

## Assessing AVOID: A prevention program to curb youth vaping

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### Background

Since their introduction to the marketplace only a decade ago, electronic cigarettes (more commonly called vapes) have been rapidly adopted for use by youth, creating a public health epidemic. In the U.S., from 2017 to 2018, vaping by youth increased by 78 percent. Now, more than 3.6 million middle and high school students – roughly one in five high school students and one in twenty middle school students – have vaped in the past year.<sup>1</sup> Vapes are the most commonly used tobacco delivery product among youth and show youth usage rates substantially higher than any other drugs of abuse.

Vapes include a variety of electronic devices that use a battery to heat a metal coil that in turn heats a liquid to create an inhalable aerosol of nicotine, flavorings, and other chemicals.<sup>1,2</sup> Vapes are easily concealed because they mimic innocuous devices like USB flash drives. The high popularity of vapes and their easy concealment make vaping a substantial concern in schools.<sup>3</sup> According to a recent survey, nearly one in five students aged 12 to 17 saw another student use a JUUL, a popular brand of vape in school.<sup>4,5</sup>

What is more, emerging research has begun to document the harmful effects of vaping. Many vapes, even those claiming to be nicotine free, can contain nicotine,<sup>6</sup> which is especially addictive to youth and their developing brains.<sup>7</sup> With and without nicotine, vapes can expose their users to toxic chemicals,<sup>8</sup> which can permanently damage the lungs,<sup>9,10</sup> and deliver metal particles to the lungs.<sup>11,12</sup> Worse, youth who vape are more likely to eventually smoke traditional cigarettes,<sup>7</sup> whose deleterious health effects are well documented, than non-vapers.

While rapid increases in vaping prevalence among youth have certainly captured the attention of policy makers, prevention practitioners, and the media, the emergence of a new vaping-related respiratory illness, afflicting mostly young people and characterized by severe symptoms and sudden onset, exploded into public awareness in Summer 2019. To date, nearly 2,000 people are registered in CDC's surveillance systems as diagnosed with "e-cigarette, or vaping, product use associated lung injury" (EVALI), and to date, there have been 37 deaths across 24 states.<sup>13</sup> A majority of EVALI cases reported to the CDC involved patients under 35 years old.<sup>13</sup> The overarching commonality among those diagnosed with EVALI is past use of a vaping device.

Taken together, the prevalence of youth vaping, vaping's potential for long term health consequences, and the documented risk of sudden onset, life-threatening, respiratory illness from vaping, have underscored the need for comprehensive, effective, and evidence-based vaping prevention programs for youth. Youth are the most common user of vapes and the most at-risk for the harmful and lasting effects of vaping.

With funding from the National Institute on Drug Abuse (NIDA), KDH Research and Communication developed and evaluated the AVOID (Anti-Vaping Online Information Dissemination) program, a video- and discussion-based vaping prevention toolkit that is implemented by youth-serving, community-based organizations and schools. AVOID is targeted to middle and high schools students and anchored by five brief educational videos that cover multiple topics, beginning with an overview of AVOID, reviewing the documented

health risks of vaping, and concluding that the known risks of vaping, particularly for youth, are real, substantial, and ever-growing as more research emerges.

To reduce youth vaping, AVOID aims, as a first step, to change youth knowledge and understanding of vapes. With increased knowledge, we hypothesize that youth will exhibit more protective attitudes against vapes and greater self-efficacy and intentions to resist vaping. In this research brief, we report the results of a two-group, pretest/posttest feasibility study that assesses a prototype of AVOID to increase youth's knowledge, heighten perceived risk, promote protective attitudes, increase self-efficacy to refuse vapes, and decrease intentions to use vapes. The prototype consists of a rough-cut video with all the key messages planned for the full version of AVOID. The final version of AVOID will be released in late November 2019 and research on its effectiveness will follow.

