Letters of Opposition SB 1

Peering through the mist: What does the chemistry of contaminants in electronic cigarettes tell us about health risks?

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Abstract

The aim of this paper is to review available data on chemistry of aerosols and liquids of electronic cigarettes and to make predictions about compliance with occupational exposure limits of personal exposures of vapers (e-cigarette users) to compounds found in the aerosol. Both peer-reviewed and "grey" literatures were accessed and more than 9000 observations of highly variable quality were extracted. Comparisons to the most universally recognized workplace xposure standards, Threshold Limit Values (TLVs), were conducted under "worst case" assumptions about both chemical content of aerosol and liquids as well as behavior of vapers. The calculations reveal that there was no evidence of potential for exposures of e-cigarette users to contaminants that are associated with risk to health at a level that would warrant attention if it were an involuntary workplace exposures by approaching half of TLV. The vast majority of predicted exposures are <<1% of TLV. Predicted exposures to acrolein and formaldehyde are typically <5% TLV. Considering exposure to the aerosol as a mixture of contaminants did not indicate that exceeding half of TLV for mixtures was plausible. Only exposures to the declared major ingredients -- propylene glycol and glycerin -- warrant attention because of precautionary nature of TLVs for exposures to hydrocarbons with no established toxicity. Comparing the exposure to nicotine to existing occupational exposure standards is not valid so long as nicotinecontaining liquid is not mislabeled as nicotine-free. It must be noted that the quality of much of the data that was available for these assessment was poor, and so much can be done to improve certainty in this risk assessment. However, the existing research is of the quality that is comparable with most workplace assessments for novel technologies. In summary, an analysis of current state of knowledge about chemistry of liquids and aerosols associated with electronic cigarettes indicates that there is no evidence that vaping produces inhalable exposures to contaminants of the aerosol that would warrant health concerns by the standards that are used to ensure safety of workplaces. However, the aerosol generated during vaping as a whole (contaminants plus declared ingredients), if it were an emission from industrial process, creates personal exposures that would justify surveillance of health among exposed persons in conjunction with investigation of means to keep health effects as low as reasonably achievable. Exposures of bystanders are likely to be orders of magnitude less, and thus pose no apparent concern.

ywords: vaping, e-cigarettes, tobacco harm reduction, risk assessment, aerosol, occupational exposure limit

Introduction

Dectronic cigarettes (also known as e-cigarettes) are generally recognized as a safer alternative to combusted tobacco products (reviewed in [1]), but there are conflicting claims about the degree to which these products warrant concern for the health of the vapers (e-cigarette users). A vaper inhales aerosol generated during heating of liquid contained in the e-cigarette. The technology and patterns of use are summarized by Etter [1], though there is doubt about how current, complete and accurate this information is. Rather conclusive evidence has been amassed to date on comparison of the chemistry of aerosol generated by electronic cigarettes to cigarette smoke [2-8]. However, it is meaningful to consider the question of whether aerosol generated by electronic cigarettes would warrant health concerns on its own, in part because vapers will include persons who would not have been smokers and for whom the question of harm reduction from smoking is therefore not relevant, and perhaps more importantly, simply because there is value in minimizing the harm of those practicing harm reduction.

One way of approaching risk evaluation in this setting is to rely on the practice, common in occupational hygiene, of relating the chemistry of industrial processes and the emissions they generate to the potential worst case of personal exposure and then drawing conclusions about whether there would be interventions in an occupational setting based on comparison to occupational exposure limits, which are designed to ensure safety of unintentionally exposed individuals. In that context, exposed individuals are assumed to be adults, and this assumption appears to be suitable for the intended consumers of electronic cigarettes. "Worst case" refers to the maximum personal exposure that can be achieved given what is known about the process that generates contaminated atmosphere (in the context of airborne exposure considered here) and the pattern of interaction with the contaminated atmosphere. It must be noted that harm reduction notions are embedded in this approach since it recognizes that while elimination of the exposure may be both impossible and undesirable, there nonetheless exists a level of exposure that is associated with negligible risks. To date, a comprehensive review of the chemistry of electronic cigarettes and the aerosols they generate has not been conducted, depriving the public of the important element of a risk-assessment process that is mandatory for environmental and occupational health policy making.

The present work considers both the contaminants present in liquids and aerosols as well as the declared ingredients in the liquids. The distinction between exposure to declared ingredients and contaminants of a consumer product is important in the context of comparison to occupational or environmental exposure standards. Occupational exposure limits are developed for unintentional exposures that a person does not elect to experience. For example, being a bread baker is a choice that does not involve election to be exposed to substances that cause asthma that are part of the flour dust (most commonly, wheat antigens and fungal enzymes). Therefore, suitable occupational exposure limits are created to attempt to protect individuals from such risk on the job, with no presumption of "assumed risk" inherent in the occupation. Likewise, special regulations are in effect to protect persons from unintentional exposure to nicotine in workplaces (http://www.cdc.gov/niosh/docs/81-123/pdfs/0446.pdf; accessed July 12, 2013), because in environments where such exposures are possible, it is reasonable to protect individuals who do not wish to experience its effects. In other words, occupational exposure limits are based on protecting people from involuntary and unwanted exposures, and thus can be seen as appropriately more stringent than the standards that might be used for hazards that people intentionally choose to accept.

By contrast, a person who elects to lawfully consume a substance is subject to different risk tolerance, as is emonstrated in the case of nicotine by the fact that legally sold cigarettes deliver doses of nicotine that exceed occupational exposure limits[9]: daily intake of 20 mg of nicotine, assuming nearly 100% absorption in the lungs and

inhalation of 4 m³ of air, corresponds to roughly 10 times the occupational exposure limit of 0.5 mg/m³ atmosphere over hours[10]. Thus, whereas there is a clear case for applicability of occupational exposure limits to contaminants in a consumer product (e.g. aerosol of electronic cigarettes), there is no corresponding case for applying occupational exposure limits to declared ingredients desired by the consumer in a lawful product (e.g. nicotine in the aerosol of an electronic cigarette). Clearly, some limits must be set for voluntary exposure to compounds that are known to be a danger at plausible doses (e.g. limits on blood alcohol level while driving), but the regulatory framework should reflect whether the dosage is intentionally determined and whether the risk is assumed by the consumer. In the case of nicotine in electronic cigarettes, if the main reason the products are consumed is as an alternative source of nicotine compared to smoking, then the only relevant question is whether undesirable exposures that accompany nicotine present health risks, and the analogy with occupational exposures holds. In such cases it appears permissible to allow at least as much exposure to nicotine as from smoking before admitting to existence of new risk. It is expected that nicotine dosage will not increase in switching from smoking to electronic cigarettes because there is good evidence that consumers adjust consumption to obtain their desired or usual dose of nicotine[11]. The situation is different for the vapers who want to use electronic cigarettes without nicotine and who would otherwise not have consumed nicotine. For these individuals, it is defensible to consider total exposure, including that from any nicotine contamination, in comparison to occupational exposure limits. In consideration of vapers who would never have smoked or would have quit entirely, it must be remembered that the exposure is still voluntary and intentional, and comparison to occupational exposure limits is legitimate only for those compounds that the consumer does not elect to inhale.

The specific aims of this review were to:

- 1. Synthesize evidence on the chemistry of liquids and aerosols of electronic cigarettes, with particular emphasis on the contaminants.
- 2. Evaluate the quality of research on the chemistry of liquids and aerosols produced by electronic cigarettes.
- 3. Estimate potential exposures from aerosols produced by electronic cigarettes and compare those potential exposures to occupational exposure standards.

Methods

Literature search

Articles published in peer-reviewed journals were retrieved from *PubMed* (http://www.ncbi.nlm.nih.gov/pubmed/) using combinations of the following keywords: "electronic cigarettes", "e-cigarettes", "smoking alternatives", "chemicals", "risks", "electronic cigarette vapor", "aerosol", "ingredients", "e-cigarette liquid", "e-cig composition", "e-cig chemicals", "e-cig chemical composition", "e-juice electronic cigarette", "electronic cigarette gas", "electronic cigars". In addition, references of the retrieved articles were examined to identify further relevant articles, with particular attention paid to non-peer reviewed reports and conference presentations. Unpublished results obtained through personal communications were also reviewed. The Consumer Advocates for Smoke-free Alternatives Association (CASAA) was asked to review the retrieved bibliography to identify any reports or articles that were missed. The papers and reports were retained for analysis if they reported on the chemistry of e-cigarette liquids or aerosols. No explicit quality control criteria were applied in selection of literature for examination, except that secondary reporting of analytical results was not used. Where substantial methodological problems that precluded interpretation of analytical results were noted, these are described below. For each article that contained relevant analytical results, be compounds quantified, limits of detection, and analytical results were summarized in a spreadsheet. Wherever possible, individual analytical results (rather than averages) were recorded (see electronic Appendix A:

https://dl.dropboxusercontent.com/u/4285761/CASAA/eAppendixA.xlsx). Data contained in Appendix A is not fully jummarized in the current report but can be used to investigate a variety of specific questions that may interest the reader. Each entry in Appendix A is identified by a Reference Manage ID that is linked to source materials in a list in Appendix B (linked via RefID: https://dl.dropboxusercontent.com/u/4285761/CASAA/AppendixB.rtf) and attached electronic copies of all original materials (Biobliography.zip: https://dl.dropboxusercontent.com/u/4285761/CASAA/bibliography.zip).

Comparison of observed concentrations in aerosol to occupational exposure limits

For articles that reported mass or concentration of specific compounds in the aerosol (generated by smoking machines or from volunteer vapers), measurements of compounds were converted to concentrations in the "personal breathing zone", which can be compared to occupational exposure limits (OELs). The 2013 Threshold Limit Values (TLVs)[10] were used as OELs because they are the most up to date and are most widely recognized internationally when local jurisdictions do not establish their own regulations (see http://www.ilo.org/oshenc/part-iv/occupational-hygiene/item/575; accessed July 3, 2013). Whenever there was an uncertainty in how to perform the calculation, a "worst case" scenario was used, as is the standard practice in occupational hygiene, where the initial aim is to recognize potential for hazardous exposures and to err on the side of caution. The following assumptions were made to enable the calculations that approximate the worst-case personal exposure of a vaper (Equation 1):

- Air the vaper breathes consists of a small volume of aerosol generated by e-cigarettes that contains a specific chemical plus pristine air;
- 2. The volume of aerosols inhaled from e-cigarettes is negligible compared to total volume of air inhaled;
- 3. The period of exposure to the aerosol considered was normalized to 8 hours, for comparability to the standard working shift for which TLVs were developed (this does not mean only 8 hours worth of vaping was considered (see point 4) but rather that amount of breathing used to dilute the day's worth of vaping exposure was 8 hours);
- 4. Consumption of 150 puffs in 8 hours (an upper estimate based on a rough estimate of 150 puffs by a typical vaper in a day[1]) was assumed to be conservative;
- 5. Breathing rate is 8 liters per minute [12,13];
- 6. Each puff contains the same quantity of compounds studied.

$$[mg/m^3] = mg/puff \times puffs/(8 hr day) \times 1/(m^3 air inhaled in 8 hr)$$
 Eq. 1

The only exception to this methodology was when assessing a study of aerosol emitted by 5 vapers in a 60 m³ room over 5 hours that seemed to be a sufficient approximation of worst-case "bystander" exposure[6]. All calculated concentrations were expressed as the most stringent (lowest) TLV for a specific compound (i.e. assuming the most toxic form if analytical report is ambiguous) and expressed as "percent of TLV". Considering that all the above calculations are approximate and reflecting that exposures in occupational and general environment can easily vary by a factor of 10 around the mean, we added a 10-fold safety factor to the "percent of TLV" calculation. Details of all calculations are provided in an Excel spreadsheet (see electronic **Appendix C**:

https://dl.dropboxusercontent.com/u/4285761/CASAA/eAppendixC.xlsx).

No systematic attempt was made to convert the content of the studied liquids into potential exposures because sufficient information was available on the chemistry of aerosols to use those studies rather than making the necessary

^a Atmosphere that contains air inhaled by a person

simplifying assumptions to do the conversion. However, where such calculations were performed in the original esearch, the following approach as used: under the (probably false – see the literature on formation of carbonyl compounds below) assumption of no chemical reaction to generate novel ingredients, composition of liquids can be used to estimate potential for exposure if it can be established how much volume of liquid is consumed in given 8 hours, following an algorithm analogous to the one described above for the aerosols (Equation 2):

$$[mg/m^3] = mg/(mL liquid) \times (mL liquid)/puff \times puffs/(8 hr day) \times 1/(m^3 air inhaled in 8 hr)$$
 Eq. 2

Comparison to cigarette smoke was not performed here because the fact that e-cigarette aerosol is at least orders of magnitude less contaminated by toxic compounds is uncontroversial [2-8].

Results and discussion

General comments on methods

In excess of 9,000 determinations of single chemicals (and rarely, mixtures) were reported in reviewed articles and reports, typically with multiple compounds per electronic cigarette tested [2-8,14-42]. Although the quality of reports is highly variable, if one assumes that each report contains some information, this asserts that quite a bit is known about composition of e-cigarette liquids and aerosols. The only report that was excluded from consideration was work of McAuley et al. [23] because of clear evidence of cross-contamination – admitted to by the authors – with cigarette smoke and, possibly, reagents. The results pertaining to non-detection of tobacco-specific nitrosamines (TSNAs) are potentially trustworthy, but those related to PAH are not since it is incredible that cigarette smoke would contain fewer polycyclic aromatic hydrocarbons (PAH; arising in incomplete combustion of organic matter) than aerosol of e-cigarettes hat do not burn organic matter [23]. In fairness to the authors of that study, similar problems may have occurred in other studies but were simply not reported, but it is impossible to include a paper in a review once it is known for certain that its quantitative results are not trustworthy. When in doubt, we erred on the side of trusting that proper quality controls were in place, a practice that is likely to increase appearance of atypical or erroneous results in this review. From this perspective, assessment of concordance among independent reports gains higher importance than usual since it is unlikely that two experiments would be flawed in the same exact manner (though of course this cannot be assured).

It was judged that the simplest form of publication bias – disappearance of an entire formal study from the available literature – was unlikely given the exhaustive search strategy and the contested nature of the research question. It is clearly the case that only a portion of all industry technical reports were available for public access, so it is possible that those with more problematic results were systematically suppressed, though there is no evidence to support this speculation. No formal attempt was made to ascertain publication bias *in situ* though it is apparent that anomalous results do gain prominence in typical reviews of the literature: diethylene glycol[43,44] detected at non-dangerous levels (see details below) in one test of 18 of early-technology products by FDA[22] and one outlier in measurement of formaldehyde content of exhaled air [4] and aldehydes in aerosol generated from one e-cigarette in Japan [37]. It must be emphasized that the alarmist report of aldehydes in experiments presented in [37] is based on the concentration in generated aerosol rather than air inhaled by the vaper over prolonged period of time (since vapers do not inhale only aerosol). Thus, results reported in [37] cannot be the basis of any claims about health risk, a fallacy committed both by the authors themselves and commentators on this work [44].

It was also unclear from [37] what the volume of aerosol sampled was — a critical item for extrapolating to personal exposure and a common point of ambiguity in the published reports. However, in a personal exchange with the authors of [37][July 11, 2013], it was clarified that the sampling pump drew air at 500 mL/min through e-cigarette for 10 min, allowing more appropriate calculations for estimation of health risk that are presented below. Such misleading reporting is common in the field that confuses concentration in the aerosol (typically measured directly) with concentration in the air inhaled by the vaper (never determined directly and currently requiring additional assumptions and modeling). This is important because the volume of aerosol inhaled (maximum ~8 L/day) is negligible compared to the volume of air inhaled daily (8L/min); this point is illustrated in the Figure.

A similar but more extreme consideration applies to the exposure of bystanders which is almost certainly several orders of magnitude lower than the exposure of vapers. In part this is due to the absorption, rather than exhalation, of a portion of the aerosol by the vapers: there is no equivalent to the "side-stream" component of exposure to conventional cigarettes, so all of the exposure to bystanders results from exhalation. Furthermore, any environmental contamination that results from exhalation of aerosol by vaper will be diluted into the air prior to entering a bystander's personal breathing zone. Lastly, the number of puffs that affects exposure to bystander is likely to be much smaller than that of a vaper unless we are to assume that vaper and bystander are inseparable.

It is unhelpful to report results in cigarette-equivalents, as in [42], because this does not enable one to estimate exposures of vapers. Moreover, there is no value in comparison of the content of e-cigarette aerosol to cigarette smoke when the two products produce emissions that are orders of magnitude apart. To be useful for risk assessment, the results on the chemistry of the aerosols and liquids must be reported in a form that enables the calculations in Equations 1 and 2. It must be also be noted that typical investigations consisted of qualitative and quantitative phases such that uantitative data is available mostly on compounds that passed the qualitative screen. This biased all reports on concentration of compounds towards both higher levels and chemicals which a particular lab was most adept at analyzing.

Declared Ingredients: comparison to occupational exposure limits

Propylene glycol and glycerin have default or precautionary TLV of 10 mg/m³ over 8 hours set for all organic mists with no specific exposure limits or identified toxicity (http://www.osha.gov/dts/chemicalsampling/data/CH_243600.html; accessed July 5, 2013). These interim TLVs tend to err on the side of being too high and are typically lowered if evidence of harm to health accumulates. For example, in a study that related exposure of theatrical fogs (containing propylene glycol) to respiratory symptoms [45], "mean personal inhalable aerosol concentrations were 0.70 mg/m³ (range 0.02 to 4.1)" [46]. The only available estimate of propylene concentration of propylene glycol in the aerosol indicates personal exposure on the order of 3-4 mg/m³ in the personal breathing zone over 8 hours (under the assumptions we made for all other comparisons to TLVs) [2]. The latest (2006) review of risks of occupational exposure to propylene glycol performed by the Health Council of the Netherlands (known for OELs that are the most protective that evidence supports and based exclusively on scientific considerations rather than also accounting for feasibility as is the case for the TLVs) recommended exposure limit of 50 mg/m³ over 8 hours; concern over short-term respiratory effects was noted [http://www.gezondheidsraad.nl/sites/default/files/200702OSH.pdf; accessed July 29, 2013].

Assuming extreme consumption of the liquid per day via vaping (5 to 25 ml/day and 50-95% propylene glycol in the liquid)^b, levels of propylene glycol in inhaled air can reach 1-6 mg/m³. It has been suggested that propylene glycol is

This estimate of consumption was derived from informal reports from vaping community; 5 ml/day was identified as a high but not rare quantity of consumption and 25 ml/day was the high end of claimed use, though some skepticism was expressed about

very rapidly absorbed during inhalation [4,6] making the calculation under worst case scenario of all propylene glycol ecoming available for inhalation credible. It must also be noted that when consuming low-nicotine or nicotine-free liquids, the chance to consume larger volumes of liquid increases (large volumes are needed to reach the target dose or there is no nicotine feedback), leading to the upper end of propylene glycol and glycerin exposure. Thus, estimated levels of exposure to propylene glycol and glycerin are close enough to TLV to warrant concern.

Nicotine is present in most liquids and has TLV of 0.5 mg/m³ for average exposure intensity over 8 hours. If approximately 4 m³ of air is inhaled in 8 hours, the consumption of 2 mg nicotine from e-cigarettes in 8 hours would place the vaper at the occupational exposure limit. For a liquid that contains 18 mg nicotine/ml, TLV would be reached upon vaping ~0.1-0.2 ml of liquid in a day, and so is achieved for most anyone vaping nicotine-containing e-cigarettes[1]. Results presented in [24] on 16 e-cigarettes also argue in favor of exceedance of TLV from most any nicotine-containing e-cigarette, as they predict >2mg of nicotine released to aerosol in 150 puffs (daily consumption figure adopted in this report). But as noted above, since delivery of nicotine is the purpose of nicotine-containing e-cigarettes, the comparison to limits on unintended, unwanted exposures does not suggest a problem and serves merely to offer complete context. If nicotine is present but the liquid is labeled as zero-nicotine [24,43], it could be treated as a contaminant, with the vaper not intending to consume nicotine and the TLV, which would be most likely exceeded, is relevant. However, when nicotine content is disclosed, even if inaccurately, then comparison to TLV is not valid. Accuracy in nicotine content is a concern with respect to truth in advertising rather than unintentional exposure, due to self-regulation of consumption by persons who use e-cigarettes as a source of nicotine.

Overall, the declared ingredients in the liquid would warrant a concern by standards used in occupational hygiene, provided that comparison to occupational exposure limits is valid, as discussed in the introduction. However, this is not say that the exposure is affirmatively believed to be harmful; as noted, the TLVs for propylene glycol and glycerin mists is based on uncertainty rather than knowledge. These TLVs are not derived from knowledge of toxicity of propylene glycol and glycerin mists, but merely apply to any compound of no known toxicity present in workplace atmosphere. This aspect of the exposure from e-cigarettes simply has little precedent (but see study of theatrical fogs below). Therefore, the exposure will provide the first substantial collection evidence about the effects, which calls for monitoring of both exposure levels and outcomes, even though there are currently no grounds to be concerned about the immediate or chronic health effects of the exposure. The argument about nicotine is presented here for the sake of completeness and consistency of comparison to TLVs, but in itself does not affect the conclusions of this analysis because it should not be modeled as if it were a contaminant when declared as an ingredient in the liquid.

Polycyclic Aromatic Hydrocarbons

Polycyclic aromatic hydrocarbons (PAH) were quantified in several reports in aerosols [5,6,42] and liquids [7,18,41]. These compounds include well-known carcinogens, the levels of which are not subject to TLV but are instead to be kept "as low as reasonably achievable" (the so called ALARA principle)[10]. For PAH, only non-carcinogenic pyrene that is abundant in the general environment was detected at 36 ng/cartridge in 5 samples of liquid [7]; PAHs were not detected in most of the analyses of aerosols, except for chrysene in the analysis of the aerosol of one e-cigarette[42].

Tobacco-Specific Nitrosamines

^{.√}hether the latter quantity was truly possible. High-quality formal studies to verify these figures do not yet exist but they are consistent with report of Etter (2012).

The same risk assessment considerations that exist for PAH also hold for carcinogenic tobacco-specific nitrosamines TSNAs)[47] for which no occupational exposure limits exist because (a) these exposures do not appear to occur in occupational settings often enough to warrant development of TLVs, and (b) it is currently accepted in establishing TLVs that carcinogens do not have minimal thresholds of toxicity. As expected because the TSNAs are contaminants of nicotine from tobacco leaf, there is also evidence of association between nicotine content of the liquid and TSNA concentrations, with reported concentrations <5 ng/cartridge tested [7]. Smaller studies of TSNA content in liquids are variable, with some not reporting any detectable levels [17,32,34] and others clearly identifying these compounds in the liquids when controlling for background contamination (n=9)[22]. Analyses of aerosols indicate that TSNAs are present in amounts that can results in doses of <ng/day[5,32] to µg/day [8] (assuming 150 puffs/day) (see also [42]). The most comprehensive survey of TSNA content of 105 samples of liquids from 11 manufactures indicates that almost all tested liquids (>90%) contained TSNAs in µg/L quantities [35]. This is roughly equivalent to 1/1000 of the concentration of TSNAs in modern smokeless tobacco products (like snus), which are in the ppm range [47]. The TSNA concentration of the liquids is orders of magnitude less than smokeless tobacco products, though the actual dosage from e-cigarettes vs. smokeless tobacco remains to be clearly understood. For example, 10 µg/L (0.01 ppm) of total TSNA in liquid[35] can translate to a daily dose of 0.000025-0.00005 µg from vaping (worst case assumption of 5 ml/day); if 15 g of snus is consumed a day [48] with 1 ppm of TSNAs [47] and half of it were absorbed, then the daily dose is estimated to be 0.008 μg, which is 160-320 times that due to the worst case of exposure from vaping. Various assumptions about absorption of TSNAs alter the result of this calculation by a factor that is dwarfed in magnitude compared to that arising from differences considered above. This is reassuring because smokeless tobacco products, such as snus, pose negligible cancer risk[49], certainly orders of magnitude smaller than smoking (if one considers the chemistry of the products alone). In general, it appears that the cautious approach in face of variability and paucity of data is to seek better nderstanding of predictors of presence of TSNA in liquids and aerosols so that measures for minimizing exposure to TSNAs from aerosols can be devised. This can include considering better control by manufactures of the nicotine.

Volatile Organic Compounds

Total volatile organic compounds (VOC) were determined in aerosol to be non-detectable[3] except in one sample that appeared to barely exceed the background concentration of 1 mg/m³ by 0.73 mg/m³[6]. These results are corroborated by analyses of liquids[18] and most likely testify to insensitivity of employed analytic methods for total VOC for characterizing aerosol generated by e-cigarettes, because there is ample evidence that specific VOC are present in the liquids and aerosols.^c Information on specific commonly detected VOC in the aerosol is given in **Table 1a**. It must be observed that these reported concentrations are for analyses that first observed qualitative evidence of the presence of a given VOC and thus represent worst case scenarios of exposure when VOC is present (i.e. zero exposures are missing from the overall summary of worst case exposures presented here). For most VOC and aldehydes, one can predict the concentration in air inhaled by a vaper to be <<1% of TLV. The only exceptions to this generalization are:

- (a) acrolein: $^{\sim}1\%$ of TLV (average of 12 measurements) and measurements at a mean of 2% of TLV (average of 150 measurements)[39,40] and
- (b) formaldehyde: between 0 and 3% of TLV based on 18 tests (average of 12 measurements at 2% of TLV, the most reliable test) and an average of 150 results at 4% of TLV [39,40].

¹The term "VOC" loosely groups together all organic compounds present in aerosol and because the declared ingredients of aerosol are organic compounds, it follows that "VOC are present"

Levels of acrolein in exhaled aerosol reported in [6] were below 0.0016 mg/m³ and correspond to predicted exposure of \$1\% of TLV (Table 2). It must re-emphasized that all calculations based on one electronic cigarette analyzed in [37] are best treated as qualitative in nature (i.e. indicating presence of a compound without any particular meaning attached to the reported level with respect to typical levels) due to great uncertainty about whether the manner in which the ecigarette was operated could have resulted in overheating that led to generation of acrolein in the aerosol. In fact, a presentation made by the author of [37] clearly stated that the "atomizer, generating high concentration carbonyls, had been burned black" [39,40]. In unpublished work,[39] there are individual values of formaldehyde, acrolein and glyoxal that approach TLV, but it is uncertain how typical these are because there is reason to believe the liquid was overheated; considerable variability among brands of electronic cigarettes was also noted. Formaldehyde and other aldehydes, but not acrolein, were detected in the analysis one e-cigarette [42]. The overwhelming majority of the exposure to specific VOC that are predicted to result from inhalation of the aerosols lie far below action level of 50% of TLV at which exposure has to be mitigated according to current code of best practice in occupational hygiene [50].

