Ohio Public Health Association
Ohio Journal of Public Health

Ohio Journal of Public Health, Vol. 7, Issue 1 ISSN: 2578-6180

RESEARCH ARTICLE

# Gauging Risk and Protective Factors Contributing to e-Cigarette Use Among Multiracial Youth

Rebecca A. Vidourek[1]; Kruti S. Chaliawala[2]; Keith A. King[1]

[1]University of Cincinnati, Cincinnati, OH
[2]Boise State University, Boise, ID

Corresponding Author: Kruti S. Chaliawala, 1910 University Drive, Boise, ID 83725, (208) 426-3921, chaliaki@mail.uc.edu

Submitted August 30, 2024 Accepted October 30, 2024 Published February 3, 2025 https://doi.org/10.18061/ojph.v7i1.10096

## ABSTRACT

**Background:** Currently, e-cigarettes are the most common form of nicotine consumption among youth in the United States. There is a lack of research focusing on e-cigarette use among multiracial youth, yet the sparse literature points toward the adverse consequences of e-cigarettes on multiracial youth. Multiracial youth tend to have higher addiction and prevalence rates of e-cigarette use compared to other racial/ethnic groups. The current research focuses on analyzing e-cigarette use based on parental factors, school factors, prosocial behavior, ease of access, risk behaviors, perception of harm, and sociodemographic differences among multiracial youth.

**Methods:** A secondary data analysis of the 2020 Student Drug Use Survey (N = 38 048) was performed. Of these, n = 3340 self-identified as multiracial. Descriptive analysis, univariate logistic regression, and logistic regression were performed.

**Results:** Results indicate that the odds of using e-cigarettes among multiracial youth increase 2 times when not perceived as harmful, 2 times if one is employed, 18 times if involved in high-risk behaviors, and 2 times if in 9th through 12th grade. Additionally, logistic regression demonstrates that parental factors may not be significant in e-cigarette use among multiracial youth.

**Conclusion:** It is crucial to investigate the association between e-cigarette use and multiracial youth, as they may be disproportionately affected by chronic conditions and fatal diseases linked to tobacco use. Understanding the specific risk and protective factors influencing e-cigarette use within this demographic can help design targeted interventions, particularly for multiracial youth in the Greater Cincinnati region.

**Keywords:** e-Cigarette; Youth; School; Tobacco use; Multiracial; Adolescents

## INTRODUCTION

Electronic cigarettes (e-cigarettes) have become a significant public health concern, particularly among youth, with a marked increase in usage since 2014.[1] Recent data indicate a concerning prevalence of e-cigarette use among middle and high school students, with approximately 1 out of 35 middle school students and 1 out of 9 high school students reporting e-cigarette use in the past 30 days.[2] This trend necessitates an examination of the factors contributing to the widespread adoption of e-cigarettes among young individuals and the identification of groups at higher risk. Among these groups, multiracial youth have emerged as an essential demographic to study.[2] The escalating prevalence of e-cigarette use among youth, especially among multiracial adolescents in grades 7th through 12th, has emerged as a pressing public health issue.[3] This demographic, characterized by its unique intersectionality of age and race, presents a critical area of study due to its susceptibility to substance use initiation and progression.[4]

Use of e-cigarettes is influenced by many risk and protective factors, with accessibility being a key driver of its prevalence. Parental factors play a significant role in shaping a child's behavior, including their propensity to engage in e-cigarette use. Parental attitudes toward smoking, parental smoking behavior, and the

degree of parental monitoring can all impact a youth's likelihood of using e-cigarettes.[5] In 2021, approximately 32.8% of youth obtained e-cigarettes from friends, while 31.3% purchased these products.[2] The school environment can also contribute to e-cigarette use among youth. Factors such as peer influence, school policies on tobacco use, and prevention programs can all play a role.[5] Engagement in risky behaviors, such as substance use or risky sexual behavior, can increase the likelihood of e-cigarette use among youth.[5] These behaviors often co-occur, and comprehensively addressing them can be an effective strategy for prevention.[5] The ease of accessibility has undoubtedly played a significant role in the popularity of e-cigarettes among youth. Moreover, the perception of harm associated with the intermittent use of tobacco has been identified as a noteworthy factor, with a striking 16.6% of e-cigarette users reporting that they believe such use causes little to no harm.[2]

