PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Prevalence of disposable pod use and consumer preference for e-cigarette product characteristics among vape shop customers in Southern California: a cross-sectional study
AUTHORS	Galimov, Artur; Leventhal, Adam; Meza, Leah; Unger, Jennifer; Huh, Jimi; Báezconde-Garbanati, L; Sussman, Steven Y

VERSION 1 – REVIEW

REVIEWER	Schneller, Liane Roswell Park Comprehensive Cancer Center
REVIEW RETURNED	22-Mar-2021

GENERAL COMMENTS	This study assessed the prevalence of disposable pod and flavor preferences compared to other device type users among vape shop customers. It was found that disposable pod users were more likely to prefer mint and menthol flavors, used a higher nicotine concentration, and were younger relative to other device type users. Although this study does add to the body of literature, there are some revisions needed. Methods: What tests were used to calculate the odds ratios presented in the results section? Were any adjustments made? Why was the first nicotine product used the only one adjusted for age? Why not flavor preference also? Also, this adjustment should be noted in the methods section. Results: When you list the mean age and nicotine concentration levels for the various product user groups, it would be helpful to label which statistic corresponds with what product. What is the difference between the two odds ratios that are presented? Is one the crude odds ratio and one adjusted? Also, the confidence interval should be included with all odds ratios. Did you assess concurrent/poly flavor use? What was the prevalence of reporting more than one flavor category? Discussion: Based on the methods and results presented here, it seems that it is an over-conclusion to state that, "it is unlikely that young vapers are using disposable pods as a means of harm reduction."

REVIEWER	Stalgaitis, Carolyn

	Rescue Agency, San Diego, Research
REVIEW RETURNED	07-Apr-2021

GENERAL COMMENTS	This article reports findings from intercept surveying of vape shop customers in Southern California regarding their e-cigarette preferences including type and flavor. Findings focus on differences between those who prefer disposable pod products compared to refillable pods and other devices. The findings are interesting, and with a few edits and additions I think the paper would make a useful addition to the literature. I've provided point by point feedback below, organized by paper section. --- General Feedback • I recommend taking a quick look throughout for grammatical errors – I noticed several places where periods were missing at the end of sentences. • The Abstract and Introduction frame this paper as examining how disposable pod users compare to other e-cigarette users following FDA restrictions which were enacted in February 2020. However, most of the data were collected prior to February 2020. Because of that limitation (most data collected before the FDA action), I think characterizing the study as an examination of disposable pod users during a time of rapid proliferation in response to FDA regulation is a mischaracterization. This study would be more accurately described as an examination of early-adopters of disposable pod products during a time of changing federal regulation of e-cigarette products. I don't think this minimizes the interest of the data – the framing just needs to be adjusted throughout to accurately reflect what the study actually captures. --- Strengths & Limitations • Final bullet point seems to be missing a word – should it be "… the Southern California area"? --- Introduction • The final paragraph switches between active voice ("… we assessed…") and passive voice ("… the differences… were examined."). Please select one and remain consistent throughout the paper. • It would be helpful to include justification or support for your hypotheses. Is there evidence in the literature that led you to expect disposable pod users would use higher nicotine concentrations and prefer mint/menthol flavors? --- Methods - Participants and procedures: • The first sentence describes the list of shops as "exhaustive" but also specifies that vape shops were pulled from "locations with ethnically diverse populations." Does this mean only "ethnically diverse" locations were selected for inclusion (if so, please describe how that was defined), or was this intended to convey the fact that Southern California itself is an ethnically diverse area? A minor point but I found it a little confusing.

	• Were the 44 vape shops that were visited all of the shops identified in the target area? If not, how were shops selected for visits? How many shops declined to allow researchers to visit, and do you know if those shops or their clientele differed significantly from those included in the sampling? • Is there any information available on the 31% of eligible individuals who did not participate? Why did they not participate? Do you know if they differed significantly from those who did participate? This should also be mentioned as a limitation as it relates to generalizability and potential biases. --- Methods - Measures: • I think additional detail on how "most preferred type of e-cigarette device" data were collected would be useful, since this is the question used to create the subgroups at the center of your analyses. Were individuals provided with brand examples or images? Why was "preferred" device collected rather than most frequently used device or another metric? Was consideration given to allowing individuals to select all that apply, to account for those who may be using multiple product types? • How were responses collected for the question regarding nicotine concentration – did participants provide open-ended information on mg/ml, were they given response options to select from, or some other approach? Was there a proportion of the sample who did not know or could not answer this question, and if so, how were their responses handled in analysis? --- Methods - Data Analysis • This section does not describe the methods used to generate the odds ratios reported in the Results. This information needs to be added, including details on any adjustment for confounders like demographics that may have been included. • I believe the first sentence should state that prevalence, demographics, etc. are reported for the full sample, as the same results by user type (disposable, refillable, other) are mentioned in the second sentence. • Were any data missing, and if so, how was missingness addressed in analysis? --- Results • I recommend adding an in-text reference to Table 1 the first time data from the table are reported, to let the reader know they should check out the table for details. Then, you can streamline the text of Results so you are only stating the % in the text (since the reader knows to find the n in the table), which will make the Results section much easier to read. Right now, it's very dense due to all the numbers being reported in-text. • This section includes results from a series of regressions which are not described in the Data Analysis section or presented in the table. In addition to describing this analysis in the Data Analysis section, I recommend adding a Table 2 with regression results. This will allow you to report only the ORs in the text, saving the p-values for the table and making the section much easier for the