Finding of an unusually high level of formaldehyde by Schripp *et al.*[4] – 0.5 ppm predicted vs. 15-minute TLV of 0.3 ppm (not given in Table 2) – is clearly attributable to endogenous production of formaldehyde by the volunteer smoker who was consuming e-cigarettes in the experimental chamber, since there was evidence of build-up of formaldehyde prior to vaping and liquids used in the experiments did not generate aerosol with detectable formaldehyde. This places generalizability of other findings from [4] in doubt, especially given that the only other study of exhaled air by vapers who were not current smokers reports much lower concentrations for the same compounds [6] (Table 2). It should be noted that the report by Romagna *et al.*[6] employed more robust methodology, using 5 volunteer vapers (no smokers) over an extended period of time. Except for benzene, acetic acid and isoprene, all calculated concentrations for elected VOC were much below 1% of TLV in exhaled air [6]. In summary, these results do not indicate that VOC generated by vaping are of concern by standards used in occupational hygiene.

Diethylene glycol and ethylene glycol became a concern following the report of their detection by FDA[43], but these compounds are not detected in the majority of tests performed to date [3,14,16,18,22]. Ten batches of the liquid tested by their manufacture did not report any diethylene glycol above 0.05% of the liquid [41]. Methods used to detect diethylene glycol appear to be adequate to be informative and capable of detecting the compound in quantities <<1% of TLV[14,16,22]. Comparison to TLV is based on a worst case calculation analogous to the one performed for propylene glycol. For diethylene glycol, TLV of 10 mg/m³ is applicable (as in the case of all aerosols with no know toxicity by inhalation), and there is a recent review of regulations of this compound conducted for the Dutch government by the Health Council of the Netherlands (jurisdiction with some of the most strict occupational exposure limits) that recommended OEL of 70 mg/m³ and noted lack of evidence for toxicity following inhalation [http://www.gezondheidsraad.nl/sites/default/files/200703OSH.pdf; accessed July 29; 2013]. In conclusion, even the quantities detected in the single FDA result were of little concern, amounting to less than 1% of TLV.

Inorganic compounds

Special attention has to be paid to the chemical form of compounds when there is detection of metals and other elements by inductively coupled plasma mass spectrometry (ICP-MS)[8,25]. Because the parent molecule that occurs in the aerosol is destroyed in such analysis, the results can be alarmist and not interpretable for risk assessment. For example, the presence of sodium (4.18 µg/10 puffs)[25] does not mean that highly reactive and toxic sodium metal is in the aerosol, which would be impossible given its reactivity, but most likely means the presence of the ubiquitous compound that contains sodium, dissolved table salt (NaCl). If so, the corresponding daily dose of NaCl that arises from

these concentrations from 150 puffs is about 10,000 times lower than allowable daily intake according to CDC http://www.cdc.gov/features/dssodium/; accessed July 4, 2013). Likewise, a result for presence of silica is meaningless -for health assessment unless the crystalline form of SiO $_2$ is known to be present. When such ambiguity exists, a TLV equivalence calculation was not performed. We compared concentrations to TLVs when it was even remotely plausible that parent molecules were present in the aqueous solution. However, even these are to be given credence only in an extremely pessimistic analyst, and further investigation by more appropriate analytical methods could clarify exactly what compounds are present, but is not a priority for risk assessment. It should also be noted that one study that attempted to quantify metals in the liquid found none above 0.1-0.2 ppm levels [7] or above unspecified threshold [18]. Table 1b indicates that most metals that were detected were present at <1% of TLV even if we assume that the analytical results imply the presence of the most hazardous molecules containing these elements that can occur in aqueous solution. For example, when elemental chromium was measured, it is compared to TLV for insoluble chromium IV that has the lowest TLV of all chromium compounds. Analyses of metals given in [42] are not summarized here because of difficulty with translating reported units into meaningful terms for comparison with the TLV, but only mercury (again with no information on parent organic compound) was detected in trace quantities, but arsenic, beryllium, chromium, cadmium, lead and nickel were not. Taken as the whole, it can be inferred that there is no evidence of contamination of the aerosol with metals that warrants a health concern.

Consideration of exposure to a mixture of contaminants

All calculations conducted so far assumed only one contaminant present in clean air at a time. What are the implications of small quantities of various compounds with different toxicities entering the personal breathing zone at the same time? For evaluation of compliance with exposure limits for mixtures, Equation 3 is used:

OEL_{mixture} =
$$\sum_{i=1}^{n} (C_i/TLV_i)$$
, Eq. 3

where C_i is the concentration of the i^{th} compound (i=1,...,n, where n>1 is the number of ingredients present in a mixture) in the contaminated air and TLV_i is the TLV for the i^{th} compound in the contaminated air; if $OEL_{mixture} > 1$, then there is evidence of the mixture exceeding TLV.

The examined reports detected no more than 5-10 compounds in the aerosol, and the above calculation does not place any of them out of compliance with TLV for mixture. Let us imagine that 50 compounds with TLVs were detected. Given that the aerosol tends to contain various compounds at levels, on average, of no more than 0.5% of TLV (Table 1), such a mixture with 50 ingredients would be at 25% of TLV, a level that is below that which warrants a concern, since the "action level" for implementation of controls is traditionally set at 50% of TLV to ensure that the majority of persons exposed have personal exposure below mandated limit [50]. Pellerino et al.[2] reached conclusions similar to this review based on their single experiment: contaminants in the liquids that warrant health concerns were present in concentrations that were less than 0.1% of that allowed by law in the European Union. Of course, if the levels of the declared ingredients (propylene glycol, glycerin, and nicotine) are considered, the action level would be met, since those ingredients are present in the concentrations that are near the action level. There are no known synergistic actions of the examined mixtures, so Equation 3 is therefore applicable. Moreover, there is currently no reason to suspect that the trace amounts of the contaminants will react to create compounds that would be of concern.

Conclusions

 λ the standards of occupational hygiene, current data do not indicate that exposures to vapers from contaminants in electronic cigarettes warrant a concern. There are no known toxicological synergies among compounds in the aerosol, and mixture of the contaminants does not pose a risk to health. However, exposure of vapers to propylene glycol and glycerin reaches the levels at which, if one were considering the exposure in connection with a workplace setting, it would be prudent to scrutinize the health of exposed individuals and examine how exposures could be reduced. This is the basis for the recommendation to monitor levels and effects of prolonged exposure to propylene glycol and glycerin that comprise the bulk of emissions from electronic cigarettes other than nicotine and water vapor. From this perspective, and taking the analogy of work on theatrical fogs [45,46], it can be speculated that respiratory functions and symptoms (but not cancer of respiratory tract or non-malignant respiratory disease) of the vaper is of primary interest. Monitoring upper airway irritation of vapers and experiences of unpleasant smell would also provide early warning of exposure to compounds like acrolein because of known immediate effects of elevated exposures (http://www.atsdr.cdc.gov/toxprofiles/tp124-c3.pdf; accessed July 11, 2013). However, it is questionable how much concern should be associated with observed concentrations of acrolein and formaldehyde in the aerosol. Given highly variable assessments, closer scrutiny is probably warranted to understand sources of this variability, although there is no need at present to be alarmed about exceeding even the occupational exposure limits, since occurrence of occasional high values is accounted for in established TLVs. An important clue towards a productive direction for such work is the results reported in [39,40] that convincingly demonstrate how heating the liquid to high temperatures generates compounds like acrolein and formaldehyde in the aerosol. A better understanding about the sources of TSNA in the aerosol may be of some interest as well, but all results to date consistently indicate quantities that are of no more concern than TSNA in smokeless tobacco products. Exposures to nicotine from electronic cigarettes is not expected to eced that from smoking due to self-titration[11]; it is only a concern when a vaper does not intend to consume. nicotine, a situation that can arise from incorrect labeling of liquids [24,43].

The cautions about propylene glycol and glycerin apply only to the exposure experienced by the vapers themselves. Exposure of bystanders to the listed ingredients, let alone the contaminants, does not warrant a concern as the exposure is likely to be orders of magnitude lower than exposure experienced by vapers. Further research employing realistic conditions could help quantify the quantity of exhaled aerosol and its behavior in the environment under realistic worst-case scenarios (i.e., not small sealed chambers), but this is not a priority since the exposure experienced by bystanders is clearly very low compared to the exposure of vapers, and thus there is no reason to expect it would have any health effects.

The key to making the best possible effort to ensure that hazardous exposures from contaminants do not occur is ongoing monitoring of actual exposures and estimation of potential ones. Direct measurement of personal exposures is not possible in vaping due to the fact the aerosol is inhaled directly, unless, of course, suitable biomarkers of exposure can be developed. The current review did not identify any suitable biomarkers, though cotinine is a useful proxy for exposure to nicotine-containing liquids. Monitoring of potential composition of exposures is perhaps best achieved though analysis of aerosol generated in a manner that approximates vaping, for which better insights are needed on how to modify "smoking machines" to mimic vaping given that there are documented differences in inhalation patterns[51]. These smoking machines would have to be operated under a realistic mode of operation of the atomizer to ensure that the process for generation of contaminants is studied under realistic temperatures. To estimate dosage or exposure in personal breathing zone), information on the chemistry of aerosol has to be combined with models of the inhalation pattern of vapers, mode of operation of e-cigarettes and quantities of liquid consumed. Assessment of

exhaled aerosol appears to be of little use in evaluating risk to vapers due to evidence of qualitative differences in the hemistry of exhaled and inhaled aerosol.

Monitoring of liquid chemistry is easier and cheaper than assessment of aerosols. This can be done systematically as a routine quality control measure by the manufacturers to ensure uniform quality of all production batches. However, we do not know how this relates to aerosol chemistry because previous researchers have failed to appropriately pair analyses of chemistry of liquids and aerosols. It is standard practice in occupational hygiene to analyze the chemistry of materials generating an exposure, and it is advisable that future studies of the aerosols explicitly pair these analyses with examination of composition of the liquids used to generate the aerosols. Such an approach can lead to the development of predictive models that relate the composition of the aerosol to the chemistry of liquids, the e-cigarette hardware, and the behavior of the vaper, as these, if accurate, can anticipate hazardous exposures before they occur. The current attempt to use available data to develop such relationships was not successful due to studies failing to collect appropriate data. Systematic monitoring of quality of the liquids would also help reassure consumers and is best done by independent laboratories rather than manufactures to remove concerns about impartiality (real or perceived).

Future work in this area would greatly benefit from standardizing laboratory protocols (e.g. methods of extraction of compounds from aerosols and liquids, establishment of "core" compounds that have to be quantified in each analysis (as is done for PAH and metals), development of minimally informative detection limits that are needed for risk assessment, standardization of operation of "vaping machine", etc.), quality control experiments (e.g. suitable positive and negative controls without comparison to conventional cigarettes, internal standards, estimation of "recovery, etc.), and reporting practices (e.g. in units that can be used to estimate personal exposure, use of uniform definitions of limits of detection and quantification, etc.), all of which would improve on the currently disjointed literature. Detailed ecommendations on standardization of such protocols lie outside of scope of this report.

All calculations conducted in this analysis are based on information about patterns of vaping and the content of aerosols and liquids that are highly uncertain in their applicability to "typical" vaping as it is currently practiced and says even less about future exposures due to vaping. However, this is similar to assessments that are routinely performed in occupational hygiene for novel technology as it relied on "worst case" calculations and safety margins that attempt to account for exposure variability. The approach adopted here and informed by some data is certainly superior to some currently accepted practices in the regulatory framework in occupational health that rely purely on description of emission processes to make claims about potential for exposure (e.g.[52]). Clearly, routine monitoring of potential and actual exposure is required if we were to apply the principles of occupational hygiene to vaping. Detailed suggestions on how to design such exposure surveillance are available in [53].

In summary, analysis of the current state of knowledge about the chemistry of *contaminants* in liquids and aerosols associated with electronic cigarettes indicates that there is no evidence that vaping produces inhalable exposures to these contaminants at a level that would prompt measures to reduce exposure by the standards that are used to ensure safety of workplaces. Indeed, there is sufficient evidence to be reassured that there are no such risks from the broad range of the studied products, though the lack of quality control standards means that this cannot be assured for all products on the market. However, aerosol generated during vaping on the whole, when considering the declared ingredients themselves, if it were treated in the same manner as an emission from industrial process, creates personal exposures that would justify surveillance of exposures and health among exposed persons. Due to the uncertainty bout the effects of these quantities of propylene glycol and glycerin, this conclusion holds after setting aside concerns about health effects of nicotine. This conclusion holds notwithstanding the benefits of tobacco harm reduction, since

there is value in understanding and possibly mitigating risks even when they are known to be far lower than smoking. It must be noted that the proposal for such scrutiny of "total aerosol" is not based on specific health concerns suggested by compounds that resulted in exceedance of occupational exposure limits, but is instead a conservative posture in the face of unknown consequences of inhalation of appreciable quantities of organic compounds that may or may not be harmful at doses that occur during vaping.

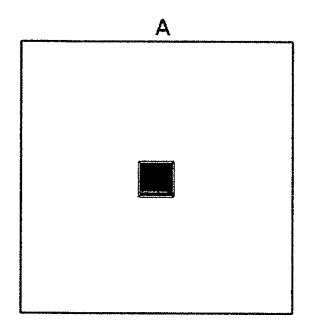
Key Conclusions:

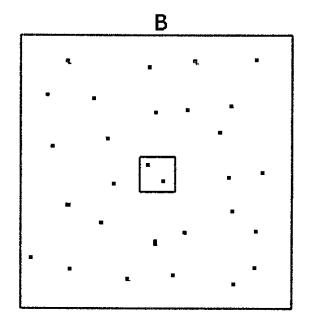
- Even when compared to workplace standards for involuntary exposures, and using several conservative (erring
 on the side of caution) assumptions, the exposures from using e-cigarettes fall well below the threshold for
 concern for compounds with known toxicity. That is, even ignoring the benefits of e-cigarette use and the fact
 that the exposure is actively chosen, and even comparing to the levels that are considered unacceptable to
 people who are not benefiting from the exposure and do not want it, the exposures would not generate concern
 or call for remedial action.
- Expressed concerns about nicotine only apply to vapers who do not wish to consume it; a voluntary (indeed, intentional) exposure is very different from a contaminant.
- There is no serious concern about the contaminants such as volatile organic compounds (formaldehyde, acrolein, etc.) in the liquid or produced by heating. While these contaminants are present, they have been detected at problematic levels only in a few studies that apparently were based on unrealistic levels of heating.
- The frequently stated concern about contamination of the liquid by a nontrivial quantity of ethylene glycol or diethylene glycol remains based on a single sample of an early technology product (and even this did not rise to the level of health concern) and has not been replicated.
- Tobacco-specific nitrosamines (TSNA) are present in trace quantities and pose no more (likely much less) threat to health than TSNAs from modern smokeless tobacco products, which cause no measurable risk for cancer.
- Contamination by metals is shown to be at similarly trivial levels that pose no health risk, and the alarmist claims about such contamination are based on unrealistic assumptions about the molecular form of these elements.
- The existing literature tends to overestimate the exposures and exaggerate their implications. This is partially due to rhetoric, but also results from technical features. The most important is confusion of the concentration in aerosol, which on its own tells us little about risk to heath, with the relevant and much smaller total exposure to compounds in the aerosol averaged across all air inhaled in the course of a day. There is also clear bias in previous reports in favor of isolated instances of highest level of chemical detected across multiple studies, such that average exposure that can be calculated are higher than true value because they are "missing" all true zeros.
- Routine monitoring of liquid chemistry is easier and cheaper than assessment of aerosols. Combined with an
 understanding of how the chemistry of the liquid affects the chemistry of the aerosol and insights into behavior
 of vapers, this can serve as a useful tool to ensure the safety of e-cigarettes.
- The only unintentional exposures (i.e., not the nicotine) that seem to rise to the level that they are worth further
 research are the carrier chemicals themselves, propylene glycol and glycerin. This exposure is not known to
 cause health problems, but the magnitude of the exposure is novel and thus is at the levels for concern based on
 the lack of reassuring data.

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Panel A shows black square that represents aerosol contaminated by some compound as it would be measured by a "smoking machine" and extrapolated to dosage from vaping in one day. This black square is located inside the white square that represents total uncontaminated air that is inhaled in a day by a vaper. The relative sizes of the two squares are exaggerated as the volume of aerosol generated in vaping relative to inhaled air is much smaller in the figure. Panel B shows how exposure from contaminated air (black dots) is diluted over a day for appropriate comparison to occupational exposure limits that are expressed in terms of "time-weighted average" or average contamination over time rather than as instantaneous exposures (with the exception of "ceiling limits" that do not affect the vast majority of comparisons in this report). Exposure during vaping occurs in a dynamic process where the atmosphere inhaled by the vaper alternates between the smaller black and larger white squares in Panel A. Thus, the concentration of contaminants that a vaper is exposed to over a day is much smaller than that which is measured in the aerosol (and routinely improperly cited as reason for concern about "high" exposures).





able 1a: Exposure predictions based on analysis of aerosols generated by smoking machines: Volatile Organic Compounds

Compound	N#	Estimated concentration in personal hreathing zone		Ratio of most stringent TLV (%)		Reference
		PPM	mg/m³	. Calculated directly	Safety factor	
Acetaldehyde	1	0.005		0.02	0.2	[5]
	3	0.003		0.01	0.1	[4]
	12	0.001		0.004	0.04	[8]
	· 1·	0.00004	·	0.0001	0.001	[3]
	1	0.0002		0.001	0.008	[3]
	150	0.001		0.004	0.04	[39,40]
	1	0.008		0.03	3	[37]
Acetone	1	0.002		0.0003	0.003	[37]
	150	0.0004		0.0001	0.001	[39,40]
Acrolein	12	0.001		1	13	[8]
	150	0.002		2	20	[39,40]
	1	0.006		6	60	[37]
Butanal	150	0.0002		0.001	0.01	[39,40]
Crotonaldehyde	150		0.0004	0.01	0.1	[39,40]
Formaldehyde	1	0.002		0.6	6	[5]
	3	0.008		3	30	[4]
	12	0.006	,	2	20.	[8].
	1	<0.0003		<0.1	<1	[3]
	1	0.0003		0.1	1	[3]
	150	0.01		4	40	[39,40]
	1	0.009		3	30	[37]
Glyoxal	1		0.002	2	20	[37]
	150		0.006	6	60	[39,40]
o-Methylbenzaldehyde	12		0.001	0.05	0.5	[8]
p,m-Xylene	12		0.00003	0.001	0,01	[8]
Propanal-	3 -	0.002	,	0.01	0.1	[4].
	150	0.0006		0.002	0.02	[39,40]
	1	0.005		0.02	0.2	[37]
Toluene	12	0.0001		0.003	0.03	[8]
Valeraldehyde	150	·	0.0001	0.0001	0.001	[39,40]

[#] average is presented when N>1

Table 1b: Exposure predictions based on analysis of aerosols generated by smoking machines: Inorganic Compounds*

Element Assumed. quantified compound containing the element for		. N## Estimated concentration in		Ratio.of most stringent TLV (%).		Reference
	comparison with TLV		personal breathing zone (mg/m³)	Calculated directly	Safety factor 10	
Aluminum	Respirable Al metal & insoluble compounds	1	0.002	0.2	1.5	[25]
Barium	Ba & insoluble compounds	1	0.00005	0.01	0.1	[25]
Boron	Boron oxide	1	0.02	0.1	1.5	[25]
Cadmium	Respirable Cd & compounds	12	0.00002	1	10	[8]
Chromium	Insoluble Cr (IV) compounds	1	3E-05	0.3	3	[25]
Copper	Cu fume	1	0.0008	0.4	4.0	[25]
Iron	Soluble iron salts, as Fe	1	0.002	0.02	0.2	[25]
Lead I	Inorganic compounds as Pb	I	7E-05	0.1	1	[25]
		12	0.000025	0.05	0.5	[8]
Magnesium	Inhalable magnesium oxide	1	0.00026	0.003	0.03	[25]
Manganese	Inorganic compounds, as Mn	1	8 E -06	0.04	0.4	[25]
Nickel Inhalable soluble inor compounds, as Ni	Inhalable soluble inorganic	1	2E-05	0.02	0.2	[25]
	compounds, as M	12	0.00005	0.05	0.5	[8]
Potassium	КОН	· 1	0.001	0.1	i	[25]
)Tin	Organic compounds, as Sn	1	0.0001	0.1	1	[25]
Zinc	Zinc chloride fume	1	0.0004	0.04	0.4	[25]
Zirconium	Zr and compounds	1	3E-05	0.001	0.01	[25]
Sulfur	SO ₂	1	0.002	0,3	3	[25]

[#] The actual molecular form in the aerosol unknown and so worst case assumption was made if it was physically possible (e.g. it is not possible for elemental lithium & sodium to be present in the aerosol); there is no evidence from the research that suggests the metals were in the particular highest risk form, and in most cases a general knowledge of chemistry strongly suggests that this is unlikely. Thus, the TLV ratios reported here probably do not represent the (much lower) levels that would result if we knew the molecular forms.

average is presented when N>1

Table 2: Exposure predictions for volatile organic compounds based on analysis of aerosols generated by volunteer papers

Compound	N [#]	Estimated concentration in personal breathing zone (ppm)	Ratio of most strii	Reference	
			Calculated directly	Safety factor 10	
2-butanone (MEK)	3	0.04	0.02	0.2	[4]
	1	0.002	0.0007	0.007	[6]
2-furaldehyde	3	0.01	0.7	7	[4]
Acetaldehyde	3	0.07	0.3	3	[4]
Acetic acid	3	0.3	3	30	[4]
Acetone	3	0.4	0.2	2	[4]
Acrolein	1	<0.001	<0.7	<7	[6]
Benzene	3	0.02	3_	33	[4].
Butyl hydroxyl toluene	. 1	4E-05	0.0002	0.002	[6]
Isoprene	3	0.1	7	70	[4]
Limonene	3	0,009	0.03	0.3	[4]
	1	2E-05	0.000001	0.00001	[6]
m,p-Xyelen	3	10.0	0.01	0.1	[4]
Phenol	3	0.01	0.3	3	[4]
Propanal	3	0.004	0.01	0.1	[4]
Toluene	3	0.01	0.07	0.7	[4]

[#] average is presented when N>1

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Electronic cigarettes

(also known as vapourisers)

ស្រុកស្នាន់ទៀត ថាក្រឡូ មាន

Summary

- Electronic cigarettes are not cigarettes. They do not contain tobacco and using them is not smoking.
- ASH, in line with the NICE guidance on Tobacco Harm Reduction, always recommends that quitting all forms of nicotine use is the best option for smokers.
- However, for those who remain addicted to nicotine NICE guidance recommends the use of medicinally licensed nicotine containing products as an alternative to smoking or to cut down or for temporary abstinence to help reduce the harms of smoking.
- NICE guidance cannot recommend the use of unlicensed nicotine containing products but
 many smokers are finding unlicensed electronic cigarettes helpful. Research by ASH shows
 that their use has grown threefold in the last two years from 700,000 to 2.1 million users.¹
- Electronic cigarettes are proving more attractive to smokers than NRT^{1,2} while providing them
 with a safer alternative to cigarettes.³ There is evidence that they can be effective in helping
 smokers' quit^{2,4} and little evidence that they are being used by never smokers.
- The number of children and young people regularly using electronic cigarettes remains very low and their use is almost entirely amongst those who are current or ex-smokers.¹ This is a similar pattern to that found in jurisdictions such as the USA.⁵
- ASH supports enhanced regulation to ensure the safety and reliability of electronic cigarettes and to prevent their promotion to non-smokers and children.
- However, in the absence of evidence of significant harm to bystanders, ASH does not support
 the inclusion of electronic cigarettes in smokefree laws which would completely prohibit their
 use in enclosed public places.

Curently electronic cigarettes are regulated as general consumer products. Once the EU Tobacco Products Directive (TPD) comes into effect in Member States in May 2016, electronic cigarettes containing up to 20mg/ml of nicotine will come under the TPD (levels of 18mg/ml have been reported on user websites as suitable for typical smokers). Above that level, or if manufacturers and importers decide to opt into medicines regulation, such products will require authorisation by the Medicines and Healthcare Products Regulatory Agency (MHRA) as over the counter medicines in the same way as nicotine replacement therapy (NRT).

Nicotine Substitution

Smoking is the largest preventable cause of premature mortality in the UK.8 The goal of tobacco control is to diminish the harm caused by tobacco products. While the ideal remains that people should stop using tobacco completely and permanently, consensus currently supports a properly regulated harm reduction approach for those unable to do so.9,10,11 This is a framework by which the harmful effects of smoking are reduced without requiring the elimination of a behaviour that is not necessarily condoned. Such strategies have proved successful in the past, for example within the contexts of needle exchange programmes for illicit drug use and the promotion of safer sex to prevent HIV infection. 12,13

In 1976 Professor Michael Russell wrote: "People smoke for nicotine but they die from the tar." Indeed, the harm from smoking is caused primarily through the toxins produced by the burning of tobacco. By contrast, non-tobacco, non-smoked nicotine products, although addictive, are considerably less harmful.

Electronic cigarettes consequently represent a safer alternative to cigarettes for smokers who are unable or unwilling to stop using nicotine.

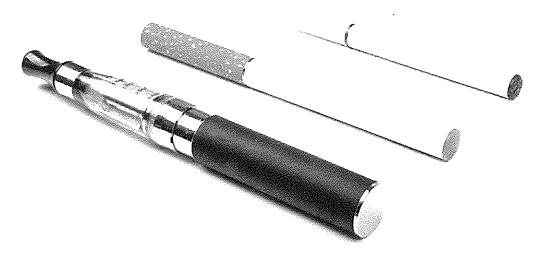
The National Institute for Health and Care Excellence (NICE) has developed guidance on a harm reduction approach to smoking.¹⁵ NICE's recommendations aim to inform on how best to reduce illness and deaths attributable to smoking through a harm reduction approach. As part of this guidance, NICE supports the use of licensed nicotine containing products (NCPs) to help smokers cut down, for temporary abstinence and as a substitute for smoking, possibly indefinitely. NICE guidance cannot recommend the use of unlicensed nicotine containing products. However, the guidance is clear that using an electronic cigarette is safer than smoking.¹³

What are electronic cigarettes?

