

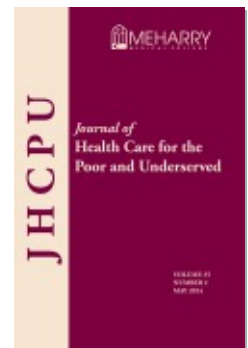


PROJECT MUSE®

---

Exploring Native Hawaiian and Pacific Islander Youths'  
E-Cigarette Resistance Strategies: Implications for Tobacco  
Product Use Prevention

Scott K. Okamoto, Andrew M. Subica, Katlyn J. An, Kelsie H. Okamura,  
Sarah D. Song, Paula Angela Saladino, Adabelle B. Carson, Tea A.  
Stephens, Sarah Momilani Marshall, Steven Keone Chin, Thomas A. Wills,  
Joseph Keawe'aimoku Kaholokula, Pallav Pokhrel



Journal of Health Care for the Poor and Underserved, Volume 35,  
Number 2, May 2024, pp. 692-706 (Article)

Published by Johns Hopkins University Press

➔ For additional information about this article

<https://muse.jhu.edu/article/928640>

# Exploring Native Hawaiian and Pacific Islander Youths' E-Cigarette Resistance Strategies: Implications for Tobacco Product Use Prevention

Scott K. Okamoto, PhD  
Andrew M. Subica, PhD  
Katlyn J. An, MS  
Kelsie H. Okamura, PhD  
Sarah D. Song, BS  
Paula Angela Saladino  
Adabelle B. Carson, MA  
Tea A. Stephens  
Sarah Momilani Marshall, PhD  
Steven Keone Chin, BS  
Thomas A. Wills, PhD  
Joseph Keawe'aimoku Kaholokula, PhD  
Pallav Pokhrel, PhD

*Abstract:* This study examined the e-cigarette and vaping resistance strategies used by Native Hawaiian and Pacific Islander (NHPI) youths in rural Hawai'i. Focus groups ( $N = 17$ ) were conducted in eight geographically dispersed elementary, middle/intermediate, and multi-level schools in low-income communities on Hawai'i Island. Sixty-nine youths (67% NHPI,  $M_{age} = 12.5$  years) participated in this study. The resistance strategies discussed across the greatest number of groups were "refuse" (saying no), "explain" (providing reasons for vaping refusal), "avoid" (avoiding people or places where e-cigarettes were used), and "leave" (walking away from a situation where e-cigarettes were being used). Participants described the challenges in using these strategies within contexts characterized by widespread peer and family vaping and strong social demands to use e-cigarettes. The findings suggest the need for multi-level interventions based on youths' resistance strategies to meaningfully reduce youth vaping use in rural and/or NHPI communities.

---

**SCOTT K. OKAMOTO, KATLYN J. AN, SARAH D. SONG, PAULA ANGELA SALADINO, ADABELLE B. CARSON, TEA A. STEPHENS, STEVEN KEONE CHIN, THOMAS A. WILLS, and PALLAV POKHREL** are affiliated with the Population Sciences in the Pacific Program at the University of Hawai'i Cancer Center. **ANDREW M. SUBICA** is affiliated with the School of Medicine at the University of California Riverside. **KELSIE H. OKAMURA** is affiliated with The Baker Center for Children and Families. **SARAH MOMILANI MARSHALL** is affiliated with the Thompson School of Social Work & Public Health at the University of Hawai'i at Mānoa. **JOSEPH KEAWE'AIMOKU KAHOLOKULA** is affiliated with the John A. Burns School of Medicine at the University of Hawai'i at Mānoa. Please address all correspondence to Scott K. Okamoto, Population Sciences in the Pacific Program, University of Hawai'i Cancer Center, 701 Ilalo St., Honolulu, HI, 96813; Email: [okamotos@hawaii.edu](mailto:okamotos@hawaii.edu).

*Key words:* Electronic nicotine delivery systems, vaping, e-cigarettes, prevention, Native Hawaiian, Pacific Islander, youth.

Since 2011, youths' e-cigarette use (i.e., vaping) has grown into a national epidemic. Citing data from the Centers for Disease Control and Prevention (CDC), King et al.<sup>1</sup> described the exponential growth of youth e-cigarette use. Compared with other tobacco products, which have shown relatively unchanged or decreasing trajectories of use since 2011, youth e-cigarette use has rapidly accelerated, particularly since 2017. These rates are particularly concerning, in light of documented cases of e-cigarette/vaping-associated lung injury (EVALI). As of January 2020,\* 2,602 cases of EVALI have been reported by the CDC in all 50 U.S. states, with 57 confirmed deaths. Recent data have also indicated that youths' e-cigarette use is directly and independently associated with their development of severe respiratory disorders, such as COVID-19<sup>2</sup> and asthma.<sup>3</sup> These data and statistics point to the need for evidence-based interventions to deal with dramatically rising rates of e-cigarette use and their associated serious health consequences.

In Hawai'i, the rates of e-cigarette use are among the highest in the nation in several categories. Recent surveillance data has indicated that 18% of all middle school youths in the state of Hawai'i currently use an electronic vapor product, ranking first nationally among all states collecting data on middle school youths.<sup>4</sup> Of these youths that currently use an electronic vapor product, 30% are of Native Hawaiian or Pacific Islander (NHPI) ancestry, which represents the highest percentage of e-cigarette use among major youth ethnic groups in Hawai'i. There is a clear and urgent need to understand the social and cultural contexts of youth e-cigarette use in NHPI communities, and how NHPI youths resist e-cigarettes within these contexts, in order to effectively address their escalating use rates through health promotion practices.

