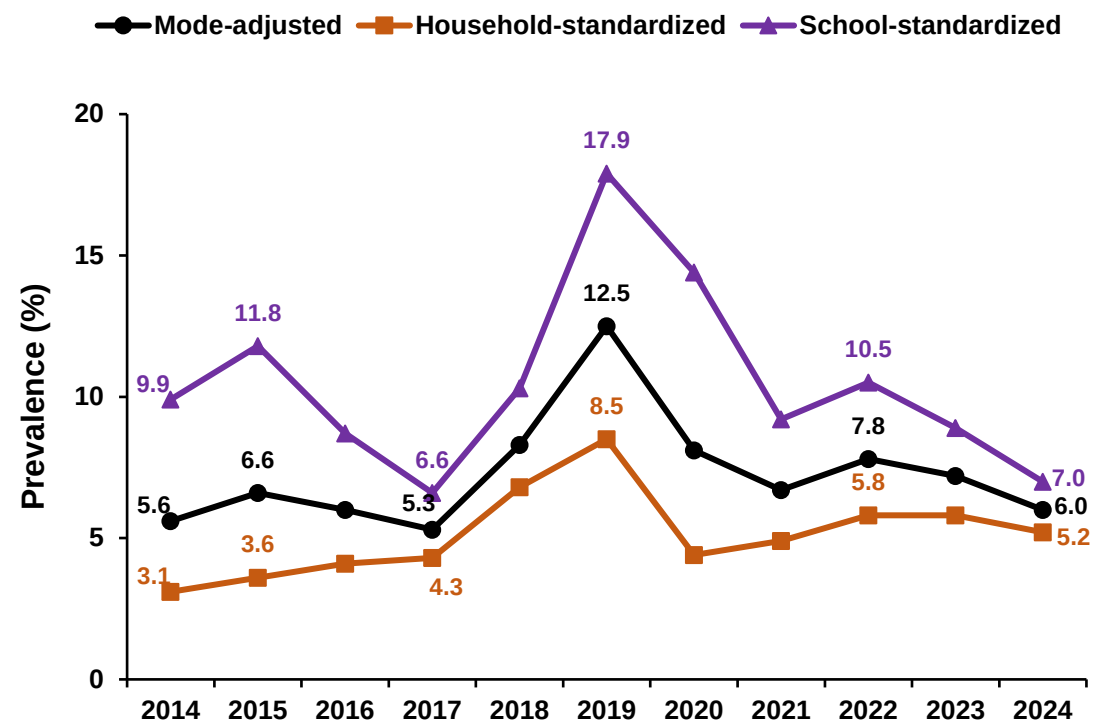
E-CIGARETTE USE



Individual Survey Prevalence Estimates, 2014-2024



Pooled Prevalence Estimates, 2014-2024



Source: ALCS analysis of NYTS, MTF RUF, NSDUH, UTUS (13-17-year-olds) 2020-2024, and PATH Waves 1-8.

Missing data reflect years or survey waves for which data were unavailable.

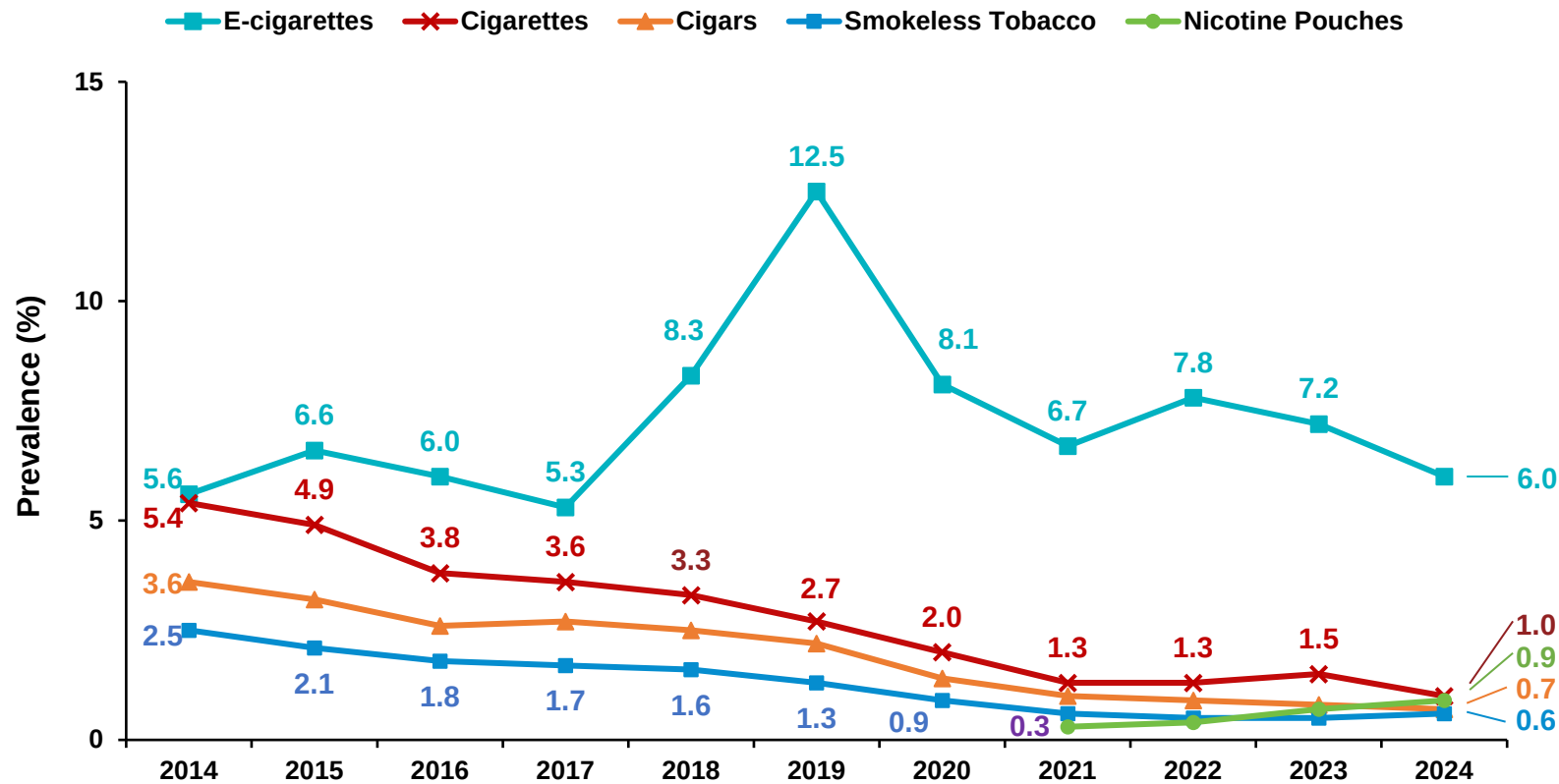
Dashed lines represent methodological changes that preclude comparison between years. Nicotine vaping estimates from NSDUH are not comparable between 2021 and 2022.