Electronic cigarettes, also known as vapourisers or electronic nicotine delivery systems (ENDS),¹⁶ are often, although not always, designed to look and feel like cigarettes. They have been marketed as less harmful alternatives to cigarettes and for use in places where smoking is not permitted since they do not produce smoke.

There are three main types of electronic cigarettes or vapourisers:

- Disposable products (non-rechargeable)
- An electronic cigarette kit that is rechargeable with replaceable pre-filled cartridges
- An electronic cigarette that is rechargeable and has a tank or reservoir which has to be filled with liquid nicotine



The first two types of electronic cigarette are often known as 'cigalike' products as they resemble cigarettes and often have a light at the end that glows when the user draws on the device to resemble a lit cigarette. The liquid in the devices usually contains nicotine suspended in propylene glycol and glycerine. The level of nicotine in the cartridges may vary and most also contain flavourings.¹⁷ When a user sucks on the device, a sensor detects air flow and heats the liquid in the cartridge so that it evaporates. The vapour delivers the nicotine to the user. There is no side-stream smoke but some nicotine vapour is released into the air as the smoker exhales.

Are electronic cigarettes safe to use?

Compared with smoking using an electronic cigarette is safer. However, in the absence of a thorough clinical evaluation and long term population level surveillance, absolute safety of such products cannot be guaranteed. By comparison, the harm from tobacco smoking – the leading cause of preventable death in the UK – is well established.

Most, but not all electronic cigarettes contain nicotine. As noted above, the harm from smoking comes mainly from inhaling tobacco smoke rather than the nicotine. However, nicotine is an addictive drug which stimulates the nervous system, increasing the heart rate and blood pressure.¹⁸

Toxins have been found in a number of studies of electronic cigarettes 19,20,21,22 although these are at levels much lower than those found in cigarettes and not at levels which would generally cause concern. 23,24,25

One small study showed that after switching from tobacco to electronic cigarettes nicotine exposure was unchanged while exposure to selected toxicants was substantially reduced.²⁶

Most of the safety concerns regarding electronic cigarettes relate to the absence of appropriate product regulation and inconsistencies in quality control. The current lack of regulatory oversight means that there is significant variability in device effectiveness, nicotine delivery and cartridge nicotine content both between and sometimes within product brands.¹⁵

Research has identified possible concerns about specific products. A recent study by the US Food and Drug Administration (FDA) has raised some safety concerns over the presence of toxins, released in low concentrations, from the vaporisation process of certain cartridges.²⁷

There is little evidence of harmful effects in the short to medium term from repeated exposure to propylene glycol, the chemical in which nicotine is suspended.^{28,29} One study concludes that electronic cigarettes have a low toxicity profile, are well tolerated, and are associated with only mild adverse effects.³⁰ More research is needed on long-term impact, particularly on the lungs.

Is there a risk to non-users from electronic cigarette vapour?

Although electronic cigarettes do not produce smoke, users exhale a smoke-like vapour which consists largely of propylene glycol and glycerine. The level of nicotine present in electronic cigarette vapour is about one tenth of that generated by a cigarette.³¹ Any health risks of secondhand exposure to propylene glycol vapour are likely to be limited to irritation of the throat. One study exposed animals to propylene glycol for 12 to 18 months at doses 50 to 700 times the level the animal could absorb through inhalation. Compared to animals living in normal room atmosphere, no localised or generalised irritation was found and kidney, liver, spleen and bone marrow were all found to be normal. ²⁵ A recent review of the impact of electronic cigarettes noted that passive exposure to the aerosol can expose non-users to nicotine but at concentrations that are unlikely to have any pharmacological significance.³²

The fact that many electronic cigarettes look similar to conventional cigarettes has been said to risk confusion as to their use in enclosed public places, such as on public transport.^{33,34} However, given that the most distinctive feature of cigarette smoking is the smell of the smoke, which travels rapidly, and that this is absent from electronic cigarette use, it is not clear how any such confusion would be sustained.

Furthermore, the absence of risk from "secondhand" inhalation of vapour from electronic cigarettes has been described as an "often unconsidered advantage" of electronic cigarettes.³⁵ As an alternative to smoking, electronic cigarettes are preferable in situations where secondhand smoke poses serious health risks to others, such as in vehicles or in the home.

Are electronic cigarettes effective in helping smokers quit?

The degree of effectiveness depends on what effect is being measured. ASH research shows that the most commonly reported reason for using electronic cigarettes (among all who report using or having tried them) was "to help me stop smoking tobacco entirely". ³⁶ Current smokers also report that they use the devices to "help me reduce the amount I smoke but not stop completely". Effectiveness also varies between products and between users according to their experience in use. ³⁷

Currently in the UK, any nicotine-containing product which claims or implies that it can treat nicotine addiction is considered to be a medicinal product and is therefore subject to regulation by the MHRA. Consequently, electronic cigarette manufacturers have avoided making such explicit claims. Furthermore, the WHO has stated that "the electronic cigarette is not a proven nicotine replacement therapy".³⁸

Nevertheless, survey data suggests that, whatever the reason e-cigarette use may have been initiated, about 4 in 10 users in England currently use them in an attempt to quit smoking.³¹ Recently published population level data shows they have taken over from over the counter NRT as the most popular support people use when quitting smoking² and are 60% more effective than NRT bought over the counter in helping smokers quit.⁴ The effectiveness in that study was broadly similar to using a prescription medicine (including NRT) with limited professional support and less than using a prescription medicine with specialist behavioural support. A randomised controlled trial conducted in New Zealand found that electronic cigarettes, with or without nicotine, were modestly effective at helping smokers to quit, with broadly similar achievement of abstinence as with nicotine patches.³⁹ There is also some evidence to suggest that electronic cigarette use leads to abstinence among some smokers who had not intended to quit.⁴⁰

Empirical data on the effectiveness of electronic cigarettes as nicotine delivery devices are still being collected.⁴¹ Some reports from the published literature suggest that electronic cigarettes are inefficient nicotine delivery devices and result in only modest and unreliable increases in plasma nicotine levels.⁴² Such findings appear to apply particularly to new users whereas studies using participants experienced in electronic cigarette use have been found to derive more reliable nicotine intake levels.²⁷ Whether experienced users are able to use these devices in a way in which their nicotine intake is maximised, or the variability is due to such users preferring certain devices which might significantly differ from those used by inexperienced users, is yet to be determined.^{43,44}

Nevertheless, growing evidence suggests that electronic cigarettes are becoming more reliable in their nicotine delivery and that they have a beneficial impact in reducing subjective cravings and, in turn, number of cigarettes smoked.²⁷ Moreover, some studies have demonstrated an ability for certain brands of electronic cigarettes to reduce nicotine cravings despite delivering low plasma nicotine levels.⁴⁵ A recent review on the use, safety and effects of electronic cigarettes concluded that the devices do enable some smokers to reduce or quit smoking and that they offer a route to complete cessation of nicotine use.³³

Another feature of electronic cigarettes that apparently lends to their effectiveness is an ability to provide an approximation to the superficial aspects of the experience of smoking. This has been demonstrated by users exhibiting reduced cravings, withdrawal symptoms and number of cigarettes smoked per day even when given a placebo electronic cigarette.²⁷

The potential value, and perceived effectiveness, of electronic cigarettes in aiding smoking cessation has been assessed in user surveys. Caution must be exercised with these data as the samples have been recruited from electronic cigarette users' websites. However, one such survey conducted internationally reported that 72% of users believed that electronic cigarettes were beneficial in reducing cravings and withdrawal symptoms while 92% declared that the devices had reduced the number of conventional cigarettes they smoked. Indeed, in the same survey, 96% of former smokers claimed that electronic cigarettes had helped them quit, and 79% reported a fear that if they stopped using them they would start smoking again.⁴⁶

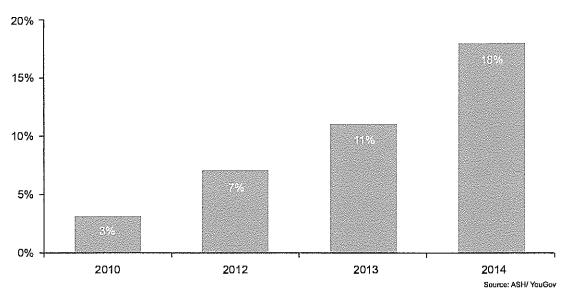
Who uses electronic cigarettes in the UK?

Public awareness of electronic cigarettes has grown substantially in recent years with online media playing an integral role in the growing popularity of the product.

Between the years 2009 and 2011 searches via the search engine Google using the terms 'electronic cigarette' increased fifty fold,⁴⁷ a fact the industry has attempted to capitalise on by funding various online adverts, web-pages and social networking site groups.⁴⁸ In addition to the influence of online media, there is also evidence to suggest that tighter tobacco control measures are also positively driving electronic cigarette behaviour.⁴⁹

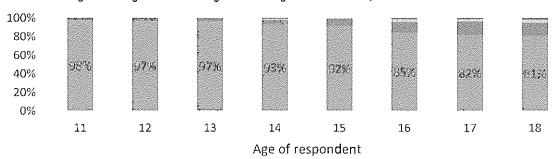
According to surveys commissioned by ASH, 3% of smokers in Great Britain reported using electronic cigarettes regularly in 2010, a figure that has increased to 18% in 2014 (see figure 1). Similarly, the number of smokers reporting having tried electronic cigarettes has increased significantly, from 9% in 2010 to 22% in 2012, 35% in 2013 and 52% in 2014.

Figure 1: Usage of e-cigarettes amongst adult smokers in Britain



One of the risks highlighted by professionals is that electronic cigarettes could act as a 'gateway' to smoking tobacco among children. Current evidence suggests this phenomenon is not occurring. Among children, current electronic cigarette use is confined almost entirely to those who have already tried smoking. ^{50,51} Figure 2 further shows that even having tried electronic cigarettes is rare among children, particularly those under the age of 15.

Figure 2: Usage of electronic cigarettes among children in Britain, 2014



- ☑ Don't want to say
- I use them often (more than once a week)
- ! use them sometimes (more than once a month)
- I have tried them once or twice
- I have never used them

Source: ASH/ YouGov

ASH estimates that there are 2.1 million current users of electronic cigarettes in the UK.⁵² This number consists almost entirely of current and ex-smokers; of these approximately one third are ex-smokers while two thirds continue to use tobacco alongside electronic cigarettes. There is little evidence to suggest that anything more than a negligible number of never-smokers regularly use the product.⁴⁵

For further information see:

ASH Factsheet: Use of electronic cigarettes in Great Britain

The National Centre for Smoking Cessation and Training (NCSCT) has produced an <u>e-cigarette</u> <u>briefing</u> summarising the evidence to date, especially in relation to the role of the stop smoking services and how stop smoking practitioners should respond to enquiries about e-cigarettes from smokers.

Regulation

Concerns have been raised about the rapid growth of the electronic cigarette market and the increasing involvement of tobacco companies in the industry. The World Health Organization treaty on tobacco (WHO Framework Convention on Tobacco Control) obliges signatories to protect health policy with respect to tobacco control from the 'commercial and vested interests' of the tobacco industry. Tobacco company involvement in tobacco harm reduction is a cause for concern.

Regulation has been seen as an important part of limiting the risk of tobacco industry involvement and to ensure the market evolves in a way that supports public health objectives.

In February 2014 the EU Tobacco Products Directive (TPD) was passed by the European Parliament and became law on 29 April. Member States now have until 20 May 2016 to transpose the new rules into national law.

Electronic cigarettes containing up to 20mg/ml come under the TPD.⁵³ Above that level electronic cigarettes will require marketing authorisation as medicines if they are to remain on the market.⁵

The detailed requirements of regulation under the TPD are as follows:

- A limit on nicotine strength of 20mg/ml (vaper websites say 18 ml/mg is the strength usually found suitable by average smokers⁵⁴)
- A size limit for e-liquids of 10ml for dedicated refill containers and 2ml for electronic cigarette cartridges and tanks.
- Safety mechanisms (such as childproof fastening and opening) for e-liquid containers, cartridges and tanks.
- Warnings on the two largest surfaces of the packs and any outside packaging covering 30% of the external area. These must state either 'This product contains nicotine which is a highly addictive substance' or the above plus 'It is not recommended for use by non-smokers'.
- Consumer information must also include instructions on use, information on addictiveness and toxicity, a list of all ingredients and information on nicotine content along with a prohibition on promotional materials on packs.
- Manufacturers and importers bear full responsibility for the quality and safety of their product and must notify detailed information about their products to competent authorities in each Member State.
- Prohibition on cross-border advertising promotion and sponsorship in line with that for tobacco products.
- Member States will be able to introduce extra safeguards for example on age-limits and flavourings in electronic cigarettes.

Until regulations implementing the EU Directive take effect electronic cigarettes not licenced as medicines will continue to be subject to general consumer protection law and it is the responsibility of trading standards officers to enforce the law.

In addition, the Children & Families Act 2014 gave the Government powers to ban the sale of electronic cigarettes to persons under the age of 18. A consultation on draft regulations is expected soon.

On 12 September 2014, Kind Consumer, a healthcare research and development company, announced that it had been granted marketing authorisation from the MHRA for a novel nicotine inhaler designed to help smokers cut down or quit smoking. The product called Voke is being developed with the company's partner, Nicoventures, a wholly-owned subsidiary of BAT.55

The MHRA has said that it "continues to encourage companies to voluntarily submit medicines licence applications for electronic cigarettes and other NCPs as medicines". ⁵⁶ Public Health England supports the regulation by the MHRA of nicotine-containing products – including e-cigarettes – as medicines, to give people access to safe products that are also effective. ⁵⁷ In the UK medicines regulation has some advantages for electronic cigarette manufacturers and importers over regulation under the TPD.

The following table shows the main elements of regulation under the TPD versus medicines regulation:

Characteristics of regulation under Tobacco Products Directive and MHRA				
Tobacco Products Directive regulation of electronic cigarettes	MHRA licenced Nicotine Containing Products (NCPs) including e-cigs			
Products not available on prescription	Products available on prescription			
20% VAT	5% VAT			
Cross border advertising banned by 2016; up to Member States to decide on domestic advertising (billboards, Point of Sale, buses etc.)	Advertising allowed – under OTC rules so no celebrity endorsement, free samples and must be targeted at adult smokers etc.			
Products widely available	Products available on general sale (GSL)			
Can't make health claims	Can make health claims			
Upper limits for nicotine content will be set and likely to be in force by 2017.	MHRA regulation is flexible; there are no upper limits.			
30% health warning on packs about nicotine on front and back of packs	No health warnings on packs. Pack contains detailed Patient Information Leaflet.			
Member States retain powers e.g. on flavours, domestic advertising.	Flavours require a marketing authorisation			
Children and Families Bill allows for age of sale of 18 for nicotine products.	Age of sale 12 but can be varied by product so could be higher for e-cigarettes.			

Following a referral from the Department of Health, NICE published guidance on tobacco harm reduction on 5th June 2013 as mentioned above. This guidance recommended the use of licensed NCPs, which are nicotine replacement therapy products licensed by the MHRA (and do not at the current time include electronic cigarettes) for harm reduction purposes. Such purposes include using licensed NCPs as a substitute for tobacco, possibly indefinitely, to cut down prior to quitting, to smoke less, or to temporarily abstain from smoking.

Regulation of Advertising of electronic cigarettes

Some advertising for electronic cigarettes has been criticised as possibly attractive to young people and never-smokers.⁵⁸ There is a risk that inappropriate advertising could glamorise smoking and undermine public health goals. The involvement of the tobacco industry in the electronic cigarette market also raises questions about the opportunity of this industry to reach young people with prosmoking messages.

Following a public consultation, CAP, the Committee on Advertising Practice, published new rules on the advertising of electronic cigarettes to cover the interim period between now and when the TPD comes into effect.

Key measures include:

- Ads must not be likely to appeal to people under 18
- People shown using e-cigarettes must neither be, nor seem to be under 25
- Ads must not be directed at people under 18 through the selection of media or the context in which they appear
- Ads must not encourage non-smokers or non-nicotine users to use electronic cigarettes
- Ads must make clear that the product is an e-cigarette and not a tobacco product.

CAP will monitor the effect of the rules and conduct a review after 12 months.

ASH's response to the public consultation can be viewed <u>here</u>.

Regulation of where electronic cigarettes can be used

Currently, electronic cigarettes are not regulated under smokefree laws in the UK, although this is under consideration in Wales.⁵⁹ In general, users are free to use them in most public places such as bars, restaurants and on public transport, although the managers of some premises have prohibited their use.

One stated advantage of smokefree legislation is that it de-normalises smoking, effectively distancing the behaviour from what is an accepted social norm. The ban on smoking in public places has reinforced in many people's minds that such behaviour has gone from a normal, widely accepted activity to one that is abnormal and unaccepted. There are concerns that electronic cigarettes will undermine this process, threatening the now established practice of smokefree public places, such as at work or on public transport. However to date there is little evidence to suggest this is the case.

ASH has worked with the Chartered Institute of Environmental Health and the Trading Standards Institute to produce guidance for organisations considering whether or not to ban the use of electronic cigarettes on their premises.⁵⁰ This provides a structure for thinking through the issues but leaves it to organisations to develop their own approach informed by the evidence.

Global Guidance

In August 2014 the World Health Organization published a report on ENDS (electronic nicotine delivery systems, more commonly known as electronic cigarettes) for discussion by the WHO Framework Convention on Tobacco Control Conference of the Parties meeting in October. Parties to the WHO FCTC were asked to note the report and 'provide further guidance'.⁶¹ The Framework Convention Alliance (FCA), which represents civil society organisations, developed a consensus position in advance of the COP on the principles which should underpin any regulatory system. See box below.⁶²

The COP agreed with the FCA that global guidelines are not yet feasible but did invite "Parties to consider prohibiting or regulating ENDS including as tobacco products, medicinal products, consumer products, or other categories, as appropriate, taking into account a high level of protection for human health". Furthermore, the WHO was asked to prepare a report for the next COP with an update on the evidence of the health impacts, the potential role in quitting tobacco usage, methods to measure contents and emissions of these products, and impact on tobacco control efforts and policy options.

Principles to guide policy on tobacco harm reduction and electronic cigarettes:

- The global burden of death and disease from tobacco is primarily caused by smoking.
- While quitting tobacco use is paramount, quitting nicotine use altogether is the best option.
- For those unable to quit, switching to alternative sources of nicotine that are less harmful than tobacco can reduce, often very substantially, the harm smoking causes to the individual.
- The benefits of such an approach would be maximized if uptake were limited to existing smokers who are unable to quit.
- The risks of such an approach would be minimized by limiting uptake by neversmokers, in particular amongst young people, and by taking measures to protect nonusers and discourage long-term dual use.
- There could be negative unintended consequences from over-regulation just as there could be from under-regulation.
- The involvement of tobacco companies in the production and marketing of electronic cigarettes is a matter of particular concern as there is an irreconcilable conflict of interest between those profiting from the sale of tobacco and public health.

Conclusion

ASH recognises that whilst efforts to help people stop smoking should remain a priority, many smokers either do not wish to stop quit or find it very hard to do so because of their addiction to nicotine. For this group, nicotine containing products which have been properly regulated to ensure product safety, quality and efficacy should be available as an alternative to tobacco.

Most of the diseases associated with smoking are caused by inhaling smoke which contains thousands of toxic chemicals. By contrast, nicotine is relatively safe. Electronic cigarettes, which deliver nicotine without the harmful toxins found in tobacco smoke, are a safer alternative to smoking. In addition, electronic cigarettes reduce secondhand smoke exposure in places where smoking is allowed since they do not produce smoke. Nonetheless, nicotine is an addictive substance, electronic cigarettes currently available are highly variable in terms of delivery of nicotine and product quality, and smokers are uncertain about the effectiveness of the product. There are concerns, as yet unsupported by evidence, that these products may provide a gateway into smoking for children and young people. The regulation of these products, in particular with respect to their advertising, promotion and sponsorship needs to be undertaken with these factors in mind.

In the UK smokefree legislation exists to protect the public from the demonstrable harms of secondhand smoke. ASH does not consider it appropriate for electronic cigarettes to be subject to this legislation, but that it should be for organisations to determine on a voluntary basis how these products should be used on their premises.⁵⁵

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- 51 YouGov survey. Fieldwork dates and sample size:

Adults: Children:

 March 2010:
 2,297 adult smokers
 March 2013:
 2,178 children aged 11-18

 March 2012:
 12,436 adults
 March 2014:
 2,068 children aged 11-18

February 2013: 12,171 adults March 2014: 12,269 adults

Surveys were conducted online and results weighted to reflect the British population, as appropriate.

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www.learn.eversmoke.com/nicotine-strength.html [accessed 28 May 2014] www.vapertrain.com/page/hdics [accessed 28 May 2014]

www.vapehit.co.uk/info.php?articles&articles_id=22 [accessed 28 May 2014]

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Article

Comparison of Select Analytes in Exhaled Aerosol from E-Cigarettes with Exhaled Smoke from a Conventional Cigarette and Exhaled Breaths

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Abstract: Exhaled aerosols were collected following the use of two leading U.S. commercial electronic cigarettes (e-cigarettes) and a conventional cigarette by human subjects and analyzed for phenolics, carbonyls, water, glycerin and nicotine using a vacuum-assisted filter pad capture system. Exhaled breath blanks were determined for each subject prior to each product use and aerosol collection session. Distribution and mass balance of exhaled e-cigarette aerosol composition was greater than 99.9% water and glycerin, and a small amount (<0.06%) of nicotine. Total phenolic content in exhaled e-cigarette aerosol was not distinguishable from exhaled breath blanks, while total phenolics in exhaled cigarette smoke were significantly greater than in exhaled e-cigarette aerosol and exhaled breaths, averaging 66 μg/session (range 36 to 117 μg/session). The total carbonyls in exhaled e-cigarette aerosols were also not distinguishable from exhaled breaths or room air blanks. Total carbonyls in exhaled cigarette smoke was significantly greater than in exhaled e-cigarette aerosols, exhaled breath and room air blanks, averaging 242 μg/session (range 136 to 352 μg/session). These results indicate that exhaled e-cigarette aerosol does not increase bystander exposure for phenolics and carbonyls above the levels observed in exhaled breaths of air.

Keywords: smoking; vaping; electronic cigarette; e-cigarette; aerosol; carbonyl; phenolic; hydroxybenzene; combustion; nicotine; emission; passive vaping

1. Introduction

Electronic cigarettes (e-cigarettes) are products that became available to United States consumers in about 2007 [1]. Unlike conventional cigarettes that burn tobacco at high temperatures, e-cigarettes contain a liquid flavor solution (e-liquid) that is thermally vaporized by a battery powered heating element. The e-liquids typically contain a mixture of aerosol forming components such as glycerin and propylene glycol, various flavors and, optionally, nicotine. Recently published studies have reported on the constituents of e-liquids and e-cigarette aerosols [2–8]. Some of these constituents are among those listed as Harmful and Potentially Harmful Constituents (HPHC) for tobacco products by the United States Food and Drug Administration (FDA) [9]. Constituents that have been identified in machine-generated e-cigarette aerosols and emissions in enclosed spaces [3,4,6,10], include the carbonyl compounds acetaldehyde, acrolein and formaldehyde [3,6,11,12]. The reported levels of these carbonyl compounds were lower than those of conventional cigarettes smoked under comparable conditions by one to two orders of magnitude.

Riker, et al. have advanced the notion that exhaled e-cigarette aerosol may pose an exposure risk to bystanders similar to that of environmental tobacco smoke (ETS) from conventional cigarettes through "passive vaping" [13]. However, the majority (~85%) of ETS aerosol arises from side stream smoke generated during static cigarette smolder in between puffs [14], which is absent for e-cigarettes. Several investigators have reported machine generated e-cigarette aerosol contributions to particulates/droplets and chemical constituents in test chambers [13,15] and indoor environments [5]. All of these studies suggest that exposure to constituents in machine-generated mainstream e-cigarette aerosols would not exceed background, although such studies did not actually use exhaled e-cigarette aerosol from human subjects.

Recent investigations have reported emissions of constituents in closed air chambers or in rooms having minimal ventilation with human subjects using e-cigarettes [15–18]. A study by Romanga, *et al.* in an unventilated room using human subjects failed to detect a number of analytes including nicotine [16], consistent with the sampling and analytical challenges posed by the baseline levels of many of the constituents in e-cigarette aerosols.

A 2013 study by Schripp, *et al.* reported aerosol droplet counts and chemical constituents generated by e-cigarette users, under prescribed puffing parameters, in a room with air exchange [17]. Several compounds, including carbonyls, were detected. However, the authors attributed these levels to the test subjects' normal metabolic processes and not to the exhaled e-cigarette aerosols.

A recent study with nine e-cigarette users puffing *ad libitum* in a room with air exchange found propylene glycol, glycerin and nicotine in the room air [18]. No increases above background were noted for formaldehyde, acetone or acrolein.

These studies have explored the potential for bystander exposure from e-cigarettes, but that have not adequately addressed the chemical composition of exhaled e-cigarette aerosol. A simple mass balance and distribution of known constituents such as water, glycerin and nicotine has not been reported for exhaled e-cigarette aerosol. The quantities of constituents such as phenolics and carbonyls in exhaled cigarette smoke relative to exhaled e-cigarette aerosol, and to a suitable blank of exhaled breaths of air is also lacking in the scientific literature. The present study addressed these gaps with direct analyses of the quantities of phenolic and carbonyl compounds in the exhaled aerosols from human subjects using cigarettes and e-cigarettes without any dilution effects due to room volume or air exchange and determined

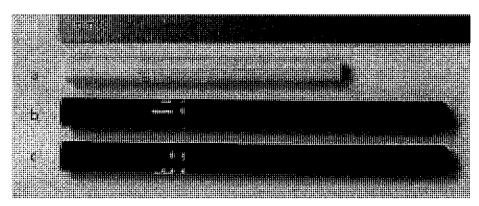
mass balance and distribution of water, glycerin and nicotine in exhaled e-cigarette aerosols. These data were compared with baseline levels in exhaled breath blanks to place the findings in the context of the known and common presence of some chemical constituents in indoor environments [19–22]. The analytical methodologies used in this study have been applied to collection and measurement of constituents in exhaled cigarette aerosols [23–27] and have been adapted to measure levels of phenolics and carbonyls in exhaled e-cigarette aerosols.