	reader to comprehend. It will also allow the reader to quickly scan a table and see the high-level results of the regressions. • In paragraph 2, I think some of the reported results are misrepresenting Table 1, if I understand what is being reported correctly. The text states "… disposable pod users tended to be younger (mean age: 26.1 vs. 29.7 vs. 34.5 years, p<.001)". The mean ages match what is provided in Table 1, but the p-value does not – Table 1 reports the p-value for the comparison between disposable and refillable users as p= .08, and between disposable and other users as p < .001. So the text implies that disposable users are significantly younger than both refillable and other users, when in actuality the difference only reaches significance for disposable vs. other. This needs to be fixed. • When p-values are referenced in the text, if two p-values are being referenced at once (for example, when reporting 2 ORs at once), I recommend stating "both p < .001" (or the appropriate significance level) to make it clear that more than 1 comparison is being reported. This applies to both ORs and mean/frequencies comparisons reported in-text. • I recommend separating the results of mean/frequency statistical comparisons from the results of regressions, to help the reader keep track of what is being discussed. Right now they are intertwined, which is confusing to track. --- Discussion • I found it interesting that almost 20% of disposable pod users reported using tobacco flavors, and in frequency comparisons, this was significantly higher than among refillable users (and neared significance for the comparison with other users). I believe that previous literature generally indicates that younger users and those who are not switching from combustible products (so, the folks who make up the disposable pod users in the current study) tend to dislike the tobacco flavored pods/juices. I'm curious if the authors have any thoughts on this finding, especially as it relates to potential recommendations for further policy/regulatory action. • I feel like stating that "… disposable pod users preferred to use higher nicotine levels…" may be mischaracterizing the data. As you note in the next sentence, disposable products often come with high nicotine concentration levels, whereas other products come in lower mg/ml concentrations. So, someone who chooses disposable products (which could be for any number of reasons) is selecting a product likely to have a higher nicotine concentration simply because they're selecting that type of product and not necessarily because they are actively seeking out or preferring a higher nicotine concentration. It's a minor distinction, but I do think it's important to be clear since the nature of the data means you can't disambiguate the preference for the product from the preference for a certain nicotine level. It's more accurate to say disposable users report higher nicotine concentration levels, than to say they prefer them. • In regards to the following sentence – "This might suggest that Puff-Bar-like devices are highly appealing to emerging adults and also to minors." – I understand that disposable users tended to be younger in this sample, so that could lead to the conclusion that the product appeals to younger people. However, disposable products are also newer than refillable and other products – so isn't it also possible that older vape users initiated prior to disposables being on the market (or being widely accessible), and

	therefore they prefer refillables/other products simply because that's what was available when they first tried vaping? So, these findings could be more of a temporal/generational trend as products evolve over time and young people initiate with whatever is new and available, rather than an indication that disposables themselves are inherently more appealing to young people than other device types. I think it's worth considering and seeing if there is anything in the literature to support a conclusion either way. • The statement "Moreover, it is unlikely that young vape users are using disposable pods as a means of harm reduction" feels out of place. It requires more support (why can we assume this?) and context within the study's findings (why is it relevant here?). • I think there are 2 important limitations that are missing here. First, as I mentioned earlier, this study really focuses on early adopters of disposable pods, or more accurately, those using just before and during federal action that led to an explosion in disposable use (after the data collection period). Findings may be very different now, a year after the FDA action and the resultant increase in disposable use, so I think it is important to state this limitation. Second, the actual number of participants who preferred disposable pods was relatively small – only 31 out of 276 participants. This limits generalizability further, and further emphasizes that the data were collected primarily before the FDA action and resultant increase in disposable use rather than following the increase in disposable use. --- Table 1 • In the far left column, several rows state "(yes vs. no)". I found this confusing – I believe the table is reporting the % who reported yes, but the attempt at clarification ended up making me second guess what the table was presenting. I recommend dropping "(yes vs. no)" as I believe it's clear enough you are reporting the % answering affirmatively to these items. • The rows for first nicotine-containing product use the superscript f indicating they have been adjusted for age. How was this conducted? I don't believe any adjustment methods (beyond adjusting for multiple comparisons) were described for the % comparisons in the Data Analysis section.