The purpose of this study is to examine the e-cigarette and vaping resistance strategies used by NHPI youths in rural Hawai'i. Epidemiological research collected between 2019–2020 has indicated that rural communities in Hawai'i have been disproportionately affected by youth e-cigarette use, compared with their urban and semi-urban counterparts.<sup>5</sup> For example, 24.4 percent of urban/semi-urban youths on O'ahu indicate current (past 30-day) vaping, compared with rural youths on Hawai'i Island (29.7%), Kauai (31.9%), and Maui (29.1%). This study is part of a larger effort to develop and evaluate a culturally grounded, e-cigarette prevention intervention for rural NHPI youths. An important initial step in grounding the intervention in NHPI youths' social, cultural, and developmental norms is to elucidate the effective strategies that they use on their own to resist offers to use e-cigarettes in their homes, schools, and communities.

**Literature review.** *NHPI youth and ENDS use.* Epidemiologic research collected between 2017–2021 among young people in Hawai'i showed that NHPIs, compared

---

\*Due in large part to the COVID-19 pandemic, the Centers for Disease Control and Prevention discontinued the evaluation of EVALI case reports in February 2020. See Armatas C, Heinzerling A, Wilken JA. E-cigarette, or vaping, product use-associated lung injury cases during the COVID-19 response—California, 2020. *Morb Mortal Wkly Rep.* 2020;69(25):801–802.

with other ethnic groups, not only had the highest prevalence of current e-cigarette use, but also showed the largest growth in e-cigarette dependence over time (Pokhrel unpublished data). These findings converge with similar e-cigarette research on the continental U.S., which found e-cigarette use to be common among NHPI youths and young adults, exceeding rates of other at-risk racial groups.<sup>6,7</sup> While these e-cigarette-use disparities have historically been documented to begin in high school, data from 2019 indicates they are now emerging as early as middle school.<sup>4</sup> Compared with Asian American and non-Hispanic White high schools students in Hawai'i, Native Hawaiian students were found to have disproportionately higher rates of e-cigarette use in a large urban sample.<sup>8</sup> Further, compared with Asian American and non-Hispanic White youths, Native Hawaiian youths are particularly vulnerable to dual use—using both e-cigarettes and combustible cigarettes either concurrently or sequentially.<sup>8,9</sup> These findings parallel similar disparities in combustible cigarette use for Native Hawaiian middle school students in Hawai'i,<sup>10-12</sup> and reflect the elevated ecological risk for substance use for Hawaiian youths.<sup>13</sup>

While relatively little is still known about the causal factors related to e-cigarette and dual-use initiation for NHPI youths, evidence suggests that these youths are more likely to transition from smoking abstinence to dual use through e-cigarette use over time.<sup>9</sup> Further, studies examining NHPI substance use initiation suggest important pathways toward e-cigarette and dual use that warrant further study. For example, studies have found that Native Hawaiian youths are exposed to gateway drug offers from peers, cousins, parents, and other adult family members significantly more frequently than their non-Hawaiian counterparts,<sup>14</sup> and that these offers predicted higher rates of gateway substance use for these youths.<sup>13</sup> Similarly, peer influences were recently found to be the most common reason for e-cigarette initiation of Native Hawaiians.<sup>15</sup> Mediation analyses conducted in 2016 have found peer affiliations with smokers to be a significant factor in predicting youths' transition from e-cigarette to combustible cigarette use.<sup>16</sup> These findings point to the need to understand and then target the social context of e-cigarette offers with interventions for NHPI youths, in order to provide these youths with the necessary tools to resist strong social demands to use e-cigarettes.

*Drug resistance strategies.* Reviews of youth drug prevention programs have found training youths on strategies to resist substances to be the most effective preventive approach, particularly when conducted within a social influence model of prevention.<sup>17,18</sup> Further, Hopfer et al.<sup>19</sup> found through a latent class analysis that preadolescents who were highly competent in using drug resistance skills had a significantly lower probability of recent substance use compared with other sampled youths. Hecht and colleagues identified four universal youth resistance strategies in response to offers to use substances—saying no (refuse), providing reasons for drug refusal (explain), avoiding people or places where drugs are used (avoid), and walking away from a situation where drugs are being used (leave).<sup>20</sup> While some research has indicated the efficacy of these strategies for preventing substance use of NHPI youths,<sup>21</sup> there is a lack of research and understanding of the degree to which these strategies apply to e-cigarette use, as the majority of studies on drug resistance strategies predated the widespread use of e-cigarettes. Specifically, it is not clear if these strategies will remain efficacious with the persistent and widespread use of e-cigarettes among NHPI youths.

*Relevance of the study.* This study is part of recent national efforts in the United States to improve health outcomes and eliminate health disparities of Asian Americans, Native Hawaiians, and Pacific Islanders. It is consistent with President Biden's Executive Order 14031, which explicitly states the need to "improve health outcomes [and] eliminate health disparities" of NHPIs.<sup>22[p.1]</sup> It is also consistent with related national efforts, such as the Asian American, Native Hawaiian, and Pacific Islander Mental Health Summit hosted by the White House and the Substance Abuse and Mental Health Services Administration in July 2023.<sup>23</sup> These efforts highlight the need for community-based health research focused on NHPIs. The present study has implications for addressing tobacco disparities and preventing tobacco addictions of NHPIs, thereby preventing cancers and promoting respiratory and cardiovascular health within NHPI populations.