2. Experimental Section

2.1. Materials

The conventional cigarette and the two e-cigarettes used in this study were all products with significant U.S. market shares in their respective categories. The products used in this study are shown in Figure 1.

Figure 1. The three study products: (a) Marlboro Gold Box, 85 mm conventional cigarette (MGB); (b) blu Classic Tobacco Disposabe (blu CTD); (c) blu Magnificent Menthol Disposable (blu MMD).



The Marlboro Gold King Box filtered cigarette (MGB), which is the largest-selling brand in the U.S. was selected to represent the conventional cigarette category (Philip Morris USA, Miami, FL, USA) [28]. The blu eCigs Classic Tobacco Disposable (blu CTD) and blu eCigs Magnificent Menthol Disposable (blu MMD) electronic cigarettes were selected to represent the e-cigarette category (Charlotte, NC, USA), representing the U.S. market leaders for this product category. The MGB sample was obtained from a commercial wholesaler (Reidsville Grocery Company, 1624 Freeway Dr., Reidsville, NC, USA). The e-cigarette products were obtained directly from the manufacturer.

Both of the disposable e-cigarette products utilize a flow activation design whereby the heating circuit is activated only during puffing. Both e-cigarette products utilize glycerin as the aerosolizing agent and are labeled as containing nicotine (20–24 mg/e-cigarette). Compositions of the e-liquids were 82% glycerin, 9% water, 2% nicotine and 7% flavor for blu CTD; 75% glycerin, 18% water, 2% nicotine and 5% flavor for blu MMD [29]. The e-liquid loadings were 1.03 g and 1.00 g for blu CTD and blu MMD,respectively. Both e-cigarettes utilize 3.7 V batteries, 3.0 Ω atomizers, and both products are designed to deliver approximately 400 puffs.

All three samples were representative of commercially available consumer products at the time of the study. Exhaled aerosols from each of the products were captured on glass fiber filter pads. In addition to the exhaled aerosol from products, exhaled breath blanks were used to establish baseline values for the exhaled cigarette smoke and exhaled e-cigarette aerosol comparisons. Blanks were obtained from each subject prior to the exhaled aerosol sessions by collecting their exhaled breaths.

2.2. Experimental Design

This study involved collection of exhaled aerosol from human subjects using conventional cigarettes and e-cigarettes. The experiments were conducted under an IRB-approved protocol (Quorum IRB, 1501 Fourth Ave., Suite 800, Seattle, WA, USA). Subject recruiting was performed by Eastcoast Research (Eastcoast Research, 1118 Grecade St., Greensboro, NC, USA). All sessions were conducted in a 40 m³ conference room at the Eastcoast Research facility. Subjects were screened for age (21 ≤ age ≤ 54), product use (e-cigarette subject puffs ≥30 puffs/day; conventional cigarettes >20 cigarettes/day), product preference (MGB, blu CTD or blu MMD) and for a stable preference for the specified products (≥6 months). All subjects were required to abstain from any tobacco product use for a minimum of one hour prior to the collection sessions. Exhaled carbon monoxide levels were verified for the subjects prior to each session with a piCO+ Smokerlyzer (Bedfont Scientific Ltd., Station Road, Harrietsham, Maidstone, Kent ME17 IJA, England) and were required to be less than 10 ppm to participate in the sessions. A total of thirty subjects were recruited for the study—ten subjects for each of the three products.

The three analyte classes (major components, phenolics and carbonyls) studied in this work are listed in Table 1 along with the individual analytes. The major components were selected to provide a mass balance distribution of water, glycerin and nicotine in exhalants from the three products. Some carbonyls have been reported in machine deliveries from e-cigarettes although at levels ten to hundreds of times less than in mainstream cigarette smoke [3,6,11,12]. A recent literature summary of e-cigarette chemical analysis also suggested the presence of o,m,p-cresols in the headspace of a single product [30]. Therefore, this work will also establish the levels of carbonyls and phenolics in exhaled aerosols from the cigarette, e-cigarettes and exhaled breaths.

Table 1. A listing of the three classes of analytes—major components, phenolic and carbonyl and individual analytes measured in this study.

Analyte Class	Analyte	
	Water	
Major Components	Glycerin	
	Nicotine	
	Hydroquinone	
	Resorcinol	
Phenolics	Catechol	
Phenonics	Phenol	
	m,p-Cresol	
	<i>m,p</i> -Cresol <i>o-</i> Cresol	

Table 1. Cont.

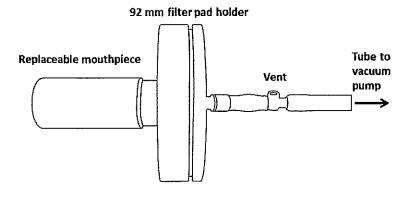
Analyte Class	Analyte							
Carbonyls	Formaldehyde							
	Acetaldehyde							
	Acetone Acrolein Propionaldehyde							
						Crotonaldehyde		
						Methylethylketone		
	Butyraldehyde							

Total particulate matter, TPM, for three MGB cigarettes and 99 puffs from the two e-cigarettes were all approximately 150 mg under an intense puffing regime [29] and served as the basis for the puffing arrangement in this study. Cigarette subjects used three cigarettes per session and e-cigarette subjects used a maximum of 99 puffs per session. Each subject used their preferred product in a total of nine sessions which provided three replicates per subject in the three analyte classes. Sessions were limited to a maximum of two hours in duration.

2.3. Exhaled Collection Method Summary

This research utilizes modified ISO 17025 accredited conventional cigarette smoke analysis methods to quantitate select analytes in the exhaled aerosols from cigarettes and e-cigarettes. The vacuum-assisted collection system employed in the present work has been previously described [23–26] and used to quantify a number of different analytes in the exhaled smoke from conventional cigarettes. The system utilizes 92 mm glass fiber filter pads that have greater than 99% efficiency in retaining aerosols in the size range of cigarette smoke, with calibrated vacuum assistance to permit collection of exhaled samples in a manner that is perceived by subjects as neutral in terms of the effort required to deliver exhalate into the collection system. A schematic of the collection system is shown in Figure 2.

Figure 2. Schematic of the vacuum-assisted collection system for exhaled samples. The single pad collection was used for analysis of phenolics and major components. The apparatus used for the collection of carbonyls included a second filter holder of identical dimensions in series with the first.



The system incorporates a replaceable mouthpiece into which subjects exhale aerosol or breaths. The vacuum pumps were calibrated daily to aspirate 200 mL/min. The tube connecting the pad holder to the vacuum pump was vented to prevent aspiration through the pads when the subjects were not exhaling into the collection system. Subjects covered the vent with a finger when exhaling into the system and then uncovered the vent between exhaled puffs or breaths. A variation of the collection system in Figure 1 was used in carbonyl sessions. Two filter pads arranged in series and treated with a 2,4-dinitrophenylhydrazine (DNPH) solution were used for carbonyl collection sessions to increase sensitivity for these compounds.

2.3.1. Exhaled Breath Blank Collections

Blanks for each participant were collected at the beginning of each session prior to collection of exhaled aerosol from the products. These blanks were performed to obtain baseline levels of analytes in their exhaled breath prior to collection of exhalates from the products. Blanks were collected by instructing the subjects to exhale normal breaths into the vacuum assisted collection system over a twenty-minute period—a maximum of 30 exhaled breaths for cigarette sessions and a maximum of 99 exhaled breaths for e-cigarette sessions.

2.3.2. Carbonyl Room Air Blank Collections

In addition to exhaled breath blanks, a single replicate of room air was sampled with the collection system during each carbonyl session. Carbonyls have been observed in indoor air at levels in excess of 100 µg/m³ [19–22]. Room air background levels of carbonyls were collected in the occupied conference room prior to carbonyl exhaled cigarette and e-cigarette usage sessions. Room air blanks were generated by pulling room air through DNPH treated pads with the vacuum-assisted collection system for 30 simulated exhaled puffs during cigarette sessions and 99 simulated exhaled puffs during e-cigarette sessions. The simulated exhaled puff duration for room air blanks was 2–3 sec.

After completion of the exhaled breath collections, pad holders with new pads were inserted into the collection system and the respective products presented to the subjects. Cigarette smokers were presented with an unopened pack at the beginning of each session and instructed to light their cigarettes, puff normally and exhale their smoke into the collection systems. Similarly, after e-cigarette subjects completing their exhaled breath collections, each subject received a new e-cigarette for the session. Subjects were instructed to take one test puff to verify nominal operation of their test products, puff normally and exhale their aerosol into the collection systems. Pad holders were capped upon completion of the collections and subjected to work-up within 40–60 min.

2.3.3. Analytical Method Capabilities Summary

ISO 17025 methods for cigarette mainstream smoke were verified for use with exhaled aerosol matrices from cigarettes and e-cigarettes. Cartridge-based collections were investigated for carbonyls, but were not suitable for exhaled aerosol collections due to their high resistance to air flow and observed break though during method development. Exhaled aerosol method verification involved spiking and

recovery experiments over the response ranges with an emphasis on accuracy and precision at the method limits of quantitation.

A summary of capabilities for the exhaled aerosol methods for e-cigarettes is provided in Table 2 as detection limits, quantitation limits, accuracy and precision. The limit of detection (LOD), is defined as the lowest quantity of an analyte that can be distinguished from the background matrix. The limit of quantitation (LOQ), is the level above which quantitative results may be obtained for an analyte with 99% confidence. Instrument parameters and additional method information for phenolics, carbonyls, glycerin, nicotine and water analyses are available as supplementary materials (Supplemental Files).

Table 2. Exhaled aerosol analysis capabilities for major components, phenolics and carbonyls in e-cigarette samples.

Analyte		LOD	LOQ	Accuracy (%)	Precision (%)
Major Components	Nicotine	0.69	4.86	108	2
	Glycerin	0.0059	1.51	101	2
	Water	ND	31	99	0
Phenolics	Hydroquinone	0.37	2.00	113	2
	Resorcinol	0.06	0.40	109	2
	Catechol	0.47	2.00	114	2
	Phenol	0.09	0.32	108	2
	m,p-Cresol	0.60	4.00	110	2
	o-Cresol	0.16	1.00	113	1
Carbonyls	Formaldehyde	0.10	12.45	97	0
	Acetaldehyde	0.39	5.20	96	1
	Acetone	0.61	13.64	96	3
	Acrolein	0.13	12.34	97	0
	Propionaldehyde	0.21	1.89	98	2
	Crotonaldehyde	0.21	2.17	95	1
	Methylethylketone	0.24	2.06	97	2
	Butyraldehyde	0.18	5.30	95	1

Notes: All units are µg/session except glycerin and water (mg/session). ND—LOD for water was not determined.

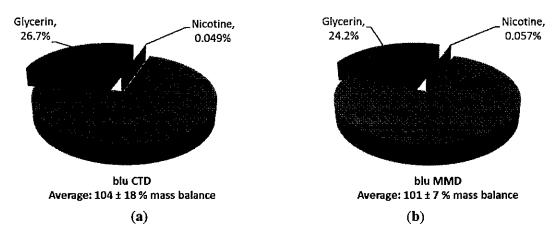
3. Results and Discussion

3.1. Exhaled Aerosol Mass Balance Distribution of Water, Glycerin and Nicotine

The average number of exhaled puffs collected during the water, glycerin and nicotine, phenolic and carbonyl collection sessions were not significantly different between methods as determined by an ANOVA analysis. The average number of exhaled puffs was 30 for three cigarettes and 95 for e-cigarettes during the water, glycerin and nicotine collection sessions.

Nicotine, glycerin and water analysis were used to compare distribution and mass balance of these analytes in exhaled aerosols. Distribution is determined by measuring the amounts of these compounds in exhalate collection sessions for the three products and then dividing by the sum total of the three constituents. The average distributions of exhaled e-cigarette aerosols are shown in Figure 3.

Figure 3. Average distributions and mass balances of water, glycerin and nicotine in exhaled e-cigarette aerosols for (a) blu Classic Tobacco Disposable (blu CTD) and (b) blu Magnificent Menthol Disposable (blu MMD).



The exhaled aerosol mass from the two e-cigarettes is primarily water and glycerin, which together comprise greater than 99.9% of the collected aerosol distribution. Average mass balances for water, glycerin and nicotine were fully accounted for in the e-cigarette aerosols at 104% and 101%. Machine-generated mainstream from e-cigarettes contain approximately 86% glycerin and 8% water [29], which is similar to the e-liquid composition itself. The high concentration of water in the exhaled e-cigarette aerosol has been attributed to water accretion from the respiratory tract by the hydrophilic glycerin aerosol [31].

Average mass balance for nicotine, glycerin and water in exhaled aerosol from the conventional cigarette was (83% \pm 21%). The remaining exhaled aerosol mass for cigarettes samples are attributed to particulates from combustion processes known to comprise more than 70% of mainstream conventional cigarette smoke [32,33]. The concentration of nicotine observed in exhaled cigarette smoke was approximately an order of magnitude higher than in the exhaled e-cigarette aerosols (\sim 0.40% $vs. \sim$ 0.05%, respectively). Furthermore, the great majority (\sim 85%) of real-world bystander exposures to nicotine and other smoke constituents in smoking environments is derived from the sidestream smoke emitted from the smoldering cigarette rather than from smokers' exhaled breaths [14]. Since e-cigarettes do not produce such sidestream emissions, the reductions in most potential bystander chemical exposures that accompany indoor e-cigarette usage as opposed to smoking may be anticipated to be even greater than the differences in exhaled nicotine concentrations of the very different aerosols. The public health impacts of environmental tobacco smoke have been overwhelmingly attributed to chemical constituents other than nicotine, so the simple presence of some nicotine in the exhalate of e-cigarette users does not suggest a basis for concern about bystander exposures.

3.2. Exhaled Phenolics and Carbonvls

The majority of phenolic and carbonyl measurements in exhaled e-cigarette aerosols were either not detectable, below the detection limits or below the quantitation limits. However, these analytes were consistently observed in exhaled cigarette smoke at quantifiable levels. Example data are shown in Table 3 for hydroquinone and acetaldehyde.

Table 3. Hydroquinone and acetaldehyde in exhaled aerosol (μg/session) for Marlboro Gold Box (MGB), blu Classic Tobacco Disposable (blu CTD) and blu Magnificent Menthol Disposable (blu MMD).

MGB			Blu CTD			Blu MMD			
Subject	Acetaldehyde	Hydroquinone	Subject	Acetaldehyde	Hydroquinone	Subject	Acetaldehyde	Hydroquinone	
	227.6	70.6	11	<loq< td=""><td><lod< td=""><td>21</td><td>16.7</td><td><lod< td=""></lod<></td></lod<></td></loq<>	<lod< td=""><td>21</td><td>16.7</td><td><lod< td=""></lod<></td></lod<>	21	16.7	<lod< td=""></lod<>	
1	186.0	60.0		<loq< td=""><td><lod< td=""><td></td><td>35.3</td><td><lod< td=""></lod<></td></lod<></td></loq<>	<lod< td=""><td></td><td>35.3</td><td><lod< td=""></lod<></td></lod<>		35.3	<lod< td=""></lod<>	
	221.0	69.1		<loq< td=""><td><lod< td=""><td></td><td>38.9</td><td><lod< td=""></lod<></td></lod<></td></loq<>	<lod< td=""><td></td><td>38.9</td><td><lod< td=""></lod<></td></lod<>		38.9	<lod< td=""></lod<>	
	134.7	41.3	12	<loq< td=""><td><lod< td=""><td>22</td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<></td></loq<>	<lod< td=""><td>22</td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<>	22	<loq< td=""><td><lod< td=""></lod<></td></loq<>	<lod< td=""></lod<>	
2	129.8	33.2		<loq< td=""><td><lod< td=""><td></td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<></td></loq<>	<lod< td=""><td></td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<>		<loq< td=""><td><lod< td=""></lod<></td></loq<>	<lod< td=""></lod<>	
	107.7	31.9		<loq< td=""><td><lod< td=""><td></td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<></td></loq<>	<lod< td=""><td></td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<>		<loq< td=""><td><lod< td=""></lod<></td></loq<>	<lod< td=""></lod<>	
	131.2	32.2	13	<loq< td=""><td><lod< td=""><td>23</td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<></td></loq<>	<lod< td=""><td>23</td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<>	23	<loq< td=""><td><lod< td=""></lod<></td></loq<>	<lod< td=""></lod<>	
3	169.0	47.4		86.4	<lod< td=""><td></td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<>		<loq< td=""><td><lod< td=""></lod<></td></loq<>	<lod< td=""></lod<>	
	128.1	52.5		44.2	<lod< td=""><td></td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<>		<loq< td=""><td><lod< td=""></lod<></td></loq<>	<lod< td=""></lod<>	
	115.6	48.5	14	<loq< td=""><td><lod< td=""><td>24</td><td>5.4</td><td><lod< td=""></lod<></td></lod<></td></loq<>	<lod< td=""><td>24</td><td>5.4</td><td><lod< td=""></lod<></td></lod<>	24	5.4	<lod< td=""></lod<>	
4	119.3	47.3		<loq< td=""><td><lod< td=""><td></td><td>7.2</td><td><lod< td=""></lod<></td></lod<></td></loq<>	<lod< td=""><td></td><td>7.2</td><td><lod< td=""></lod<></td></lod<>		7.2	<lod< td=""></lod<>	
	124.1	42.5		<loq< td=""><td><lod< td=""><td></td><td>9.9</td><td><lod< td=""></lod<></td></lod<></td></loq<>	<lod< td=""><td></td><td>9.9</td><td><lod< td=""></lod<></td></lod<>		9.9	<lod< td=""></lod<>	
	195.4	18.4	15	<loq< td=""><td><lod< td=""><td>25</td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<></td></loq<>	<lod< td=""><td>25</td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<>	25	<loq< td=""><td><lod< td=""></lod<></td></loq<>	<lod< td=""></lod<>	
5	122.0	13.3		<loq< td=""><td><lod< td=""><td></td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<></td></loq<>	<lod< td=""><td></td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<>		<loq< td=""><td><lod< td=""></lod<></td></loq<>	<lod< td=""></lod<>	
	196.3	20.0		<loq< td=""><td><lod< td=""><td></td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<></td></loq<>	<lod< td=""><td></td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<>		<loq< td=""><td><lod< td=""></lod<></td></loq<>	<lod< td=""></lod<>	
	208.0	99.5	16	<loq< td=""><td><lod< td=""><td>26</td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<></td></loq<>	<lod< td=""><td>26</td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<>	26	<loq< td=""><td><lod< td=""></lod<></td></loq<>	<lod< td=""></lod<>	
6	116.9	103.5		<loq< td=""><td><lod< td=""><td></td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<></td></loq<>	<lod< td=""><td></td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<>		<loq< td=""><td><lod< td=""></lod<></td></loq<>	<lod< td=""></lod<>	
	116.0	83.9		<loq< td=""><td><lod< td=""><td></td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<></td></loq<>	<lod< td=""><td></td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<>		<loq< td=""><td><lod< td=""></lod<></td></loq<>	<lod< td=""></lod<>	
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7	88.1	8.79		<loq< td=""><td><lod< td=""><td></td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<></td></loq<>	<lod< td=""><td></td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<>		<loq< td=""><td><lod< td=""></lod<></td></loq<>	<lod< td=""></lod<>	
	48.1	25.9		<loq< td=""><td><lod< td=""><td></td><td>6.2</td><td><lod< td=""></lod<></td></lod<></td></loq<>	<lod< td=""><td></td><td>6.2</td><td><lod< td=""></lod<></td></lod<>		6.2	<lod< td=""></lod<>	
	380.2	29.1	18	<lod< td=""><td><lod< td=""><td>28</td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<></td></lod<>	<lod< td=""><td>28</td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<>	28	<loq< td=""><td><lod< td=""></lod<></td></loq<>	<lod< td=""></lod<>	
8	193.7	37.7		24.2	<lod< td=""><td></td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<>		<loq< td=""><td><lod< td=""></lod<></td></loq<>	<lod< td=""></lod<>	
	189.7	30.9		<loq< td=""><td><lod< td=""><td></td><td>7.1</td><td><lod< td=""></lod<></td></lod<></td></loq<>	<lod< td=""><td></td><td>7.1</td><td><lod< td=""></lod<></td></lod<>		7.1	<lod< td=""></lod<>	
	285.2	73.0	19	<loq< td=""><td><lod< td=""><td>29</td><td>6.5</td><td><lod< td=""></lod<></td></lod<></td></loq<>	<lod< td=""><td>29</td><td>6.5</td><td><lod< td=""></lod<></td></lod<>	29	6.5	<lod< td=""></lod<>	
9	126.6	26.8		<loq< td=""><td><lod< td=""><td></td><td>8.9</td><td><lod< td=""></lod<></td></lod<></td></loq<>	<lod< td=""><td></td><td>8.9</td><td><lod< td=""></lod<></td></lod<>		8.9	<lod< td=""></lod<>	
	104.6	81.6		<loq< td=""><td><lod< td=""><td></td><td>7.6</td><td><lod< td=""></lod<></td></lod<></td></loq<>	<lod< td=""><td></td><td>7.6</td><td><lod< td=""></lod<></td></lod<>		7.6	<lod< td=""></lod<>	
	217.6	43.0	20	6.9	<lod< td=""><td>30</td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<>	30	<loq< td=""><td><lod< td=""></lod<></td></loq<>	<lod< td=""></lod<>	
10	162.7	46.2		<loq< td=""><td><lod< td=""><td></td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<></td></loq<>	<lod< td=""><td></td><td><loq< td=""><td><lod< td=""></lod<></td></loq<></td></lod<>		<loq< td=""><td><lod< td=""></lod<></td></loq<>	<lod< td=""></lod<>	
	114.1	64.0		<loq< td=""><td><loq< td=""><td></td><td>5.4</td><td><lod< td=""></lod<></td></loq<></td></loq<>	<loq< td=""><td></td><td>5.4</td><td><lod< td=""></lod<></td></loq<>		5.4	<lod< td=""></lod<>	
Avg *	156.7	46.8		<9.73 *	<0.421 *		<8.29 *	<0.367 *	
SD	68.8	24.7		16.5	0.3		8.2	0.0	
LOQ	41.6	2.00		5.20	2.00		5.20	2.00	
LOD	0.390	0.367		0.390	0.367		0.390	0.367	

Note: * LOD and LOQ values were averaged to provide upper limit estimates in exhalates from the two e-cigarette samples.

To simplify data reporting, total phenolic compounds and total carbonyl compounds in exhaled aerosols are presented for each product, along with exhaled breath blanks for comparison. Upper-limit estimates for exhaled aerosol compositions are accomplished by using the method limits for observations below the limits of detection and quantitation. In cases where individual measurements

were less than the limits of quantitation, the limit of quantitation values were used and in cases where the measurements were non-detects or less than the limits of detection, the limit of detection values were used to compare analytes in exhaled aerosol between products. ANOVA comparisons were performed to test for differences between exhaled aerosol samples, breath blanks and room air ($\alpha = 0.05$).

Total exhaled phenolics are shown in Figure 4 for exhaled aerosol and breaths collected following use of each product. The average number of exhaled puffs was 29 for three cigarettes and 98 for e-cigarettes during the phenolics collection sessions. Phenolics in exhaled breath blanks were all below limits of quantitation or limits of detection for the three products tested. The average total phenolics in exhaled e-cigarette aerosols were not statistically different than in exhaled breaths. In contrast, the average total phenolic compounds in exhaled smoke for cigarette subjects averaged 66 μg/session and ranged from 36 to 117 μg/session, significantly greater than in exhaled e-cigarette aerosol or exhaled breaths. The total phenolics for the ten MGB subjects is comparable, although higher, than data reported by Moldoveanu [23] for the phenolic compounds reported here, (12.3 μg/3 cigs, range 6–25 μg/3 cigs).

Figure 4. Total exhaled phenolics for exhaled aerosol and breaths for Marlboro Gold Box (MGB), blu Classic Tobacco Disposable (blu CTD) and blu Magnificent Menthol Disposable (blu MMD).

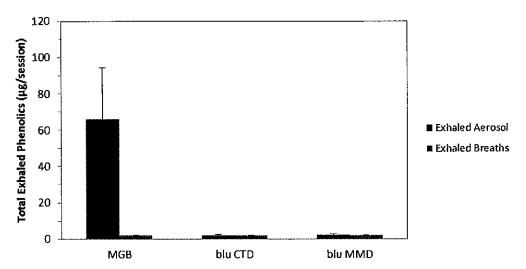


Figure 5 summarizes total carbonyl compounds exhaled from each product, exhaled breaths and room blanks. The average number of exhaled puffs was 27 for three cigarettes and 98 for e-cigarettes during the carbonyl collection sessions. Carbonyls in room air blanks and exhaled breath blanks were observed at the levels of quantitation due to the pervasive nature of carbonyls in indoor environments [20–23]. Room air blanks, exhaled breath blanks and exhalates from the two e-cigarettes were not statistically different. And as a result, total carbonyls in exhalates from the two e-cigarettes were not distinguishable from exhaled breaths or room air blanks. However, total carbonyls in exhaled smoke from cigarettes were significantly greater than the total carbonyls in exhaled e-cigarette aerosols, exhaled breaths and room blanks (average 242 μ g/session, range 136–352 μ g/session). The total carbonyls for the ten MGB subjects is comparable to historical data from Moldoveanu [24], for the carbonyls reported here, (average 183 μ g/3 cigs, range 122–309 μ g/3 cigs).

The absence of carbonyls and phenolics at quantifiable levels in exhaled e-cigarette aerosols is also demonstrated by comparing acetaldehyde and hydroquinone, as examples, for exhaled aerosol from products, breath blanks and room air as shown in Table 4. The sample aerosol values for the e-cigarettes are not statistically different than breath blanks, or room blanks.

Figure 5. Total carbonyls in exhaled aerosol, breaths and room blanks for Marlboro Gold Box (MGB), blu Classic Tobacco Disposable (blu CTD) and blu Magnificent Menthol Disposable (blu MMD).

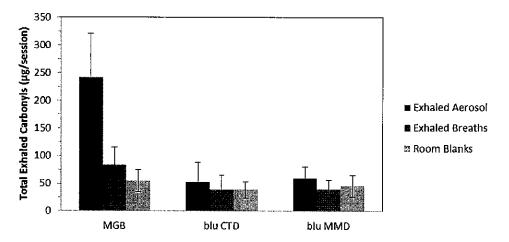


Table 4. Hydroquinone and acetaldehyde in exhaled aerosol, breaths and room air (µg/session) for blu Classic Tobacco Disposable (blu CTD) and blu Magnificent Menthol Disposable (blu MMD).