VERSION 1 – AUTHOR RESPONSE

Reviewer # 1

1. Methods: What tests were used to calculate the odds ratios presented in the results section? Were any adjustments made?

Response:
Thank you for bringing this to our attention. We have added this information to the revised version. "Pearson's chi-square tests were calculated for categorical study variables, while ANOVA tests were calculated for continuous variables. Statistically significant variables were then included as dependent variables in multilevel regression analyses with type of device used (i.e., disposable pods, refillable pod users, and other e-cigarette devices) as a predictor, while controlling for the nesting of vape shop customers (Level 1) within 44 vape shops (Level 2). All models were adjusted for sociodemographic factors."

2. Why was the first nicotine product used the only one adjusted for age? Why not flavor preference also? Also, this adjustment should be noted in the methods section.

Response:
Thank you for your comment. Per the 2nd reviewer suggestion, we have added Table 2 displaying the results of regression models (adjusted for sociodemographic factors). We have also added clarifications regarding procedures in the methods section.

"Pearson's chi-square tests were calculated for categorical study variables, while ANOVA tests were calculated for continuous variables. Statistically significant variables were then included as dependent variables in multilevel regression analyses with type of device used (i.e., disposable pods, refillable pod users, and other e-cigarette devices) as a predictor, while controlling for the nesting of vape shop customers (Level 1) within 44 vape shops (Level 2). All models were adjusted for sociodemographic factors. Maximum likelihood estimation was used to account for non-normal distributions and missing data."

3. Results: When you list the mean age and nicotine concentration levels for the various product user groups, it would be helpful to label which statistic corresponds with what product. What is the difference between the two odds ratios that are presented? Is one the crude odds ratio and one adjusted? Also, the confidence interval should be included with all odds ratios.

Response:
Thank you for this valuable comment and your guidance. We now have added the information regarding the statistical tests to the methods section. We have also revised the Results section and added the explanations regarding the odds ratios to the revised version to avoid confusion.

"Bivariate comparisons between study variables and the type of e-cigarette device used by vape shops customers in past 30-days are reported in Table 1. Disposable pod users tended to be younger than other (non-pod) device type users (mean age: 26.1 [SD=7.9] vs. 34.5 [10.9], p<.001). Disposable pod users also preferred to use higher nicotine concertation levels (mean nicotine level: 41.6 [17.7] mg/ml) than refillable pod users (26.4 [18.0] mg/ml) and other device type users (5.2 [6.9] mg/ml, both p<.001). Lifetime cigarette use was more prevalent among refillable pod users (81.4%) compared to disposable pod users (61.3%, p=0.02). Refillable pod users (78.3%) and other device type users (84.6%) reported higher prevalence of daily e-cigarette use compared to disposable pod users (45.2%, both p<.001). Additionally, disposable pod users reported higher prevalence of using e-cigarettes as their first nicotine containing product (35.5%) than refillable pod (8.8%) and other device type users (8.4%, both p ≤ .001).
Fruit/candy (80.7%), mint (77.4%) and menthol (67.7%) were the most preferred flavors among disposable pod users, while tobacco flavor (19.4%) was the least preferred. In fact, a flavor preference of mint and menthol was more prevalent among disposable pod users compared to refillable pod users and other e-cigarette users (see Table 1). Tobacco flavor preference was more prevalent among disposable pod users (19.3%), compared to the other groups (see Table 1). Post-hoc analyses demonstrated that all disposable users who preferred tobacco flavors reported using combustible tobacco in their lifetime, and their mean age was 30.2 (SD=8.4) years.
The multilevel regression models (Table 2) demonstrated that after adjusting for sociodemographic factors, refillable pod users (OR, 3.79 [95% CI, 1.57 - 9.11]) and other e-cigarette device type users (OR, 5.80 [95% CI, 2.38 - 14.13]) were more likely to report daily e-cigarette use compared to disposable pod users. Further, e-liquid nicotine concentration preference was significantly lower among refillable pod users (β= -14.90 [95% CI, 1(-20.34; -9.46]) and other e-cigarette users (β= -35.87 [95% CI, -41.25; -30.48]) than among disposable pod users. Additionally, refillable pod users were less likely to report e-cigarette as their first nicotine containing product (OR, 0.27 [95% CI, 0.09 -

0.81]) than disposable pod users. Finally, it was shown that refillable pod users (OR, 0.17 [95% CI, 0.06 - 0.46]) and other e-cigarette users (OR, 0.16 [95% CI, 0.06 - 0.43]) were less likely to prefer mint flavors compared to disposable pod users."

