Wisconsin Young Adults' Attitudes, Beliefs, Motivations, and Behaviors Surrounding E-Cigarette Use and Cessation

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Introduction: Electronic cigarette (e-cigarette) use is prevalent among young adults, yet cessation treatment options are limited and underutilized.

Methods: Wisconsin residents aged 18 to 24 who had vaped nicotine in the past month (N = 480) completed an online survey assessing vaping initiation, past quit experiences, future quit intentions, and treatment knowledge and preferences. The survey also assessed perceived physical and mental health harms of vaping nicotine and other products (eg, cannabis, cannabidiol).

Results: Most young adults had made a prior e-cigarette quit attempt, commonly motivated by concerns about addiction, cost, and health problems. Though 80% want support to quit, preferred methods of support were highly variable. The same methods (eg, medication, friends/family, health care provider, therapist) that were most endorsed as the form of support young adults were most likely to use were also among the most endorsed forms of support that young adults would not want to use. Nearly 40% of participants reported vaping cannabis and perceived vaping cannabis as significantly less harmful than vaping nicotine or tobacco for physical and mental health.

Conclusions: Vaping cessation resources that are responsive to young adults' needs and preferences are needed. The high variability in treatment preferences suggests that multiple strategies need to be offered; there is no one-size-fits-all approach. Cannabis vaping is prevalent, and an important area for future research is to examine the impact of cannabis vaping on nicotine vaping dependence, cessation, and treatment use. Strategies to reach, motivate, and engage young adults in e-cigarette cessation and cessation treatment should highlight their concerns about addiction, costs, health harms, and desired treatment options.

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INTRODUCTION

The prevalence of electronic cigarette (e-cigarette) use (ie, vaping) has increased dramatically over the past decade. In 2018, the US Surgeon General declared e-cigarette use among young people an epidemic.[1] Young adults (aged 18-24) are consistently the age demographic with the highest prevalence of e-cigarette use. In 2021, 11.0% to 14.5% of young adults in the US reported currently using e-cigarettes, a rate more than 5 times higher than the rate of adults aged 45 and older.[2-4] Prevalence of current e-cigarette use some days or every day among young adults in Wisconsin in 2022 was 18.9%.[5] While e-cigarette use may be a viable method of harm reduction to help people stop smoking combustible cigarettes,[6-8] over half of young adults who vape have never smoked cigarettes regularly, suggesting that they typically are not using e-cigarettes as a smoking cessation strategy.[2,3] E-cigarettes are not harmless, particularly for young people; long-term health consequences remain uncertain.[9-12]

Among young adults who vape, approximately 1 in 5 attempted to quit in the past year, and a majority report plans to quit eventually.[13] Given the high rates of e-cigarette use among young adults, there is a need to develop and disseminate evidence-based treatments to help them quit.[13] Only 3 clinical trials have rigorously evaluated e-cigarette cessation interventions. The "This Is Quitting" text-message support program by the Truth Initiative has demonstrated modest but clinically significant efficacy in helping young adults quit vaping (self-abstinence: OR 1.39; 95% CI, 1.15-1.68).[14] The combination of counseling and the smoking

Table 1. Participant Characteristics (N = 480)

Demographic Characteristics	
Age, Mean (SD)	21.0 (1.9)
Gender, n (%)	
Female	237 (46.4%)
Male	207 (43.1%)
Nonbinary/third gender	14 (2.9%)
Transgender	17 (3.5%)
Other	5 (1.0%)
Race, n (%)	
White	355 (74.0%)
Black/African American	64 (13.3%)
Asian	16 (3.3%)
American Indian or Alaskan Native	13 (2.7%)
Native Hawaiian or Other Pacific Islander	3 (0.6%)
More than 1 race	18 (3.8%)
Other	11 (2.3%)
Ethnicity, n (%)	
Latino/Hispanic	69 (14.4%)
Sexual orientation, n (%)	
Heterosexual	319 (66.5%)
Bisexual	98 (20.4%)
Gay or lesbian	35 (7.3%)
Asexual	9 (1.9%)
Another	19 (4.0%)
Education level, n (%)	
Less than high school	49 (10.2%)
High school	212 (44.2%)
GED	26 (5.4%)
Some college or technical school	133 (27.7%)
4-year college	60 (12.5%)
Rural-Urban Area Classification,[a] n (%)	
Large rural	44 (9.2%)
Small town/rural	89 (18.5%)
Suburban	38 (7.9%)
Urban core	298 (62.1%)
Wisconsin region, n (%)	
Northeastern	72 (15%)
Southeastern	234 (48.8%)
Southern	97 (20.2%)
Western	77 (16.0%)
Vaping Behavior	
Age started vaping, Mean (SD)	17.0 (2.7)
Years vaping, Mean (SD)	4.0 (2.7)
Vaping frequency, n (%)	
>2 times/day	266 (55.4%)
1–2 times/day	86 (17.9%)
4–6 days/week	47 (9.8%)
1–3 days/week	34 (7.1%)
<1 day/week	47 (9.8%)
Has tried to quit vaping nicotine, n (%)	377 (78.5%)
Vaping other products, n (%)	
Cannabis	188 (39.2%)
Cannabidiol (CBD)	90 (18.8%)
Essential oils	26 (5.4%)

