JUUL in School: Teacher and Administrator Awareness and Policies of E-Cigarettes and JUUL in U.S. Middle and High Schools

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*Electronic cigarette (e-cigarette) use, including JUUL, has risen to epidemic levels among high school and middle school students in the United States. Schools serve as a key environment for prevention and intervention efforts to address e-cigarette use, yet little is known about the awareness of and response to e-cigarettes in schools. This national survey of middle and high school teachers and administrators (*n *= 1,420) measured JUUL awareness, e-cigarette policies, and barriers to enforcement in schools. While two thirds of respondents had heard of a product called JUUL (67.6%), less than half accurately identified a photo of a JUUL as a vaping device/e-cigarette (47.3%). Awareness of JUUL (80.9%) was higher among high school teachers (83.3%) than among middle school teachers (78.3%). A large majority of respondents reported that their school had an e-cigarette policy (82.9%), but less than half of the sample worked in a school with a policy that specifically included JUUL (43.4%). Those working in a school with an e-cigarette policy in place noted that e-cigarettes' discreet appearance (65.6%) and difficulties in identifying origin of vapor or scent (46.1%) made the policy difficult to enforce. Efforts to increase middle and high school staff awareness of the ever-evolving e-cigarette market are essential to help prevent youth use. Adoption and enforcement of policies will be critical to ensure that schools remain tobacco-free spaces.*

Keywords: *school health; tobacco prevention and control; child/adolescent health*

BACKGROUND

Electronic cigarettes (e-cigarettes) are the most popular tobacco product among youth in the United States, with use increasing dramatically in recent years. Data from the 2018 National Youth Tobacco Survey indicate that 20.8% of high school students are current e-cigarette users, which is a 78% increase from 2017 (Cullen et al., 2018). E-cigarette use among middle school students has also risen 48% in the past year, with 4.9% of middle school students reporting current use (Cullen et al., 2018). Of concern is evidence suggesting that many of these young e-cigarette users are low-risk youth who would have otherwise not been susceptible to combustible tobacco use (Berry et al., 2019). This rise in youth use has alarmed experts who are concerned about adolescent nicotine exposure (U.S. Department of Health and Human Services [USDHHS],

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2016). Nicotine can harm the developing brain and lead to future addiction and dependence, raising fears that these products could addict a new generation to nicotine and tobacco (Berry et al., 2019; National Academies of Sciences Engineering and Medicine, 2018; USDHHS, 2016).

The JUUL e-cigarette became available in 2015 and currently accounts for 73.9% of the e-cigarette market (Herzog & Kanada, 2019). JUUL use is especially high among youth and young adults (Vallone, Bennett, Xiao, Pitzer, & Hair, 2018), and media reports indicate that students are increasingly using JUUL devices at school (Ibarra, 2018). A recent study further demonstrated JUUL use in schools, with many YouTube videos related to "JUUL at school" (15,500 videos), "JUUL in class" (6,840 videos), and "JUUL in school bathroom" (1,040 videos) (Ramamurthi, Chau, & Jackler, 2018).

Schools are where youth develop important interpersonal relationships, including friendships, and are where students are exposed to new knowledge, social norms, and organizational policies (Ennett et al., 2010; Sallis, Owen, & Fisher, 2015). School environments have implications for e-cigarette prevention as research suggests that friends serve as the main source by which adolescents acquire e-cigarettes (Kong, Morean, Cavallo, Camenga, & Krishnan-Sarin, 2017). While schools have long addressed tobacco use and other risky health behaviors among their students (Centers for Disease Control and Prevention, 1994), e-cigarettes represent a new and growing threat. School staff are key influencers in the social and ecological environments of young people and have a unique ability to monitor and influence student behavior (Sallis et al., 2015). In fact, the Surgeon General identified teachers as important stakeholders in the efforts needed to address youth e-cigarette use (USDHHS, 2016). However, little is known about the experience of monitoring e-cigarette and JUUL use among middle and high schools' staff.