According to the Centers for Disease Control and Prevention (CDC), e-cigarette usage is currently at 20.8% among non-Hispanic multiracial students. In comparison to their peers, these numbers are higher; 18.4% of non-Hispanic White students, 18.2% of Hispanic students, 15.4% of non-Hispanic American Indian/Alaska native students, and 12.9% of non-Hispanic Black or African American students are reported to use e-cigarettes.[6] Furthermore, the 2021 Youth Risk Behavior Survey indicates that electronic vapor products (EVPs) are used by 36.8% of multiracial high school students.[7] These rates are comparable to the usage rates among White students (36.7%) and Hispanic students (40.4%) but higher than the rates among Black students (33.6%) and American Indian/Alaska native students (33.5%).[7]

A significant concern is the emerging pattern of high e-cigarette use among multiracial youth, particularly among multiracial girls.[8] This phenomenon is underscored by a report based on the 2014-2017 National Youth Tobacco Surveys (NYTS), which revealed that multiracial youth ranked third highest in terms of ever using any tobacco products, following only Native Hawaiians/Other Pacific Islanders and American Indian/Alaska native youth.[9] These findings indicate a pressing need to investigate the prevalence and underlying factors contributing to e-cigarette use within this demographic.

Given the growing concerns surrounding e-cigarette use among multiracial youth and the evolving landscape of risk and protective factors, the current study aims to address these issues through a secondary data analysis of the 2020 Student Drug Use Survey.[10] By examining the prevalence of e-cigarette use and identifying the factors associated with its uptake among multiracial youth, the research study seeks to contribute valuable insights into the ongoing discourse on youth tobacco product use and to inform targeted interventions and policy measures to address this pressing public health concern. Specifically, the research questions analyzed are (1) What is the extent of e-cigarette use among multiracial youth? (2) Does e-cigarette use differ based on parental factors, school factors, involvement in risky behaviors, ease of access, perceived harm to self, perceived harm to others, and demographics (sex, age, employment status, and grade) among multiracial youth?

## METHODS

### Study Design

The current cross-sectional study utilizes a secondary data analysis from the biannual Student Drug Use Survey conducted by the Coalition for a Drug-Free Greater Cincinnati Interact for Health.[10] The questionnaire assesses various health risk behaviors among adolescents, including substance use, gang involvement, and violence. Institutional review board review for nonhuman research was obtained before analyzing the data.

### Participants

The participants included adolescents in the 7th through 12th grades recruited from 77 local and private schools in the Greater Cincinnati area. This study's sample was restricted to multiracial adolescents, resulting in a total sample size of 3340.

### Instrument

The Student Drug Use Survey for grades 7th through 12th, a nationally recognized tool for evaluating substance use and other high-risk behaviors, was administered to students. The current study utilized data from the 2020 survey, focusing on specific sections related to e-cigarette use, prosocial and risky behaviors, parental factors, school factors, ease of access, perceived harm to others and self, and sociodemographic factors among multiracial youth. Past-year e-cigarette use: participants' e-cigarette usage in the past year was assessed using the question, "Within the past year, how often have you used an electronic vapor product?" Prosocial factors and risky behaviors: the survey assessed 5 items each for prosocial, such as taking part in school sports teams, and risky behaviors, such as taking part in gang activities. Parent and school factors: the parent factors section included parent communication, rules, and enforcement. The school factors section also included 3 items about school rules, teacher discussions about rules, and rules enforcement. Ease of access, perceived harm to others, and perceived harm to self: perceived harm to self and others was analyzed by asking students how electronic vapor products harm them and other people. Ease of access was assessed by asking participants how easy it was to get all tobacco products such as cigarettes, e-cigarettes, smokeless tobacco, etc. Demographic and background information included race, sex, age, employment status, and grade.

### Data Analysis

All data analyses were conducted using IBM SPSS statistical software package (version 28.0). The data were dichotomized, with 1 indicating involvement in the behavior and 0 indicating nonparticipation. Descriptive statistics, including frequency distributions, means, standard deviations, and ranges, were calculated for demographic characteristics and the prevalence of e-cigarette

use. Univariate logistic regression analyses were performed to compute odds ratios, specifically examining the relationship between e-cigarette use and various risk and protective factors. Significant variables were retained and incorporated into a final logistic regression model.

