

Perceptions and Use of an ENDS Device for a Vulnerable Population: Incarcerated Persons

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ABSTRACT

Objectives: The public health community recognizes the need for tobacco harm reduction among vulnerable and marginalized groups, where smoking is increasingly concentrated. Some populations may need specialized approaches or products to effectively reduce harm. One example is smoking among people in custody, where studies find 50-83% in the U.S. are smokers, and use of contraband or adulterated tobacco is a widespread concern. Electronic nicotine delivery systems (ENDS) for prison/jail use require special safety and tracking features. We assessed perceptions, use intentions, and actual use in the prison/jail setting of a specially product (eCig4Inmate™) among a U.S. national sample of formerly incarcerated persons.

Methods: We surveyed 1,587 persons who did and did not use such specialized vaping devices during a recent incarceration.

Results: Of survey respondents who had an opportunity to purchase an eCig4Inmate™ device in a prison/jail commissary (where cigarettes were not legally sold), 95.1% of pre-incarceration daily smokers tried vaping the product. Of those who tried it, 99.0% went on to purchase more than one device. Among survey respondents not exposed to eCig4Inmate™ when last incarcerated, just 1.5% of daily smokers (and 2.3% of smokers who had never vaped) were unwilling to try vaping should they be incarcerated in future. This compares to 55.3% of tobacco non-users who were very unlikely to or definitely would not try it if reincarcerated.

Implications: Specialized e-cigarette products have potential to attract people in custody who are smokers to vaping, reducing both exposure to toxicants and use of contraband tobacco. Such products may also benefit other vulnerable populations with high smoking rates and special needs.

INTRODUCTION

Smoking in the United States is increasingly concentrated among marginalized populations. This includes persons with low incomes and chronic physical or mental disorders, who are especially vulnerable to smoking-related diseases [1]. The prevalence of smoking is about four times higher among people in custody in the U.S. compared to the general population, with studies finding 50-83 percent of prisoners are smokers [2]. Globally, smoking prevalence among people in custody is between 64 and more than 90 percent, depending upon the country and setting [3].

In addition to nicotine, incarcerated persons use a variety of mood-altering substances. For example, nearly two-thirds (64%) of state and federal prisoners reported using at least one drug in the 30 days prior to arrest for the offense for which they were serving time, and half (49%) of state prisoners met the criteria for having a substance use disorder [4].

The stresses and boredom of incarceration, combined with reduced or non-availability of other substances people may have used to cope before imprisonment, appear to push many toward increased smoking. As a World Health Organization report on prison health noted [3], "Tobacco use is completely entangled in prison life where it helps to cope with boredom, deprivation or stress, relieve anxiety and tension and function as a source of pleasure or monetary value in an environment without currency."

Policies and medications typically used to counter smoking can be ineffective or even counterproductive in prison/jail settings. Some correctional facilities ban combustible cigarettes due to concerns about health effects of second-hand smoke. One U.S. study found that 76 percent of incarcerated male smokers continued to smoke following a prison smoking ban [5]. Bans also reportedly create robust black markets in combustible cigarettes. Studies in Australia, New Zealand and Canada have reported smoking of nicotine patches and lozenges provided to prisoners for smoking cessation (e.g., Puljevic et al., 2018 [6]).

Some correctional facilities have attempted to avoid these problems by substituting e-cigarettes for combustible cigarettes. Reviews of randomized controlled trials have found e-cigarettes to be more effective than nicotine replacement therapies in encouraging smokers to quit [7].

Several companies have created e-cigarette products specially designed for use in correctional settings, e.g., metal-free, transparent, and with tracking barcodes. Here we describe results of a survey regarding one such product, called eCig4Inmate™.

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RESULTS

Demographics A total of 578 Exposed respondents and 1,009 Non-Exposed respondents completed surveys and passed quality checks, for a total sample size of 1,587. The respondents had been incarcerated "within the past couple of years" across all but a few U.S. states.

Nine in ten respondents in both samples were male. Self-identified race/ethnicities (could choose more than one) were White (69.8% of Exposed and 74.5% of Non-Exposed), Black/African American (22.65% of Exposed, 16.6% of Non-Exposed), and Hispanic/Latino (any race) (9.5% of Exposed, 9.6% of Non-Exposed). The vast majority were under age 45, with the largest proportion of each group aged 25-29 (48.3% of Exposed, 36.7% of Non-Exposed).