PURPOSE

Given the growing popularity of this device, research is needed to understand teachers' and school administrators' awareness of JUUL, level of concern, and level of priority to address e-cigarettes, including JUUL, and policies regulating e-cigarette and JUUL use in schools to inform school-based health programs and policies.

METHOD

Sample

Data were collected from a national nonprobability sample using an online Qualtrics panel from November to December 2018. Participants self-identified as U.S. teachers in middle (5th to 8th grades) or high (9th to 12th grades) school or as administrators (i.e., principals, vice principals, superintendents, and other administrators) at the middle, high, or district level (n = 1,420). Quotas were set for both middle and high school teachers for sufficient distribution over the four U.S. census regions. This study was reviewed by Advarra Institutional Review Board (Pro00030275).

Measures

Participant and School Demographics. Participant demographics included age (18-24, 25-29, 30-39, 40-49, 50+ years) and job title (middle school teacher, high school teacher, administrator). Demographics of participants' schools included region (Northeast, South, Midwest, West), estimated percentage of students eligible for free or reduced-price lunch (0% to 25%, 26% to 50%, 51% to 75%, 76% to 100%), and estimated town size (<50,000 people vs. 50,000+ people).

JUUL Awareness. JUUL awareness was measured by two items: (1) Participants were shown a JUUL device photo and asked to identify the product from a list of items and (2) participants were asked if they had seen or heard of a product called JUUL (yes/no). Any JUUL awareness was defined as accurately responding to either question.

Level of Concern and Priority. Estimated staff level of concern about (not at all, somewhat, and very concerned) and level of priority to address (very high, somewhat high, medium, somewhat low, and very low priority) e-cigarette (including JUUL) use by students on school property or at school-related events were measured. Additionally, participant opinion on the extent to which e-cigarette (including JUUL) use by students on school property has been a problem in the past 12 months was measured (very serious, moderately serious, minor, and not a problem).

JUUL Policies. Participants were asked if their school or district (1) had a general e-cigarette policy, (2) if the general e-cigarette policy specifically included JUUL, and (3) if they had an additional policy specifically about JUUL (yes, no, don't know). Participants working at schools with an e-cigarette policy specifically mentioning JUUL or an additional policy about JUUL were considered to have any JUUL policy. Respondents with any e-cigarette policy or an additional policy specifically about JUUL were asked about barriers to enforcement and asked to select all that applied from a list of items.

TABLE 1
JUUL Awareness Among Middle School Teachers, High School Teachers, and Administrators

JUUL Awareness Measures	*Total,* N = *1,420,* n *(%)*	*Middle School Teachers,* N = *532,* n *(%)*	*High School Teachers,* N = *618,* n *(%)*	*Administrators,* N = *270,* n *(%)*	p[a]
JUUL photo identification					
Vaping device or e-cigarette	672 (47.3)	252 (47.4)	307 (49.7)	113 (41.9)	.099
Other product[b]	748 (52.7)	280 (52.6)	311 (50.3)	157 (58.1)	
Seen or heard of JUUL[d]					
Yes	958 (67.6)	336 (63.3)	444 (72.0)	178 (65.9)	**.006**
No	460 (32.4)	195 (36.7)	173 (28.0)	92 (34.1)	
Any JUUL awareness[c,d]					
Yes	1146 (80.9)	415 (78.3)	514 (83.3)	217 (80.4)	**.009**
No	271 (19.1)	115 (21.7)	103 (16.7)	53 (19.6)	

NOTE: Boldface values indicate statistical significance.
[a]*p*-value for chi-square test for difference in awareness among middle school teachers, high school teachers, and administrators. [b]Other products were USB drive, power bank, pencil lead, medical device, candy, or don't know. [c]Any JUUL awareness refers to correctly identifying the JUUL photo or having seen or heard of JUUL. [d]The sum does not add up to the total due to missing values.