## Methods

We sampled a national population of youth aged 12 to 16 and used a two-group, pretest/posttest approach to collect survey data from 152 youth in May and June of 2018. We randomly assigned youth to treatment and control groups and exposed those in the treatment group to the AVOID prototype and those in the control group to a placebo that contained no vaping information. During data collection, we asked each participating youth several questions at pretest and posttest on their knowledge about vaping; protective attitudes about vaping; assessment of their personal risk from vaping; self-efficacy to avoid vaping; and intentions to avoid vaping. We then created composite scores for each category of questions that statistically calculates survey responses as a single score, ranging from zero to 100. For example, a composite score of 100 on knowledge of vaping means that the participant answered all knowledge survey questions correctly. We created composite scores at pretest and posttest and calculated their differences, which serve as the key dependent variables in this study.

The study's chief independent variable is exposure to the AVOID prototype. We also collected and empirically modeled several demographic and social variables to control for the relationship between exposure to AVOID and the four key dependent variables, namely, composite changes in knowledge, protective attitudes, risk assessment, self-efficacy, and intentions. Examining the demographic and social differences between treatment and control group participants reveals no major differences. In fact, there are no statistically significant differences by age, grade, gender, race, Hispanic origin, parental education level, and a host

of other factors between those exposed to the AVOID prototype and those who received the placebo. The only exception is that those in the treatment group were significantly less likely to report that their siblings vape. Despite this finding, overall, the differences in population characteristics are generally minor and provide the analytic basis for attempting to isolate the effect of the exposure to the AVOID prototype with changes in knowledge, protective attitudes, risk assessment, self-efficacy, and intentions to vape.

We built two multivariate models to assess the relationship between exposure to the AVOID prototype and composite changes in knowledge, protective attitudes, risk assessment, self-efficacy, and intentions, respectively. The first model controlled for participants' demographic characteristics. The second model controlled for participants' social characteristics. In each case, we tested and found no statistical violations of our multivariate assumptions.

## Findings

Taken on the whole, the multivariate models reveal several significant findings about the AVOID prototype.

- Even when controlling for demographic and social characteristics, there remain statistically significant relationships between exposure to AVOID and changes in knowledge about vaping ( $p < 0.01$ ).
- Similarly, we found strong relationships between exposure to AVOID and composite score changes in perceived risk of vaping and intentions to avoid vaping when controlling for either participants' demographic or social characteristics. For risk assessments, the effects of AVOID exposure are significant at the 99.99 percent confidence level. For intentions to avoid vaping, the confidence levels equal 99.00 percent.
- We found a weak, though significant relationship between exposure to AVOID and changes in protective attitudes at the 97.00 percent confidence level when controlling for participants' demographic characteristics. We found no such significant relationship when controlling for social characteristics.
- Like the bivariate findings, we found no statistically significant effects of AVOID exposure on changes in self-efficacy to refuse vaping when controlling for demographics and social characteristics. Though, the

relationships are positive, we cannot be certain that the coefficients are not attributable to error or other factors.

## Discussion

We found significant, predictive relationships between survey participants' exposure to the AVOID prototype and changes in knowledge about vaping, their understanding of the harmful risks of vaping, and their intentions to avoid vaping, even when controlling for demographic and psychosocial characteristics. Furthermore, we found positive though insignificant effects of exposure on changes in survey participants' protective attitudes toward vaping and self-efficacy to avoid vaping. In short, students walked away from their exposure to AVOID's key prevention messages with protective cognitive structures that theoretically predict their future avoidance of vaping. Indeed, decades of prevention research and the theories of behavior change underscore the strong theoretical connections from knowledge, attitudes, self-efficacy, and intentions that lead to protective behavior change.<sup>14-18</sup> Therefore, these preliminary findings show AVOID's promise as an effective and persuasive vaping prevention tool.

More than 11 million U.S. youth currently at-risk for experimenting with vapes,<sup>19</sup> and a new cohort of teens enters this risk pool yearly. Preliminary evaluation of the AVOID prototype increases the likelihood that youth will be equipped with information on the harmful health effects of vaping and a personal perception of risk from vaping, which translate into lower intentions to vape. As an easy to implement and evidence-based prevention tool, AVOID has the potential to stem the epidemic of youth vaping.

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