Post-incarceration (current) tobacco product use In line with previous research, the large majority of persons in both recruited samples used tobacco products, often multiple types. In the Exposed group, 84.1% reported smoking daily, 14.9% smoked on some days, and 1.0% not at all; in the Non-Exposed group, 69.3% smoked daily, 21.4% some days, and 9.3% not at all. More of the Exposed group used e-cigarettes, with 76.8% using daily and just 0.7% not at all; among the Non-Exposed, 13.9% vaped daily, and 47.9% had not vaped at all. Roughly half of each group used smokeless tobacco at least some days.

Use of eCig4Inmate™ while in jail/prison Before their recent stay in prison/jail, almost all of the Exposed sample (who had the opportunity to purchase eCig4Inmate™) were tobacco users; only six people did not use any form of tobacco. Just 8.8% of the sample were nonsmokers.

The vast majority of people who had the opportunity to try vaping when incarcerated did so. Among pre-incarceration daily smokers, 95.1% tried vaping the product; 99.0% of those went on to purchase more than one eCig4Inmate™ device. Among non-smokers (most were tobacco users), 86% tried vaping; all but one continued.

User perceptions of eCig4Inmate™ The 522 people in the Exposed sample who bought more than one eCig4Inmate™ device were asked in an open-ended question, **What did you most like about eCig 4 Inmate?** Most mentioned were taste and flavors (e.g., "The awesome flavors"; "I like the flavor and my ability to satisfy my nicotine urge"; "I liked the menthol flavor and the mixed berries"). Other frequently mentioned positive features were appearance and design (e.g., "The design is very high-end"; "It's very small. It's very convenient to hold it in your hand"; "Very safe design") durability (e.g., "It is very durable very stable") and the product name (e.g., "It is very good brand"). Finally, there were a number of general positive comments, such as "Excellent product I love it" and "A trusted product."

Among pre-incarceration daily smokers, the most frequent reasons selected for deciding to try eCig4Inmate™ were: "I liked the name eCig 4 Inmate" (45.1%), "I was curious" (35.5%), "The flavors sounded good" (25.9%), and "To deal with stress/calm down" (22.2%). (Respondents could choose multiple reasons.)

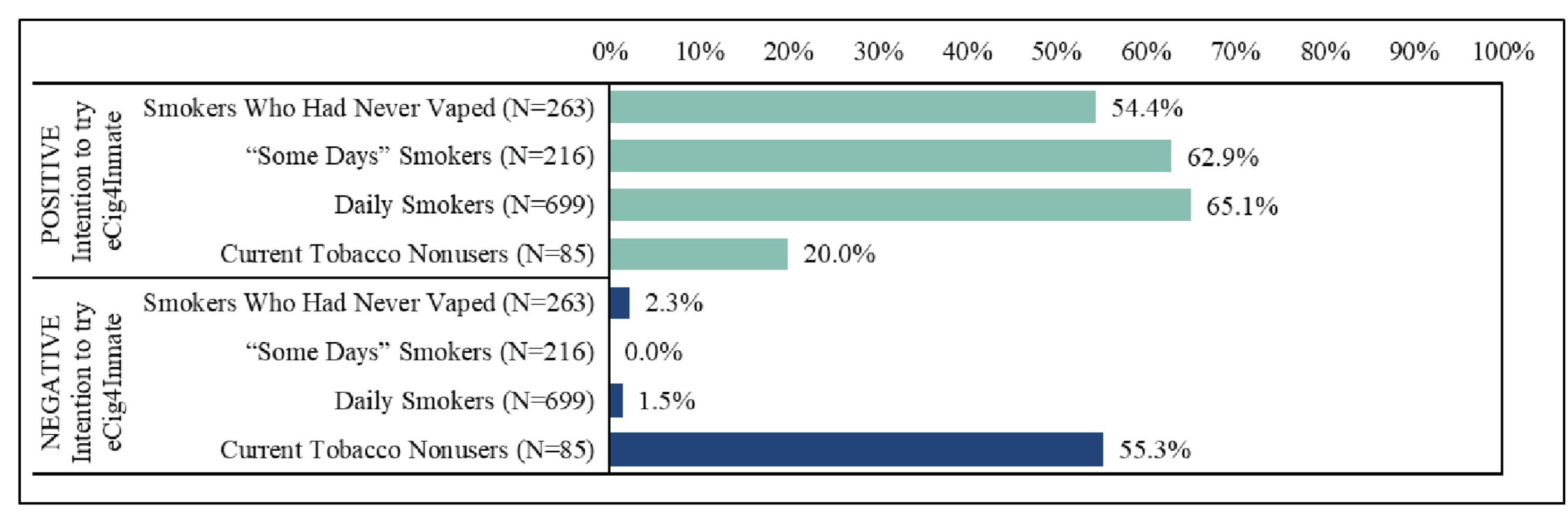
Intent to try eCig4Inmate™ if re-incarcerated People who could not legally vape or smoke during their most recent incarceration (Non-Exposed sample) were asked about their intent to try vaping if they were in jail/prison in the future:

"eCig 4 Inmate is sold in state prisons and jails where cigarette smoking is banned. When answering the questions below, assume that eCig 4 Inmate is the only tobacco product sold at the prison/jail commissary.

If you were incarcerated today and this product was available...How likely would you be to try this eCig 4 Inmate?"

Response options were on a six-point scale. To highlight tobacco user subgroup differences, we compared the **positive intention to try** (top two: "very likely to try" and "definitely would try") and the **negative intention to try** (bottom two: "definitely would not try" and "very unlikely to try") eCig4Inmate™ in the intended use setting. (Fig. 1)

Figure 1: Positive/Negative Intentions to Try eCig4Inmate™, by Tobacco Use Status (Non-Exposed Sample)



The positive intention to try eCig4Inmate™ in the intended use setting among daily smokers was 65.1%; for daily vapers, 78.5%. This compares to 20.0% among tobacco nonusers, and 23.4% among the 94 current nonsmokers (not shown). Among those smokers completely unfamiliar with vaping, the positive intention to try (54.4%) was more than twice that of nonsmokers.

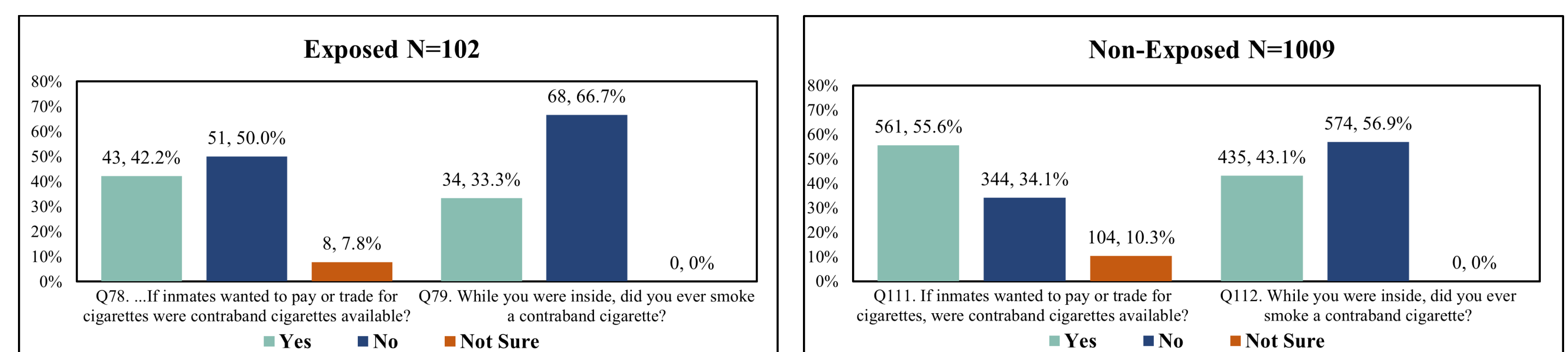
Perceptions of eCig4Inmate™ by people new to it Asked **Based on what you know or have learned in this survey, overall, what do you think about the eCig 4 Inmate product?**, at least 67 of the 395 comments left by the 699 Non-Exposed current daily smokers spontaneously indicated a desire to use the product. Examples:

- "I would be willing to try it if I was ever incarcerated again."
- "I am thrilled. I wish this had been available while I was incarcerated. It would have made a world of difference. I hope I never have to return to thst facility, however if I do and this is available im definitely a customer."
- "Maybe it'll help people in prison quit smoking. It would be great to get into the habit of replacing cigarettes with e-cigarettes in prison. I've been trying to quit, but each time I've given up because of the pain of nicotine withdrawal."