[a]Eleven ZIP codes were not classified using RUCA package, thus N = 469

cessation medication varenicline (vs placebo plus counseling) also demonstrated efficacy for vaping cessation, but this trial was not conducted specifically with young adults (mean age 52 years).[15] Recently, cytisinicline, a plant-based compound with similar properties to varenicline, demonstrated efficacy for vaping cessation (vs placebo plus counseling in both medication conditions).[16] However, cytisinicline is not available in the US as approval by the Food and Drug Administration (FDA) is still pending. Young adults tend to have lower uptake of treatment approaches that historically have been promoted for cigarette smoking cessation. Efforts are needed to develop new resources to reach and support young adults to quit vaping.

In September 2022, the Wisconsin Department of Justice finalized a multistate settlement with JUUL Labs to hold JUUL accountable for marketing e-cigarettes to young people.[17] The current study, funded by the Wisconsin JUUL settlement, was an online survey to ascertain how and why young adults in Wisconsin started vaping, their interest in quitting, cessation treatments they have tried or are interested in trying, and how and where they would like to learn about vaping cessation treatment. These results will inform ongoing efforts to develop strategies to reach, motivate, and engage young adults in e-cigarette cessation.

METHODS

We surveyed 480 eligible young adults during August and September 2023. Centiment, a nationwide survey company, invited eligible participants to complete an online survey via email, text message, or through a web portal. Centiment actively recruits and maintains survey panels, obtaining extensive background profile information to allow for targeted survey recruitment. Centiment shares the survey with its panel members and uses rigorous methods to ensure the consistency of survey responses. Eligible participants were aged 18 to 24, resided in Wisconsin, and reported that they do not smoke cigarettes but do vape nicotine or use e-cigarettes with nicotine.

Participants provided informed consent electronically and then completed an anonymous online survey that assessed vaping practices, beliefs, attitudes, and preferences using standardized assessments and newly developed items. The full survey is available online at https://osf.io/cyx4u/. Survey questions included items assessing vaping history (eg, age of initiation, contexts, motivations), other products vaped (eg, cannabis, cannabidiol [CBD]), vaping frequency, typical vaping contexts/situations, and likes/dislikes about vaping. Survey questions also assessed perceived harmfulness of vaping nicotine, cannabis, and other products to physical and mental health as well as knowledge of specific negative effects of vaping before they started vaping and what information they wish they had known before they started vaping. Finally, the survey assessed what vaping cessation resources or treatments they had used in the past, would want to use in the future, and would not want to use in the future, as well as where they would want to

learn about vaping cessation treatment options. Participants were compensated $12.50. This study was approved by the University of Wisconsin Institutional Review Board.

We conducted descriptive analyses using IBM SPSS version 29.0.2.0 (IBM) and R version 4.4.1 (R Foundation for Statistical Computing) using RStudio IDE version 2024 (Posit). Geographic distribution is classified by Rural-Urban Commuting Areas (RUCA) ZIP codes using the R package ruca.[17] We conducted a series of paired-samples *t* tests to evaluate differences in the perceived harmfulness of vaping nicotine, tobacco, cannabis, and CBD.