## RESULTS

Table 1 provides the demographic bifurcation and descriptive characteristics of the participants. The sample comprised 3340 participants, with an approaching equal distribution between females and males. Specifically, 1708 participants (52%) identified as female, and 1575 (48%) identified as male. Participants were distributed across 2 grade categories: 7th and 8th grades and 9th through 12th grades. There were 1357 participants (40.6%) in the 7th and 8th grades category and 1983 participants (59.4%) in the 9th through 12th grades category. Regarding employment status, 2520 participants (76.9%) reported not having a job, while 759 participants (23.1%) reported having a job. Furthermore, the ease of access to e-cigarettes was assessed, with 1772 participants (58.8%) indicating no ease of access and 1241 participants (41.2%) indicating ease of access. The reported percentages reflect valid responses for each demographic characteristic, with missing data excluded from the denominator.

Among the total sample, a notable proportion of 667 (20%) reported using e-cigarettes in the past year. Further examination of the data revealed gender disparities, with 375 (23.1%) females reporting e-cigarette use compared to 218 (19.4%) males. Additionally, e-cigarette use appeared to increase with higher grade levels, as 511 (27.8%) youth in 9th through 12th grades reported usage, whereas 156 (12.1%) in 7th and 8th grades reported the same. Employment status also played a role, with 226 (32.4%) of those with jobs reporting e-cigarette use compared to those without employment. Moreover, 396 reported low parental factors (26.7%), and 356 reported school factors (22.9%) were associated with higher rates of e-cigarette use among multiracial youth.

The univariate logistic regression was employed to analyze the e-cigarette use against the risk and protective factors (Table 2). There was a significant difference in past-year e-cigarette use by gender ($\chi^2 = 6.243$, $p = .012$). Female respondents reported a significantly higher usage rate (23.1%) than males (19.4%). Of the participants who perceived e-cigarette use as harmful to others, 14.7% reported using e-cigarettes in the past year, whereas 34.8% of those who did not perceive harm reported past-year use. The odds ratio indicates that those who do not perceive harm are 3.1 times more likely to use e-cigarettes (OR = 3.103, 95% CI [2.586, 3.723]). Similarly, among respondents who perceived e-cigarette use as harmful, 15.8% reported past-year use, compared to 35.4% of those who did not perceive harm. The odds of using e-cigarettes were almost 3 times higher for those who did not perceive harm (OR = 2.911, 95% CI [2.421, 3.500]). Among those who found it easy to access e-cigarettes, 37.6% reported past-year use, compared to 9.5% of those who did not find it easy. The odds of past-year use were significantly higher for those with easier access (OR = 5.753, 95% CI [4.725, 7.005]). Higher-grade students (9th-12th) reported a higher usage rate (27.8%) compared to 7th/8th grade students (12.1%). The odds of past-year use were higher for

**Table 1. Demographic Characteristics of the Multiracial Youth**

| Variable | | Frequency (*n*) | Percent (%) |
|---|---|---|---|
| Sex | | | |
| | Female | 1708 | 52.0 |
| | Male | 1575 | 48.0 |
| Grade | | | |
| | $7^{th}$–$8^{th}$ | 1357 | 40.6 |
| | $9^{th}$–$12^{th}$ | 1983 | 59.4 |
| Employment status | | | |
| | No | 2520 | 76.9 |
| | Yes | 759 | 23.1 |
| Parent factors | | | |
| | High parent factors | 1440 | 48.3 |
| | Low parent factors | 1543 | 51.7 |
| School factors | | | |
| | High school factors | 1448 | 47.2 |
| | Low school factors | 1623 | 52.8 |
| Prosocial activities | | | |
| | High prosocial factors | 1430 | 46.8 |
| | Low prosocial factors | 1626 | 53.2 |
| Risky behaviors | | | |
| | Low risky behaviors | 1337 | 44.8 |
| | High risky behaviors | 1646 | 55.2 |
| Perceived harm to self | | | |
| | Harmful | 2226 | 73.3 |
| | No harm | 809 | 26.7 |
| Perceived harm to others | | | |
| | Harmful | 2049 | 68.4 |
| | No harm | 947 | 31.6 |
| Ease of access | | | |
| | No ease of access | 1772 | 58.8 |
| | Ease of access | 1241 | 41.2 |

