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To cite this article: Kenneshia Williams, Brenda Dimaya, Tatum McKay, Elizabeth C. Hair & Jessica Rath (2026) Campaign Receptivity Matters for E-Cigarette Use, American Journal of Health Education, 57:5, 332-339, DOI: [10.1080/19325037.2026.2616757](https://doi.org/10.1080/19325037.2026.2616757)

To link to this article: <https://doi.org/10.1080/19325037.2026.2616757>



Published online: 09 Feb 2026.



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Campaign Receptivity Matters for E-Cigarette Use

Kenneshia Williams, Brenda Dimaya , Tatum McKay, Elizabeth C. Hair, and Jessica Rath

Truth Initiative Schroeder Institute

ABSTRACT

Background: Campaign receptivity is critical in public education campaigns seeking to decrease e-cigarette use.

Purpose: This study explored the relationship between campaign receptivity, e-cigarette use, intentions to use, and campaign-targeted beliefs among young people.

Methods: Data were drawn from the Truth Continuous Tracker, a repeated cross-sectional survey of participants residing in the United States from a national online panel. Data were collected between September 2021 and October 2022 ($N = 14,303$; 15–24 years). This time frame corresponds to the launch of the truth mental health messaging campaign, “It’s Messing With Our Heads.”

Results: Results revealed a negative relationship between campaign receptivity score, past 30-day e-cigarette use, and intentions to use. Respondents with higher campaign receptivity had lower odds of past 30-day e-cigarette use (odds ratios ranging from 0.45 to 0.70) and intentions to use (odds ratios ranging from 0.34 to 0.60). Results also revealed a positive association between campaign receptivity and beliefs.

Discussion: Health Educators should design campaigns that influence e-cigarette beliefs and behaviors by emphasizing key aspects that shape the target audience’s response to health messages.

Translation to Health Education Practice: Tailoring e-cigarette prevention campaign messaging to the specific needs of the target audience may enhance receptivity, thereby influencing e-cigarette beliefs, use intentions, and patterns of use.

A AJHE Self-Study quiz is online for this article via the SHAPE America Online Institute (SAOI) <http://portal.shapeamerica.org/trn-Webinars>

ARTICLE HISTORY

Received 17 October 2025

Accepted 10 January 2026

Background

Mass media public education campaigns are effective population-level interventions for preventing tobacco use among youth and young adults (R. M. Davis, 2008; U.S. Department of Health and Human Services, 2012). Public education campaigns have been shown to impact tobacco-related beliefs, with these beliefs influencing tobacco use behaviors in diverse populations (Dutra et al., 2023). When paired with policies that decrease youth access to tobacco products and interventions that assist with quitting, the impact of campaigns on youth outcomes is demonstrated to be greater than intervention alone (Levy et al., 2018). E-cigarettes continue to be a challenge for public education efforts. With few comprehensive marketing restrictions for the industry, the e-cigarette industry has been allowed to aggressively market e-cigarette products to youth and young adults (U.S. Department of Health and Human Services, 2016). In 2023, the National Youth Tobacco Survey found that 10% of high school students and 8% of middle school students reported current e-cigarette use (Birdsey et al., 2023).

There was growing concern about the rise of overall tobacco product use (4.5%–6.6%) and multiple tobacco product use (1.5%–2.5%) among middle school students between 2019 and 2023 (Birdsey et al., 2023) and thus an immediate need to counter the marketing of these harmful products among young people.

Research identifies campaign receptivity as a critical factor in effective countermarketing efforts (Guillory et al., 2020, 2022; Rath et al., 2021). Campaign receptivity reflects how well campaign messages resonate with the target audience, enabling message retention and influencing health behaviors (Hair et al., 2023). Understanding these beliefs helps public health professionals tailor to audience perceptions, increasing relevance and impact (Rath et al., 2022). Tailored messaging enhances receptivity, promotes belief alignment, and drives behavioral change. Consequently, receptivity often precedes shifts in beliefs and can influence intentions and behaviors related to e-cigarette use (Guillory et al., 2022).