RESULTS

Participant Demographic Characteristics

Of the 480 participants, the mean age was 21.0 years, and 50% of participants identified as female. The most common racial identities were White (74%) and Black/African American (13%); 86% were non-Hispanic/Latino; 67% identified as heterosexual and 33% identified as lesbian, gay, bisexual, transgender and queer/questioning (LGBTQ+) (Table 1). The sample was geographically diverse with 62.1% residing in urban areas, 27.7% residing in rural areas, and 48.8% residing in southeast Wisconsin (Table 1).

Vaping Initiation, Context, and Motivations

On average, participants started vaping at age 17.0 (SD 2.7) (Table 1). In addition to nicotine, 39% of respondents had vaped cannabis products. Most (73%) reported vaping daily and over half (55%) vaped 3 or more times per day. The most common situations for vaping were when alone (66%), before bed (59%), upon waking (56%), after meals (54%), when socializing (54%), and when drinking alcohol (50%). When asked what they like about vaping, the most common responses were taste (63%), relaxation effect (62%), and buzz or lightheadedness (58%). However, individuals reported they disliked how vaping was bad for their health (67%), expensive (66%), addictive (53%), disapproved by their family (33%), and how others view them for vaping (29%).

Vaping Perceptions and Knowledge

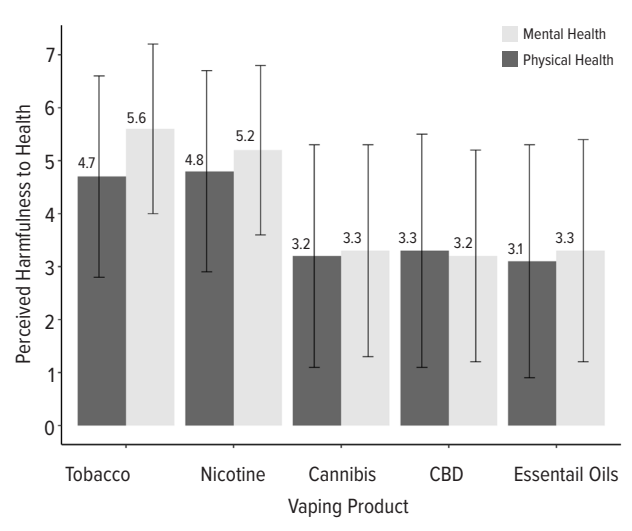
Most participants (92%) had some knowledge of the negative effects of vaping before they began vaping. However, a majority wished that before they began vaping, they had known about addiction, asthma, exposing others to secondhand vapor, explosion of devices, mental health-related issues, and how expensive vaping is (Table 2). Participants perceived vaping tobacco and nicotine to be moderate-to-severely harmful for physical and mental health (Figure 1). Vaping tobacco was perceived to be significantly more harmful than vaping nicotine for physical health (Cohen's d = 1.5, $t(479) = 5.4$, $P < .001$), but not mental health, ($t(479) = -.70$, $P = .49$). Vaping cannabis was perceived to be significantly less harmful than vaping nicotine for physical health (Cohen's d = 2.4, $t(479) = 17.2$, $P < .001$) and mental health (Cohen's d = 2.4, $t(479) = 12.9$, $P < .001$). There were no significant differences in perceived harmfulness of vaping cannabis or vaping CBD for physical or mental health, Ps > .05.

Table 2. Knowledge of Vaping Harms, N = 480

Desired Knowledge on Harms to Health Prior to Initiation	N (%)
Explosion of device	357 (74.4)
Addiction	355 (74.0)
Exposing others to my vapor	355 (74.0)
Asthma	351 (73.1)
How expensive vaping is	334 (69.6)
Mental health related issues	330 (68.8)
Nose and throat damage	321 (66.9)
Increased risk of heart disease	132 (27.5)
Lung scarring	131 (27.3)
How difficult it would be to quit vaping	128 (26.7)
None of the above	93 (19.4)

Note: Knowledge of the negative effects of vaping was assessed by "What information about negative side effects of vaping nicotine do you wish you had known before you started?"

Figure 1. Perceptions of Physical and Mental Health Harms From Vaping Different Products



Note: Survey questions related to health harms were rated on a 7-point Likert scale (1 = not at all harmful to 7 = extremely harmful). Two questions assessed: "How harmful do you think vaping each of these products is to your [physical or mental] health?" Bars represent means and error bars represent standard deviations.