**Table 2. Univariate Logistic Regression Analysis Reporting Odds Ratios for e-Cigarette Use in Past Year**

| Variables | $\chi^2$ | *p* | Odds Ratio (*OR*) | 95% Confidence Interval Lower | Upper |
|---|---|---|---|---|---|
| Perceived harm to others (*Harmful*/No Harm) | 156.415 | <.001 | 3.10 | 2.58 | 3.72 |
| Perceived harm to self (*Harmful*/No Harm) | 135.731 | <.001 | 2.91 | 2.42 | 3.50 |
| Ease of access (*No*/Yes) | 344.478 | <.001 | 5.75 | 4.72 | 7.00 |
| Sex (*Female*/Male) | 6.243 | .012 | 0.80 | 0.67 | 0.95 |
| Grade (*7th–8th*/9th–12th) | 110.122 | <.001 | 2.78 | 2.28 | 3.38 |
| Employment status (*No*/Yes) | 64.602 | <.001 | 2.15 | 1.78 | 2.60 |
| Parental factors (*High*/Low) | 37.913 | <.001 | 1.75 | 1.46 | 2.10 |
| School factors (*High*/Low) | 1.652 | .199 | 1.12 | 0.94 | 1.33 |
| Prosocial activities (*High*/Low) | 19.752 | <.001 | 1.49 | 1.25 | 1.79 |
| Risky behavior (*Low*/High) | 477.224 | <.001 | 18.24 | 13.10 | 25.39 |

Except for school factors ($p = 0.199$), all the variables were significant at $p < 0.05$. The italics denote reference categories.

older students. Employment status was also significantly related to past-year e-cigarette use ($\chi^2 = q64.602$, $p < .001$). Those with low parent factors reported higher usage (26.7%) than those with high (17.2%). The odds ratio for low versus high parent factors was 1.756 (95% CI [1.466, 2.103]). Both high and low school factors groups showed similar usage rates, with no substantial difference in odds ratios (OR = 1.121, 95% CI [0.942, 1.335]). A significant relationship was observed between prosocial activities and past-year e-cigarette use ($\chi^2 = 19.752$, $p < .001$). Those with low prosocial activities had higher usage rates (24.6%) than those with high prosocial activities (17.9%). Students with high risk behaviors reported much higher usage rates (36.7%) compared to those with low risky behaviors (3.1%). The odds ratio for low versus high risky behaviors was 18.240 (95% CI [13.102, 25.395]), indicating a strong correlation.

A logistic regression analysis (Table 3) evaluated the association between various predictor variables and past-year e-cigarette use among students. The predictor variables included sex, grade, employment status, parent factors, prosocial activities, risky behaviors, perceived harm of e-cigarettes, perceived harm to others from e-cigarettes, and ease of access to e-cigarettes. The final model was statistically significant, $\chi^2$ (9, 2344) = 705.030, $p < .001$. The model explained 26.0% (Cox-Snell $R^2$) to 39.9% (Nagelkerke $R^2$) of the variance in the past-year of e-cigarette use and correctly classified 82.0% of cases. Significant predictors of past-year's e-cigarette use included sex, grade, employment status, prosocial activities, risky behaviors, perceived harm of e-cigarettes, perceived harm to others from e-cigarettes, and ease of access to e-cigarettes. Male students were less likely to use e-cigarettes in the past-year than female students. Students in higher grades, those with jobs, and those engaged in fewer prosocial activities were more likely to use e-cigarettes. High risky behavior scores significantly increased the likelihood of e-cigarette use. Additionally, students who perceived e-cigarettes and their effects on others as less harmful and those who found e-cigarettes easier to access were more likely to use them. Parental factors were not a significant predictor in this model.