Analyta		Blu CTD			Blu MMD		
Analyte		Aerosol	Breaths	Air	Aerosol	Breaths	Air
Hydroquinone	Mean	<0.421 *	<0.367 *	ND	<0.367 *	<0.367 *	ND
	SD	0.3	0.0	ND	0.0	0.0	ND
Acetaldehyde	Mean	<9.73 *	<9.58 *	<3.60 *	<8.29 *	<5.20 *	<5.20 *
	SD	16.5	16.0	2.3	8.2	0.0	0.0

Note: * LOD and LOQ values were averaged to provide upper limit estimates in the aerosol, breath and air samples. ND—Room air blanks were not determined for phenolics.

Recent work by Robinson, *et al.* characterized the potential for second-hand e-cigarette exposure in indoor air from human subjects using validated air sampling methods (ASTM, EPA, NIOSH and OSHA) for 34 HPHC analytes [34]. Carbonyls and phenolics were no different than background levels in the room when the study subjects used e-cigarettes. Carbonyls were significantly greater than background when conventional cigarettes were smoked. Phenolics were no different than background for conventional cigarettes. Combustion byproducts were not observed above background for e-cigarettes but were present during conventional cigarette use.

The findings of this study establish the substantial reduction in the complexity and quantities of select chemical constituents in exhaled aerosols from e-cigarettes relative to exhaled smoke from conventional cigarettes. These constituents are expected in mainstream and exhaled conventional cigarette smoke as

demonstrated in this study and in extant literature since their formation is a result of combustion and pyrolysis processes. However, the thermal vaporization mode of operation common to e-cigarette designs does not provide a combustion formation pathway for those analytes. Whereas the present work has focused on the smaller, cigarette-like devices that have historically been market leaders in the U.S., the operation of these devices is fundamentally very similar to that of the larger, tank-style products that are increasingly favored by vapers in the U.S. and elsewhere around the world. The emerging technical literature in this area is consistent with an expectation that similarities in emitted and exhaled aerosols across the spectrum of innovative new e-cigarette designs will continue to demonstrate markedly reduced exposures to both users and bystanders relative to those that occur from conventional cigarette smoking.

4. Conclusions

This study was designed to measure phenolics and carbonyls in exhaled cigarette smoke, exhaled e-cigarette aerosols and exhaled breaths using a vacuum-assisted, pad collection system. This collection system was also used to determine a mass balance and distribution for water, glycerin and nicotine in exhaled e-cigarette aerosol. Distribution of exhaled e-cigarette aerosol showed the composition was greater than 99.9% water and glycerin, a small amount of nicotine (<0.06%) and gave a quantitative mass balance for these analytes in the exhaled aerosol mass, (101%-104%). Exhaled aerosol collections from e-cigarettes averaged over three times more exhaled puffs than from the conventional cigarettes. Total phenolics in exhaled e-cigarette aerosol were not significantly different than the amounts observed in exhaled breaths. Total phenolics in exhaled cigarette smoke were greater than in exhaled breaths and averaged 66 µg/session for the test subjects. Similar results were observed for carbonyl compounds in exhaled aerosols. Total carbonyls in exhaled e-cigarette aerosol were not significantly different than those in exhaled breaths and room air blanks. Carbonyls in exhaled cigarette smoke were greater than in exhaled breaths, room air blanks and exhaled e-cigarette aerosols, with an average total carbonyl content of 242 µg/session for the cigarette test subjects. Exhaled phenolics and carbonyls in cigarette smoke were comparable to historical data, although higher for the phenolics class in the present study than in prior work. The findings of this work suggest that exhaled e-cigarette aerosol does not increase bystander exposure for phenolics and carbonyls above the levels observed in exhaled breaths of air, in contrast to the quantifiable levels of these analytes in exhaled conventional cigarette smoke.

Acknowledgments

The author would like to thank the analytical testing laboratories at Lorillard Tobacco Company for methods development and testing, Eastcoast Research for support during the recruiting and data collection phases of the project and Phil Stern, Carl D'Ruiz; and Steven Brown, Dan Heck, Edward Robinson, and Robert Stevens for technical discussions.

Conflicts of Interest

The author is employed by Lorillard, a manufacturer of conventional cigarettes and the parent company of the manufacturer of the e-cigarette products used in this study.

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To Whom it may concern:

Enclosed are various testimonials from people about why vaping/e-ciggs should not be consider as a tobacco product or be in the same category as tobacco and how vaping has helped them and others change their lives.

To whom it may amon concern:

I'm not a long time smoker but I have smoked for a year in 2013. I started smoking necause it had helped me calm down due to stressful life and I know it wasn't the nest decision not it nelped. I have asthma and one of my friends turned me into vaping begining of 2014 and this month maries one year for me and I haven't truch a ciggarette since than then. I feel so much better. haven't had an asthma flare ups or going to the E.R. aue to an attack. I also work at an ENNER E- Cig establishment and nelped a lot of schoker a quit smoking and they always come back telling me how much vaping makes them feel better than smoking. I like to help people help themselves to be neathber and it makes me feel weeker than the knowing that I can put an impact on their daily lives. We have a very good vaping community hulping others to quit and put an impact on each other's lives and I think this is a better way to help others to quit.

Anna Vongphachanh anchovage, AK

2-18-15

Ever since I started vaping, my life has Only improved. I was a cigarethe smoker for seventeen years and now I'm not. Now that I vape I physically feel a lot better than I ever have as a smoker. Vaping and tobacco Smoke should never be categorised in the same class, as the two are completely different. Vaping is most definitely a healthier alternative to smoking. I love vaping. Anchorage Alaska has a beautiful) Community of vapers. There are positive events rapers throw that unite the community with a sense of brother hood and fellowship. Vape shops are popping up all over town which only helps the economy. Vapers are very custeous about where they vape and are radly considerate of others. Vaping has only changed my life for the better and is only something positive in our community.

Mark Cummase Anchorage AK 2/17/2015

To whom this may concern,

I'm writing this to show how vaping/e-cigs have Changed my life, for the better. I was a smoker for 10 years with no intentions to quit, until one day I noticed that I couldn't even make it up My own stairs without preathing hard. So I decided to head to I VAPE shop for a change in my life. I bought a lat, went home and in my life. I bought a lat, went home and did some research because I was still unsure, \$301 did some research because I was still unsure, \$301 reviewed the mechanical end and chemical end of reviewed the mechanical end and chemical end of the products and Industry. I am Convinced this the products and Industry. I am Convinced this has saved my life. I no longer nave any negative health conditions caused from smoking negative health conditions caused from smoking and this is 100% due to switching over to vaping.

Logan Cordell
2/18/15

To Whom it May Concern,

I'M lysa Shewer. I have buck vaping for about le months. WON! After 30 years of smoking tobacco; I can Inally Say... I Am SMoke-Fre In the post several months, I have noticed a significant difference in my health, energy, lungs and last... But not least... my finances. Vaping is a fraction of the price of Cyarettes.

I was very skepteal in the beginning, so I did extensive research of on Valapizer-E cigs and other electronic cigarettes as well as their product. I have not found ONE (1) conculsive result saying that vaping is as bad as tobacco or even concluding that it is unhealthy or harmful.

I was soon impressed with the E-Cig; that I have thread my mother Lafter 50 years) into a non-smoker.

5) is now vaping... Her and her Boctor has seen a difference after only 3 months. Vaping has probable extended her like!!!

My Story is very true, and one of many. I would testify that to "The World" or anybody that asked.

any questions or Concerns; Tysa Sherrer 907.884-5715 Sherrerville 5 @ yahoo. Com

> Shapk You Lypa

TO WHOM IT MAY CONCERN,

1S A GREAT ALTERNATIVE TO SMOKING, IT IS NOT SMOKING AND SHOULD NOT ISK TREATED AS SUCH. SINCE MAKING THE SWITCH I FEEL BETTER AND AM HEACTHICR. TREATING VAPING AS SMOKING 19 A MISTAKE.

THANK YOU.

WILK BIZSAK 2/17/15

To whom it may Concern.

I HAVE SMOKED FOR 40+ YEARS

IVE FRIED CHANTEX and Accupulture

Cold tarkey Nicotine Prothers nothing

WORKED, I WAPED 12/31/14 And

WORKED, I WAPED 12/31/14 And

HAVEN'T SMOKED SINCE THE SMELL

MAKES ME SICK OF CIGARETS, Thank

MOU FOR VARING

LORISHUSTER 2/17/15

Feb 17 6015 This is my testimonial for the Bill All My life my mother has chair moked Strs allians ubsted to out, she tried acrything and nothing worked so Started to do research and told her to protes a Vapor 1801 Al though the 265 Very Skaplice I'm jobs her lif De did it I would do It with her than was 8 months igo. Since then She has not picked up a Single cigarette sixc. her howth his been 100% Improved and Shes siving a ton or morey compared to cigarelites. It would not be pair to other cex-smore's to kisk the pick on taxes, night as Well go buck to Sysking cigrety Johnny L Roberts

.

Naping changed my life in the fact that I have been able to quit chewing and smoking. I am now down to 6 mg from 18 mg nicotene and instend to be @ 3 mg by summer. This has been avery life Changing experience boarse I can hike, swim and be active without I don't smell like digarettes or have any more high being windedblood pressure. This is Not smoking. Kenneth J. Conningham II PAIMER, ALASKA 2/17/15

Engen L Pervien Q Somo Vepor

To date I have been a Toller coaster smoker, busy days a hork had me smoking climst a pack of cigs a day. Working in food service it was an ordeal to teep the odors from our customers and the name Fomoked, the more unhealthy I felt the smoke as Well. 16 how days added to thee betigue. Vepe ing has added energy through not making my lungs feel heavy & conjested from ligarettes

2/16/14

antorge AK (150)

As an ex-smoker, vaporizing has returned me to good health. I have So many friends that have Dcessfully quit smoking cigarettes because the of vaporizers, despite multiple attempts at other alternatives. It is abhorrent to tax and regulate vaporizers the same as tobacco.

Seth Pomeroy 2-16-15 Andhorage, AK @ Samo Vapor I have smalled 38 years intill my husband turned me on to vapes it howent smalled a rig in over a month it can breath better work further, taste and small bretter it am slowly decreasing my Nic it hope to completely stop all nic and only vape for the taste

Hamara Hert Sumo vapers anchargge alaska 99501 all my life i have Been around cigs. Both my parents smoke, And I started smoking at a very younge age. I have tried to guit cigs many many times over, tried all kinds of ways and failed every time. So last year I decided to try vaping and Never turned Back, even being around other Reople smoking I don't even Have a social thought about starting again.

The home

Anchorage, AK 2/16/15 Vaping Should not be associated w/ ciggarettes for several reasons. First and foremost is the smell. White uppg does severate a scent the scents are pleasent cand fruity unlike the state to bacco stench that clings to cargarette smallers second the carcinogens present in cigs are drastically reduced in againsters. Finally, the massive maste that is cigarette buths is virtually moneristant with experizers. Finally, they these and many reasons besides, vaporizers should not be associated unthe cigarette small.

Jest Jaby

Un Clarke Anchorage Ah 2/16/2015 Naping shouldn't te banned because it's nox harmful the way cigarette smoke is.

Smoke can give geople diseases, hurt their lungs, and Stein Walls. Vapor won't do that so it's not hurting anything. Vaping is a delicious, healthy alternative that should be allowed everywhere.

Char)

Char Connolly Anchorge, Ak 2/16/15 To whom it may concern,

Smoking, the combustion of orthanict man male chemicalis, timm manuale chemicalis that sounds Bad. Statistically speaking more people Die From Smoking. Husen Any other Reason, and not Just Boom your Dead. But Rather a slow openfull Death. Vaping may Not get be withely know as to the effects. However Mensionally speaking I was a 2pack Aday Gry, the Day I Purchased a vape mod I stopped smoking. Like Tello cigenal Now to Date In Granthis Free of Smoking and I there never Felt so Good, things like, Breathing, tasting, energy. + mental Alenthess all of which lame sky lacketted. I Feel. Amazing, IF joure a Skeptic. Five it 30 Ptris + Recualiste, I promise, you won't smoke Again. Don't Be AFDAID YOU CAN DO: I.

San Ada

vaping how helped me quit and healthier in my life. I thred vary thing doe to it to got how any rester and healthier in my life. I thred vary thing doe me it doesn't have any rester tooked or small

Hillary Denonaur 2/16/15 Hollory Bronzoun Andrerge, AK HI, MY NAME IS TONY. FAGASAM, I VAPE AP I SEE NO PROMBLE WITH WAPING EVERY SINCE I STARTED VAPING + have NOT Touch A On CHAMBEITE AND STILL GOING ON FOR 9 MONTHS NOW. FEEL TREE TO CARL ME AT (907) -782-5557.

To whom it may concord :

Vaping has allowing my life by allowing me to virtually pliminate smoking from my daily routine and regain my youth and preserve my health. Japeing has boosted my confidence by helping me maintain my hydiene and keeping my smile beautitul.

Thank you sumo for Providing me with health, better hydiene and helping anonish my body.

02-10-15

Qio Sanches

1884the Andropago, Alaska

By whom it may concer,

Vaping changed my life by Keeping men cigarette free for two years. I smoked for over 10 years and the au proved of fund. Copyed tologo al feel bestler Vajons. Il don't smell like on out trans and Can go to work without the smell of smoke bothundry anyone cocasia Excercing is better for Je and I browne better breathing. I spend less mony or vaping compared to ingrarethes, my oking states compared have I smorted agrantles. Thank you sind for providing a wonderful atnosphere ad providing vapores Experies.

Sasha Pagsolingen
3755 Challerger Circle
Anchorage, AK 201517

Dan Delie Box 100484 Dch, AK 99510 2-16-2015

To whom it may concern;

As a former smoker of cigarents I 'am so glad e-cig's have been sold here in Anchorage. After 28 years I could not stop smoking. Itsing E-cigs has improved my health. I can taste the food I part I can walk around and not expensive a loss of breath. Starting out with My vapar at 18mg. I now after 4 yrs of use is at ang. I have never heard about canyong 'having problems health wise because of E-liquids. I have read peer-review reports about second hand vape. In summary the report found by this Bio-chemical lability there is no psecond hand vapor risk of people who do is not stops that there is no psecond hand vapor risk of people who do this to see E-cigs.

Thiost store's that sell these product's second nand vap is contained in side the store. The order of second hand vap is a non-evase of oder. Usa consumer of e-liquids I want test what lam purchasing before I pay for the product. As a loss of my personal rights to use these product's in public place. I feel this is imposing on my personal rights, because there is no known risks using these problems. So why are you trying to force me to evit?

me to quit?

Manus Rilles

Espinosa, krnest 501 B St. Apt A Anchorage, AK 99501 (907) 231-3320

To whom it may concern,

I am a former smoker and I started vaping six months ago. I found that vaping really helps people from smooking real tobacco. As a member of the Armed Forces, it is really hard for me not to smoke especially during deployments. I weed to smoke a pack a day and during my tour in Afghanistan, with all the affect I experienced, I end up amoking 2 to 3 packs everyday.

My buildy buddies are the same and after the four I came across with electronic aggarettes. After a little bit of recearched. I found and discovered vaping. Since then I haven't had a real edga agarettes since I started vaping. I introduced it real edga agarettes since I started vaping. I introduced it my battle buddies that I worked with and after a couple of mouths, everybody thank me because they all made it not or moths, everybody thank me because they all made it not eversince they knew about vaping.

I have Lived in Anchorage Alaska For 35 years and For 22 years I have smoked thing cigarettes, since I have moved to vaping I can actually Breath I can wake up atn the maning nowand can take a Deep breathe in the maning and can honestly say that it has changed my LiFe in many ways I can use it around my child and my parents without even so much as a single complaint and can now Breathe I have had no downside to vaping and have Went From 24 mg's to 2 mg's in Cess Than 6 month's and will probably never stop. I has-made such a improvement in my life I really can't put it into words. Any one who would wantito mess with anything that has to do with vaping should Wossy more about smoking. Smoking caused me to have some very bad problems with catching preumonia and one time was coughing up Blood! since I stasted vaping Im 100% Better and can Breathe The best I have sence the day I stapped smoking.

To whom it may concern of 16/15

Trevot Cornett Stagget Anchorage,

Ak.

WENDY NEAR Oxhorage, A/K wordy Naan 2/16/15

Because of vaping I have gotten

10 people to girt smoking eigenates. They all
agree how much betten they Feel, Eieren months

ago I started vaping started on 24 mb and now
today I am vaping OMb. It is now for enjoyment to

Jann Caspersen Anchorage AK 16 Feb 2015

Vaping is my safe alternative to smoking cigarettes. Without all the poisonous chemicals found in cigarettes, I can and have enjoyed vaping. My amount of nicotine has dropped to nearly zero with vaping, as opposed to smoking around 20 cigarettes a day (much more nicotine). I do not have a linguring nasty odor of smoking as the result of vaping. My co workers, family, friends do not have to be inconvienced by a smoker any longer. I vape. Jefasperser I have been vaping for a year.

I Coarm M. Brown a citizen of Anchorage, AK find no reason to inhibit the use of nicother vapors within the City, Any reasonable citizen using nicotine vapors is usually politic and countcous. If a bussiness or resident finds it is necessary to ban such products in their facility that is their right, I find it over bearing to decide for the entire city's residence. We have not choosen to ban these products or their use. Please do not assume you know what's best face everyone.

Gavin M. Brown Feb. 16 ZOBS

ancharage, AK

I WAS A Smoken for 25 yes And vaping has been the only curp for my smoking habits now I can breather Better And No more wasty smoke small Bean laping oven a year Now and smake free My Body Feels so mank Better Now. Having 5 CHildren It's Been the Best thing for me my health and my family. They how longer have to small the cigenather on me. Just a much healthing Alterative for a vise

Kevin Trespale

Feb 16; 208

Anchorage, AK

VAPING FOR ME HAS HELPED TENFOLD FOR QUITTING TOBACCO,

NOT ONLY IS IT A HEALTHEER ALTERNATIVE WITH NO CARCINOGENS,

IT IS THERAPEUTIC FOR THOSE WITH WITDRAWALS, I LOVE

VAPORIZING AS IT BRINGS TOBETHER A FRIENCY CULTURE & COMMUNIT,

NOT INTENDING TO HARM ANYONE LIKE TOBACCO COMPANIES,

- FRANCI NOCEDA FEB 16.2015 ANCHORAGE AK

Fran Moform

I feel Japing is better Than Cigaretts
Decause there is no actual Smoke going into
the lungs and I know what is in the varor juice
I have no idea how many chemicals are in
tabaco

Jason Schatz

Jason Schatz

Anchorage, AK

16 Feb 2015

)

Vaping is more eco-friendly and more comfortable for non-smokers to be around, ie. (the odor and toxicity level) in comparison to tobacco.

Marjo Ramos

anchorage, Alaska

Feb 16, 2015

I think vaping is a healthier alternative then significantly been vaping for almost 2 months and although 1 smoke, I don't smoke as much as I used to an vape around friends and family, without worky of Second hand Smoke Being harnoful to my loved ones. I also like the fact that Undudocorde vaping I doesn't make you stink like Cigarettes. In Comparison to smoking, vaping should not be categorized as the Sand thing ()

Sylvia Joseph 2/18/2015

I was a Smoker for 12 years. I tried it all to quit, and nothing worked. My Cousin also a long time Smoker quit due to an ecig. He purchesed one for me and I haven't smoked since. I'm coming up on two years of being smoketres. Within the first month of stopping, Inoticed a change in my Health. I had more energy, I wasn't coughing in the mornings, my breathin was better, my taste had increase, and also my phsical appearance improved. I felt more confident in Walking around not smelling of cigerattes. I started at a level 12 nic, now Im a 3 nic and headed towards & Nic. It even gotten my dad to stop smoking Who has been to 30 plus years. I'm thankful of greatful for that the most. His health has also improved. Grouping this with smoking would be a mistake. I've read various studies online, most of the negative studies are backed by tobacco companies. Other negative Studies show st vaping at extreme tempretures for long drage has it risk. Realistly any vaper can not vape in these condition or even achieve this with there device. There have been no known deaths due to vaping. It hasn't been around that long, but smoking can take its toll on a person in a short period of time. I've also have been to these vape conventions. There are doctors that back vaping. No doctor will say smoking eigerattes is safe in any way. A clip online shows the head of the FDA saying combustiable cigarattes (E-cig) are safur for public heath. Unlike second hand smoking the vapor released by a vapor has minimal to no effect on the none users.

Grouping taping with tobacco is unfair. Unfair to the businesses that care for there customers, unfair to the businesses that care for there customers, unfair to the businesses, and unfair to the consumer. If this is also taxed businesses, and unfair to the consumers would stop vaping and at a high rate I believe current users would stop vaping and resort to smoking again due to high prices. Not being able to smoking again due to high prices. Not being able to vape in the shops also pose a problem. Consumers able to vape in the shops also pose a problem. Consumers would not be able to try product before buying and would not be able to try product before buying and might deter them from even switching to a vaper. The laping industry & Anti-smoking group share the same ideals & goals. By regulating & taxing the State might distroy a great alternative to tobacco.

Alonzo Malasarte Slungo Hulkson 2/18/15

Chuck Kopp

om:

Robin Forsi

Jént:

Wednesday, January 28, 2015 5:40 PM

To:

Chuck Kopp

Subject:

FW: Smoking ban

----Original Message-----

From: jeffndol [mailto:jeffndol@yahoo.com] Sent: Tuesday, January 27, 2015 7:21 PM

To: Sen. Peter Micciche Subject: Smoking ban

Good evening Sir, I hope this find you well.

This is Dollynda Phelps, perhaps you remember speaking with me a few days ago in regards to SB30. Please let me commend you for standing up for the voters, it was very encouraging to see some common sense in the mix. I am feeling a little more secure with my state government leaders!

But I am writing to you this evening in regards to another concerning bill that infringes on our rights as citizens and I believe takes a solid, well meant idea and pushes it over the line. I am talking about the proposed smoking ban. I am not a smoker, but in my mind not even allowing a private, enclosed section at existing establishments is so uncalled for. I ye seen these private areas, ventilated to the outside, blocked off from indoor areas, and not accessible from the atside. I do appreciate the intent to protect everyone from second hand smoke, and I agree. But these smoking areas are just that-areas for smokers to go where they are NOT infringing on anyone else's breathing rights. What is the goal in not allowing these areas to exist any longer?? This brings up red flags for me, I see more and more rights taken away from the people and it is not just or fair.

I absolutely hate cigarette smoke. It breaks my heart to see a car full of children driving down the road with the windows up and the driver is puffing away. Yes, that should not be allowed!!!! There are clear victims in this case. But who is the victim if there is a designated, separate area, either outdoors or indoors with proper ventilation?? I cannot reasonably conceive that outdoor cigarette smoke diffused in the air is anywhere near as much of a pollutant as car exhaust. Therefore, under these grounds, all motor vehicles should be banned as well.

Please consider the obscene overreach this bill proposes. I am deeply hurt by all these new 'rules'.... Rules for this, rules, for that.... Oh you want to have a smoke? Oh there's a rule for that! Let's see some constructive rule making that is not so overbearing that they can be construed as infringement upon our Freedom. Please, I implore you to think about this. I'm not sure how many other citizens have expressed their concern about this, but they are out there and there are a lot of us! Perhaps they are too busy worrying about all the other Bills!!!!

I appreciate your time and would be happy to speak with you. Dolly nda Phelps 252-8026

Sent from: Lenovo B8000-F

)m: Sent: Jimmy <jameslarkinfox@gmail.com> Wednesday, February 18, 2015 9:26 AM

To:

Sen. Bert Stedman

Subject:

Senate Bill 1

Dear Senator Stedman,

Senate Bill 1 lays out the scientific facts that exposure of tobacco smoke is harmful and that one person's right to smoke what he wants ends where his neighbor's nose begins.

I applaud the logic in this bill. And I draw your attention to the fact that numerous scientific studies show that wood smoke has worse impacts than tobacco smoke. One study found that 10 pounds of wood burned in one hour emits roughly the same amount of carcinogens as burning 43,000 packs of cigarettes. Put another way, one hour of wood burning is equivalent to smoking a pack of cigarettes every day for about 6 years.

Students, teachers and residents in Alaska, particularly Fairbanks and North Pole, are subjected to large doses of coal and wood smoke without their consent. We ask that Senate Bill 1 recognize this fact and expand the language in the bill to include coal and wood smoke. Otherwise, the bill shows ignorance and at worse negligence of these facts.

We appreciate your concern for the health impacts of smoke and would also draw your attention to the onetary needs of the Fairbanks North Star Borough to monitor and mitigate the harmful impacts coal and smoke is having on innocent children. See this recent news article as an example.

Regards,

"When vital issues were treated with depth and insight, people began 'thinking for themselves, and a thinking people, if honest, will seldom go wrong in the end." Doris Kearns Goodwin in The Bully Pulpit

)m:

Jeremy Jenkins < JenkinsLJeremy81@hotmail.com>

Tuesday, February 17, 2015 6:16 PM

To:

Sen. Kevin Meyer; Sen. Mia Costello; Sen. Gary Stevens; Sen. Click Bishop; Sen. Bert

Stedman; Sen. Cathy Giessel; Sen. Pete Kelly; Sen. Bill Stoltze; Sen. Johnny Ellis

letter regarding SB-1

Subject:

2000 200 02350

To whom it may concern,

My name is Jeremy Jenkins and I'm a reformed smoker who now uses electronic cigarettes and I also own an electronic cigarette store in Eagle River, AK.

I'm in opposition to SB-1 for several reasons.

I feel including the use of electronic cigarettes with the use of smoking and banning it as such is a miss representation. Vaping as it's often referred to is not smoking and does not produce the same carcinogens that smoke from a conventional cigarette does. It doesn't carry the offensive smell and odor and is nearly completely undetectable by smell and if any is detected it is generally considered rather pleasant.

hoking bans are ostensibly enacted to protect the public from the harm of secondhand smoke, but e-cigarettes have not been found to pose a risk to bystanders. In fact, all evidence to date shows that low health risks associated with e-cigarettes are comparable to other smokeless nicotine products.