## Methods

This study is part of the early phases of a multi-phase community-based participatory research project to develop and evaluate a culturally grounded, school-based e-cigarette prevention intervention for rural NHPI youths. Consistent with culturally grounded intervention development studies with Indigenous youth populations,<sup>24,25</sup> focus groups were used to examine social demands to use e-cigarettes in youths' homes, schools, and communities. The study was approved by the institutional review board at the University of Hawai'i at Mānoa, protocol number 2022-00225.

**Sampling and participants.** Eight schools on Hawai'i Island (one elementary, six middle/intermediate, and one multi-level) participated in this study. These schools were in low-income, rural communities. Consistent with the U.S. Office of Management and Budget's definition of rural, the communities had populations of less than 50,000. They also had a higher percentage of families receiving public assistance compared with the state average.<sup>26</sup> The mean percentage of Native Hawaiian youths across participating schools was 34% ( $SD = 5.8$ ). Participant recruitment was conducted in collaboration with school-based research liaisons, who were school staff members (e.g., teachers, school counselors) that assisted the research team with describing the study, distributing and collecting parental consent and student assent forms, and securing space on school campuses to conduct focus groups. Liaisons were asked to recruit primarily NHPI youths across three demographic groups—(1) e-cigarette users, (2) e-cigarette contemplators (i.e., youths who were considering trying e-cigarettes), and (3) non-e-cigarette users.

Of the 69 youths who participated in this study, 42% identified as female, 48% identified as male, and 9% identified as non-binary. The mean age of the sample was 12.5 years ( $SD = 0.59$ ). Most of these youths were in 7th grade (65%), followed by 6th grade (25%), and 8th grade (3%). In terms of ethnicity, most of the sample was Native Hawaiian or part-Hawaiian (58%), followed by multiracial (not part-Hawaiian or part-Pacific Islander; 10%), Pacific Islander or part-Pacific Islander (9%), White (9%), Hispanic/Latino/Spanish (7%), Filipino (6%), and Japanese (1%). Thirty-eight percent of the youth participants indicated that they had tried vaping before, and of the youths that indicated that they had not tried vaping, 21% indicated that they were thinking about trying it.

**Procedures.** Each youth participated in one of 17 gender-specific focus groups. The focus groups were separated by gender to create group homogeneity to promote candid discussions on a sensitive topic (youth vaping). The mean number of youths participating per school was 7.67 ( $SD = 1.20$ ). The semi-structured interview schedule used to guide the focus group discussions is presented in Box 1. These questions were intended to elucidate the social and cultural contexts of e-cigarette use offers in homes, schools, and communities. These discussions took place in April and May 2023, and were conducted on-site at participating schools. Each group was 45–60 minutes long, and comprised youth participants, a doctoral-level group facilitator, and at least one notetaker. The notetaker's role was to track participants' speaking patterns and note any of their non-verbal communications, to enhance the accuracy of transcribed data. To preserve confidentiality, youth participants were assigned researcher-selected pseudonyms prior to the focus group discussions and were asked to use these pseudonyms when addressing other members in the focus groups. They were also instructed to not use real names when describing e-cigarette-related problem situations and were asked to keep all disclosures in the group setting confidential. Data saturation was reached when no new resistance strategies were identified by participants. Youths received a \$5 gift card and snacks as incentives for their participation in the focus groups.

**Data analysis.** Focus groups were audio-recorded, transcribed verbatim, and checked for accuracy. The transcription and checking processes were conducted by two different

### Box 1.

#### SEMI-STRUCTURED INTERVIEW SCHEDULE (ADAPTED FROM HELM ET AL.<sup>38</sup> AND HURDLE ET AL.<sup>39</sup>)

1. Have you or someone you know ever been offered e-cigarettes, something similar to e-cigarettes (like vape pens), or tobacco cigarettes? If so, what did you/they do?
2. Where do kids use e-cigarettes, similar devices, or tobacco cigarettes on Hawai'i Island?
3. Have you or someone you know been invited to go with kids who planned to use e-cigarettes, similar devices, or tobacco cigarettes? What did you/they do?
4. Is it hard to resist offers to use e-cigarettes, similar devices, or tobacco cigarettes? Why or why not?
5. If your parents found out that you had been using e-cigarettes, similar devices, or tobacco cigarettes, what would they do?
6. How would you respond to your parents if they found out that you had been using e-cigarettes, similar devices, or tobacco cigarettes?
7. Do you know of anyone who uses both an e-cigarette or a similar device and tobacco cigarettes? Which type of cigarettes did they start to use first? Do they continue to use both of them? In what way(s)?
8. Have you or someone you know ever vaped marijuana or used tobacco products other than e-cigarettes or tobacco cigarettes (e.g., chewing tobacco, hookah, or pipe)? Please describe.

research team members, and at least one of these members was present as a notetaker during the focus group discussion. Five research team members collectively coded two transcripts (one female group and one male group) to develop the initial coding framework and clarify the definitions and parameters of each code. The remainder of the transcripts were independently coded and validated in pairs. A consensus coding technique rather than a numerical concordance technique among coders was employed. Narrative segments that were not identically coded were identified, discussed, and justified for inclusion or exclusion in the data set. Consistent with grounded theory, the constant comparative method was employed.<sup>27</sup> As additional codes emerged, they were validated and captured in prior coded transcripts. A computer-assisted qualitative data analysis software package (NVivo 14<sup>28</sup>) was used to facilitate data management and analysis. As an additional validation check, after all transcripts were coded and entered into NVivo, the content of conceptually complex codes was again reviewed and validated by the research team. This allowed for further clarification and verification of the code content.