Analyses

All analyses were conducted in Stata 15.1 (StataCorp, 2017). Chi-square tests were conducted to evaluate differences in JUUL awareness among middle school teachers, high school teachers, and administrative staff. Frequency analyses assessed the distribution of e-cigarette policies and barriers to enforcement.

RESULTS

Participant and school demographics can be found in Supplemental Table S1. The sample included 532 middle school teachers, 618 high school teachers, and 270 administrators. Teacher and administrator age were roughly evenly distributed from 18-24 years to 50 years and older. Schools were evenly distributed by region. Roughly half of participants worked at a school in a town with 50,000 or more people (51.8%), and 30.2% worked in schools where 75% to 100% of students qualified for free or reduced-price school lunches.

JUUL awareness among middle school teachers, high school teachers, and administrators is found in Table 1. Overall, 47.3% of the sample accurately identified a photo of a JUUL as a vaping device/e-cigarette and 67.6% had heard of a product called JUUL. An overwhelming majority of the sample (80.9%) had any JUUL awareness. While JUUL photo identification accuracy did not vary by job title, high school teachers (72.0%) had seen or heard of JUUL at a higher rate than middle school teachers (63.3%) or administrators (65.9%, $p = .006$). Similarly, high school teachers (83.3%) had higher rates of any JUUL awareness than middle school teachers (78.3%) or administrators (80.4%, $p = .009$). Any JUUL awareness differed by school region, with higher awareness among respondents in the Midwest (75.4%) and Northeast (78.8%) compared with the South (67.6%) and West (66.7, $p < .001$) but did not differ by other school demographics.

Teachers and administrators expressed concern about student e-cigarette use and reported that prevention was a high priority at their school. Most respondents felt that their school's staff were very (30.1%) or somewhat (50.2%) concerned about students using e-cigarettes, including JUUL, on school property, and almost all felt that preventing use was a very high (21.7%), somewhat high (27.4%), or medium priority (24.0%). Few respondents felt that e-cigarette use had been a major problem at their school in the past 12 months, with 34.8% reporting that e-cigarette use by students had been a minor problem and 21.3% reporting that it had not been a problem.

Table 2 shows the existence of school e-cigarette and JUUL policies among the sample. Most participants reported that their school had a general e-cigarette policy in place (82.9%), and almost half (44.4%) of these policies specifically included JUUL. Another 31.1% of the sample reported that their school had a separate policy surrounding JUUL. Overall, 43.4% of the sample worked in a school with any JUUL-specific

TABLE 2
Frequency of School E-Cigarette and JUUL Policies and Barriers for Enforcing E-Cigarette and JUUL Policies in Schools (N = 1,420)

Policy and Enforcement Measures	n *(%)*
School has a general e-cigarette policy[a]	
Yes	1176 (82.9)
No	121 (8.5)
Don't know	121 (8.5)
School's general e-cigarette policy specifically includes JUUL[a]	
Yes	521 (44.4)
No	239 (20.4)
Don't know	414 (35.3)
School has an additional policy specifically about JUUL[a]	
Yes	437 (31.1)
No	484 (34.5)
Don't know	482 (34.4)
School has any JUUL policy[a]	
Yes	614 (43.4)
No	516 (36.5)
Don't know	284 (20.1)
Barriers to rule enforcement (n = 1,196)	
E-cigarette/JUUL products are discreet in appearance	784 (65.6)
It is difficult to pinpoint where the vapor/scent is coming from	551 (46.1)
E-cigarettes/JUUL products are addictive	308 (25.8)
Lack of clarity about how the policy should be enforced	217 (18.1)
Lack of clarity on the policy	190 (15.9)
Parents do not support the policy	180 (15.1)
Other	31 (2.6)
No barriers	153 (12.8)

[a]The sum does not add to the total due to missing values.

policy. Presence of any JUUL-specific policy did not differ by school demographics.