The theory of planned behavior (TPB) provides a foundational framework for understanding these

outcomes. TPB posits that attitudes influence behavioral intentions and ultimately behavioral change (Conner, 2001). As it relates to mass media campaigns, increased receptivity can lead to changes in attitudes, which in turn can influence behavioral intentions and change. It is critical to evaluate campaign receptivity in e-cigarette prevention campaigns. Campaigns that resonate with their audience and address relevant beliefs can accelerate various public health behavioral changes, including diminishing the intention and use of e-cigarettes (Hair et al., 2023). Studies have revealed that youth and young adults with greater awareness of e-cigarette prevention campaigns report greater agreement with anti-tobacco beliefs and lower rates of current use (R. M. Davis, 2008; Hair et al., 2025; U.S. Department of Health and Human Services, 2012). However, research is limited. Few studies have explored the relationship between campaign receptivity to e-cigarette prevention messages and youth anti-vaping beliefs or e-cigarette use. This study seeks to fill this gap by assessing the impact of campaign receptivity on e-cigarette use, intentions to use, and campaign targeted beliefs in a youth and young adult population of 15- to 24-year-olds.

Methods

Study sample

This study utilized the Truth Continuous Tracker (CTO), a repeated cross-sectional survey of participants drawn from a national online panel that surveys approximately 300 youth and young adults ages 15–24 years residing in the United States each week. The CTO was established in 2014 to assess truth campaign performance, media use, and tobacco-related beliefs and attitudes in real time. All participants provide informed consent/assent prior to participation. Additional details of the CTO methods have been published elsewhere (Hair et al., 2023). The analytical sample ($N = 14,303$) for this study included participants if (a) they were included in data collection between September 2021 and October 2022 and (b) they had data for all variables of interest (i.e., campaign receptivity, e-cigarette use intentions, and current e-cigarette use). The study time frame was selected because it corresponds to the launch of the truth mental health messaging campaign titled “It’s Messing With Our Heads.” It’s Messing With Our Heads was a tobacco prevention public health media campaign that educated youth and young adults about the connection between e-cigarette use and mental health. The campaign was aired nationally via digital and social platforms and targeted youth and young adults ages 15 to 24 years. It’s Messing With Our

Heads was proven to be cost-effective, and exposure to the campaign led to lower odds of e-cigarette use and intentions to use e-cigarettes (Diaz et al., 2025; Hair et al., 2025). Sampling quotas and survey weights were applied to reflect national demographic benchmarks for age, sex, race and ethnicity. Advarra Institutional Review Board approved the study (Protocol No. Pro00010120). Respondents included in the study reported being aware of at least one truth advertisement on air during the study time frame.

Measures

Campaign receptivity score

The primary independent variable for this analysis was a five-level mean campaign receptivity score. Respondents received the campaign receptivity measure because they were campaign aware. Campaign awareness is defined as reporting awareness of at least one truth advertisement on air during the time period of the study. To measure campaign awareness, respondents were shown collages that included up to six screenshots from all advertisements on air during the study time frame. Three advertisements were selected for this study because they had the highest proportion of media dollars allocated to airing them on digital and social platforms. All three advertisements centered on the association between e-cigarettes and mental health, with messages such as vaping nicotine can amplify feelings of depression and anxiety, vaping nicotine is not a stress reliever, and there are resources to help people quit using e-cigarettes. Campaign awareness was assessed by asking: “These pictures are from multiple ads or videos. How often would you say you have seen any of these ads/videos on TV or online recently?” Answer choices were on a 5-point scale including *never*, *rarely*, *sometimes*, *often*, and *very often*. Respondents answering *sometimes*, *often*, or *very often* were categorized as campaign aware, and answers *never* and *rarely* were categorized as not campaign aware. Awareness was self-reported and averaged across respondents for each week. The weekly aggregated percentage of truth campaign awareness served as a control in the models.