4. Did you assess concurrent/poly flavor use? What was the prevalence of reporting more than one flavor category?

Response:
Thank you for your comment. Participants' e-liquid flavor preference was assessed with the question, "Which types of e-juices do you like the most? (Check all that apply)". The response categories included: "fruit/candy", "dessert", "minty flavors", "menthol", and "tobacco flavor". In other words, participants had the opportunity to indicate multiple flavor preference (i.e., concurrent flavor use). In fact, 53% of them indicated that they prefer more than two types of flavors.

5. Discussion: Based on the methods and results presented here, it seems that it is an over-conclusion to state that, "it is unlikely that young vapers are using disposable pods as a means of harm reduction."

Response:
Thank you for this comment. We agree that this conclusion is beyond our study findings, and we now have removed this sentence from the revised version.

Reviewer # 2

1. I recommend taking a quick look throughout for grammatical errors – I noticed several places where periods were missing at the end of sentences.

Response:
Thank you for bringing this to our attention. We carefully read through the article and fixed typos and grammatical errors in the revised version.

2. The Abstract and Introduction frame this paper as examining how disposable pod users compare to other e-cigarette users following FDA restrictions which were enacted in February 2020. However, most of the data were collected prior to February 2020. Because of that limitation (most data collected before the FDA action), I think characterizing the study as an examination of disposable pod users during a time of rapid proliferation in response to FDA regulation is a mischaracterization. This study would be more accurately described as an examination of early-adopters of disposable pod products during a time of changing federal regulation of e-cigarette products. I don't think this minimizes the interest of the data – the framing just needs to be adjusted throughout to accurately reflect what the study actually captures

Response:
Thank you for this comment. We have revised the abstract and introduction sections accordingly:
"This study examined the prevalence of disposable pod use and flavor preference compared to refillable pod and other e-cigarette users among vape shop customers."
"To inform future flavor and other regulations of pod-style devices, we assessed the prevalence of disposable pod use and flavor preference among vape shop customers utilizing intercept interviews, in real time, as customers exited the vape shop."

3. Final bullet point seems to be missing a word – should it be "… the Southern California area"?

Response:
Thank you for bringing this to our attention. We have added the missing information to the revised version.

“This study is limited in sample size, and our findings might not be generalizable to vapers outside the Southern California area.”

4. Introduction: The final paragraph switches between active voice (“… we assessed…”) and passive voice (“… the differences… were examined.”). Please select one and remain consistent throughout the paper

Response:
Thank you for bringing this to our attention. We have fixed this in our revision.

“Additionally, we examined the differences in consumer preference for e-cigarette product characteristics between disposable pod users, refillable pod product users, and other e-cigarette users.”

5. It would be helpful to include justification or support for your hypotheses. Is there evidence in the literature that led you to expect disposable pod users would use higher nicotine concentrations and prefer mint/menthol flavors

Response:
Thank you for your comment. We have this information in our revision.

“Disposable pod-style devices (i.e., Puff Bar, Ignite, Lush) are compact, sleek, ready-to-use, prefilled vaping devices that contain 20-70 mg/ml of nicotine salt and are marketed to deliver 200-300 puffs per device.[1]”

“They are priced as low as $4.60 USD and are available in mango, mint, strawberry and many other fruit/candy novel flavors with attractive packaging that may be appealing to minors and young adults.[1]”

6. Methods: The first sentence describes the list of shops as “exhaustive” but also specifies that vape shops were pulled from “locations with ethnically diverse populations.” Does this mean only “ethnically diverse” locations were selected for inclusion (if so, please describe how that was defined), or was this intended to convey the fact that Southern California itself is an ethnically diverse area? A minor point but I found it a little confusing.

Response:
Thank you for bringing this to our attention. We now have added clarification regarding shop selection process in our revision.

“A list of eligible vape shops located in Southern California was generated from Google Maps and Yelp in locations with relatively high proportion of residents representing four ethnic groups (based on U.S. Census data).[2]”

7. Methods: Were the 44 vape shops that were visited all of the shops identified in the target area? If not, how were shops selected for visits? How many shops declined to allow researchers to visit, and do you know if those shops or their clientele differed significantly from those included in the sampling?