Table 2 also summarizes barriers to enforcement of e-cigarette policies. Only 12.8% of staff who worked in schools with any e-cigarette policy said that there were no barriers to enforcing the policy. The most common barriers were the discreetness of e-cigarettes in appearance (65.6%) and the difficulty in pinpointing where vapor or scent was coming from (46.1%). About one quarter (25.8%) of respondents also identified the addictive nature of these products as a barrier to enforcing e-cigarette policies.

DISCUSSION

Research demonstrates that multilevel interventions are most effective in changing behaviors (Sallis et al., 2015); thus, schools present a critical opportunity to create an environment where youth reject tobacco and e-cigarettes. Efforts to intervene need to start with raising awareness among school personnel of e-cigarette products, including JUUL. While more than two thirds of respondents had heard of JUUL in our study, less than half were able to correctly identify the product from a photo. Given the 78% increase in e-cigarette use from 2017 to 2018 among high school students (Cullen et al., 2018), there is a critical need to provide educators with information about these products and resources to prevent their use. Middle school teachers had even lower awareness of JUUL than high school teachers and should receive tailored education and resources to support preventing youth initiation of these products at younger ages. With the rapid evolution of e-cigarettes in a largely unregulated environment, it will be important not only to raise awareness of existing products and their use but also to develop methods to keep school staff informed of emerging products.

Schools should be made aware of educational resources and curricula that are becoming available. Several universities and health departments have developed toolkits for teachers and administrators, which include policy guidelines and educational resources. As part of a comprehensive approach to combatting youth e-cigarette use, it is critical that these types of resources be made available and are widely disseminated to allow teachers and administrators to better intervene and prevent such use.

This survey demonstrates that many schools are responding to the youth e-cigarette epidemic with targeted policies. However, less than half of the policies currently in place included JUUL specifically. Given its dominance in the current market and popularity among youth (Herzog & Kanada, 2019; Vallone et al., 2018), reference to JUUL specifically in these policies may be important. There is an urgent need for schools to evaluate tobacco policies to ensure that e-cigarettes, including JUUL, are included. Ensuring that school policies cover all e-cigarettes is critical since tobacco-free spaces are a proven way to prevent youth tobacco

use (National Center for Chronic Disease Prevention and Health Promotion, 2012).

While effective school e-cigarette policies are needed, it is important to note that the most frequently reported barriers to enforcement in this study—the discreet appearance and difficulty in pinpointing the source of vapor—result from the design of devices that are intended to escape detection. Prior research indicates that the stealthy nature of these devices is part of what makes these products so appealing to young people (Ramamurthi et al., 2018; USDHHS, 2016). Clearly, stronger regulation of e-cigarettes, including JUUL, are needed from the Food and Drug Administration to ensure that e-cigarettes are no longer designed and marketed in ways that appeal to young people, that encourage their covert use, and that make it difficult for educators to keep them out of school buildings and off school campuses.

There are some limitations to this study. This study examined a national, though not nationally representative, sample of teachers and administrators in U.S. middle and high schools. Hence, it is likely that this nonprobabilistic sample is not representative, despite efforts made to ensure geographic variation during sampling.

IMPLICATIONS

Comprehensive, multilevel efforts are needed to address the growing epidemic of e-cigarette use among middle and high school students. These efforts include raising awareness of emerging e-cigarette products among teachers and administrators. Effective policies at the school level, coupled with enforcement, are needed. Further research is also needed to understand the extent to which JUUL use is occurring in school environments through novel methods. Additionally, the Food and Drug Administration must act now to regulate a product that is designed to appeal to young people and is easily disguised in school and other settings in ways that make its use difficult to detect. Schools must also take steps to increase JUUL awareness among teachers and administrators to better detect use and prevent further escalation of the youth e-cigarette epidemic.

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SUPPLEMENTAL MATERIAL

Supplemental material for this article is available online.

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