## Results

The majority of e-cigarette offers occurred in the school setting. All groups (100%) discussed offers that occurred in school bathrooms, while 82% discussed offers in unmonitored places across their school campuses or in a classroom during class. Other common locations included in a community setting (e.g., a public park; 82%), at home (41%), or on a school bus (41%). Fifty-three percent of the groups discussed e-cigarette offers from peers or friends, followed by offers from siblings (41%) and cousins (29%). Participants identified nine different resistance strategies that they used when offered an e-cigarette or related device (see Table 1). Consistent with prior research,<sup>20</sup> four of these strategies were referred to by six or more groups—refuse, explain, avoid, and leave. The focus of the analysis is on these four strategies, to highlight the strategies that were the most generalizable across the different focus groups and schools. Five strategies (involve others, ignore, divert, aggression, and questioning) were also discussed within five or fewer groups.

**Refuse.** Overt refusal was the most frequently described resistance strategy to e-cigarette offers. This strategy seemed to work best when the youth lacked a close relationship with the offeror. For example, Karma described a typical situation when this strategy was effective.

Some boy came up to me once and asked if I wanted to [vape] and I said no, and then he kind of just stopped bothering me. [He] came up to me when I was talking with my friends and was like, “Hey, do you want to take a hit?” And I was like “No, thank you.” And he was like, “Oh, but I have like a bunch of different flavors and stuff.” And I was like “Nooo.”

However, overt refusal became more challenging in situations when youths had a close relationship with the offeror. Cyclops described the challenges saying “no” to a close friend.

**Table 1.**  
**YOUTH ENDS RESISTANCE STRATEGIES**

Strategy	Definition	Number of Groups	Number of References
Refuse	Overtly saying “no” in response to a vaping offer	14	42
Explain	Using an explanation in response to a vaping offer	6	10
Avoid	Avoiding a situation where vaping is occurring	6	9
Leave	Leaving a situation after a vaping offer occurs	6	9
Involve Others	Involving others in response to a vaping offer (e.g., telling a teacher)	5	11
Ignore	Ignoring a direct or indirect offer to vape	4	4
Divert	Changing the subject of a conversation in response to a vaping offer	3	4
Aggression	Using verbal and/or physical violence or aggression in response to a vaping offer	2	4
Questioning	Posing a question in response to a vaping offer	1	1

[Normally] it [would] be pretty easy to say “no,” but, like, if it was a good friend I knew that was trying to hook [me into using] it, then it would be pretty hard. You know them for a long time and you just do whatever [they ask] because they’re your friend.

Cyclops later described an experience of being offered an e-cigarette by a close friend, which resulted in him using the device once with his friend. While he indicated that they are still close, he stated he did not plan on continuing to use e-cigarettes with him anymore.

Several participants described the use of overt refusals in situations when offerors exerted pressure and persisted in trying to get youths to use e-cigarettes. Scorpion described this type of situation in his school.

A friend walks up to you and says, “Here, come try my vape,” and [most kids] usually say, “No.” [But] then they just keep on going and nagging them, saying that “it’s good for you.” When probably the other person [gets] tired of [the nagging], she’s like, “Okay, I’ll just try it once.” And then, [after] that one time, they get addicted, [and] they want more.

After the facilitator asked why offerors target certain kids at school and pressure them to vape, he provided an explanation.



'Cause probably they're not saying it firmly, "No, I don't want to." They're just saying, "Nah, I'm good." And then that makes other people think that they can ask again later.

When asked, "How do you communicate to an offeror 'to leave me alone,'" Ronin suggested that this is difficult to achieve once someone is targeted by an offeror.

By saying "no" enough times, [they'll leave you alone]. Maybe? I doubt that actually [works]. But, maybe communicating [by] saying "I never want to try this. I do not want that." Maybe that'll get them to listen.

**Explain.** Participants described using real or fabricated explanations for refusing e-cigarettes from offerors. Explanations tended to be used more as a resistance strategy when youths had a closer relationship with the offeror. In these types of situations, Blossom stated that "you can always make up an excuse like, 'Oh, I have asthma.'" Fergie provided another explanation.

"Oh, sorry, I have to go to the dentist." Because when you go to the dentist, they can tell from your teeth if you vape. That's why a lot of people, a week before or maybe a month before, they stop vaping, so the [dentist] can't tell by their teeth.

Tupac similarly provided some examples of explanations that could be used to refuse e-cigarette offers from close friends.

Oh, I just say, "Nah, I'm good right now. I don't really want to. I don't really want to try right now." Or I'll be like, "What flavor is it?" And they'll tell me [the flavor], and I'm like, "Oh, I don't really like that."

Half of the references to explanations for refusal in the data were paired with overt refusal. For example, after Cyclops was asked how he would maintain his friendship with his close friend while communicating that he did not want to vape with him anymore, he described how he would pair overt refusal with an explanation to achieve these two goals.