Response:
Our list of eligible vape shops were selected by utilizing baseline shops with previous data collected, originally selected utilizing Google Maps and Yelp to identify type of shops (vape-only vs. smoke shops) and shop location. The 44 shops represented in this study are a subsample of the eligible baseline shops. Additional shops were not assessed because COVID shutdowns limited data collection and in-person procedures at vape shops.

"A list of eligible vape shops located in Southern California was generated from Google Maps and Yelp in locations with relatively high proportion of residents representing four ethnic groups (based on U.S. Census data).[2] From July 2019 - March 2020 (prior to COVID-19 shutdowns) two or three trained data collectors visited a subsample of 44 vape shops between 10 am and 5 pm during workdays with permission to recruit customers from shop owners. All vape shop customers present at the time of data collection were approached by data collectors as they exited the vape shop (n=425)."

8. Is there any information available on the 31% of eligible individuals who did not participate? Why did they not participate? Do you know if they differed significantly from those who did participate? This should also be mentioned as a limitation as it relates to generalizability and potential biases.

Response:
Thank you for this comment. Most participants that were invited to take the survey but refused to participate reported that they either "didn't have time" to take the survey or were "not interested" in taking the survey. Those participants that took the survey did not differ from those who refused to participate in the study by any sociodemographic factor except for age. Those who agreed to participate in the study were significantly younger that those refused (p=0.001). We have added this information to the revised version, while also accounted for that in the limitations section.

"The participants that took the survey did not differ from those who refused to participate in the study by any sociodemographic factor except for age. That is, subjects that participated in the study were significantly younger than those who refused to take the survey (p=0.001)."

"Subjects participated in the study were significantly younger that those refused to take the survey, thus our study findings may have limited generalizability to older vapers."

9. I think additional detail on how "most preferred type of e-cigarette device" data were collected would be useful, since this is the question used to create the subgroups at the center of your analyses. Were individuals provided with brand examples or images? Why was "preferred" device collected rather than most frequently used device or another metric? Was consideration given to allowing individuals to select all that apply, to account for those who may be using multiple product types?

Response:
Thank you for bringing this to our attention. This question was worded as follows: "What type of e-cigarette device do you use most often?" and was open ended. Response categories were further coded into multiple categories. We have fixed this in our revision and provided the exact wording for this item:
"The most frequently used type of e-cigarette device (used in the past 30-days) was assessed by asking participants: "What type of e-cigarette device do you use most often?" (open-ended and further coded into the following categories: pen, box mod, disposable pod style, refillable pod mod or other)."
Participants had the opportunity to list any device used most often. The "other" category was used internally to report multiple product types. Nonetheless, as we stated in the manuscript: only 3 (1.0%) participants selected "other" and reported (equally) using both reillable pods and box mods; for analyses purposes they were classified as box mod users.

10. How were responses collected for the question regarding nicotine concentration – did participants provide open-ended information on mg/ml, were they given response options to select from, or some other approach? Was there a proportion of the sample who did not know or could not answer this question, and if so, how were their responses handled in analysis?

Response:
Thank you for your comment. This was an open-ended item; however, participants were provided with examples: 0, 3, 6, 9, 12, 18, 24, 25, 50 mg/ml. Vape shop customers were generally aware of their nicotine content levels. Four participants (1.4%) reported that their preference for nicotine concertation varies and were not able to answer this question. Their responses to this item were treated as missing.

“Additionally, we evaluated the preferred e-liquid nicotine level by asking participants: “How many mg per ml of nicotine does your favorite brand/flavor have?” (Open-ended, e.g., 0, 3, 6, 9, 12, 18, 24, 25, 50 mg/ml).”

11. Data analysis: This section does not describe the methods used to generate the odds ratios reported in the Results. This information needs to be added, including details on any adjustment for confounders like demographics that may have been included.

Response:
Thank you for your comment. We now have added this information to the methods section.

“Pearson’s chi-square tests were calculated for categorical study variables, while ANOVA tests were calculated for continuous variables. Statistically significant variables were then included as dependent variables in multilevel regression analyses with type of device used (i.e., disposable pods, refillable pod users, and other e-cigarette devices) as a predictor, while controlling for the nesting of vape shop customers (Level 1) within 44 vape shops (Level 2). All models were adjusted for sociodemographic factors. Maximum likelihood estimation was used to account for non-normal distributions and missing data.”

12. Data analysis: I believe the first sentence should state that prevalence, demographics, etc. are reported for the full sample, as the same results by user type (disposable, refillable, other) are mentioned in the second sentence.