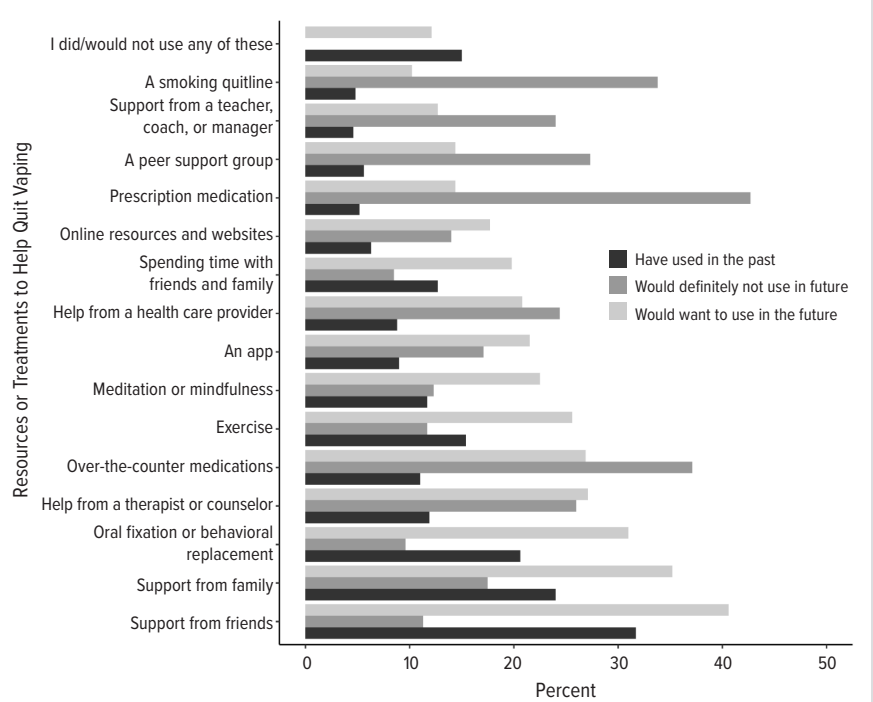
Vaping Quit and Treatment Preferences

Most participants (67%) intended to quit vaping in their lifetime (25% at some point, 11% in the next 10 years, 31% in the next year), 26% had no specific plans, and 7% planned to continue vaping indefinitely. Most participants (79%) had attempted to quit vaping previously, but only 15% successfully quit at some point before returning to vaping. Among participants who had

tried to quit (N = 377), the most common reasons for quitting were addiction (53%), cost (43%), physical health problems (36%), and mental health problems (25%).

The most common resources to quit vaping that participants used in the past or preferred for the future were social support (friends and family), behavioral replacements (eg, gum, food, drinks), mental health therapist or counselor, or over-the-counter medications (eg, nicotine patch, gum) (Figure 2). The least commonly used or preferred resources were quitlines; peer support groups; or support from teachers, coaches, or managers. A minority reported that they had not (15.0%) or would not (12.1%) use any of these resources. Further, many participants reported that they would not use prescription (42.7%) or over-the-counter medications (37.1%), quitlines (34%), peer support groups (28%), mental health therapists (26%), or health care providers (24%). The most common fears related to quitting vaping nicotine products were not succeeding in quitting (44%), withdrawal symptoms (42%), and quitting causing mental health problems (36%).

Figure 2. Quit Vaping Experiences and Treatment Preferences



Note: Figure bars reflect percentage of respondents who endorsed each category. Survey questions about resources and treatment were "What resources or treatments have you used to quit vaping nicotine?", "What resources or treatments would you want to use if you were to quit vaping nicotine in the future?", "What resources or treatments would you definitely not use if you were to quit vaping nicotine?". All questions included instructions to "check all that apply." Some responses above are shortened for display purposes; full response options included "prescription medication (varenicline, bupropion)," "over-the-counter medications (such as nicotine patch, gum, lozenge)," "help from a therapist, counselor or mental health provider," "an oral fixation or behavioral replacement like gum, food, or drinks."

The most common places participants have found information about quitting vaping were social media (42%), health care websites (33%), friends (29%), and family (29%) (Table 3). Participants would like to get information from health care websites (36%), a health care provider (31%), friends (27%), or social media (25%). Among those who desire information from social media (N=118), the preferred apps were TikTok (72%), Instagram (47%), YouTube (47%), or Facebook (36%).