I'm just going to tell him "No." Before I didn't have a reason, but I'm trying to get to somewhere now, so I can't [keep] doing that stuff, you know? I'm trying to do a lot of sports and I go to the gym, so I need all the energy I can get. So, I can't [vape]. And we run, like, a lot, and we do a lot of things, and then I got to sign up for wrestling later. I [also] do basketball, so I can't [vape].

**Avoid.** Participants indicated that avoidance was used as a resistance strategy in situations where there was widespread e-cigarette use. When asked how he would resist using e-cigarettes when moving into 7th grade at his school (where vaping was widespread across the grade level), Antman stated he would "keep away from [kids who vape]." Beast described his two older siblings regularly vaping at home, and how he avoided them at certain times of the day to prevent himself from being offered e-cigarettes.

I just avoid, like, stay away from them. I ask my parents if we can, like, go out or something. Sometimes, I walk up to my friend's house. The other times, I go to my auntie's house that lives right above me and I help clean their farm.

Beast stated that avoiding his siblings at certain times of the day was challenging because he had to figure out where he wanted to go based on the best available option. However, he also felt that it was all he really could do in his situation.

In one group, Biggie was the only participant who had not tried vaping. When asked how he was able to abstain, he indicated that he socially isolated himself from peers to avoid being offered e-cigarettes.

Interviewer: Alright Biggie, you're the only one [in this group] that didn't get offered.

Why do you think you haven't been offered?

Biggie: 'Cause I don't really leave my family. 'Cause I don't really go outside.

Interviewer: You don't go outside?

Biggie: [Nods in agreement].

Interviewer: So, you only go to school and go home. You don't really hang out with other kids, is that why?

Biggie: Mhm [agrees].

The other members of this group all agreed that vaping was “everywhere.” Corroborating Biggie's experience, Tupac stated that there was “no way to escape [vaping]” unless “you just don't go outside.” He elaborated on his statement.

Like, even if you do go out sometimes, you might get offered it. The more you go outside, the more you talk to people, the more popular you are, the more you might get offered to vape.

Other group members provided examples of where e-cigarette use was widespread in their community, including the arcade at the mall, the park, and the gym.

**Leave.** Participants described leaving a situation when offered e-cigarettes primarily when they lacked a close relationship with the offeror. Frost described a situation in which she was offered an e-cigarette by an older boy at the park. She was looking for her friend when she ran into him.

He said, “I can't find my friends. So, you wanna hang out with me for now until I find my friends? You want to try this?” Because [my friend] was walking around, I was like, “What is that?” He said, “It's just candy.” I said, “Nah, I know what that is. Bye.”

Leaving the situation was also used when there was excessive pressure to use e-cigarettes. Phoenix described some of his peers following him into the school bathrooms and pressuring him to use vaping devices, with the intent of selling one to him. He described how he dealt with this predatory behavior.

When they are like walking and following us into the bathrooms, I usually walk out and then leave them, and tell them to leave me alone, but if they don't then I just ignore them. Act like nobody is there.

His response to the offeror in this situation highlights the use of multiple types of resistance strategies (i.e., refuse, ignore, and leave) when dealing with aggressive and/or predatory offerors in schools.

## Discussion

This study examined the resistance strategies that NHPI youths used to deal with offers to use e-cigarettes in their homes, schools, and communities. These strategies are informed by communication competence theory, which posits that competence is a relational phenomenon in which knowledge of the context, the other person, and the subject influences the perceived competency of the individual's communication skills.<sup>29</sup> Consistent with prior research,<sup>20</sup> the most frequently accessed strategies included overt refusals (refuse), explanations for refusals (explain), avoiding e-cigarette offer situations (avoid), and leaving e-cigarette offer situations (leave). Further, participants described combining two or more resistance strategies in situations where a stronger response was needed. Prior research described how Native Hawaiian youths combined different resistance strategies when a stronger response was needed to resist offers to use alcohol, tobacco, or other drugs.<sup>30</sup> The present study suggests that this approach also generalizes to NHPI youths' resistance of e-cigarette offers. The use of these strategies did not appear to vary by age or grade level, and participants suggested that non-assertive or reserved youth would be susceptible to e-cigarette offers. They suggested that these youth would lack the ability to competently use resistance strategies in e-cigarette offer situations, and would be more likely to succumb to the offers.

While the types of resistance strategies used in e-cigarette offer situations are consistent with prior research, the findings from the present study suggest that the overall efficacy of these strategies may be diminished when applied to e-cigarette offer situations. Factors such as the widespread prevalence of e-cigarette use in rural Hawai'i across different ecological contexts (e.g., home, school, and community) may have required youths to repeatedly use the same or different types of resistance strategies in combination to effectively communicate refusal. This widespread prevalence was also the perceived reason they thought they were initially offered e-cigarettes and received repeat offers. Further, the interconnected, relational context in rural NHPI communities may have challenged youths' ability to effectively refuse e-cigarettes. Several of the communities represented in this study comprised a small number of familial networks, and in most of them, NHPI youths attended schools with biological or ascribed cousins. As a result, their decisions to vape were heavily influenced across multiple contexts (i.e., home, school, and/or community) by same-generation family members.<sup>31</sup> Within this setting, NHPI youths may struggle to balance the cultural expectation to maintain harmony in their significant relationships with their personal vaping abstinence. Past research has described a similar phenomenon, and its impact on alcohol, tobacco, and other drug use of Native Hawaiian youths.<sup>31,32</sup>