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Mode-adjusted Pooled Prevalence Estimates of Tobacco Product Use Among Youth Ages 12-17 Across National Surveys, 2014-2024



KEY TAKEAWAY

Integrating multiple national surveys produced stable, harmonized prevalence estimates that provide a more comprehensive view of youth tobacco and nicotine product use than any single survey alone

Source: ALCS analysis of NYTS, MTF RUF, NSDUH, UTUS (13-17-year-olds) 2020-2024, and PATH Waves 1-8. Error bars representing 95% confidence intervals are omitted for readability.

Sensitivity Analyses Support the Robustness of Pooled Prevalence Estimates

Change in Pooled Estimates After Excluding UTUS Data

Year	E-Cigarettes	Cigarettes	Cigars	Smokeless Tobacco
2014	0.14	-0.00	-0.48	-0.02
2015	0.17	-0.00	-0.43	-0.01
2016	0.15	-0.00	-0.35	-0.01
2017	0.15	-0.00	-0.36	-0.01
2018	0.22	-0.00	-0.34	-0.01
2019	0.31	-0.00	-0.30	-0.01
2020	0.30	0.02	-0.11	0.01
2021	0.41	0.04	-0.08	0.02
2022	0.18	0.00	-0.13	-0.03
2023	0.12	-0.03	-0.20	-0.01
2024	0.17	-0.01	-0.10	0.10

Change in Pooled Estimates After Excluding 2020 Data

Year	E-Cigarettes	Cigarettes	Cigars	Smokeless Tobacco
2014	-0.00	-0.00	0.05	0.02
2015	-0.00	-0.00	0.05	0.02
2016	-0.00	-0.00	0.04	0.02
2017	0.02	-0.00	0.04	0.01
2018	0.03	-0.00	0.04	0.01
2019	0.03	-0.00	0.03	0.01
2020				
2021	0.01	-0.00	-0.00	-0.00
2022	0.02	-0.00	-0.00	-0.00
2023	0.01	-0.00	-0.00	-0.00
2024	-0.01	-0.00	-0.00	0.11



Sensitivity analyses generally supported the robustness of pooled estimates, although some product- and year-specific differences were observed.

Difference = sensitivity-analysis estimate minus primary-analysis estimate. Values are percentage-point differences and are rounded to two decimal places.



Strengths and Limitations



STRENGTHS



Integrates evidence from multiple nationally representative youth surveys



Produces more stable prevalence estimates than any single survey



Supports consistent assessment of long-term trends (2014-2024)



Findings were generally robust across sensitivity analyses



LIMITATIONS



Some methodological differences across surveys may remain after standardization



Product definitions and measurement approaches are not fully harmonized across data sources



Survey contributions vary by year based on data availability



Pooled estimates may conceal important survey-specific patterns



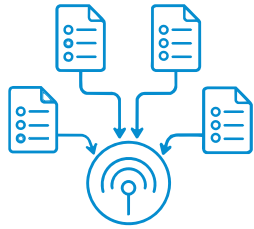


Key Takeaways

- **Combining surveys supports more continuous surveillance** despite variation in data availability, survey schedules, and methodology
- **Overall trends were consistent across surveys and sensitivity analyses**, strengthening confidence in the pooled prevalence estimates
- **The framework can incorporate emerging products and categories**, enabling surveillance to adapt as the tobacco and nicotine landscape evolves



Implications for Surveillance, Regulation, and Underage Use Prevention



IMPLICATIONS FOR SURVEILLANCE

Provides a framework for integrating multiple national surveys to estimate youth tobacco use prevalence

Generates harmonized prevalence estimates that support consistent interpretation of trends across surveys and years



REGULATION

Can serve as a surveillance tool for regulators and policy makers



UNDERAGE USE PREVENTION

Supports underage use prevention efforts by providing stable population-level estimates for monitoring youth tobacco and nicotine product use over time





Thank You!