Table 3. Quit Vaping Information

Where to Find Information About Quitting Vaping	Has Found Information	Would Like to Find Information
Non-governmental and non-health care website	95 (19.8%)	80 (18.3%)
Government website	71 (14.8%)	88 (18.3%)
Health care websites	160 (33.3%)	171 (35.6%)
A health care provider	121 (25.2%)	150 (31.3%)
Family	138 (28.7%)	104 (21.7%)
Friends	137 (28.5%)	128 (26.7%)
Peers who also vape	100 (20.8%)	92 (19.2%)
Social media	199 (41.5%)	118 (24.6%)
I did not search for information/I would not seek help for quitting vaping	100 (20.8%)	103 (21.5%)

Note: Survey questions about where to find information were "Where have you found information about quitting vaping nicotine?" and "Where would you like to go for information about quitting vaping nicotine?" All questions included instructions to "check all that apply."

DISCUSSION/CONCLUSIONS

Young adults in Wisconsin who vape nicotine reported a wide range of experiences, beliefs, motivations, and preferences surrounding vaping and vaping cessation. Many respondents reported vaping behaviors that are indicative of addiction (eg, daily vaping, vaping upon waking, vaping alone). Almost 4 out of 5 young adults have tried to quit in the past, primarily due to concerns about not wanting to be addicted, high cost, and developing or worsening physical and/or mental health problems. They appear to be knowledgeable about the potential negative physical and mental health consequences of vaping and perceive the harms of vaping nicotine or tobacco as worse than vaping other products (eg, cannabis, CBD).

Young adults want to use support or treatment to stop vaping nicotine. There were highly variable—and often contradictory—responses in preferred type of resources and support for vaping cessation. For instance, similar numbers of participants would and would not want to work with a therapist or counselor to quit

vaping. Many young adults are interested in structured support (eg, doctors, therapists, smartphone apps). However, there was a clear segment of respondents who are not interested in traditional tobacco treatments or professional assistance (eg, medication, quitline coaching) and prefer informal support and treatment approaches (eg, family/friends, behavioral replacements). Parents and friends remain primary sources of support for many young adults who want to quit vaping; public health educational efforts are warranted to provide them with the knowledge, skills, and confidence to effectively support their peers or children on their journey to stop vaping. Novel digital approaches, such as mobile apps or brief, online, single-session interventions, also may complement traditional treatment in ways that are appealing to young adults.[19,20] No one-size-fits-all cessation intervention approach emerged that would meet the needs and preferences of all young adults. Therefore, it is important to increase public health education to inform young adults of the variety of currently available effective interventions and prioritize developing new vaping cessation interventions to help this demographic (ie, the group that is vaping at the highest rate) quit vaping in support of health-promoting behavior change.

Young adults want to learn about treatment resources online (eg, health care websites, social media) and from their health care providers. However, similar numbers of young adults do not want to learn about treatment from these same sources, suggesting that diverse and complementary outreach and education approaches are necessary to reach the broadest population. Public health campaigns and educational messages (eg, Tobacco is Changing,[21] Real Talks Wisconsin[22]) can address young adults' primary concerns about quitting (eg, failure, withdrawal, mental health problems) and promote evidence-based programs like the This is Quitting texting program and possibly prescription medications like varenicline (and cytisinicline if approved by the FDA for vaping cessation).[14,15] However, the messaging will need to address the barriers that many young adults have to using any form of medication.

Nearly 40% of young adults who vaped nicotine also reported vaping cannabis. Respondents perceive vaping nicotine or tobacco to be moderately-to-highly harmful to both physical health and mental health. However, consistent with national trends, vaping cannabis and CBD were perceived to be significantly less harmful than vaping nicotine.[23] Future research is needed to understand whether vaping cannabis presents a barrier to nicotine vaping cessation motivation and treatment use and should also examine integrated treatments targeting co-use of vaping nicotine and cannabis for young adults.[24]

There remains a need to develop new tools and resources that address the unmet needs and preferences of young adults who vape. Young adults want options – in terms of where they learn about treatment resources, ways to access support, who treatment or support is provided by, and the types or modalities of resources that are available. The variability in preferences highlights the importance of having multiple strategies to inform this age group about the effective resources that currently are available, while continuing to pursue the creation and dissemination of novel interventions. The results of this study will inform ongoing efforts to develop strategies to reach, motivate, and engage young adults in vaping cessation.

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