The low risks of e-cigarettes is supported by research done by Dr. Siegel of Boston University, Dr. Eissenberg of Virginia Commonwealth, Dr. Maciei L Goniewicz of the Roswell Park Cancer Institute, Dr. Laugesen of Health New Zealand, Dr. Igor Burstyn of Drexel University, and by the fact the FDA testing, in spite of its press statement, failed to find harmful levels of Carcinogens or toxic levels of any chemical in the vapor.

Business owners and managers should have the control if they want to allow use of E-cigarettes in their place of business. Banning the use of e-cigarettes in all public places similar to smoking will make it hard for the many small businesses in our state to stay in business. This will have a negative effect on the local communities as these businesses provide employment to locals that could effectively be out of work and worst case scenario close businesses that occupy retail locations that would otherwise sit empty.

People who use electronic cigarettes as a whole are generally rather respectful to others despite the low risks and honor the wishes of people who ask for them not to vape around them.

With the myriad of other issues within this state the money spent banning E-cigarettes and including them under the same rule as smoking is a waste and could be spent better in other places.

Sincerely

Jeremy Jenkins

)m:

Elizabeth Gasses < mommy 72011@outlook.com >

sént:

Wednesday, February 18, 2015 12:32 PM

To:

Sen. Bert Stedman

Subject:

Senate Bill 1

Dear Senate,

I am writing you because I oppose Senate Bill 1 because e cigarettes are included in the bans. I agree that second hand smoke is a problem and that vaping and electronic cigarettes are a solution. When I was about 14/15 I made the poor choice to smoke cigarettes and had shortness of breath and was sick often but I was introduced to vaping and it has made my life so much better. I can breath a lot easier. If you look up the ingredients of what all is in the vapor juices you will see that there is nothing really harmful in there. If the bill was changed to not include ecigarettes and vapors then I would fully support it but until then, I cannot support anything that will inhibit a product that is affective as the removal of second hand cigarette smoke. Thank you for your time and I know if you would research or visit a vapor shop you would see the change.

Sincerely,

Elizabeth Gasses Fairbanks, AK

Sent from my iPhone

Hello thank you for having me here today,

my name is benjamin nguyen, i am the co owner of cloud 49 located in eagle river alaska

im here to express my concern in pregards to the senate bill 1 and its definition.

the author and sponsor of this bill. Senator Peter Micciche has personal electronic vaporizers also known to the public as electronic cigarette.

Senator Micciche, in your sponsor statement you stated and i quote "the reason is simply to protect the rights of non-smokers, save lives and reduce the staggering health cost of second hand exposure to tobacco end quote

in another article it also has your statement stated " my father made his personal choices" said Micciche "but my siblings and i didn't.

Im the lucky of the three. They all had respiratory issues from from living through second-hand effects" end quote

Senator Micciche, I now FULLY understand how passionate you and your team are. Placing yourselves as the voice of the weak and unable, and the young that doesnt know any better. To prevent the same thing from happening as DID to your sibling.

200% steadfast in this matter.

But Senator because your this personal vendetta, and passion, it has clouded your judgement.

You see, me and you and fellow shop owners are actually working together, side by side to reach similar GOALS, and that is a healthier lifestyle.

You choose to fight the fight of bystanders and innocents. While we choose to fight the fight at its source. The frontline, converting tradition smokers everyday to a safer alternative.

With that being said Senator I urge you and your team to reconsider and rewrite Senate Bill 1. That it would exclude electronic cigarette and its establishment from the definition.

In closing

I ask you to reach out to us, learn about us as its community and as its industries.

Thank you for your time

)m: -ent: Cameron Washburn < cwakm8@gmail.com>

Tuesday, February 10, 2015 12:50 PM

To:

Sen. Bert Stedman

Subject: E-cigarette Meeting

Dear Senator,

I am on vacation and just received an email from casaa regarding and upcoming meeting on feb 11 regarding ecigs/vaporizers. I will be unable to attend the meeting as I'm not due back until the 17th. I am writing you to ask that you promote the use of electronic cigarettes, and keeping them at a reasonable price.

I was a smoker for 10+ years, starting around 16. I had to tried to quit a handful of times over the years. Chantix, cold turkey, reducing the strengthen the cigarettes, and the original e-cigs. Over the years the technology and quality of the vaporizers has improved drastically. So I gave it another try and was able to succeed in finally kicking the habit. I appreciate it, my kids appriciate it, my girlfriend appreciates it. I do not believe that I could have done it otherwise. As much as I hate to admit that kind of weakness. But I am 100% cigarette free now.

It is my hope that others will be able to achieve the goal of not smoking. And anything that we can do to make that easier for them I believe we need to do. Imposing higher costs on the products trying to discourage their use only discourages smokers from trying a potential product that could help them quit. Outlawing their use completely minates the option for smokers. We should be promoting these products. Not making it the black sheep.

I have researched the use of e-cigs and formed what is obviously my own personal opinion but I wanted to share. They are made of compounds that have been used for a long time, and are FDA approved. What is not FDA approved is what happens when you combine the ingredients. Not because it shouldn't be, because it hasn't been done yet. Whether or not the big tobacco companies have a hand in the delay of this approval I don't know. But it is my belief that for every smoker they lose, their profit margins go down. \$2,400 a year in my case.

It may be safer to breath air, but from someone who wants to quit smoking cigarettes, I would far prefer using something made with 4 FDA approved ingredients than something with 4.000 to 7,000 ingredients proven to cause cancer, illness and death. It the obvious safer alternative.

Thank you very much for you time. I look forward to hearing the outcome of the meeting tomorrow.

Cameron Washburn

n:

To:

Cameron Washburn < Cwakm8@gmail.com> Tuesday, February 10, 2015 1:05 PM

Sen. Bert Stedman

Subject:

Please Oppose SB 1 and HB 40 and any other effort to treat e-cigarettes like smoking.

Cameron Washburn 118 Glacier Ave Fairbanks, AK 99701

February 10, 2015

Dear Bert Stedman,

I am writing to express my deep concern and opposition regarding HB 40 and SB 1 which would include the use of smoke-free vapor products (e-cigarettes) in Alaska's smoking law.

Smoking laws are ostensibly enacted to protect the public from the harm of secondhand smoke, but smoke-free ecigarettes have not been shown to cause harm to bystanders. In fact, all evidence to date shows that the low health risks associated with e-cigarettes are comparable to other smokeless nicotine products. A comprehensive review conducted by Dr. Igor Burstyn of Drexel University School of Public Health (and published in a peer-reviewed journal earlier this year - http://www.biomedcentral.com/1471-2458/14/18/abstract) examined over 9,000 observations of e-cigarette id and vapor and found "no apparent concern" for bystanders exposed to e-cigarette vapor, even under "worst case" and important exposure.

Lawmakers must beware of unintended consequences from well-intentioned laws. There is clear evidence of a phenomenon called "accidental quitting," wherein many of the smokers who initially choose e-cigarettes to use just where smoking is prohibited go on to quit smoking conventional cigarettes completely. Prohibiting the use of e-cigarettes in public spaces completely eliminates that incentive to even try e-cigarettes. Unfortunately, the health risks of every one smoker who doesn't quit because e-cigarette use is prohibited (and the risks to the children and others who live with them) cummulatively outweigh any good done by eliminating the miniscule exposures to even hundreds of bystanders in public spaces.

Clearly, the benefits of allowing smokers to use e-cigarettes in public--and thereby increasing the likelihood of "accidental quitting" and reducing the known, extremely high health risks of smoking--outweigh the very low risks of insignificant exposures to bystanders. So, not only is there no genuine public health reason to prohibit e-cigarette use in public spaces, but, in fact, allowing e-cigarettes to be used in public spaces will actually improve public health by inspiring other smokers to switch and reduce their health risks by an estimated 99%. Moreover, private businesses in Alaska are already setting their own policies, and they should retain the right to allow or disallow usage since there is no proven health threat to bystanders.

While I understand some have expressed a fear about these products acting as a "gateway" to traditional cigarettes for youth, there is no evidence to suggest this is really happening, and research actually shows it is unlikely to happen to any substantial extent. Teen smoking rates are at their lowest point since smoking became popular and continue to drop, but there are adults who will continue to smoke until they die unless we provide attractive alternatives.

In regards to Senate Bill 1: I am Danny Ruerup and I am opposed to SB 1. This Bill is phrased as a direct attack to local small business. There needs to be some rewording to this bill to stand up for community members that run small business that this will in effect shutdown their livelihood. There is no one that will argue that smoking and tobacco products are not healthy and kill millions a year. There is no proof the e-juice and vaping products do any such thing. There is a great deal of research that needs to be done yet that will provide any type of conclusion to this question. Please do not include e cigarettes in this bill. The state obviously does not have the funding to police this situation anyways. I appreciate your time to allow me to voice my opinion.

Danny Ruerup

Thank you for taking time to hear my concerns with Senate bill 1 (SB1).

My name is Eric Vargason from North Pole, AK. I am no longer a smoker. I have tried numerous attempts to quit tobacco including gum, patches, therapy, counseling, thumb stones, assorted medication, including Chantix; many were recommended by the Alaska Quitline, none have worked for me and not for lack of trying. If you are questioning my motivation to quit, I was told if I didn't quit smoking I would die, that is plenty of motivation. Some of the recommendations even made my health conditions worse. After many failed attempts of using more mainstream ways of quitting tobacco, I found vaping. I haven't smoked since, and that was seven months ago. The last two years of using tobacco were my worst. I had diminished quality of life, loss of hope, and I would hang my head in shame while buying a pack of cigarettes. The past seven months I've noticed positive changes in my health and life. Now my breathing isn't labored, I feel energized, and I'm losing weight because I'm more active. I also have a great support network in the Alaskan vaping community. They help me stay tobacco free, for the first time in 23 years. That is over two decades that I have been dependent on tobacco products.

I have been six months without a lung infection, which were normal occurrences. I was often sick at work, due to my tobacco use. Since I have quite tobacco, I have been in good health and my productivity has gone up dramatically.

My family's health has improved as well, even though I never smoked inside, or around my daughter, this is the first winter that she has not required her inhaler. We had thought that it might be allergies, pollen, or other factors, but after a week of quitting tobacco she has been fine. My kids are proud to see that I have quit using tobacco products, my health has improved, as have theirs. I don't have any more regular check ups scheduled, and I will be around to enjoy more of their lives. Restricting alternatives to tobacco diminishes people's chances of quitting tobacco through alternative means. A medical research team from the University of London published in the British Journal of General Practice states "Given that smokers smoke for the nicotine but die primarily from the tar, one might imagine that ecigarettes would be welcomed as a means to prevent much death and suffering caused by cigarettes." in conclusion I am proof that this works.

andn-

I would like to thank you for allowing me to share my concerns with Senate Bill 1 (SB1).

My name is Jennifer Vargason of North Pole, Alaska. Vaping has saved my family from the ball and chain of tobacco use And I am thankful for that! I am healthier, my husband is healthier, and my family is healthier. Why this bill would consider vaping the same thing as smoking or a tobacco product is beyond me. Vapor products do not contain tobacco and there is no combustion! Current research has shown that vaping does not have the harmful effect of smoking and there are no concerns for bystanders. The ingredients in the liquid are in every day foods that we consume. Yes, there can be nicotine in the liquid but there have been studies that show that nicotine is not harmful. The article "Is everything we know about nicotine wrong?" Dr. Neff even states instances where nicotine has been know to help certain conditions such as Alzheimer's disease, depression, Parkinsons disease, and more. It has been found that in those demographics tobacco use is higher. Alternatives to tobacco could help these demographics.

I have been a tobacco user since I was 9 years old. Since then I have gone from Iqmik (natural tobacco mixed with punk ash), Copenhagen, to cigarettes and have never been able to quit. I will be honest and tell you that when I first came upon vaping, I rolled my eyes and thought that it was just another fad that does not work. I was disgusted that my husband would vape, I was hesitant to even try it until I had witnessed my husband go without a cigarette for over a month. I was amazed, as I had seen him try several different methods of quitting, none of which were successful. I did a little research, after seeing the results in person, and I decided to give it a try. When I started vaping, I vaped while I was off work, but I still used Iqmik during normal work hours. Since December of 2014, I have been without

tobacco completely. Nearly 28 years of tobacco use and I haven't yet picked up a cigarette or any form other of tobacco since! Please reconsider Senate Bill 1. Thank you again for taking your time to read my testimony.

Jan Dagaon

)m:

Will Manuel <wmmanuel@hotmail.com>

sent: To: Wednesday, February 11, 2015 8:12 PM

Culcia at

Sen. Bert Stedman

Subject:

SB 1

Follow Up Flag: Flag Status:

Follow up Flagged

Senator Stedman,

I hope this day finds you and your family well.

I am writing you this evening in regards to SB 1. My words will be few, and not as refined as I usually try to be.

Although I prefer to walk into a business that has chosen to be smoke free, and I think even many smokers enjoy to spend time in smoke free environments, I am against a State Law dictating that a private business not allow smoking. Most business are already smoke free, especially the ones that children are brought into. Yes, I do believe people have the right to breathe clean air, but they also have the right to make a choice and they have to accept the personal responsibility to not subject themselves or possibly their children to an environment that caters to smokers. This is true just as the owners of private businesses have the right to decide whether or not they allow smoking within their facilities.

Iso understand that current and prospective employees have the right to breathe clean air, but they also have the choice and personal responsibility to not work in an establishment that allows smoking. What's more, in today's society most business owners have come to realize that they are severely limiting themselves of potential employees and patrons if they allow smoking within the confines of their establishment, this without written law.

I applaud and commend businesses who go smoke free on their own accord, but I can never support any Governmental Entity who uses force via legislation and consequence.

Thank you for your time and consideration.

God bless,

William M. Manuel, MICP, NR-P 1513 Pine Ave Kenai, AK 99611

ွ)m: sent: David Paulsen <dpaulsen@gci.net> Thursday, February 12, 2015 12:48 AM

To:

Sen. Bert Stedman

Subject:

Please Oppose SB 1 and HB 40 and any other effort to treat e-cigarettes like smoking.

David Paulsen 4501 Reka #1 Anchorage, AK 99508

February 12, 2015

Dear Bert Stedman,

I am writing to express my deep concern and opposition regarding HB 40 and SB 1 which would include the use of smoke-free vapor products (e-cigarettes) in Alaska's smoking law.

Smoking laws are ostensibly enacted to protect the public from the harm of secondhand smoke, but smoke-free ecigarettes have not been shown to cause harm to bystanders. In fact, all evidence to date shows that the low health risks associated with e-cigarettes are comparable to other smokeless nicotine products. A comprehensive review conducted by Dr. Igor Burstyn of Drexel University School of Public Health (and published in a peer-reviewed journal earlier this year - http://www.biomedcentral.com/1471-2458/14/18/abstract) examined over 9,000 observations of e-cigarette uid and vapor and found "no apparent concern" for bystanders exposed to e-cigarette vapor, even under "worst case" assumptions about exposure.

Lawmakers must beware of unintended consequences from well-intentioned laws. There is clear evidence of a phenomenon called "accidental quitting," wherein many of the smokers who initially choose e-cigarettes to use just where smoking is prohibited go on to quit smoking conventional cigarettes completely. Prohibiting the use of e-cigarettes in public spaces completely eliminates that incentive to even try e-cigarettes. Unfortunately, the health risks of every one smoker who doesn't quit because e-cigarette use is prohibited (and the risks to the children and others who live with them) cummulatively outweigh any good done by eliminating the miniscule exposures to even hundreds of bystanders in public spaces.

Clearly, the benefits of allowing smokers to use e-cigarettes in public--and thereby increasing the likelihood of "accidental quitting" and reducing the known, extremely high health risks of smoking--outweigh the very low risks of insignificant exposures to bystanders. So, not only is there no genuine public health reason to prohibit e-cigarette use in public spaces, but, in fact, allowing e-cigarettes to be used in public spaces will actually improve public health by inspiring other smokers to switch and reduce their health risks by an estimated 99%. Moreover, private businesses in Alaska are already setting their own policies, and they should retain the right to allow or disallow usage since there is no proven health threat to bystanders.

While I understand some have expressed a fear about these products acting as a "gateway" to traditional cigarettes for youth, there is no evidence to suggest this is really happening, and research actually shows it is unlikely to happen to any substantial extent. Teen smoking rates are at their lowest point since smoking became popular and continue to drop, but there are adults who will continue to smoke until they die unless we provide attractive alternatives.

I urge you to oppose these bills and any legislation that would limit where smoke-free products like e-cigarettes can be used. It is imperative that existing adult smokers become aware of all the alternatives currently available and that access to these products remains unimpeded.

Smoke-free Alternatives Association), thank you for considering my comments and hope you will oppose misguided attempts to limit adult use of smoke-free e-cigarettes.

Sincerely, David Paulsen

m: عent: Cameron Washburn <cwakm8@gmail.com>

To: Subject: Tuesday, February 10, 2015 12:50 PM

Sen. Bert Stedman E-cigarette Meeting

Dear Senator,

I am on vacation and just received an email from casaa regarding and upcoming meeting on feb 11 regarding e-cigs/vaporizers. I will be unable to attend the meeting as I'm not due back until the 17th. I am writing you to ask that you promote the use of electronic cigarettes, and keeping them at a reasonable price.

I was a smoker for 10+ years, starting around 16. I had to tried to quit a handful of times over the years. Chantix, cold turkey, reducing the strengthen the cigarettes, and the original e-cigs. Over the years the technology and quality of the vaporizers has improved drastically. So I gave it another try and was able to succeed in finally kicking the habit. I appreciate it, my kids appriciate it, my girlfriend appreciates it. I do not believe that I could have done it otherwise. As much as I hate to admit that kind of weakness. But I am 100% cigarette free now.

It is my hope that others will be able to achieve the goal of not smoking. And anything that we can do to make that easier for them I believe we need to do. Imposing higher costs on the products trying to discourage their use only discourages smokers from trying a potential product that could help them quit. Outlawing their use completely minates the option for smokers. We should be promoting these products. Not making it the black sheep.

I have researched the the use of e-cigs and formed what is obviously my own personal opinion but I wanted to share. They are made of compounds that have been used for a long time, and are FDA approved. What is not FDA approved is what happens when you combine the ingredients. Not because it shouldn't be, because it hasn't been done yet. Whether or not the big tobacco companies have a hand in the delay of this approval I don't know. But it is my belief that for every smoker they lose, their profit margins go down. \$2,400 a year in my case.

It may be safer to breath air, but from someone who wants to quit smoking cigarettes, I would far prefer using something made with 4 FDA approved ingredients than something with 4.000 to 7,000 ingredients proven to cause cancer, illness and death. It the obvious safer alternative.

Thank you very much for you time. I look forward to hearing the outcome of the meeting tomorrow.

Cameron Washburn

om:

Alex McDonald <alex@icefogvapor.com>

ာént:

Monday, February 09, 2015 9:37 PM

To:

Sen. Bert Stedman

Subject:

SB1

Attachments:

CSA_ItaEng.pdf; ATT00001.htm

Senator Stedman,

My name is Alex McDonald, owner of Ice Fog Vapor, Inc. Fairbanks, AK. I wanted to contact you regarding my concerns with proposed Senate Bill 1 (SB1).

First, I am concerned that SB1 would take away local option for communities throughout the state to deal with issues that may or may not affect their individual community. Many other substances such as alcohol and marijuana are or will be local option for places to set up their own regulations regarding their use. This is currently the case with tobacco and several cities have already chosen to set their own rules regarding tobacco use. Juneau is smoke free, it is also not -30 in Juneau today either making it easier to step out side to an area designated for tobacco use. In Fairbanks it is currently up to local businesses to set their own policies if they would like to be smoke free. This gives both consumers and employees the choice to work at or patronize places of their choo sing. I know several places that have gone smoke free, yet built heated smoking rooms for people that wish to use tobacco. Many of these smoking rooms are closer to the entrance of the establishment than is required by SB1, and there is not a grandfather clause that would leave smoking rooms as a viable solution. This would punish places that have spent money trying to be proactive in implementing policies garding tobacco use.

Another concern I have with SB1 is enforcement. I know the budget is tight and I have been reading about cuts across the board. It does not appear feasible to create more laws that would require enforcement and more people working for the state when the state is trying to save money. The bill states an employee designated by the commissioner may enforce the provisions; and also states that the citation may be issued regardless of whether the violation was committed in the designated employees presence. This sounds like it would open the door for people being issued citations for non compliance without anyone actually seeing any violation.

My final and major concern with SB1 is that it is detrimental in helping people get off tobacco products. I am all for getting people off of tobacco products. I used a variety of tobacco products for 19 years and tried everything from traditional nicotine replacement therapies to prescription pharmaceuticals to quit using tobacco, none worked. I found an alternative to tobacco that has worked for me to quit all tobacco products; and if vapor products are included in this bill it would greatly inhibit that option for people trying to quite tobacco products. I have switched to using a vaporizer and have been tobacco free for well over a year now. Vaporizers do not contain any tobacco, or combustion by products. In the study "Characterization of chemicals released by electronic cigarette use: Is passive vaping a reality?", attached, it was concluded "by saying that could be more unhealthy to breath air in big cities compared to staying in a room with someone who is vaping." The Drexel University study, link attached, found "no apparent concern" for bystanders of people using electronic cigarettes even under "worse case" assumptions about exposure. A study of tobacco use among adults in Minnesota found a 10% decrease in use among adults from 2010-2014. Of those that attempted to quit in the last 12 months over 40% tried vaporizers in their attempt to quit tobacco use. This is double the rates for traditional cotine Replacement Therapies, such as the patch or gum, and quadruple the rates of use of pharmaceutical products, such as Chantix. Vaporizers were the number one choice people in Minnesota turned to in their attempt to quit tobacco use, which is now at an all-time low among adults. SB1 would unfairly treat this

tobacco alternative as tobacco, while not including less popular choices like the patch or gum. If this is a bill against tobacco use and discouraging people from using tobacco, leave it at tobacco. If this bill is to help improve public health, vaporizers should not be included in a smoking ban, especially when there are numerous udies stating there is no concern of harm from second hand vapor exposure. If you would like further studies and research articles, please feel free to contact me either by email, or by phone, work (907) 328-1077, or cell (907) 978-8098. Thank you for your time and consideration in this matter.

Sincerely,

Alex McDonald Owner, Ice Fog Vapor, Inc Fairbanks, AK

http://clearstream.flavourart.it/site/wp-content/uploads/2012/09/CSA ItaEng.pdf

http://www.biomedcentral.com/1471-2458/14/18

)m:

Sandra Cornelius <oscfbks@yahoo.com> Monday, February 09, 2015 2:29 PM

To:

Sen. Bert Stedman

Subject:

Please Oppose SB 1 and HB 40 and any other effort to treat e-cigarettes like smoking.

Sandra Cornelius 1347 Spring Glade Rd Fairbanks, AK 99709

February 9, 2015

Dear Bert Stedman,

I am writing to express my deep concern and opposition regarding HB 40 and SB 1 which would include the use of smoke-free vapor products (e-cigarettes) in Alaska's smoking law.

Smoking laws are ostensibly enacted to protect the public from the harm of secondhand smoke, but smoke-free ecigarettes have not been shown to cause harm to bystanders. In fact, all evidence to date shows that the low health risks associated with e-cigarettes are comparable to other smokeless nicotine products. A comprehensive review conducted by Dr. Igor Burstyn of Drexel University School of Public Health (and published in a peer-reviewed journal earlier this year - http://www.biomedcentral.com/1471-2458/14/18/abstract) examined over 9,000 observations of e-cigarette uid and vapor and found "no apparent concern" for bystanders exposed to e-cigarette vapor, even under "worst case" assumptions about exposure.

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While I understand some have expressed a fear about these products acting as a "gateway" to traditional cigarettes for youth, there is no evidence to suggest this is really happening, and research actually shows it is unlikely to happen to any substantial extent. Teen smoking rates are at their lowest point since smoking became popular and continue to drop, but there are adults who will continue to smoke until they die unless we provide attractive alternatives.

pm:

Ryan McKeown <irreverend23@gmail.com>

sént:

Monday, February 09, 2015 2:54 PM

To:

Sen. Bert Stedman

Subject:

Please Oppose SB 1 and HB 40 and any other effort to treat e-cigarettes like smoking.

Ryan McKeown 240 E Susitna Ave Wasilla, AK 99654

February 9, 2015

Dear Bert Stedman,

I am writing to express my deep concern and opposition regarding HB 40 and SB 1 which would include the use of smoke-free vapor products (e-cigarettes) in Alaska's smoking law.

Smoking laws are ostensibly enacted to protect the public from the harm of secondhand smoke, but smoke-free ecigarettes have not been shown to cause harm to bystanders. In fact, all evidence to date shows that the low health risks associated with e-cigarettes are comparable to other smokeless nicotine products. A comprehensive review conducted by Dr. Igor Burstyn of Drexel University School of Public Health (and published in a peer-reviewed journal earlier this year - http://www.biomedcentral.com/1471-2458/14/18/abstract) examined over 9,000 observations of e-cigarette uid and vapor and found "no apparent concern" for bystanders exposed to e-cigarette vapor, even under "worst case" assumptions about exposure.

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)m:

steve mapes <akgofast@gmail.com>

To:

Sunday, February 08, 2015 6:44 PM

10:

Sen. Bert Stedman; Sen. Cathy Giessel; Sen. Pete Kelly; Sen. Bill Stoltze; Sen. Johnny Ellis

Subject:

SB1

Hello.

I am sending you this email to express my concerns about this senate bill, SB1..

I was able to get off tobacco after 40 years of being a daily smoker using personal vaporizers and e-liquids that contained nicotine. I did a lot of research into the products being offered and I believe that I made the correct choices

If the option to vape an extremely less harmful product than tobacco is made more difficult than it already is people might not get the chance to get off tobacco.

This product has been studied quite a bit and very little harmful or dangerous traces have been found in it..

Certainly it is much much better then smoking..

My breathing and stamina has improved dramatically..

This nicotine delivery method saves me money..

Please give others the choice, and the chance to make their own decisions about their health..

The vape shops I buy from do not sell to youngsters and I see them carding young adults to make sure that they are of legal age to purchase nicotine products..

Please do the research yourself.. Do not listen to the propaganda that seems to be getting more newspaper headlines than the research by qualified, third party researchers and scientists.. Alaskans heath is nothing to make uninformed decisions about..

hank you for taking the time to consider a voters opinion.