**Implications for substance use prevention.** Substance use prevention interventions focused on resistance skills training have demonstrated efficacy when delivered in a specific context, such as in a school or community-based agency. However, most of these types of interventions have not been rigorously tested to prevent youth e-cigarette use. With some notable exceptions (e.g., N-O-T: Not on Tobacco from the American Lung Association), documented, empirically-supported, e-cigarette prevention interventions are primarily educational rather than skills-based in nature,<sup>33</sup> and none focus on the cultural context of NHPI youths.<sup>34</sup> The findings from the present study suggest

that e-cigarette prevention interventions should employ a skills-based component to complement health education related to e-cigarette use. Skills-based and educational components should be grounded in the values, beliefs, and worldviews of NHPI youths, to promote school-based implementation and community acceptability.<sup>35</sup>

The widespread prevalence and high rates of youth e-cigarette use in rural Hawai'i described by study participants further suggest that a unidimensional approach to health promotion or disease prevention may have limited effectiveness in curbing e-cigarette use for NHPI youths. Prevention of e-cigarette use may require intervening at multiple ecosystem levels (e.g., individual, interpersonal, community, and/or societal levels) in order to meaningfully affect e-cigarette use for rural NHPI youths. These levels are reflected in the research framework of the National Institute on Minority Health and Health Disparities<sup>36</sup> and have been applied toward understanding the correlates to NHPI tobacco product use.<sup>37</sup>

The findings from this study are useful as they can inform initiatives and interventions at different ecosystem levels to reduce NHPI youth e-cigarette use. As suggested earlier, these findings could be used at the school level to inform classroom-based, tobacco product use prevention interventions through culturally grounded resistance skills training.<sup>38,39</sup> They could also be used at the community level to develop educational posters or flyers related to e-cigarette use, bringing awareness to the extent of e-cigarette use and ways in which youths can deal with e-cigarette use offers across rural schools and communities in Hawai'i. Similarly, social media campaigns could be used to broaden vaping prevention messaging across geographically dispersed regions in Hawai'i, mainly targeting youth consumers or youths who are contemplating e-cigarette use. Finally, the findings could be used to inform parent-focused interventions, educating them on their children's social demands to use e-cigarettes and ways they can support their children's vaping abstinence. Several of these approaches are currently being operationalized in emerging vaping prevention interventions for rural NHPI youths funded by the National Institutes of Health. As a result, this study contributes to the emerging body of substance and tobacco product use prevention literature.

**Study limitations.** There were several limitations to this study. Participants attended public schools on Hawai'i Island, and their perspectives may not apply to youths from rural communities on other islands in Hawai'i, or NHPI youths in the continental U.S. or abroad. Further, the topic of e-cigarette use can be sensitive, affecting comfort level and amount of disclosure in a focus group setting. While self-disclosure of vaping use was not required nor directly addressed in the focus groups, youth who did choose to self-disclose their vaping use histories did so slowly and with some hesitation, possibly due to fear of judgement from the facilitators or other youths in the group setting. Additionally, we developed our interview guide using communication competence theory. Future research may wish to apply other theories to further explore NHPI youths' e-cigarette use. Lastly, because active parental consent was required for all youth who participated in the study, the sample may have been influenced by a selection bias. Specifically, youths with more extensive personal or familial histories of tobacco product use may not have been granted permission to participate in the study, due to parents' concerns that these histories might be discussed in the focus groups.

**Conclusions.** This study elucidates the ways in which rural NHPI youth manage strong social and cultural demands to use e-cigarettes in their homes, schools, and communities. While it validates drug resistance strategies described in past prevention literature, it suggests that the widespread and persistent use of e-cigarettes in rural Hawai'i may have limited the efficacy of these strategies. Youth participants often repeated the use of resistance strategies or used two or more of them in combination to deal with strong social demands to use e-cigarettes. While repeating or combining strategies may have strengthened the impact of interpersonal e-cigarette resistance, future health promotion and disease prevention interventions should consider focusing on multiple ecosystem levels (e.g., homes, schools, and/or communities) to generate meaningful effects on curbing youths' e-cigarette use. These interventions could include a combination of school-based interventions, parent-focused interventions, and/or social media interventions.

## Acknowledgment

This study was supported by funding from the National Institute on Drug Abuse (R01 DA054215, PI Okamoto, and L60 DA059132, PI Okamura), the National Institute of General Medical Sciences (U54 GM138062, MPIs Kaholokula and Palafox), and the National Cancer Institute (R01 CA202277, PI Pokhrel, and R25 CA244073, MPIs Maskarinec, Kaholokula, and Loo). The authors declare no conflicts of interest in the execution of this study.