Many smokers also mentioned risk, safety or health issues, with positive comments far outstripping negative ones. For example: "The most important thing is that I think it is healthier than cigarettes." "It's a good substitute for cigarettes in correction facilities but it has it's risks too."

Availability of contraband cigarettes Respondents who confirmed that cigarettes were not legally sold at any point during their recent incarceration were asked two questions about contraband tobacco. (Fig. 2)

Figure 2: Availability and Use of Contraband Cigarettes During Last Incarceration



Reports of contraband were even higher when results are limited to addicted smokers: 36.6% of Exposed and half (50.8%) of Non-Exposed current daily smokers said they had smoked a contraband cigarette while "inside."

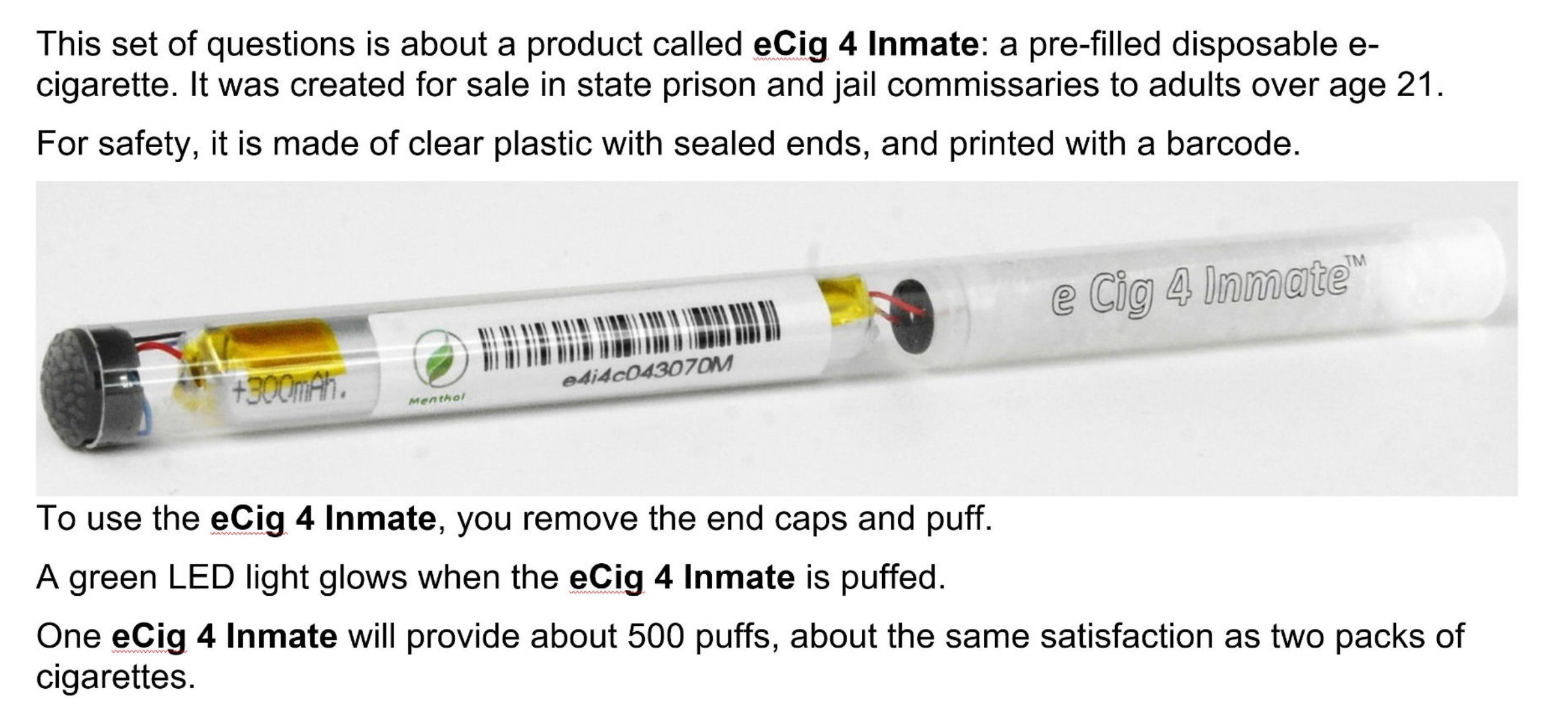
STUDY OBJECTIVES AND METHODS

The goals of the study were to understand product perceptions, tobacco product use history and intentions, and actual use of eCig4Inmate™ among a diverse sample of persons who had been recently incarcerated. This includes persons who did and did not have the opportunity to purchase eCig4Inmate™ during a recent incarceration, designated as Exposed and Non-Exposed samples respectively.

Study inclusion criteria were incarceration in a U.S. state prison or local county jail within the past two years, for more than two weeks, and aged 21 or over during that time. "Exposed" respondents spent at least part of a recent incarceration in a jail/prison where eCig4Inmate™ was the sole (or one) vaping brand sold in the commissary (identified from a list of product names/photos); this included facilities transitioning from cigarettes to e-cigarettes. "Non-Exposed" respondents were most recently in a jail/prison where no cigarettes or e-cigarettes were legally sold. Smokeless products such as nicotine pouches may have been sold. The goal was to recruit a gender and racial/ethnic mix roughly reflective of the incarcerated population, and to over-recruit tobacco nonusers. Ads were posted on Craigslist and Facebook nationwide in August and September, 2021, including areas near facilities where eCig4Inmate™ was known to be sold; a \$15 gift card incentive was offered.

Survey questions addressed current nicotine product use, pre-incarceration use (Exposed sample only), ever-use of cigarettes and e-cigarettes, future tobacco use intentions, and exposure to contraband cigarettes (asked of those who never had legal access to cigarettes during their last incarceration). Respondents who had an opportunity to purchase eCig4Inmate™ were asked about trial and purchase of the product, reasons for use or nonuse, and satisfaction/dissatisfaction with the product, including compared to cigarettes.