## DISCUSSION

The present study examined the demographic and psychosocial factors associated with e-cigarette use among a sample of 3340 multiracial youth. The findings uncovered a significant proportion (20%) of participants reporting past-year e-cigarette use, reflecting a concerning trend among this sample. Notably, gender disparities emerged, with a higher percentage of females (23.1%) reporting e-cigarette use compared to males (19.4%), aligning with previous research indicating gender differences in e-cigarette use. This finding suggests a need for targeted interventions tailored to the unique risk profiles of female youth.[11] Use of e-cigarettes was higher with higher grade levels and older students, which was consistent with prior studies. Employment status also played a role, with employed individuals exhibiting higher odds of e-cigarette use, indicating that employment may facilitate both the means and opportunity for e-cigarette use.[2]

The univariate logistic regression analysis further elucidated significant differences in past-year e-cigarette use by various factors, including gender, perceived harm of e-cigarettes, ease of access, grade level, and employment status. Notably, perceptions of harm and accessibility emerged as influential factors, underscoring the importance of addressing misconceptions and regulating access to e-cigarettes among youth.[8] The subsequent logistic regression analysis confirmed the significance of these predictors in predicting past-year e-cigarette use, explaining a substantial proportion of the variance in usage. Interestingly, parental factors did not emerge as significant predictors in this model, suggesting that other factors may play a more prominent role in influencing e-cigarette use among multiracial youth.[9]

The presence of functional peer networks was identified as a crucial factor influencing e-cigarette use behavior, highlighting the significance of peer influence in shaping youth behavior. Adolescents with peers who use e-cigarettes may be more susceptible to engaging in e-cigarette use themselves, emphasizing the need to address peer influence in prevention efforts.[5] Despite the observed influence of peer networks, parental factors did not

**Table 3. Logistic Regression Model Assessing E-Cigarette Use as Dependent Variable**

| Variable | β | SE | Wald | *p* | Adjusted Odds Ratios | 95% CI |
|---|---|---|---|---|---|---|
| Sex | -0.431 | 0.121 | 12.676 | <.001* | 0.650 | [0.513, 0.824] |
| Grade | 0.406 | 0.140 | 8.390 | .004* | 1.501 | [1.140, 1.975] |
| Employment status | 0.373 | 0.133 | 7.837 | .005* | 1.452 | [1.118, 1.886] |
| Parental factors | 0.056 | 0.121 | 0.213 | .644 | 1.058 | [0.834, 1.341] |
| Prosocial activities | 0.278 | 0.121 | 5.271 | .022* | 1.320 | [1.041, 1.674] |
| Risky behaviors | 2.325 | 0.198 | 138.182 | <.001* | 10.223 | [6.938, 15.062] |
| Perceived harm to self | 0.505 | 0.146 | 11.959 | <.001* | 1.658 | [1.245, 2.208] |
| Perceived harm to others | 0.734 | 0.141 | 27.092 | <.001* | 2.082 | [1.580, 2.745] |
| Ease of access | 1.339 | 0.127 | 111.636 | <.001* | 3.815 | [2.976, 4.891] |

* denotes variables significant at $p < 0.05$, *df = 1 for all variables.*

significantly predict e-cigarette use in the final model. This finding underscores the need for further exploration of cultural influences and parenting styles that may moderate the association between parental factors and e-cigarette use among multiracial youth.

In conclusion, this study sheds light on the complex interplay of demographic and psychosocial factors in e-cigarette use among multiracial youth. The findings underscore the need for targeted interventions addressing gender-specific risk factors, perceptions of harm, accessibility, and peer influence to mitigate the rising prevalence of e-cigarette use in this population. Future research should prioritize this demographic to develop more effective prevention and intervention strategies tailored to the unique needs of multiracial youth.[7]

## PUBLIC HEALTH IMPLICATIONS

The findings carry significant implications for addressing e-cigarette use among multiracial youth and potentially mitigating multiple health risk behaviors. Current results underscore the potential effectiveness of strengthening protective factors to combat e-cigarette use and other health risk behaviors among multiracial youth.[5] By enhancing prosocial factors, parental engagement, and school support systems, interventions can be tailored to empower multiracial youth to make healthier choices. Schools can play a pivotal role by implementing programs designed to build resilience, promote positive peer relationships, and educate on the risks associated with e-cigarette use. There is a pressing need for targeted parental education sessions within schools to raise awareness about the impact of secondhand smoke and how parental actions can influence e-cigarette use among youth. Parents influence their children's attitudes and behaviors, including their choices regarding e-cigarettes. Equipping parents with knowledge and strategies to address this issue can lead to more informed decision-making within families and potentially reduce e-cigarette use among multiracial youth.