The campaign receptivity measure included two questions: “This campaign gives good reasons not to vape” and “This campaign grabbed my attention.” This measure was adapted from the validated six-item Perceived Effectiveness Scale. Response options ranged from *strongly disagree* (1) to *strongly agree* (5) on a 5-point scale (K. C. Davis et al., 2013, 2017). A five-level campaign receptivity score was created by taking an average of the respondents’ answers. Mean score

ranges included 1.00–2.99, 3.00–3.49, 3.50–3.74, 3.75–3.99, and 4.00–5.00.

E-cigarette use intentions

Intentions to use e-cigarettes was one of four dependent variables included in analyses. Intentions to use was calculated from two items: “Thinking about the future, if one of your best friends offered you e-cigarettes, e-cigars, e-pipes, e-hookahs, personal vaporizers, vape pens, or hookah pens (even one or two puffs) in the coming year, would you use it?” and “Do you think you will use e-cigarettes, e-cigars, e-pipes e-hookahs, personal vaporizers, vape pens, or hookah pens (even one or two puffs) in the next year?” Both questions utilized a 4-point scale from *definitely not* to *definitely yes*. Respondents were considered without intention to use if they answered *definitely not* to both questions and were considered with intention to use if they answered *probably not*, *probably yes*, or *definitely yes* to either item.

Current e-cigarette use

Current e-cigarette use was another dependent variable included in analyses. Current e-cigarette use was calculated from the item “Did you use an e-cigarette at least one day in the past 30 days?” Respondents were considered current e-cigarette users if they answered “yes” to this item.

Targeted beliefs

There were two targeted beliefs included as dependent variables in analyses: “Vaping nicotine can amplify feelings of depression and anxiety” and “Quitting nicotine can improve your mental health.” For both belief items, answers ranged from *strongly disagree* to *strongly agree* on a 5-point scale. For each individual belief item, respondents selecting *strongly disagree*, *disagree*, or *neither agree/disagree* were considered to have a belief that was not campaign aligned and respondents selecting *agree* or *strongly agree* were considered to have a belief that was campaign aligned.

Covariates

Multiple covariates were included to account for confounding in the models: age (15–17, 18–20, 21–24), sex assigned at birth (male, female), race/ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic, another race), perceived financial situation (live comfortably, meet needs with a little left over, just meet basic expenses, do not meet basic expenses), parental tobacco use (yes, one or both smokes/used to smoke; no, neither of them smoke/have smoked). A mental health score was calculated for each participant by

averaging “you have trouble sleeping”; “you are unhappy, sad, or depressed”; and “you have trouble concentrating or paying attention” with a range between *never true* and *often true* on a 4-point scale, with *never* equal to 1 and *often* equal to 4 (Henry & Crawford, 2005; Lovibond & Lovibond, 1995). Sensation-seeking was calculated based on the mean of an eight-item scale with questions related to sensation seeking such as “I would like to try parachute-jumping” and “I like wild parties” (Stephenson et al., 2007).

Statistical analysis

Multilevel model analyses were conducted in MPlus (Muthén & Muthén, 2017). These generalized random coefficient multilevel models were used to account for the two-level structure of data with individuals (roughly 300 a week) nested in weeks (61 weeks). This adjusts for the likelihood that respondents who answered the survey in a particular week were more similar to one another than respondents who answered in different weeks. These models were also able to simultaneously estimate individual-level and week-level effects and provide an estimate of the association between individual-level ad receptivity and week-level ad awareness with individual-level current use of e-cigarettes, intent to vape, and targeted belief outcomes.