Steven Mapes

47870 Interlake drive

Kenai Alaska 99611

}m:

Steven Mapes <akgofast@gmail.com> Sunday, February 08, 2015 6:47 PM

To:

Sen. Bert Stedman

Subject:

Please Oppose SB 1 and HB 40 and any other effort to treat e-cigarettes like smoking.

Steven Mapes 47870 Interlake Drive Kenai, AK 99611

February 8, 2015

Dear Bert Stedman,

I am writing to express my deep concern and opposition regarding HB 40 and SB 1 which would include the use of smoke-free vapor products (e-cigarettes) in Alaska's smoking law.

Smoking laws are ostensibly enacted to protect the public from the harm of secondhand smoke, but smoke-free ecigarettes have not been shown to cause harm to bystanders. In fact, all evidence to date shows that the low health risks associated with e-cigarettes are comparable to other smokeless nicotine products. A comprehensive review conducted by Dr. Igor Burstyn of Drexel University School of Public Health (and published in a peer-reviewed journal earlier this year - http://www.biomedcentral.com/1471-2458/14/18/abstract) examined over 9,000 observations of e-cigarette uid and vapor and found "no apparent concern" for bystanders exposed to e-cigarette vapor, even under "worst case" assumptions about exposure.

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I ùrge you to oppose these bills and any legislation that would limit where smoke-free products like e-cigarettes can be used. It is imperative that existing adult smokers become aware of all the alternatives currently available and that access to these products remains unimpeded.

wook forward to your response on this issue. I, along with my fellow members of CASAA (Consumer Advocates for Smoke-free Alternatives Association), thank you for considering my comments and hope you will oppose misguided attempts to limit adult use of smoke-free e-cigarettes.

Sincerely, Steven Mapes

)m:

Guiness64 . <jmfinney64@gmail.com> Friday, February 06, 2015 12:20 PM

To: Subject: Sen. Bert Stedman Regarding SB1

Senator Stedman,

I am writing you to voice my concerns with SB1, REGULATION OF SMOKING. There are several items in this bill that I find concerning, and would like your thoughts regarding them. Thank you in advance for your attention to this matter.

In Sec 18.35.301.f.1, smoking the bill states that nothing in the section would prohibit smoking in a private club, but then prohibits smoking in private clubs that serve alcohol or have employees. This section would in fact prohibit smoking in 99% of the private clubs that would have smokers in it. The big questions about this section, what does the consumption of alcohol make an establishment required being smoke-free, and what private club does not have a single employee?

Under Section 18.35.346.b, an employee of the department designated by the commissioner to enforce the provisions of AS 18.35.301, 18.35.306, 18.35.306, 18.35.311, or 18.35.326 may issue a citation for a violation of AS 18.35.301, 18.35.306, 18.35.311, or 18.35.326 regardless of whether the violation was committed in the employee's presence. This section is one of the most concerning of the entire bill. This section alone gives an employee with no policing authority, more power than an actual law enforcement officer. In the section above, Section 18.35.346.a, a peace officer may only issue a citation if they witness the act. This opens the door to false claims, whereas I could call in an anonymous report of someone violating this bill, regardless of whether it was true or not. Not to mention, with the budgetary issues that are occurring in the state currently, with a large state employee layoff to occur, can we afford new employees for this monitoring?

Along with the "prohibition" of smoking, the author has placed electronic cigarettes in the same category as smoking. Electronic cigarette just by name alone have been treated improperly solely because they look like cigarettes. People whom actually use them refer to them as personal vaporizers, because the term ecigs assists in a bad reputation. Aside from containing nicotine, but not always, there is absolutely nothing similar between the two items. Vaporizers do not emit smoke, they emit a vapor for inhalation. The second hand vapor in these devices has been tested, and it has been found to be below toxic level for workplace safety. This study was done by Drexel University titled "Peering Through the Mist". Nearly every single study that has painted a negative picture on personal vaporizers has been deemed invalid because of improper testing. With the potential benefits personal vaporizers have on the American public, it would be negligent to bw them to be included in this bill.

In closing, I would implore you to stop this bill from progressing through the committees, and not allow it to even be given a vote. The poorly written text along with the lack of evidence to include certain items makes this one of the largest violations of personal rights we will see this session.

Thank you,

Jason Finney

North Pole, AK

907-322-1301

ેવા:

Alex McDonald <alex@icefogvapor.com> Monday, February 09, 2015 9:37 PM

To:

Sen. Bert Stedman

Subject:

SB1

Attachments:

CSA_ItaEng.pdf; ATT00001.htm

Senator Stedman,

My name is Alex McDonald, owner of Ice Fog Vapor, Inc. Fairbanks, AK. I wanted to contact you regarding my concerns with proposed Senate Bill 1 (SB1).

First, I am concerned that SB1 would take away local option for communities throughout the state to deal with issues that may or may not affect their individual community. Many other substances such as alcohol and marijuana are or will be local option for places to set up their own regulations regarding their use. This is currently the case with tobacco and several cities have already chosen to set their own rules regarding tobacco use. Juneau is smoke free, it is also not -30 in Juneau today either making it easier to step out side to an area designated for tobacco use. In Fairbanks it is currently up to local businesses to set their own policies if they would like to be smoke free. This gives both consumers and employees the choice to work at or patronize places of their choo sing. I know several places that have gone smoke free, yet built heated smoking rooms for people that wish to use tobacco. Many of these smoking rooms are closer to the entrance of the establishment than is required by SB1, and there is not a grandfather clause that would leave smoking rooms as a viable solution. This would punish places that have spent money trying to be proactive in implementing policies arding tobacco use.

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My final and major concern with SB1 is that it is detrimental in helping people get off tobacco products. I am all for getting people off of tobacco products. I used a variety of tobacco products for 19 years and tried everything from traditional nicotine replacement therapies to prescription pharmaceuticals to quit using tobacco, none worked. I found an alternative to tobacco that has worked for me to quit all tobacco products; and if vapor products are included in this bill it would greatly inhibit that option for people trying to quite tobacco products. I have switched to using a vaporizer and have been tobacco free for well over a year now. Vaporizers do not contain any tobacco, or combustion by products. In the study "Characterization of chemicals released by electronic cigarette use: Is passive vaping a reality?", attached, it was concluded "by saying that could be more unhealthy to breath air in big cities compared to staying in a room with someone who is vaping." The Drexel University study, link attached, found "no apparent concern" for bystanders of people using electronic cigarettes even under "worse case" assumptions about exposure. A study of tobacco use among adults in Minnesota found a 10% decrease in use among adults from 2010-2014. Of those that attempted to quit in the last 12 months over 40% tried vaporizers in their attempt to quit tobacco use. This is double the rates for traditional potine Replacement Therapies, such as the patch or gum, and quadruple the rates of use of pharmaceutical products, such as Chantix. Vaporizers were the number one choice people in Minnesota turned to in their

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Sincerely,

Alex McDonald Owner, Ice Fog Vapor, Inc Fairbanks, AK

http://clearstream.flavourart.it/site/wp-content/uploads/2012/09/CSA ItaEng.pdf

http://www.biomedcentral.com/1471-2458/14/18

)III.

Sandra Cornelius <oscfbks@yahoo.com> Monday, February 09, 2015 2:29 PM

To: Sen. Bert Stedman

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em:

Ryan McKeown < irreverend23@gmail.com>

Monday, February 09, 2015 2:54 PM

To:

Sen. Bert Stedman

Subject:

Please Oppose SB 1 and HB 40 and any other effort to treat e-cigarettes like smoking.

Ryan McKeown 240 E Susitna Ave Wasilla, AK 99654

February 9, 2015

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Lawmakers must beware of unintended consequences from well-intentioned laws. There is clear evidence of a phenomenon called "accidental quitting," wherein many of the smokers who initially choose e-cigarettes to use just where smoking is prohibited go on to quit smoking conventional cigarettes completely. Prohibiting the use of e-cigarettes in public spaces completely eliminates that incentive to even try e-cigarettes. Unfortunately, the health risks of every one smoker who doesn't quit because e-cigarette use is prohibited (and the risks to the children and others who live with them) cummulatively outweigh any good done by eliminating the miniscule exposures to even hundreds of bystanders in public spaces.

Clearly, the benefits of allowing smokers to use e-cigarettes in public--and thereby increasing the likelihood of "accidental quitting" and reducing the known, extremely high health risks of smoking--outweigh the very low risks of insignificant exposures to bystanders. So, not only is there no genuine public health reason to prohibit e-cigarette use in public spaces, but, in fact, allowing e-cigarettes to be used in public spaces will actually improve public health by inspiring other smokers to switch and reduce their health risks by an estimated 99%. Moreover, private businesses in Alaska are already setting their own policies, and they should retain the right to allow or disallow usage since there is no proven health threat to bystanders.

While I understand some have expressed a fear about these products acting as a "gateway" to traditional cigarettes for youth, there is no evidence to suggest this is really happening, and research actually shows it is unlikely to happen to any substantial extent. Teen smoking rates are at their lowest point since smoking became popular and continue to drop, but there are adults who will continue to smoke until they die unless we provide attractive alternatives.

m:

steve mapes <akgofast@gmail.com> Sunday, February 08, 2015 6:44 PM

To:

Sen. Bert Stedman; Sen. Cathy Giessel; Sen. Pete Kelly; Sen. Bill Stoltze; Sen. Johnny Ellis

Subject:

SB1

Hello,

I am sending you this email to express my concerns about this senate bill, SB1..

I was able to get off tobacco after 40 years of being a daily smoker using personal vaporizers and e-liquids that contained nicotine. I did a lot of research into the products being offered and I believe that I made the correct choices

If the option to vape an extremely less harmful product than tobacco is made more difficult than it already is people might not get the chance to get off tobacco.

This product has been studied quite a bit and very little harmful or dangerous traces have been found in it.. Certainly it is much much better then smoking..

My breathing and stamina has improved dramatically..

This nicotine delivery method saves me money..

Please give others the choice, and the chance to make their own decisions about their health..

The vape shops I buy from do not sell to youngsters and I see them carding young adults to make sure that they are of legal age to purchase nicotine products..

Please do the research yourself.. Do not listen to the propaganda that seems to be getting more newspaper headlines than the research by qualified, third party researchers and scientists.. Alaskans heath is nothing to make uninformed decisions about..

ank you for taking the time to consider a voters opinion.

Steven Mapes

47870 Interlake drive

Kenai Alaska 99611

m:

Steven Mapes <akgofast@gmail.com> Sunday, February 08, 2015 6:47 PM

To:

Sen. Bert Stedman

Subject:

Please Oppose SB 1 and HB 40 and any other effort to treat e-cigarettes like smoking.

Steven Mapes 47870 Interlake Drive Kenai, AK 99611

February 8, 2015

Dear Bert Stedman,

I am writing to express my deep concern and opposition regarding HB 40 and SB 1 which would include the use of smoke-free vapor products (e-cigarettes) in Alaska's smoking law.

Smoking laws are ostensibly enacted to protect the public from the harm of secondhand smoke, but smoke-free ecigarettes have not been shown to cause harm to bystanders. In fact, all evidence to date shows that the low health risks associated with e-cigarettes are comparable to other smokeless nicotine products. A comprehensive review conducted by Dr. Igor Burstyn of Drexel University School of Public Health (and published in a peer-reviewed journal earlier this year - http://www.bjomedcentral.com/1471-2458/14/18/abstract) examined over 9,000 observations of e-cigarette jd and vapor and found "no apparent concern" for bystanders exposed to e-cigarette vapor, even under "worst case" umptions about exposure.

Lawmakers must beware of unintended consequences from well-intentioned laws. There is clear evidence of a phenomenon called "accidental quitting," wherein many of the smokers who initially choose e-cigarettes to use just where smoking is prohibited go on to quit smoking conventional cigarettes completely. Prohibiting the use of e-cigarettes in public spaces completely eliminates that incentive to even try e-cigarettes. Unfortunately, the health risks of every one smoker who doesn't quit because e-cigarette use is prohibited (and the risks to the children and others who live with them) cummulatively outweigh any good done by eliminating the miniscule exposures to even hundreds of bystanders in public spaces.

Clearly, the benefits of allowing smokers to use e-cigarettes in public--and thereby increasing the likelihood of "accidental quitting" and reducing the known, extremely high health risks of smoking--outweigh the very low risks of insignificant exposures to bystanders. So, not only is there no genuine public health reason to prohibit e-cigarette use in public spaces, but, in fact, allowing e-cigarettes to be used in public spaces will actually improve public health by inspiring other smokers to switch and reduce their health risks by an estimated 99%. Moreover, private businesses in Alaska are already setting their own policies, and they should retain the right to allow or disallow usage since there is no proven health threat to bystanders.

While I understand some have expressed a fear about these products acting as a "gateway" to traditional cigarettes for youth, there is no evidence to suggest this is really happening, and research actually shows it is unlikely to happen to any substantial extent. Teen smoking rates are at their lowest point since smoking became popular and continue to drop, but there are adults who will continue to smoke until they die unless we provide attractive alternatives.

I urge you to oppose these bills and any legislation that would limit where smoke-free products like e-cigarettes can be used. It is imperative that existing adult smokers become aware of all the alternatives currently available and that access to these products remains unimpeded.

I look forward to your response on this issue. I, along with my fellow members of CASAA (Consumer Advocates for Smoke-free Alternatives Association), thank you for considering my comments and hope you will oppose misguided attempts to limit adult use of smoke-free e-cigarettes.

Sincerely, Steven Mapes

Guiness64 . <jmfinney64@gmail.com> Friday, February 06, 2015 12:20 PM Sen. Bert Stedman

To: Subject:

Regarding SB1

Senator Stedman,

I am writing you to voice my concerns with SB1, REGULATION OF SMOKING. There are several items in this bill that I find concerning, and would like your thoughts regarding them. Thank you in advance for your attention to this matter.

In Sec 18.35.301.f.1, smoking the bill states that nothing in the section would prohibit smoking in a private club, but then prohibits smoking in private clubs that serve alcohol or have employees. This section would in fact prohibit smoking in 99% of the private clubs that would have smokers in it. The big questions about this section, what does the consumption of alcohol make an establishment required being smoke-free, and what private club does not have a single employee?

Under Section 18.35.346.b, an employee of the department designated by the commissioner to enforce the provisions of AS 18.35.301, 18.35.306, 18.35.311, or 18.35.326 may issue a citation for a violation of AS 18.35.301, 18.35.306, 18.35.311, or 18.35.326 regardless of whether the violation was committed in the employee's presence. This section is one of the most concerning of the entire bill. This section alone gives an employee with no policing authority, more power than an actual law enforcement officer. In the section above, Section 18.35.346.a, a peace officer may only issue a citation if they witness the act. This opens the door to false claims, whereas I could call in an anonymous report of someone violating this bill, regardless of whether it was true or not. Not to mention, with the budgetary issues that are occurring in the state currently, with a large state employee layoff to occur, can we afford new employees for this monitoring?

Along with the "prohibition" of smoking, the author has placed electronic cigarettes in the same category as smoking. Electronic cigarette just by name alone have been treated improperly solely because they look like cigarettes. People whom actually use them refer to them as personal vaporizers, because the term ecigs assists in a bad reputation. Aside from containing nicotine, but not always, there is absolutely nothing similar between the two items. Vaporizers do not emit smoke, they emit a vapor for inhalation. The second hand vapor in these devices has been tested, and it has been found to be below toxic level for workplace safety. This study was done by Drexel University titled "Peering Through the Mist". Nearly every single study that has painted a negative picture on personal vaporizers has been deemed invalid because of improper testing. With the potential benefits personal vaporizers have on the American public, it would be negligent to we them to be included in this bill.

In closing, I would implore you to stop this bill from progressing through the committees, and not allow it to even be given a vote. The poorly written text along with the lack of evidence to include certain items makes this one of the largest violations of personal rights we will see this session.

Thank you,

Jason Finney

North Pole, AK

907-322-1301

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through the Mist", Drexel University.

Thank you	1,	
Cameron	Filz	
Name	· · ·	
Fairbanks	AK	
City. State		

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Fair banks, Alaska

City, State

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Cody Grenseman Name V A Talsbanks Aluska

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City, State

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Ryon Lintelmon
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Christopher S. Sallagher Name

Eielson AFB/Fairbacks, AK

City, State

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Darin Shelton
Name
Fairbank, AK
City, State

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Robert-Williamson Name Forbanks, AK City, State

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Nikhi Dunmar

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Thank you,

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Thank you,

Name

tair banks, ff /a

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Thank you,

Fic Richardson
Name
Fairbanks, Alaska
City, State

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Thank you,

Namé

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Thank you,

Name

I do not support House Bill 40. The use of electronic cigarettes is not smoking, and should never be classified as such. By definition alone, smoke is created during combustion, and there is no combustion in said devices. A definition change as such has a detrimental effect on technology that has the potential to save millions of lives. New research is daily released stating that electronic cigarettes are safer than traditional cigarettes, including the effects on bystanders.

 1912	Brandon	rears
Fairbank		
Yairban'll	s, M	

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through the Mist", Drexel University.

Thank you,

Mame

North Pole AK

City, State

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Thank you,

Vameron Washburn
Name

Foirbanks, Ak
City, State

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Thank you,

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City, State

porth Pole Ak

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Thank you,

Plake fouler

Name

Fairby Ks AK

City, State

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Thank you,

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Fairbanks AK-City, State

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Thank you,

Evil Gllins II
Name

Ketchikau, AK City, State

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Thank you,

Linka Schmoll
Name
Tairbanks, tok

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Thank you,

Man Sispoll
Name

Elelson AFB, AK

City, State

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City, State

City, State
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Thank you,

Name

City, State

01-31-15

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Name

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Thank you,

Elvin Wilson-Marlow
Name
Fairbanks, Alaska
City, State

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Name

Faibanks, AK

City, State

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Thank you,

Name

Name

Fairbaks, AK

City, State

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Thank you,

Jordan Chandler Name Fairbanks, AK City, State

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Thank you,

BARLOW

Name

NOFTH POLE, AK
City, State

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Thank you,

FAIRBAUKS, AIRSKA City, State

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Name

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Thank you,

Name Travis Unbinetti

North Pole, Alaska

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Thank you,

Name

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Thank you,	
Miguel Berrios	
Name	
North Pde AK	
City. State	

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Name

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Thank you,

Julia Conaway W. Name
Fairbanks, AK City, State

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Thank you,

Reging Rodgers
Name

Fairbanks Ak
City, State

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Thank you,

Johnny Rodgers
Name

Fairbants At
City, State

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Thank you,

Dylan Platz
Name
Farbanks, AK
City, State

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Name

Fairbanks AR

City, State

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Thank you,

Tyler Wood

Name

North Pole, Alas Ka

City, State

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Thank you,

Adam Lay Name Fairbonk, AK

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Thank you,

Marolyn Lang

Name

Name Fairbanks, AK

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Thank you,

Corey D Allen of Dr

Anchwage All
City, State

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Thank you,

<u>Sessi Walton</u> - Josi Walton Name Fair banks, Alaska

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Thank you,

Eric Mayor

Eric Vargason

Name

north Pole AK 99705

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Thank you,

Name

City State

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Thank you,

RICHARD JONES

Name

NORTH POLE, AK

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Thank you,

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Thank you,

ALEX Me Donald Name

Sailbanke, AK

City, State

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Thank you,

Noney Conduce

Namè

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Thank you,

Name

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Thank you,

Jackson Hole at Eagle River, AK 99577

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

Address

agle liver 9950

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Thank you,

Name

166 18 Eleonorm st Eagle River AK 99877
Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

22317 Shadowy Spruce Dr.

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

Address

19577

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Thank you,

Note Dovis

Name

120012 Tomahawk D JUER, AK 99505

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

1971 EARLY VIEW DR ANCH AK 99864
Address

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Thank you,

Name

Address

Eagle River

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Thank you,

Seth Warnke

Name

25635 Berryhill Rd 99577 eagle River Alk Address

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Thank you,

Name

13900 Old glem Huy, AK, 99577

Ballard

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Thank you,

Name

22050 Sampson Dr

Chuquat, 99567

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Momo

16685 Davis st eagle River AK99577

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

12341 LAKE St # Z Eagle river AK 99577 Address

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Thank you,

10012 Baffin St- ER., AK 99577

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Thank you,

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Thank you,

Name

Hodeway Rodge Dr.

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Thank you,

Jacob

Name

10107 wildwood 3+
Address

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Thank you,

Benjamin Nawen

Name

132 NANOOK CITCLE

on choraseak 998004

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

24557 Park Dr. Chugiak, AK, 9956 >

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

621 W Daven Dr. podmer At 99645

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

ersonSt Anchorage AK

Thank you,

Nam∉

Àddress

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Thank you,

Name

8913 Nov4hwood Park Cir. 99577 Address

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Thank you,

Name

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Thank you,

Name

16929 Hanson Dr Eagle Niver 9K 99577 Address

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Thank you,

Name

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Thank you,

LEMM MILLEN

Name

11540 Hartage ct. mit #2

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

5535 NORTH STM ST. ANCHORNET, AK 99578

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

8005 Chenrault Ave Unit 1776, Ther AK 99506 Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Devon Diante Senders

Name

7005 Gold Kings Ave unit C Anchorse Ah, 99504 Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

6459 DONCASTER OR, ANCHORNEE 99504

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Agron Cardwell

Name

3801 (avelle on Anchomse AK 90506

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Micholas Larivee

Name

4411 Spenard Rd. 99517

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Thank you,

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Thank you,

Iver P. Nore Name 1327 Medfra St. Anchorage, A.K 99520

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

4812 Westeran Auch, IX, 94508 Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

Address

9951

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Oordan Brannon

Name

1730 S Heather Meadow Loop anchorage, AK 99507 Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

15040 old seward Huy Address

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Thank you,

Name

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Thank you,

Name

7430 Florence Ch. Anch 1ec 29502 Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

Address

roh. Atc

99501

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Thank you,

Name

Address

nch 99503

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Thank you,

AUSTIN BETTS

Name

Address

nchorage Ak

99503

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Thank you,

Name

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Thank you,

Name

SOO W potter Or Anchorage Address

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Name

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Thank you,

Name

3332 Morgan Loop.

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

1161 Ridgecrest Dr Anchorage AK 995/6

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Thank you,

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Thank you,

Michael Teaples

Name

10251 Arborvitue Or. Anch AK 99507

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

COGIY E11th AUE #B ANCHORAGE AIR 99504)
Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Jean-Paul Roulet I

Name

1510 W47th Ave UnitB Anchorage. AK 99503

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

4920 clint CIT Anchorage All 99503 Address

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Thank you,

Brian Carberry

1535 Harriet Court

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Thank you,

Name

Address

JBER, AX 9950C

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

2397 Waldron Dr Anchorage AK 99507

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

10043 EXPLORER CIRLE

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

P.O. Box 873500 Wasilla, AK 99687

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Thank you,

Name JACK A

w,hART

1601 A. EAST 41 51 CT

Address

Anchorage AK

49508

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Thank you,

Name

1709 Bellevue loop Anchorage, AR 99515

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Thank you,

Name

8009 Bearborn A Ganoz

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Thank you,

10121 CLANCIBON St.
Address Engle Piver, AK

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Thank you,

Name

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Thank you,

Name

2700 w 32 AVC APT-44

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Thank you,

Name 2

2700 W. 32 nd Ave AP+ H4

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Thank you,

Ryland Staples

Name

10136 Louis Pl. 9957

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Thank you,

JAMES BRIGGS

Name

905 FICHARDSON UISTA KD. HOT #246 Address ANCHORAGE, AB 99501

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

465 Richardson Vista H Zello Address Incharage, Ah 22001

MARCA

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Thank you,

Durnick Whit

Name

1834 Juneau Dr#1

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Thank you,

Thomas Andre TV

Name

Address And

AK 98513

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Thank you,

Name

2700 W32nd Ave Androrage AL 99519

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Thank you,

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Thank you,

Name

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Thank you,

Anchorage, AK 99501

Dear sirs,

We would like these letters entered as a document of opposition to SB1.

Thank you for your time and service.

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

101 PATTERSON ST ADT 717 Address ANCHORAGE AK 9950/

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

Address Anc At 99502

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Thank you,

Name

5901 East 6th

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Thank you,

Sunny Bouass

Name

228 Park st Anch, At 99508

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Thank you,

1420

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Thank you,

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Address prohoroge, AK

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1200 w dimond Blud

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Mustalledille

Name

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Name

1421 Twining Dr. Address

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Thank you,

David T Warz

Name

3206 A Muriel place Address

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Name

3811 Checkmate Or.

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Name

Address Anch AK

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Thank you,

Michael Khotprathoum
Name

Sog N Park St Address

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Thank you,

Nathaniel Netu Name

3700 Carleton Ave Address

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Thank you,

Bernie Obas

Name

3540 hooper circle

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Thank you,

Shanelle Jimenez

Name

340 E. 45th Ave #2

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Thank you,

Kimberly Ganancial

Name

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732 muin St #A Address

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Thank you,

Kimberly Delockeyes
Name

340 East 45th Ave Apt #72 Address

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Thank you,

<u>Uessa VIIIasenor</u> Name

340 East 45th Ave Apt #2 Address

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Thank you,

Bobby Khofprathoum
Name

Soa NPARK ST Address

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Thank you,

chelsea Nuevo

Name

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Thank you,

Christina Bylund Name

5706 S. +ahitilagp AK
Address

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Thank you,

Name

Address

79503

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Thank you,

Craig Lematta

000 10621 cutter cer 99519

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Thank you,

Bailey Trent

Address Tagalak Dr

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Thank you,

Yessenia (h

Name

3869 W. 74th Ave.

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Thank you,

Eric pibriguer
Name

2321 Arrel circle Anchorage A/299515 Address

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Thank you,

Jefferson Stephenson

Name

1938 Terrebonne Loop

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Thank you,

Steven Sweeden I

Name

1)48 Ira Drive

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Thank you,

Brandon Rothis

Name

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Thank you,

Name

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Thank you,

Roderick L. Jackson

Name

4207 Greenland Dr #1 Anchorage, Ak 99517 Address

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Thank you,

Madthew J. Burke-Williard

Name

4207 Greenland Dr. #1
Address

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Thank you,

3435 Huffman Road

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Kimberly Nopper Name

9191 Old Seward Huy Unit 14 Anchorage Al 99515 Address

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Thank you,

Name

1300 BISCANECIRCLE, ANCHORAGE, AK99516

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Thank you,

lans La Eagle River

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Thank you,

Name

Address

HA 9950

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Thank you,

Josh Helmgren Name

1230 | Heritage Rd Anchorage AK 99516 Address

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Thank you,

Claron Westerlin

Name

8501 Crystal st Incharage Ak . 99502 Address

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Thank you,

10043 Explorer Circle

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Thank you,

STEVEN BURRON

Name

ZOZ N. KLEUN ST #C3 Address ANCHORAGE, AK 99508

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Thank you,

Jehecca Georos

7751 Saguar Circle Anch. At 99302 Address

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Thank you,

Name

7333 bern St Anchorage ALC 99507

In the Alaska House, Representative Bob Herron (D-Bethel) has introduced a bill (HB 40) to add "using an e-cigarette" to Alaska's definition of "smoking." In contrast to SB 1, HB 40 would not expand Alaska's existing smoking ban. It is not only wrong to define the use of a smoke-free product as "smoking," but any future changes to Alaska's smoking ban would automatically also include vaping

Please Take action to oppose this bill, fill out the info below and this form will be sent as testimony to your opposition of this bill.