Moreover, integrating culturally sensitive approaches into prevention and intervention efforts is essential for effectively addressing e-cigarette use among multiracial youth. Acknowledging and respecting diverse cultural backgrounds can enhance the relevance and acceptability of interventions within these communities. Collaborative efforts involving community stakeholders, cultural leaders, and health care professionals are vital for developing culturally tailored strategies that resonate with multiracial youth and their families. Furthermore, leveraging digital technologies and social media platforms can enhance the reach and impact of prevention efforts targeting multiracial youth. Interactive online resources, social media campaigns, and mobile applications can provide accessible and engaging platforms for delivering evidence-based information, promoting healthy behaviors, and fostering peer support networks. Harnessing digital tools can facilitate proactive engagement with diverse youth populations and facilitate ongoing communication and support.

In conclusion, addressing e-cigarette use among multiracial youth requires a comprehensive, multifaceted approach that integrates protective factors, parental involvement, cultural sensitivity, and innovative digital strategies. By implementing targeted interventions and fostering collaborative partnerships across sectors, we can work toward reducing e-cigarette use and promoting the health and well-being of multiracial youth now and in the future.

### Recommendations for Future Research

The current study provides valuable insights into the demographic and psychosocial factors associated with e-cigarette use among multiracial youth. However, several avenues for future research warrant exploration to deepen the understanding of this complex phenomenon and inform more effective prevention and intervention strategies. Longitudinal designs would enable researchers to examine how these factors evolve and their impact on e-cigarette initiation, frequency, and cessation behaviors. Qualitative research methods, such as focus groups and in-depth interviews, can provide valuable insights into the underlying motivations, perceptions, and social dynamics influencing e-cigarette use among multiracial youth. Qualitative approaches allow for a deeper exploration of subjective experiences and contextual factors that quantitative measures may not capture fully.

Furthermore, investigating the role of cultural factors and ethnic identity in e-cigarette use among multiracial youth is crucial. Cultural beliefs, values, and norms may shape attitudes toward e-cigarette use and influence behaviors differently across diverse

ethnic groups. Future research should adopt a culturally sensitive approach to examine how cultural factors intersect with other risk and protective factors to influence e-cigarette use patterns. Additionally, exploring the impact of targeted interventions and policy measures on reducing e-cigarette use among multiracial youth is imperative. Intervention studies evaluating the effectiveness of school-based programs, community outreach initiatives, and regulatory policies can provide valuable insights into the most efficacious strategies for preventing and reducing e-cigarette use in this population. Moreover, given the rapid evolution of e-cigarette products and marketing strategies, ongoing surveillance and monitoring efforts are essential to track trends in e-cigarette use and identify emerging patterns of use among multiracial youth. Longitudinal surveillance studies can inform timely interventions and policy responses to address evolving e-cigarette prevention and control challenges.

In conclusion, future research should adopt a multidisciplinary approach integrating quantitative and qualitative methods to comprehensively understand the determinants of e-cigarette use among multiracial youth comprehensively. By addressing the knowledge gaps identified in this study, researchers can develop more nuanced and practical strategies to combat the growing public health threat posed by e-cigarette use in diverse youth populations.

### Limitations

Despite the valuable insights gained from this study, several limitations must be acknowledged when interpreting the results. Firstly, the cross-sectional nature of this study prevents the establishment of causal relationships. While there are identified associations between various factors and e-cigarette use among multiracial youth, the causation cannot be inferred. Longitudinal studies are needed to explore the temporal sequence of these relationships and provide a more robust basis for causal inferences. Secondly, the possibility of social desirability bias must be acknowledged. Some participants may have responded to survey questions in a manner they perceived as socially desirable rather than providing completely accurate information. This bias could potentially influence the reported prevalence of e-cigarette use and the factors associated with it. Lastly, the generalizability of our findings may be limited to multiracial youth in the specific geographical location where the study was conducted. Multiracial populations can exhibit significant diversity in terms of cultural, social, and environmental factors, which may affect their patterns of e-cigarette use differently in other regions. Therefore, caution should be exercised when applying these results to multiracial youth populations in different locations.