Response:
Thank you for this suggestion. We have fixed this in the revised version.

“The prevalence of e-cigarette use, demographic characteristics, and flavor preference of disposable pod users were reported for the full sample of participants.”

13. Were any data missing, and if so, how was missingness addressed in analysis?

Response:
Thank you for your comment. Listwise deletion was used for missing data. We have added this information to the revised version.

“Maximum likelihood estimation was used to account for non-normal distributions and missing data.”

14. Results: I recommend adding an in-text reference to Table 1 the first time data from the table are reported, to let the reader know they should check out the table for details. Then, you can

streamline the text of Results so you are only stating the % in the text (since the reader knows to find the n in the table), which will make the Results section much easier to read. Right now, it's very dense due to all the numbers being reported in-text.

This section includes results from a series of regressions which are not described in the Data Analysis section or presented in the table. In addition to describing this analysis in the Data Analysis section, I recommend adding a Table 2 with regression results. This will allow you to report only the ORs in the text, saving the p-values for the table and making the section much easier for the reader to comprehend. It will also allow the reader to quickly scan a table and see the high-level results of the regressions.

In paragraph 2, I think some of the reported results are misrepresenting Table 1, if I understand what is being reported correctly. The text states "… disposable pod users tended to be younger (mean age: 26.1 vs. 29.7 vs. 34.5 years, p<.001)". The mean ages match what is provided in Table 1, but the p-value does not – Table 1 reports the p-value for the comparison between disposable and refillable users as p= .08, and between disposable and other users as p < .001. So the text implies that disposable users are significantly younger than both refillable and other users, when in actuality the difference only reaches significance for disposable vs. other. This needs to be fixed.

When p-values are referenced in the text, if two p-values are being referenced at once (for example, when reporting 2 ORs at once), I recommend stating "both p < .001" (or the appropriate significance level) to make it clear that more than 1 comparison is being reported. This applies to both ORs and mean/frequencies comparisons reported in-text.

I recommend separating the results of mean/frequency statistical comparisons from the results of regressions, to help the reader keep track of what is being discussed. Right now they are intertwined, which is confusing to track.

Response:

Thank you for these comments. We now have revised the narrative of results section and added Table 2 as suggested.

"Bivariate comparisons between study variables and the type of e-cigarette device used by vape shops customers in past 30-days are reported in Table 1. Disposable pod users tended to be younger than other (non-pod) device type users (mean age: 26.1 [SD=7.9] vs. 34.5 [10.9], p<.001). Disposable pod users also preferred to use higher nicotine concertation levels (mean nicotine level: 41.6 [17.7] mg/ml) than refillable pod users (26.4 [18.0] mg/ml) and other device type users (5.2 [6.9] mg/ml, both p<.001). Lifetime cigarette use was more prevalent among refillable pod users (81.4%) compared to disposable pod users (61.3%, p=0.02). Refillable pod users (78.3%) and other device type users (84.6%) reported higher prevalence of daily e-cigarette use compared to disposable pod users (45.2%, both p<.001). Additionally, disposable pod users reported higher prevalence of using e-cigarettes as their first nicotine containing product (35.5%) than refillable pod (8.8%) and other device type users (8.4%, both p ≤ .001).

Fruit/candy (80.7%), mint (77.4%) and menthol (67.7%) were the most preferred flavors among disposable pod users, while tobacco flavor (19.4%) was the least preferred. In fact, a flavor preference of mint and menthol was more prevalent among disposable pod users compared to refillable pod users and other e-cigarette users (see Table 1). Tobacco flavor preference was more prevalent among disposable pod users (19.3%), compared to the other groups (see Table 1). Post-hoc analyses demonstrated that all disposable users who preferred tobacco flavors reported using combustible tobacco in their lifetime, and their mean age was 30.2 (SD=8.4) years.

The multilevel regression models (Table 2) demonstrated that after adjusting for sociodemographic factors, refillable pod users (OR, 3.79 [95% CI, 1.57 - 9.11]) and other e-cigarette device type users (OR, 5.80 [95% CI, 2.38 - 14.13]) were more likely to report daily e-cigarette use compared to disposable pod users. Further, e-liquid nicotine concentration preference was significantly lower among refillable pod users (β= -14.90 [95% CI, 1(-20.34; -9.46]) and other e-cigarette users (β= -35.87 [95% CI, -41.25; -30.48]) than among disposable pod users. Additionally, refillable pod users

were less likely to report e-cigarette as their first nicotine containing product (OR, 0.27 [95% CI, 0.09 - 0.81]) than disposable pod users. Finally, it was shown that refillable pod users (OR, 0.17 [95% CI, 0.06 - 0.46]) and other e-cigarette users (OR, 0.16 [95% CI, 0.06 - 0.43]) were less likely to prefer mint flavors compared to disposable pod users."