Figure 3: Survey Image: eCig4Inmate™ Product Description



CONCLUSIONS AND IMPLICATIONS

- Given the opportunity to try eCig4Inmate™ when incarcerated, the vast majority of daily smokers did so; of those, virtually all continued to purchase and use it.
- The large majority of smokers new to eCig4Inmate™ (even those who had not previously tried vaping) were interested in trying it if incarcerated today.
- Given the opportunity to use an appealing prison-safe e-cigarette, there is high likelihood that incarcerated adult smokers will try it and will switch to vaping.

Note that despite stated intentions not to try eCig4Inmate™ by most tobacco nonusers and nonsmokers in our Non-Exposed sample, most nonsmokers in the Exposed sample did try and use e-cigarettes when given the opportunity in prison/jail.

From a public health perspective, the reality is not that incarcerated people face a choice between e-cigarettes and not smoking; it's a choice between legal e-cigarettes and illicit combusted tobacco. Using no tobacco products is least risky to health. However, uptake of an e-cigarette such as eCig4Inmate™ is far less risky than smoking cigarettes, smoking illicit prison-made products (filled with leftover cigarette butts or used chewing tobacco), or misusing NRT (e.g., smoking nicotine patches).

In 2018, the Scottish Prison Service and the Scottish Government decided to ban all combustible tobacco from prisons due to health concerns. In contrast to the experiences of other nations, "contraband tobacco was not reported to be a major problem" following implementation of smoke-free prison policies. "These findings may be explained by high levels of vaping among PIC [Persons in Custody] in Scotland as an alternative to tobacco, in contrast to other jurisdictions which have reported problems with illicit tobacco markets or NRT misuse" [8].

An ENDS product with the safety features described here (e.g., metal-free and trackable, without the fire risk of cigarettes) might also be suitable for use with other vulnerable populations with high health burdens from smoking and a need to balance autonomy with safety. This includes persons with severe mental illness [9] or those in nursing home care [10].

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