Results

Sample characteristics are described in Table 1. Nearly one-third (29%) of the sample was 15 to 17 years, nearly one-third (31%) was 18 to 20 years, and the remainder (40%) were 21 to 24 years. The sample was split evenly by sex assigned at birth (52% male, 48% female), and the majority (48%) were non-Hispanic White. Over half the sample perceived their financial situation as either “meets needs with a little left over” (35%) or “just meets basic expenses” (32%). Nearly half of the sample had a parent who currently or used to use tobacco products (47%). The sample, on average, had poor mental health “some of the time” (mean = 2.75, SE = 0.007). The average sensation-seeking score was moderate (3.28, SE = 0.006).

The majority of the sample (41%) had an average campaign receptivity score above 4, 23% had an average campaign receptivity score between 3.00 and 3.49, 15% had an average score below 3, 14% had an average score between 3.5 and 3.74, and 6.4% had an average campaign receptivity score between 3.75 and 3.99. The average weekly aggregate awareness was 60% (SE = 0.0005).

Table 1. Sample characteristics.

	Analytic sample (N = 14,303, 100.0%)	
	N	Wt.%
Campaign receptivity score		
1.00–2.99	2,182	15.27
3.00–3.49	3,330	23.27
3.50–3.74	1,988	13.88
3.75–3.99	918	6.42
4.00–5.00	5,885	41.16
Age (in years)		
15–17	4,140	29.20
18–20	4,464	30.78
21–24	5,699	40.01
Sex assigned at birth		
Male	7,315	51.88
Female	6,988	48.12
Race/ethnicity		
Non-Hispanic White	6,906	48.32
Non-Hispanic Black/African American	2,221	15.67
Hispanic	3,585	24.87
Other	1,591	11.13
Perceived financial situation		
Does not meet basic expenses	1,345	9.39
Just meets basic expenses	4,591	32.02
Meets needs with a little left over	5,008	35.03
Lives comfortably	3,359	23.55
Parent smoking		
Neither use tobacco	7,575	52.94
One or both currently/used to use tobacco	6,728	47.06
	Weighted mean	SE
Mental health (mean; range = 1–4)	2.75	0.01
Sensation seeking (mean; range = 1–5)	3.28	0.01
Weekly % aggregated truth ad awareness	59.79	<0.01

There was a significant negative association between campaign receptivity score and past 30-day use (odds ratios [ORs] ranging from 0.45 to 0.70), as well as intentions to use (ORs ranging from 0.34 to 0.60; Table 2). Respondents with higher campaign receptivity scores had significantly lower odds of past 30-day use and intentions to vape compared to respondents with a campaign receptivity score less than 3. The higher the campaign receptivity score, the lower the percentage of individuals who used or intended to use e-cigarettes (Figure 1). Three-fourths (74%) of individuals with a campaign receptivity score less than 3 reported intentions to use e-cigarettes and 37% of individuals with a campaign receptivity score less than 3 were current vape users.

Additionally, a significant positive association was found between campaign receptivity score and beliefs that vaping can amplify depression/anxiety (ORs ranging from 1.44 to 5.83) and quitting nicotine can improve your mental health (ORs ranging from 1.32 to 5.01; Table 2). Compared to respondents with a campaign receptivity score less than 3, respondents with higher campaign receptivity scores reported greater agreement with the beliefs. The majority of individuals (86%) with a high campaign receptivity score (greater than 4) agreed that quitting nicotine can

improve your mental health and 82% agreed that vaping can amplify feelings of depression/anxiety (Figure 1).

Discussion

This study revealed a positive relationship between campaign receptivity and beliefs. Specifically, respondents who reported greater receptivity to the truth campaign were also more likely to report agreement with the campaign-targeted beliefs “quitting nicotine can improve your mental health” and “vaping can amplify feelings of depression/anxiety.” This finding supports previous research revealing a positive association between campaign receptivity and agreement with campaign-targeted beliefs (Guillory et al., 2022; Williams et al., 2025; Zhao et al., 2022).