### Conclusion

In summary, the present study contributes valuable insights into e-cigarette use among youth, emphasizing the critical roles of peer networks, parental influences, and perceptions of harm as determinants of this behavior. These findings underscore the imperative for a holistic approach to tackling e-cigarette use among multiracial youth, centered on fostering positive peer dynamics and strengthening parental involvement while simultaneously addressing factors that contribute to the allure and accessibility of e-cigarettes. Through collaborative efforts in public health interventions, policymakers, educators, and health care professionals can strive to mitigate the health disparities linked to e-cigarette use within this vulnerable demographic. By prioritizing multifaceted strategies targeting individual and environmental influences, we can endeavor toward a healthier future for multiracial youth, where e-cigarette use is minimized and overall well-being is optimized.

### CONFLICTS OF INTEREST

The authors have no relevant financial or nonfinancial interests to disclose.

### ACKNOWLEDGMENTS

Funding. The authors declare that no funds, grants, or other support were received during the preparation of this manuscript.

Competing Interests

Data Availability. The data can be requested from PreventionFirst! (https://www.prevention-first.org/home/).

Ethics Approval. This study uses secondary data. No ethical approval is required for this secondary analysis.

Ethics Declarations. All procedures performed in this study were under the ethical standards of the University of Cincinnati institutional review board and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The author and the coauthors completed the National Institutes of Health (NIH) "Protecting Human Research Participants" before conducting the study.

Consent to Participate. This study uses secondary data. The PreventionFirst! provided consent to the participants to participate during their data collection period, but this research project did not need it.

### AUTHOR CONTRIBUTION

All authors contributed to the study's conception and design. The corresponding author wrote the first draft of the manuscript, and coauthors commented on previous versions. Rebecca Vidouek conducted the data analysis and was responsible for conceptualizing the manuscript. Kruti Chaliawala wrote the first draft. Rebecca Vidouek and Keith King reviewed and revised the manuscript before submission. All authors read and approved the final manuscript.

### REFERENCES

1. US Department of Health and Human Services. E-cigarette use among youth and young adults: a report of the surgeon general. Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2016. https://www.ncbi.nlm.nih.gov/books/n/surgecigarete/pdf/
2. Gentzke AS, Wang TW, Cornelius M, et al. Tobacco product use and associated factors among middle and high school students – National Youth Tobacco Survey, United States, 2021. *MMWR Surveill Summ.* 2022;71(5):1-29. https://doi.org/10.15585/mmwr.ss7105a1
3. Park-Lee E, Ren C, Cooper M, Cornelius M, Jamal A, Cullen KA. Tobacco product use among middle and high school students—United States, 2022. *MMWR Morb Mortal Wkly Rep*. 2022;71:1429-1435. https://doi.org/10.15585/mmwr.mm7145a1

4. NIDA. Introduction. National Institute on Drug Abuse. August 3, 2021, Accessed May 23, 2024. https://nida.nih.gov/publications/research-reports/tobacco-nicotine-e-cigarettes/introduction
5. Szoko N, Ragavan MI, Khetarpal SK, Chu KH, Culyba AJ. Protective factors against vaping and other tobacco use. *Pediatrics*. 2021;148 (2):e2020048066. https://doi.org/10.1542/peds.2020-048066
6. Birdsey J, Cornelius M, Jamal A, et al. Tobacco product use among US middle and high school students—National Youth Tobacco Survey, 2023. *MMWR Morb Mortal Wkly Rep*. 2023;72:1173-1182. https://doi.org/10.15585/mmwr.mm7244a1
7. Wang TW, Gentzke AS, Neff LJ, et al. Characteristics of e-cigarette use behaviors among US youth, 2020. *JAMA Netw Open.* 2021;4 (6):e2111336. https://doi.org/10.1001/jamanetworkopen.2021.11336
8. Juhan L, Tan ASL. Intersectionality of sexual orientation with race and ethnicity and associations with e-cigarette use status among US youth. *Am J Prev Med.* 2022. https://doi.org/10.1016/j.amepre.2022.06.013
9. Odani S, Armour BS, Agaku IT. Racial/ethnic disparities in tobacco product use among middle and high school students — United States, 2014–2017. *MMWR Morb Mortal Wkly Rep.* 2018;67(34):952-957. https://doi.org/10.15585/mmwr.mm6734a3
10. Coalition for a Drug-Free Greater Cincinnati. 2020 Student Drug Use Survey. Interact for Health. Published 2020.
11. Dutra LM, Glantz SA. E-cigarettes and national adolescent cigarette use: 2004–2014. *Pediatrics*. 2017;e20162450. https://doi.org/10.1542/peds.2016-2450