Brenda Batzner	
*Please print first and last name	
*Please print first and last name 6150 wild mountain Drive	
Address (ontional)	0-1-1-1
Eagle River Alaska * City and State	99511
* City and State	*Zip Code
brendabotzner85@yahoo.com	·
Email address (optional)	
907-854-0355	
Phone No. (optional)	
Brendo Batzur	
*Signature	

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Gret Lana		
*Please print first and last name		
10105 Crest view In		
Address (optional)		_
eggle River AK		
* City and State	*Zip Code	
Email address (optional) Lang - Biet O yahoo. Com		•
Phone No. (optional)		
Busy		
*Signature / /		

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*Please print first and last name 18107 MAC LAKEN 57, UNIT B Address (optional)	
BAGLE RIVOR, ALASKA	99577
* City and State	*Zip Code
TROTUNONAG GMAIL, COM	•
Email address (optional)	
(907) 538-8148	
Phone No. (optional)	
*Signature	

Alaska Call to Action: A bill has been introduced that threatens to ban vaping wherever smoking is banned!

Alaska Senator Peter Micciche (R-Soldotna) has again introduced a bill (SB 1) that would ban vaping by including it within Alaska's definition of "smoking." This provision is tucked inside a larger bill that would significantly expand Alaska's existing statewide smoking restrictions. If this bill passes, bars, restaurants and workplaces throughout Alaska will no longer be able to decide for themselves whether to allow or disallow vaping.

Last year, a bill nearly identical to SB 1 was introduced and made its way through two Senate committees before stalling in the Senate Finance Committee. Unlike last year's bill, SB 1 includes an exemption for vape shops. However, SB 1 still deceitfully redefines "smoking" to include the use of a smoke-free product and needlessly makes vaping in indoor and outdoor environments a fineable offense.

** SB 1 has been assigned to the <u>Senate Health and Social Services Committee</u>. At this time, no hearing has been scheduled. We will update this <u>Call to Action</u> as we learn more..

Please take action now to oppose this bill, fill out the info below and this form will be sent as testimony to your opposition of this bill.

Brenda Batzner	
*Please print first and last name	
6150 wild mountain Drive	
Address (optional)	0.0~17
Eagle River Alaska	199571
* City and State	*Zip Code
brenda batzner 85@ yahoo.com	•
Email address (optional) 907 - 854-0355	
Phone No. (optional)	
Brenda Batzuer	
*Signature	

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Bret Lana		
*Please print first and last name		
1010b Crest view In		
Address (optional)		
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* City and State	*Zip Code	
Lanes Bret G vanou Com	•	
Email address (optional)		
Phone No. (optional)		_
Busy		
*Signature		_

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18107 MAC LARBY ST. UNIT B	
Address (optional)	
EACH RIVOR, ALASKA	99577
* City and State	*Zip Code
TROTUNORA 2010@ GMAIL. COM	
Email address (optional)	
(907) 538-8129	
Phone No. (optional)	

Signature

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Thank you,

21/ PUMERIAK GULYS

Address

Fwd: Form Letter

From

Jason Finney <jmfinney64@gmail.com>

aj@sumovapor.com <aj@sumovapor.com>

2015-01-26 18:40



Sent from my iPhone

Begin forwarded message:

From: "Guiness64 ." < imfinney64@gmail.com > Date: January 22, 2015 at 11:46:46 AKST To: Guiness64 < imfinney64@gmail.com > Subject: Form Letter

To Whom it May Concern,

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through the Mist", Drexel University.

Todd Woodwerth

Name

From [a

Jason Finney <jmfinney64@gmail.com>

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Subject: Form Letter

To Whom it May Concern,

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through the Mist", Drexel University.

Thank you,

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through the Mist", Drexel University.

Thank you,

Kon Johnson
Name

Anchorage AK
City, State

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Thank you,

Allane Carpene
Name

Auc Alaska
City, State

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Thank you,

Parrish Campbell
Name
Anch. Ak angui

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Annoia C. Anch. Ax 99501

Thank you,

1

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Sima Sugs Name Unch ak City, State 99501

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Thank you,

Lordiger 1 Mune (
Name

TBER AK

City, State

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Thank you,

Name =

5BED

From

Jason Finney <jmfinney64@gmail.com>

aj@sumovapor.com <aj@sumovapor.com>

2015-01-26 18:40



Sent from my iPhone

Begin forwarded message:

From: "Guiness64 ." < imfinney64@gmail.com> Date: January 22, 2015 at 11:46:46 AKST To: Guiness64 < imfinney64@gmail.com> Subject: Form Letter

To Whom it May Concern,

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Thank you,

Anthony Fields
Name
Anchorage, AK

From Jason Finney <jmfinney64@gmail.com>

aj@sumovapor.com <ai@sumovapor.com> lte 2015-01-26 18:40



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Thank you,

Name

Anchorage

City, State

Fwd: Form Letter

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City, State

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Thank you,

MARIAH HAMILION

Name

From

Jason Finney <jmfinney64@gmail.com>

aj@sumovapor.com <aj@sumovapor.com>



2015-01-26 18:40



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Thank you,

ALBERTO DILON JIZ

Name

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aj@sumovapor.com <aj@sumovapor.com>

2015-01-26 18:40



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Name

City, State

Page 1 of 1

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Thank you,

RYAN ANDREWS

Name

Androrage, AK

Fwd: Form Letter

From

Jason Finney <jmfinney64@gmail.com>

aj@sumovapor.com <aj@sumovapor.com>

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From Jason Finney <jmfinney64@gmail.com>
To aj@sumovapor.com <aj@sumovapor.com>

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Thank you

Archorage, Alaska

Fwd: Form Letter

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aj@sumovapor.com <aj@sumovapor.com>

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Thank you,

Name

Anchorage, Ale City, State

From Jason Finney < jmfinney64@gmail.com>

aj@sumovapor.com <aj@sumovapor.com>

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2015-01-26 18:40



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AMANIDA M. BALMACEDA

Name

ANCHORAGE, ALASKA

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Thank you,

GIONOPINI Sanchez

Name

andropago, Ak

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aj@sumovapor.com <aj@sumovapor.com>

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Thank you,

Ross Brinkernost Name Anchorage, Ak

From Jason Finney <jmfinney64@gmail.com>

aj@sumovapor.com <aj@sumovapor.com>

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Thank you,

Name

From Jason Finney <jmfinney64@gmail.com>
To aj@sumovapor.com <aj@sumovapor.com>

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Cartis Bish

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Thank you,

Name

From lason l

Jason Finney <jmfinney64@gmail.com>

aj@sumovapor.com <aj@sumovapor.com>

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Thank you,

Name

Fwd: Form Letter

From

Jason Finney <jmfinney64@gmail.com>

OT_O

aj@sumovapor.com <aj@sumovapor.com>

ate

2015-01-26 18:40



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Name

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To aj@sumovapor.com <aj@sumovapor.com>



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Thank you,

Tamara Dizon

Name

Anchorage Ak

From Jason Finney <jmfinney64@gmail.com>

aj@sumovapor.com <aj@sumovapor.com>

2015-01-26 18:40



Sent from my iPhone

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Thank you,

Joshua Cremonese

Name

Anchorage, Al

From Jason Finn

Jason Finney <jmfinney64@gmail.com>
aj@sumovapor.com <aj@sumovapor.com>

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2015-01-26 18:40



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Thank you,

Benjanin Sissel Byr Cont Name

City, State

Chagiak, AK

Fwd: Form Letter

From

Jason Finney <jmfinney64@gmail.com>

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aj@sumovapor.com <aj@sumovapor.com>

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Thank you,

Greg Saludares

Name

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From

Jason Finney <jmfinney64@gmail.com> aj@sumovapor.com <aj@sumovapor.com>

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2015-01-26 18:40



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Thank you,

Name

Eagle River, AK

Fwd: Form Letter

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aj@sumovapor.com <aj@sumovapor.com>

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Thank you,

Bradley WoolWorTh

Name

Anchorage AK

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Jason Finney <jmfinney64@gmail.com>

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Thank you,

Shame vorve 11

Avenuage, AK

Name

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From

Jason Finney <jmfinney64@gmail.com>

_To

aj@sumovapor.com <aj@sumovapor.com>

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Thank you,

Andrew Fox

Name

Anchorage AK

From Jason Finney <jmfinney64@gmail.com>

q aj@sumovapor.com <aj@sumovapor.com>

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Subject **Fw**

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Thank you,

2 Ain C. Mason Name Anchorage AK.

From

Jason Finney <jmfinney64@gmail.com>



aj@sumovapor.com <aj@sumovapor.com>

2015-01-26 18:40



Sent from my iPhone

Begin forwarded message:

From: "Guiness64 ." < jmfinney64@gmail.com>
Date: January 22, 2015 at 11:46:46 AKST
To: Guiness64 < jmfinney64@gmail.com>

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EagleRiver AK99577

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Michael y. Delanga

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Anchorage, AK

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Louie Cransall SIII

3500 lake of 5 portugy

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Sawdan Bunum Name S

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Verence # Twkelson

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BY48 COULDMAN CITCLE
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LEE SOPIAND

Name

1929 E SBITH AVE AUCHORAGE, AK 99507

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Address

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COKBIN SHURAVLOFF

Name

1510 LILY POND CIECLE

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4350 Butte Circle

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Scott Garcia

1835 E Tudor

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<u>Jernaine Campbell</u> Name

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<u>√</u> ∆ddress 42rd Apt. 5

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Edwin Escalante Name

7637 Reyal Mountain Dr Anchorage, Alc 99504
Address

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Rocy Sizk:

9499 Brayton Dr. #244
Address

Anch, AK 99507

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Devin Hickey

Name

5209 Donali St. W. Auch, AR 99518

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17/6 Juneau Dr., Anch, AK 99501 Address

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6962 Terry St Address

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6962 Terry

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Thank you,

Name

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Espinosa Finest C.

7330 Tanaga Circle Apt 1 Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

2100 Cheveland Ave Apt #1

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Richard Mountasy
Name

7-100 Lake Oto Phwy #39
Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

James Voyles Name

1248 Gambell
Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Penguin St 99503

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

4312 Penan

99503

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

ANCHORAGE, AK 99509

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Jason Ocampo

Name

LEAH CT Anestmart
9750C

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

4301 See lex circle Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Doronda L. Sherman

4301 Septen Lic.

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Delun Ulir Name

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Mama ZAVACK

15 E. 76THAVE

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Cleo Reyes Name

1551 State St A4 99504 Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

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Thank you,

Name

Syg Conduin P Address

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Thank you,

Brandon Johnpier Name

5948 Goodwin au

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

642 W.344 AVE

Address

Anchorage, Ak 99503

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

5901 to bth Ave, Space 316 Address Anchorage, AK 99508

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Christa Almario Name

4520 Campbell Park Loop Address Anchoraga, AK 99507

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

1646 W 27 AVE 99503
Address

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Thank you,

Bailey Repusky

1040 w 27th Ave 99503

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Amber Easley

Name

5740 E4H AVE

**Address** 

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)

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Thank you,

Jonathan A.S. Sexson

Name

Address Archorage AK 99509

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Heather Alondge Name

1/821 Portage Circle Anchorage Ak 99515
Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

David H. Baur III

3509 Dorbrandt St. Apt #4 Address Anchorage, AK

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

KIM TERAUNE Name

316\$ DOWSON Anch AK Address 99503

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

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Thank you,

Name

PDBOD 240385 Anch A# 99524 Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Kristy Pekroon

POBOX 166, HOPE, AK 99605
Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Travis Peterson

Name

POBOX 166 Hope, AK 99605

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

Address

3450 Karovin Bay circle 99515

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

131 Patterson St # 508 Anchorage #k99504

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Patrica Whittington

131 Patterson St Apt 508 Anc, Al 99504 Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

FeliciaJohnson

Name

2500 Sentry Dr Apt 103 Aven. AK.

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name Douglas Mccullough

2500 Sentry dr Apt 103

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

9200 Independence Dr. APT 109 Address

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Thank you,

Name

Address

155 Anchoras Afaska 9 9 503

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Thank you,

Kris HANDY

Name

940 e 4318 Ave unitz Wassilla Ara9654

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Thank you,

Name

6SIO KARA SUE LIN

ANCHORAGE AX 99504

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Thank you,

Name

Anchorage, AK 99504
Address

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Thank you,

MARL ROVEM

Name

933 E46TH CTHITA ANCHORMEE TIL 9950) Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

ruce st #11

Thank you,

Name

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Thank you,

Romie Mitchen

Name

7079 Fightor Dr. # 1054 JBER, AK 99506

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

DOUBLAS M. CUAGNERII

Name

6980 CAMPOS AVE JBER, AK 99506

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

DAN RHOADS

Name

6571 HANNEGAN RD.

Address LYNDEN WA

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

11304 Via Balboa

Address Anchorage, AL 99515

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

6457 Whispering imp Akchorage, Ak 99504

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Sean Smith

Name

17641 Beaujolais Dr. Eagle River, Ah 94577 Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Nama

[-0-Bx 231803 Anch 9952)

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

1910 Cherokee Way 99504

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Thank you,

Cherokee Way, Anenorage, AK 99504

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Thank you,

Name<sup>/</sup>

791 6th Street, JBER, AK 99505

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

2202 lincon Ave Ancil Ah 99517

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

3344 BEAR FILER CITCLE

Address EAGLE RIVER AK

99577

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Davis Antoson

Name

6124 E 12th Ave D3, Anchorage, All 99504

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Thank you,

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Thank you,

VIIII

Name

3464 Lunar Dr.

Anchorage, AK. 99504

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Address

11700 Business Blud Address Eagle River, AK 9957A

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Thank you,

Name

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Thank you,

Name

Address Arch oraze Alaska 99503

tern Northern lights

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Thank you,

Name

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Thank you,

Name

1108 Eastern Northern Lights

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

Address

Hillcrest Drive Anchorage Alaska 99503

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

freet, JBER, AK 99505

Thank you,

Name

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Thank you,

Ly Howell Kon

8631 Pluto Dr. Anchorage, AK,

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

Pearl clrh

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Logan GUINA

Name

3110 West 29th

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

8047 Roselad circle 99502

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Zachary Saifert

Name

11-03 W 30th Ave Anchorage, Ak 90503

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Victoria Setchell

Name

1ele21 Stella PL#2 99507

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

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Thank you,

Náme

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Thank you,

<u> Исандоо</u>~

Name

120 w 91st au snusige ks 99615
Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

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Thank you,

Matthew Gross

Name

223. S. Silver Tip. Dr

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

 $\mathsf{Name}^{\prime}$ 

5800 Lake Olis Phay Apt. K366 Address Anchorage AK. 99507

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Thank you,

Name

S800 LAKE OTIS PKWY #K-3660 ANCHORAGE, AK 97597 Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

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Thank you,

Name

63d/ Wooder Cir

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Thank you,

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

5900 TINIANAVE

**Address** 

ACHORAGE, AK 9950 F

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Maraus Stricken

Name

1623 Russian Jack D.

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Samantha Williams

Name

3644 W.88th and #265

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Dorran Paul

Name

4029 Fahren Kamp Ave Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

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Thank you,

Name

Åddress

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Thank you,

Mark Norman

Name

4051 Taker Dr.

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Thank you,

Brett E Smith

Name

7001 Scalero Cin

ANChorAse AK 99507

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

2202 Lincoln Ave

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

3806 Luis Drive, anchorage, Ak 995/7
Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

2100 Strawberry Rd #12

Addrese

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

2939 Leawood Drive Address Anchorage XK 99502

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

y cle Anch, AK

Thank you,

Mame

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

379 Eveners 1005 per. 997/2

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Emilio Lanoza

Name

7024 Arnold Aus unite Noer AL 99506 Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Jackie Southern Name

9110 Ticinie Anch AK Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Robert Ortolano

Name

4545 Reka st. #B05, Anchorage, AK 99508
Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

11304 VIA BALBOA ANCH, AK 99575

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Thank you,

Name

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Thank you,

Name

19362 Starfbuer Cir Chugiah, AK 99567

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

ER Ale 99577

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Thank you,

Name

totale ewer, Haska

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Thank you,

Craiz Pritchett

Name

1220 NOld Town Dr.

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Samany

Address Eagle Ruer AV, 99577

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

P.O. BOX# 820116

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Bret Lang
Name

10105 Crost Vein Jane Address

1

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

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| Ţ | hank | vou. |
|---|------|------|
| - |      | ,,   |

Mame Snow

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

22 Chambres In Chugial, AK 99567

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

JONY GONGALVES

Name

<u>QUGIS HAMAN</u> RD FACLERIVER 99577 Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

Address

SS

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Thank you,

Name

135 W8th We #8 Auch Ak 9950

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Bennet Blanchard

Name

1151 West Gail Dr Wasi'lla, AK

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Offin MNeil-Varecic

19320 Ganoest.

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

26643 Whitesprucedv. E.R., AK

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

GREY CLOYFOR, WASTILA, AK 99659

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you

Mame

Address

(

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

16939 Mercy Dr EngleRiver, AK

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Dacoda Lint

Náme

20614 Icefall Dr., Eagle River

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you

Name

321 Evergreen St Anchorage HK 99504 Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

1280 Contrary Court Anchovage, AK 99515 Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Sam Hammer

Name

Eagle River Alaska

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

TRAVIS MADDEN

Name

8992 EAGLE RIVER LN, 99577

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

8992 Engle Ri Ver Lane FR

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

7018 Arnold Ave unit B Address SBER AK 99506

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Parsons, Robert De

Name

16618 Eleonora St Eagle River, 4k 99577 Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Alex Solvers

Name

11755 Galloway Loop Address Eagle Rive, Alk 99577

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

Address Eagle Kiver, AK

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Thank you,

Name

Kaarei San Nicelas

Eagle River AK

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Thank you,

Name

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Thank you,

Blake Martin

Name

20700 Icéfall Drive Eagle River, At 99577

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

PIBON 31185 FORT GALLEY, AV- 9973/

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

21415 Tina St Chugiak AL 99547 Address

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

205 W. Sheridancir

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Patrick Osden

Thank you,

Name

5501 May Rlower In Wasille AK 99654



# Correct version

1 message

Gv <glaciervapors@gmail.com>

Sun, Jan 25, 2015 at 12:42 PM

To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

To Whom It May Concern,

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

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Thank you,

Michael McClain

Name

7916th St JBER AK 89505



# **Correct version**

1 message

Gv <glaciervapors@gmail.com>

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To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

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Thank you,

nnacevic



# **Correct version**

1 message

Gv <glaciervapors@gmail.com>

Sun, Jan 25, 2015 at 12:42 PM

To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

To Whom It May Concern,

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Thank you,

Name

70 BOX 6074 JBER, AK 99506



# **Correct version**

1 message

Gv <glaciervapors@gmail.com>

Sun, Jan 25, 2015 at 12:42 PM

To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

To Whom It May Concern,

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Thank you,

Name

8431 E. 5+4 AVC



### Correct version

1 message

Gv <glaciervapors@gmail.com>

Sun, Jan 25, 2015 at 12:42 PM

To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

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Thank you,

19750 Vargues Dr #53



### Correct version

1 message

Gv <glaciervapors@gmail.com>

Sun, Jan 25, 2015 at 12:42 PM

To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

To Whom It May Concern,

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Frank Torres

Name

T800 Westover Ave Address



# **Correct version**

1 message

Gv <glaciervapors@gmail.com>

Sun, Jan 25, 2015 at 12:42 PM

To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

To Whom It May Concern,

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Thank you,

Jay Riz Rodriguez Name 3040 Pon bund Park



# Correct version

1 message

Gv <glaciervapors@gmail.com>

Sun, Jan 25, 2015 at 12:42'PM

To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

1-Anakuk Mand Pkay

To Whom It May Concern,

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Thank you,

Name



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Sun, Jan 25, 2015 at 12:42 PM

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1 Normanshire Ct. Auchorage, AK. 99504



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To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

To Whom It May Concern,

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Emy Tabucal

Name

703) Welmer Rd #1

Address

Anch, AK 99502



#### Correct version

1 message

Gv <glaciervapors@gmail.com>

Sun, Jan 25, 2015 at 12:42 PM

To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

To Whom It May Concern,

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University.

Thank you,

Name

539 Heritage C+#10 ress Eagle River, AK 99577



# **Correct version**

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Gv <glaciervapors@gmail.com>

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To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

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Thank you,

Eyan Villeins

Name\_

ZOJ9 cliffside duis Aucharage AK 1950 Address



#### Correct version

1 message

Gv <glaciervapors@gmail.com>

Sun, Jan 25, 2015 at 12:42 PM

To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

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Thank you,

Address

Denykuin Green
et. #42 Auch, AK 99508



### Correct version

1 message

Gv <glaciervapors@gmail.com>

Sun, Jan 25, 2015 at 12:42 PM

To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

To Whom It May Concern,

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Thank you,

Name

3916 East 95 au



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Gv <glaciervapors@gmail.com>

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To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

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To Whom It May Concern,

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Thank you,

Jonathan D. Mcclellan

Name

2121 Spar. Ave. Anchorage, AK 99501



### Correct version

1 message

Gv <glaciervapors@gmail.com>

Sun, Jan 25, 2015 at 12:42 PM

To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

To Whom It May Concern,

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Thank you,

Name

2121 Spar Ave

Address

9950



# **Correct version**

1 message

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Sun, Jan 25, 2015 at 12:42 PM

To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

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Thank you,

Name



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Sun, Jan 25, 2015 at 12:42 PM

To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

To Whom It May Concern,

hairer Lissee Court

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Thank you,

- 0000



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1 message

Gv <glaciervapors@gmail.com>

Sun, Jan 25, 2015 at 12:42 PM

To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

To Whom It May Concern,

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually irrappropriate. The secondhand effect from vaponzers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Ben Hoever

Name

4309 E. Sth Ave

5th Ave Archorage Ak

99508



### Correct version

1 message

Gv <glaciervapors@gmail.com>

Sun, Jan 25, 2015 at 12:42 PM

To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

To Whom It May Concern,

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Thank you,

Dustin \_

Name

Address

1/25/2015 1-51 PM



### Correct version

1 message

Gv <glaciervapors@gmail.com>

Sun, Jan 25, 2015 at 12:42 PM

To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

To Whom It May Concern,

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Thank you,

Name

3745 W 64th cure ste A

1/25/2015 1·51 PM



# Correct version

1 message

Gv <glaciervapors@gmail.com>

Sun, Jan 25, 2015 at 12:42 PM

To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

To Whom It May Concern,

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Alomo

6725 BLACKBERRY, ANEMORAGE, MC 99502



### Correct version

1 message

Gv <glaciervapors@gmail.com>

Sun, Jan 25, 2015 at 12:42 PM

To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

To Whom It May Concern,

1711 Love rd 99507 Address Andwraje, At

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

Name

1/25/2015 1:51 PM



### **Correct version**

1 message

Gv <glaciervapors@gmail.com>

Sun, Jan 25, 2015 at 12:42 PM

To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

To Whom It May Concern,

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

ERIN THOMAS

Name

Address Annuar act Mr 99518



# **Correct version**

1 message

Gv <glaciervapors@gmail.com>

Sun, Jan 25, 2015 at 12:42 PM

To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

To Whom It May Concern,

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University.

1401110



### Correct version

1 message

Gv <glaciervapors@gmail.com>

Sun, Jan 25, 2015 at 12:42 PM

To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

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Thank you,

13715 Spendlove drive



# **Correct version**

1 message

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Name



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Thạnk you,

Name `

BOOS OIGON (#7) 995)



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Thank you,

Renels will

Name

947 west 74th Ave



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Thank you,

Name

Mosg soffer of And Ah Pastos



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Thank you,

Chipis Hussen

1012 Fred Circle Address



#### Correct version

1 message

Gv <glaciervapors@gmail.com>

Sun, Jan 25, 2015 at 12:42 PM

To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

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Thank you,

Name

20209 wegging birch are chigiak AK

Address



#### **Correct version**

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To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

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Thank you,

Name

6813 Cape Listerne Loop Anchorage, AK 99504



### **Correct version**

1 message

Gv <glaciervapors@gmail.com> To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

Sun, Jan 25, 2015 at 12:42 PM

To Whorn It May Concern,

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Henry Rios Name Thank you,

99709 D P R 3030 Davis RD C.LEO. Fairbonks Address



### **Correct version**

1 message

Gv <głaciervapors@gmail.com>

Sun, Jan 25, 2015 at 12:42 PM

To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

To Whom It May Concern,

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21661 Madsans Pl. Chugiak AK 99567 Address



**Correct version** 

1 message

Gv <glaciervapors@gmàil.com>

Sun, Jan 25, 2015 at 12:42 PM

To: subzerovaporak@gmail.com, glaciervapors@gmail.com, Ang Rolland <taccdna@gmail.com>

To Whom It May Concern,

I do not support Senate Bill 1 in its current form. The inclusion of "electronic cigarettes" is negligent and factually inappropriate. The secondhand effect from vaporizers is negligible per "Peering Through The Mist", Drexel University.

Thank you,

5001 Old Sewand Hury Address Anchorage AK 99503



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17535 Palos Verdes Dr. Address Eagle River AK 99577



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Myra Timas

94 Ave. #3

Address



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25/033 Kings River Drive Address Subtur, AK 99674



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Collecto Meday H 9903

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Westegen Aven AK 99508

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Name

287 FISHWER RUE

Address



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Brandon Michols Name

14000 Old Glenn # 7, Eagh Biver, Alk



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1711 Bussian Jac Har. 99508 Address



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