## References

1. King BA, Jones CM, Baldwin GT, et al. The EVALI and youth vaping epidemics—Implications for public health. *N Engl J Med*. 2020 Feb 20;382(8):689–91. Epub 2020 Jan 17.  
<https://doi.org/10.1056/NEJMp1916171>  
PMid:31951683
2. Gaiha SM, Cheng J, Halpern-Felsher B. Association between youth smoking, electronic cigarette use, and Coronavirus Disease 2019. *J Adolesc Health*. 2020 Oct;67(4):519–23. Epub 2020 Aug 11.  
<https://doi.org/10.1016/j.jadohealth.2020.07.002>  
PMid:32798097
3. Wills TA, Choi K, Pagano I. E-Cigarette use associated with asthma independent of cigarette smoking and marijuana in a 2017 national sample of adolescents. *J Adolesc Health*. 2020 Oct;67(4):524–30. Epub 2020 Apr 24.  
<https://doi.org/10.1016/j.jadohealth.2020.03.001>  
PMid:32336559
4. Center for Disease Control and Prevention. 1995–2019 Middle School Youth Risk Behavior Survey Data. Atlanta, GA: Center for Disease Control and Prevention, 2023. Available at <http://nccd.cdc.gov/youthonline/>.
5. Onoye J, Miao T-A, Goebert D, et al. The 2019–2020 Hawai'i student alcohol, tobacco, and other drug use (ATOD) survey: Hawai'i county report. Honolulu, HI: State of Hawai'i Department of Health, Alcohol and Drug Abuse Division, 2021. Available at: <https://health.hawaii.gov/wp-content/uploads/2022/01/Hawaii-County-Report.pdf>.

6. Subica AM, Guerrero E, Wu L-T, Aitaoto N, Iwamoto D, Moss HB. Electronic cigarette use and associated risk factors in U.S.-dwelling Pacific Islander young adults. *Subst Use Misuse*. 2020;55(10):1702–8. Epub 2020 May 12.  
<https://doi.org/10.1080/10826084.2020.1756855>  
PMid:32397921
7. Do EK, Aarvig K, Muller-Tabanera H, et al. E-cigarette use behaviors of Asian American, Native Hawaiian, and Pacific Islander youth in the contiguous United States: insights from the Monitoring the Future study (2018–2019). *Prev Med Rep*. 2023 Aug 21;35:102376.  
<https://doi.org/10.1016/j.pmedr.2023.102376>  
PMid:37662868
8. Wills TA, Knight R, Williams RJ, et al. Risk factors for exclusive e-cigarette use and dual e-cigarette use and tobacco use in adolescents. *Pediatrics*. 2015 Jan;135(1):e43–51. Epub 2014 Dec 15.  
<https://doi.org/10.1542/peds.2014-0760>  
PMid:25511118
9. Wills TA, Knight R, Sargent JD, et al. Longitudinal study of e-cigarette use and onset of cigarette smoking among high school students in Hawaii. *Tob Control*. 2017 Jan;26(1):34–9. Epub 2016 Jan 25.  
<https://doi.org/10.1136/tobaccocontrol-2015-052705>  
PMid:26811353
10. Glanz K, Mau M, Steffen A, et al. Tobacco use among Native Hawaiian middle school students: Its prevalence, correlates and implications. *Ethn Health*. 2007 Jun;12(3):227–44.  
<https://doi.org/10.1080/13557850701234948>  
PMid:17454098
11. Glanz K, Maskarinec G, Carlin L. Ethnicity, sense of coherence, and tobacco use among adolescents. *Ann Behav Med*. 2005 Jun;29(3):192–9.  
[https://doi.org/10.1207/s15324796abm2903\\_5](https://doi.org/10.1207/s15324796abm2903_5)  
PMid:15946113
12. Kim SS, Ziedonis D, Chen K. Tobacco use and dependence in Asian American and Pacific Islander adolescents: a review of the literature. *J Ethn Subst Abuse*. 2007;6(3–4):113–42.  
[https://doi.org/10.1300/J233v06n03\\_05](https://doi.org/10.1300/J233v06n03_05)  
PMid:19842309
13. Okamoto SK, Kulis S, Helm S, et al. The social contexts of drug offers and their relationship to drug use of rural Hawaiian youths. *J Child Adolesc Subst Abuse*. 2014 Jul 1;23(4):242–52.  
<https://doi.org/10.1080/1067828X.2013.786937>  
PMid:24860249
14. Okamoto SK, Helm S, Giroux D, et al. The development and initial validation of the Hawaiian Youth Drug Offers Survey (HYDOS). *Ethn Health*. 2010;15(1):73–92.  
<https://doi.org/10.1080/13557850903418828>  
PMid:20013440
15. Seto J, C., Davis JW, Taira DA. E-cigarette use related to demographic factors in Hawai'i. *Hawaii J Med Public Health*. 2016 Oct;75(10):295–302.
16. Wills TA, Gibbons FX, Sargent JD, et al. How is the effect of adolescent e-cigarette use on smoking onset mediated: a longitudinal analysis. *Psychol Addict Behav*. 2016 Dec;30(8):876–86.