Previous research has explored the relationship between awareness, campaign receptivity, and targeted beliefs. For instance, in their work exploring exposure to the U.S. Food and Drug Administration’s Fresh Empire public education campaign, Guillory et al. (2022) found that greater awareness of the campaign was related to more favorable perceptions of the campaign and increased agreement with campaign-targeted beliefs. Moreover, Zhao et al. (2022), using evaluation data from The Real Cost public education campaign,

Table 2. Regression Analysis Results: Associations between campaign receptivity score and vape behaviors/beliefs.

	Current vape user OR (95% CI)	Intent to vape OR (95% CI)	Vaping nicotine can amplify feelings of depression and anxiety OR (95% CI)	Quitting nicotine can improve your mental health OR (95% CI)
Campaign receptivity score (ref. 1.00–2.99)				
3.00–3.49	0.70*** (0.62, 0.79)	0.60*** (0.54, 0.67)	1.44*** (1.28, 1.61)	1.32** (1.15, 1.51)
3.50–3.74	0.61*** (0.52, 0.71)	0.57*** (0.50, 0.66)	2.51*** (2.18, 2.88)	2.51*** (2.21, 2.86)
3.75–3.99	0.64*** (0.53, 0.77)	0.60*** (0.51, 0.71)	3.35*** (2.80, 4.02)	3.02*** (2.46, 3.71)
4.00–5.00	0.45*** (0.40, 0.50)	0.34*** (0.30, 0.38)	5.83*** (5.23, 6.51)	5.01*** (4.45, 5.64)
Age (in years, ref. 15–17 years)				
18–20 years	1.89*** (1.73, 2.07)	1.70*** (1.57, 1.84)	0.87** (0.80, 0.96)	0.82** (0.73, 0.93)
21–24 years	2.39*** (2.17, 2.63)	2.34*** (2.13, 2.57)	0.76*** (0.70, 0.83)	0.77*** (0.69, 0.85)
Sex assigned at birth (ref. male)				
Female	1.08 (1.00, 1.17)	0.98 (0.91, 1.06)	1.04 (0.96, 1.13)	1.11* (1.01, 1.21)
Race (ref. non-Hispanic White)				
Non-Hispanic Black	0.61*** (0.54, 0.68)	0.91 (0.80, 1.02)	0.72*** (0.65, 0.80)	0.63*** (0.56, 0.70)
Hispanic	0.76*** (0.70, 0.83)	1.14** (1.05, 1.23)	0.85*** (0.77, 0.93)	0.80*** (0.73, 0.88)
Another race	0.69*** (0.61, 0.79)	0.81*** (0.72, 0.90)	0.99 (0.88, 1.13)	0.98 (0.87, 1.11)
Perceived financial situation (ref. lives comfortably)				
Does not meet basic expenses	1.41*** (1.20, 1.66)	1.35*** (1.20, 1.52)	0.76*** (0.66, 0.87)	0.69*** (0.59, 0.80)
Just meets basic expenses	1.43*** (1.28, 1.59)	1.63*** (1.49, 1.79)	0.73*** (0.67, 0.81)	0.66*** (0.58, 0.74)
Meets needs with a little left over	1.29*** (1.17, 1.42)	1.37*** (1.26, 1.48)	0.95 (0.87, 1.04)	0.98 (0.88, 1.09)
Parent smoking (ref. neither of them use tobacco)				
One or both currently/used to use tobacco	1.66*** (1.52, 1.81)	1.67*** (1.57, 1.78)	0.75*** (0.70, 0.82)	0.85*** (0.77, 0.93)
Mental health	1.22*** (1.16, 1.29)	1.33*** (1.27, 1.40)	1.22*** (1.16, 1.29)	1.17*** (1.11, 1.24)
Sensation seeking	1.71*** (1.62, 1.81)	1.73*** (1.64, 1.82)	0.96 (0.91, 1.00)	1.01 (0.96, 1.06)
Weekly % aggregated truth ad awareness	0.43 (0.17, 1.08)	0.67 (0.31, 1.45)	3.20* (1.26, 8.10)	1.45 (0.60, 3.53)

CI = confidence interval.†Combined response category.