15. I found it interesting that almost 20% of disposable pod users reported using tobacco flavors, and in frequency comparisons, this was significantly higher than among refillable users (and neared significance for the comparison with other users). I believe that previous literature generally indicates that younger users and those who are not switching from combustible products (so, the folks who make up the disposable pod users in the current study) tend to dislike the tobacco flavored pods/juices. I'm curious if the authors have any thoughts on this finding, especially as it relates to potential recommendations for further policy/regulatory action.

Response:
Thank you for your comment. We have adding clarification regarding this finding in our revision.

"Tobacco flavor was the least preferred e-liquid flavor among disposable pod users but was also more prevalent among these users compared to refillable pod users and other e-cigarette users. However, the comparison of tobacco flavor was not significant after controlling for multiple test correction and is qualified by the caveat of small cell size (n=6). As a post-hoc sensitivity analysis, we found that all 6 of these disposable pod users that reported liking tobacco flavors were former combustible tobacco users. This finding raises the possibility that some vape shop customers might use disposable pod devices with tobacco flavors as a means to quit smoking combustible tobacco, although the cross-sectional design and small size precludes definitive conclusion. Future research investigating whether smokers switch to disposable pod devices that might be less harmful alternative to smoking combustible cigarettes is warranted.

16. I feel like stating that "… disposable pod users preferred to use higher nicotine levels…" may be mischaracterizing the data. As you note in the next sentence, disposable products often come with high nicotine concentration levels, whereas other products come in lower mg/ml concentrations. So, someone who chooses disposable products (which could be for any number of reasons) is selecting a product likely to have a higher nicotine concentration simply because they're selecting that type of product and not necessarily because they are actively seeking out or preferring a higher nicotine concentration. It's a minor distinction, but I do think it's important to be clear since the nature of the data means you can't disambiguate the preference for the product from the preference for a certain nicotine level. It's more accurate to say disposable users report higher nicotine concentration levels, than to say they prefer them.

Response:
Thank you for bringing this to our attention. We have revised this statement accordingly.

"Additionally, our results indicate that disposable pod users reported using products with higher nicotine levels compared to the other e-cigarette users. This may be because such devices (e.g., Puff Bar) are usually prefilled with 20-70 mg/ml salt-based nicotine e-liquid,[1] while other e-cigarette devices can be used with either free-based (0-12 mg/ml) or salt-based nicotine (>20 mg/ml) e-liquid.[3]"

17. In regards to the following sentence – "This might suggest that Puff-Bar-like devices are highly appealing to emerging adults and also to minors." – I understand that disposable users tended to be younger in this sample, so that could lead to the conclusion that the product appeals to younger people. However, disposable products are also newer than refillable and

other products – so isn't it also possible that older vape users initiated prior to disposables being on the market (or being widely accessible), and therefore they prefer refillables/other products simply because that's what was available when they first tried vaping? So, these findings could be more of a temporal/generational trend as products evolve over time and young people initiate with whatever is new and available, rather than an indication that disposables themselves are inherently more appealing to young people than other device types. I think it's worth considering and seeing if there is anything in the literature to support a conclusion either way.

Response:
Thank you for your comment. We have revised this paragraph based on your feedback.

"This might suggest that Puff Bar-like devices are highly appealing to emerging adults, and other research indicates that disposable devices may also appeal to minors.[4] For instance, one study demonstrated that the relative search volume for Puff Bar on Google Search has surpassed that of JUUL since February 2020, which may suggest that e-cigarette users are switching form cartridge-based e-cigarettes to disposable vaping products.[5] Further, another study demonstrated that the prevalence of disposable pod use has increased from 3.0% in 2019 to 15.2% in 2020 among middle school students and increased from 2.4% in 2019 to 26.5% in 2020 among high school students.[6]"

18. The statement "Moreover, it is unlikely that young vape users are using disposable pods as a means of harm reduction" feels out of place. It requires more support (why can we assume this?) and context within the study's findings (why is it relevant here?).

Response:
Thank you for this comment. We agree that this conclusion is beyond our study findings, and we now have removed this sentence from the revised version.