- <https://doi.org/10.1037/adb0000213>  
PMid:27669093
17. McBride N. A systematic review of school drug education. *Health Educ Res.* 2003 Dec;18(6):729–42.  
<https://doi.org/10.1093/her/cyf050>  
PMid:14654505
  18. Skiba D, Monroe J, Wodarski JS. Adolescent substance use: reviewing the effectiveness of prevention strategies. *Soc Work.* 2004 Jul;49(3):343–53.  
<https://doi.org/10.1093/sw/49.3.343>  
PMid:15281689
  19. Hopfer S, Hecht ML, Lanza ST, et al. Preadolescent drug use resistance skill profiles, substance use, and substance use prevention. *J Prim Prev.* 2013 Dec;34(6):395–404.  
<https://doi.org/10.1007/s10935-013-0325-0>  
PMid:23990398
  20. Hecht ML, Marsiglia FF, Elek E, et al. Culturally grounded substance use prevention: An evaluation of the keepin' it R.E.A.L. curriculum. *Prev Sci.* 2003 Dec;4(4):233–48.
  21. Okamoto SK, Kulis SS, Helm S, et al. An efficacy trial of the Ho'ouna Pono drug prevention curriculum: An evaluation of a culturally grounded substance abuse prevention program in rural Hawai'i. *Asian Am J Psychol.* 2019 Sep;10(3):239–48.  
<https://doi.org/10.1037/aap0000164>  
PMid:32395199
  22. Biden JR. Executive order on advancing equity, justice, and opportunities for Asian Americans, Native Hawaiians, and Pacific Islanders. Washington, D.C.: Executive Office of the President, 2021. Available at: <https://www.whitehouse.gov/briefing-room/presidential-actions/2021/05/28/executive-order-on-advancing-equity-justice-and-opportunity-for-asian-americans-native-hawaiians-and-pacific-islanders/>.
  23. The U.S. Department of Health & Human Services (HHS). Biden-Harris Administration Hosts Inaugural Asian American, Native Hawaiian, and Pacific Islander Mental Health Summit. Washington, D.C.: HHS, 2023. Available at: <https://www.hhs.gov/about/news/2023/07/21/biden-harris-administration-hosts-inaugural-asian-american-native-hawaiian-pacific-islander-mental-health-summit.html>.
  24. Okamoto SK, Po'a-Kekuawela K, Chin CIH, et al. Exploring culturally specific drug resistance strategies of Hawaiian youth in rural communities. *J Alcohol Drug Educ.* 2010 Apr 1;54(1):56–75.
  25. Okamoto SK, Hurdle DE, Marsiglia FF. Exploring culturally-based drug resistance strategies used by American Indian adolescents of the Southwest. *J Drug Alc Educ.* 2001 Fall;47(1):45–59.
  26. Accountability Resource Center Hawai'i. School accountability: School status and improvement report. Honolulu, HI: State of Hawaii Department of Education, 2023. Available at: <http://arch.k12.hi.us/reports/ssir>.
  27. Strauss A, Corbin J. *Basics of qualitative research*, 2<sup>nd</sup> edition. Thousand Oaks, CA: Sage, 1990;270.
  28. Lumivero. NVivo 14. 2023.
  29. Spitzberg BH, Hecht ML. A component model of relational competence. *Hum Commun Res.* 1984 Jun;10(4):575–99.  
<https://doi.org/10.1111/j.1468-2958.1984.tb00033.x>
  30. Okamoto SK, Helm S, Giroux D, et al. A typology and analysis of drug resistance strategies of rural Native Hawaiian youth. *J Prim Prev.* 2010 Dec;31(5–6):311–9.

- <https://doi.org/10.1007/s10935-010-0222-8>  
PMid:20640939
31. Okamoto SK, Helm S, Po'a-Kekuawela K, et al. Community risk and resiliency factors related to drug use of rural Native Hawaiian youth: an exploratory study. *J Ethn Subst Abuse*. 2009;8(2):163–77.  
<https://doi.org/10.1080/15332640902897081>  
PMid:19459123
  32. Bills K, Okamoto SK, Helm S. The role of relational harmony in the use of drug refusal strategies of rural Native Hawaiian youth. *J Ethn Cult Divers Soc Work*. 2016;25(3):208–26. Epub 2016 May 10.  
<https://doi.org/10.1080/15313204.2016.1146190>  
PMid:28133439
  33. Substance Abuse and Mental Health Services Administration (SAMHSA). Reducing vaping among youth and young adults. Rockville, MD: National Mental Health and Substance Use Policy Laboratory, Substance Abuse and Mental Health Services Administration, 2020. Available at: <https://store.samhsa.gov/sites/default/files/pep20-06-01-003.pdf>.
  34. Manglallan KS, Johnson DL, Rosario MH, et al. A systematic literature review of Asian American, Native Hawaiian, and Pacific Islander youth electronic nicotine delivery systems (ENDS) use. *Hawai'i J Health Soc Welf*. 2023 Jul;82(7):151–7.
  35. Okamoto SK, Helm S, Chin SK, et al. The implementation of a culturally grounded, school-based, drug prevention curriculum in rural Hawai'i. *J Community Psychol*. 2020 May;48(4):1085–99. Epub 2019 Jul 23.  
<https://doi.org/10.1002/jcop.22222>  
PMid:31332808
  36. National Institute on Minority Health and Health Disparities. NIMHD Research Framework. Bethesda, MD: National Institutes of Health, 2023. Available at: <https://www.nimhd.nih.gov/about/overview/research-framework/nimhd-framework.html>.
  37. Phillips KT, Okamoto SK, Johnson DL, et al. Correlates of tobacco use among Asian and Pacific Islander youth and young adults in the U.S.: a systematic review of the literature. *Exp Clin Psychopharmacol*. 2021 Oct;29(5):440–55.  
<https://doi.org/10.1037/pha0000511>  
PMid:34636585
  38. Helm S, Okamoto SK, Medeiros H, et al. Participatory drug prevention research in rural Hawai'i with Native Hawaiian middle school students. *Prog Community Health Partnersh*. 2008 Winter;2(4):307–13.  
<https://doi.org/10.1353/cpr.0.0042>  
PMid:19696900
  39. Hurdle DE, Okamoto SK, Miles B. Family influences on alcohol and drug use by American Indian youth: implications for prevention. *J Fam Soc Work*. 2003;7(1):53–68.  
[https://doi.org/10.1300/J039v07n01\\_04](https://doi.org/10.1300/J039v07n01_04)