** $p < .01$. *** $p < .001$

demonstrated that respondents reacting to the campaign more favorably were also more likely to agree with the campaign-targeted beliefs. Though research has examined the relationship between awareness, campaign receptivity, and targeted beliefs, little work has explored campaign receptivity's impact on tobacco use intentions or behaviors. This study expands the literature by exploring the relationship between campaign receptivity and tobacco-related behavioral outcomes. Results revealed a negative relationship between campaign receptivity and past 30-day e-cigarette use, as well as campaign receptivity and intentions to use. Respondents who reported greater campaign receptivity to the truth campaign were less likely to report past 30-day e-cigarette use, as well as less likely to have intentions to use e-cigarettes in the next year. Findings suggest that campaign receptivity can decrease e-cigarette use intentions and use behaviors in a youth and young adult sample.

This study is not without limitations. All data were self-reported. Self-reported exposure data introduce the possibility that some respondents saw the ads but did not remember them because they were less receptive to them, compared to more receptive respondents. Self-reported tobacco use

and intentions may increase the possibility of underreporting (Chan et al., 2023). A final limitation was the cross-sectional design, limiting the ability to examine the impact of receptivity on outcome variables across time.

Campaign receptivity has been used as a tool to assess audience reactions to public education campaign (Duke et al., 2015; Rath et al., 2021). One of the most critical factors influencing overall effectiveness of public education campaigns is the audience's ability to resonate with the creative content and messaging strategies. Campaign messages that align with the values, beliefs, and lived experiences of the target audience are more likely to capture attention, be retained in memory, and inspire action. To increase audience receptivity to public education campaigns, campaign messages should be tailored to align with "passion points" or areas of high personal relevance to the target audience (Zhao, 2020). Moreover, it is essential to understand the relationship between campaign receptivity and desired campaign outcomes. This relationship provides key insight into why some campaigns effectively shift attitudes, beliefs, and behaviors while others may not. Analyzing receptivity through the campaign life cycle can provide