19. I think there are 2 important limitations that are missing here. First, as I mentioned earlier, this study really focuses on early adopters of disposable pods, or more accurately, those using just before and during federal action that led to an explosion in disposable use (after the data collection period). Findings may be very different now, a year after the FDA action and the resultant increase in disposable use, so I think it is important to state this limitation. Second, the actual number of participants who preferred disposable pods was relatively small – only 31 out of 276 participants. This limits generalizability further, and further emphasizes that the data were collected primarily before the FDA action and resultant increase in disposable use rather than following the increase in disposable use

Response:
Thank you for this valuable comment and your guidance. We have revised the limitations accordingly.

"The actual number of participants who used disposable pods was relatively small (n=31 [11.2%]), while the data were collected during a time of changing federal regulation of e-cigarette products[7] (which led to the surge in disposable use prevalence); thus it is also not clear whether the same results will be observed 1 year after the data were collected."

20. Table 1: In the far left column, several rows state "(yes vs. no)". I found this confusing – I believe the table is reporting the % who reported yes, but the attempt at clarification ended up making me second guess what the table was presenting. I recommend dropping "(yes vs. no)" as I believe it's clear enough you are reporting the % answering affirmatively to these items.

Response:

Thank you for bringing this to our attention. We have revised the Table 1 accordingly.

21. Table 1: The rows for first nicotine-containing product use the superscript f indicating they have been adjusted for age. How was this conducted? I don't believe any adjustment methods (beyond adjusting for multiple comparisons) were described for the % comparisons in the Data Analysis section.

Response:
Thank you for bringing this to our attention. It was an error. We have fixed this in our revision.

1. Williams R. The rise of disposable JUUL-type e-cigarette devices. Tobacco Control 2019
2. Galimov A, Galstyan E, Yu S, et al. Predictors of vape shops going out of business in Southern California. Tobacco Regulatory Science 2020;6(3):187-95.
3. Galstyan E, Galimov A, Sussman S. Commentary: The Emergence of Pod Mods at Vape Shops. Evaluation & the health professions 2019;42(1):118-24. doi: 10.1177/0163278718812976 [published Online First: 2018/11/28]
4. US Food and Drug Adminstration. PATH Study Findings Give Insight into Flavored Tobacco, Health Effects of E-Cigarettes, and Adult Use of Cigars and Hookah. 2020; https://www.fda.gov/tobacco-products/research/path-study-findings-give-insight-flavored-tobacco-health-effects-e-cigarettes-and-adult-use-cigars Accessed July, 12 2021.
5. Dai H, Hao J. Online popularity of JUUL and Puff Bars in the USA: 2019–2020. Tobacco Control 2020
6. Wang TW, Gentzke AS, Neff LJ, et al. Disposable E-Cigarette Use among US Youth—An Emerging Public Health Challenge. New England Journal of Medicine 2021;384(16):1573-76.
7. US Food and Drug Administration. FDA finalizes enforcement policy on unauthorized flavored cartridge-based e-cigarettes that appeal to children, including fruit and mint. 2020; https://www.fda.gov/news-events/press-announcements/fda-finalizes-enforcement-policy-unauthorized-flavored-cartridge-based-e-cigarettes-appeal-children Accessed July, 12 2021.

VERSION 2 – REVIEW

REVIEWER	Schneller, Liane Roswell Park Comprehensive Cancer Center
REVIEW RETURNED	26-Jul-2021

GENERAL COMMENTS	No further comments

REVIEWER	Stalgaitis, Carolyn Rescue Agency, San Diego, Research
REVIEW RETURNED	19-Jul-2021

GENERAL COMMENTS	Thank you to the authors for addressing our feedback and revising the manuscript. The updated manuscript looks good. My only remaining feedback consists of a few additional typos/grammatical errors, which I've listed out below so they can be corrected during proofing or any further edits. - Abstract states that 12.7% of the sample used disposable pods, but the Results section of the manuscript and Table 1 list 11.2%. I'm assuming the abstract is an error and should be updated. - Two sentences in the abstract have repeated phrases, which should be removed: "Groups were compared on self-reported were

	compared on demographics…" and "Among disposable pod users, fruit/candy (80.7%), mint (77.4%) and menthol (67.7%) were common preferred flavors among disposable pods users,…" - Results section, paragraph 2 – "nicotine concertation" should be "nicotine concentration" - Discussion, paragraph 2 – "switching form cartridge-based e-cigarettes" – form should be replaced with from - Discussion, paragraph 3 – This sentence – "Subjects participated in the study were significantly younger that those refused to take the survey, thus our study findings may have limited generalizability to older vapers." Is missing a few words (additions in all capital letters) - "Subjects WHO participated in the study were significantly younger THAN those WHO refused to take the survey, thus our study findings may have limited generalizability to older vapers."