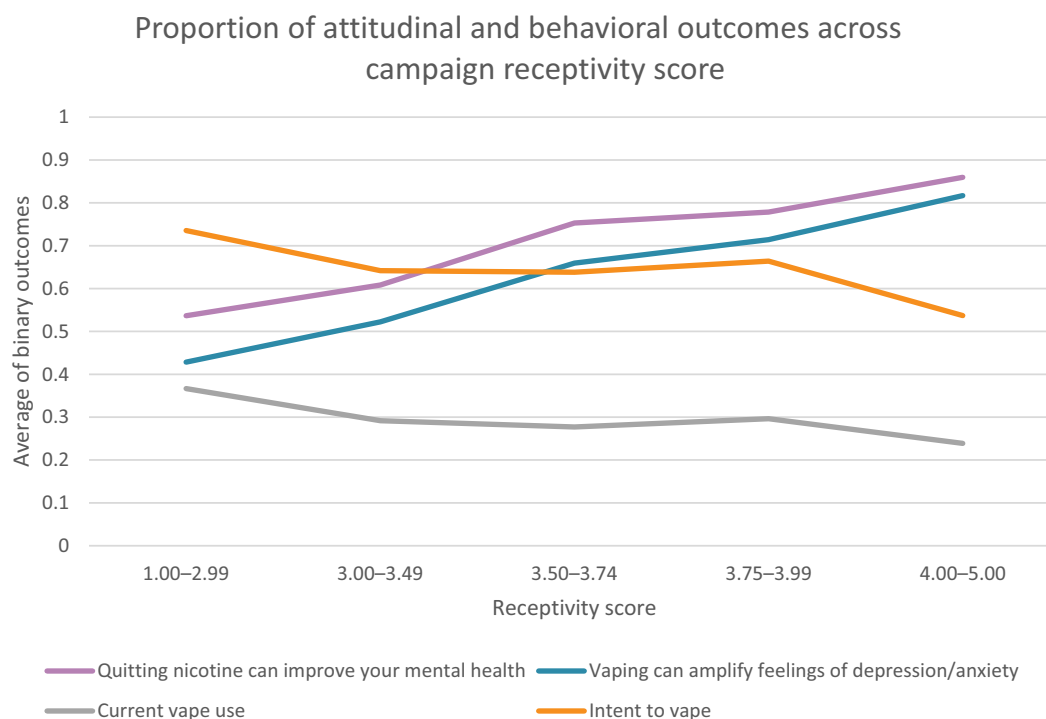


Figure 1. Attitudinal and behavior outcomes across campaign receptivity scores.

insight into which aspects of the campaign are most impactful and allow for strategies to be refined accordingly. A comprehensive understanding of this relationship enables the development of more effective marketing strategies that target the specific beliefs, attitudes, and behavioral intentions most susceptible to influence. As such, campaign receptivity can be used as a guiding metric, informing the iterative optimization of public education campaigns and real-world impact on public health behaviors and outcomes.

Translation to Health Education Practice

E-cigarette use continues to have detrimental effects on population health outcomes, presenting ongoing challenges for public Health Education efforts. Evidence indicates that e-cigarette prevention campaigns that resonate with their target audience are effective in reducing e-cigarette use. The current study underscores the importance of campaign receptivity in reducing both e-cigarette use and intentions to use. These findings have important implications for Health Educators and Certified Health Education Specialists in tailoring e-cigarette prevention campaign messaging to address the specific needs of target audiences.

This study aligns with three areas of responsibility for Health Education Specialists identified by the National

Commission for Health Education Credentialing: Area I (Assessment of Needs and Capacity), Area IV (Evaluation and Research), and Area VIII (Ethics and Professionalism). Area I: 1.1.1 (define the purpose and scope of the assessment), 1.1.2 (identify priority population(s)), 1.2.1 (identify primary data, secondary data, and evidence-informed resources), 1.2.3 (conduct a literature review), 1.2.6 (identify data gaps), 1.2.9 (develop a data analysis plan), 1.3.2 (determine the knowledge, attitudes, beliefs, skills, and behaviors that impact the health and health literacy of the priority population[s]). Area IV: 4.2.1 (determine purpose, hypotheses, and questions), 4.2.2 (comply with institutional and/or IRB requirements for research), 4.2.3 (use a logic model and/or theory for research), 4.2.6 (develop a sampling plan and procedures for data collection, management, and security), 4.2.7 (select quantitative and qualitative tools consistent with assumptions and data requirements), 4.3.4 (monitor data collection procedures), 4.3.5 (prepare data for analysis), 4.3.6 (analyze data), 4.4.1 (explain how findings address the questions and/or hypotheses), 4.4.2 (compare findings to other evaluations or studies), 4.4.3 (identify limitations and delimitations of findings), 4.4.4 (draw conclusions based on findings), 4.4.5 (identify implications for practice), 4.4.6 (synthesize findings), 4.4.7 (develop recommendations based on findings), 4.5.1 (communicate findings by preparing reports and presentations, and by other

means), 4.5.2 (disseminate findings). Area VIII: 8.1.1 (apply professional codes of ethics and ethical principles throughout assessment, planning, implementation, evaluation and research, communication, consulting, and advocacy processes; National Commission for Health Education Credentialing, 2020).

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Data availability statement

A data sharing agreement is required for the use of all data. Truth Initiative does not share data with tobacco industry representatives or affiliated researchers. Investigators seeking access to data used in the study should make a written request to Truth Initiative authors and submit a detailed research plan including the purpose of the proposed research, required variables, duration of the analysis phase, and institutional review board approval with Federalwide Assurance (FWA) information and documentation of investigator training in human subjects. Approved investigators may access data sets via an analytic portal owned and administered by Truth Initiative.

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