



## **NET FACT SHEET ANALYSIS**

*A flawed substantiation for the  
flavor ban in e-cigarettes*

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## SUMMARY

State Secretary Blokhuis intends to allow only tobacco flavors and ban other vaping flavors. He bases this intention on the advice of the National Expertise Centre for Tobacco Control (NET), which is described in Factsheet Electronic Cigarettes <sup>21</sup>.

Under the leadership of Rob de Lange (Acvoda) and in collaboration with Frank Conijn (researcher-publicist health care) we have investigated whether the Fact Sheet is a document that accurately and completely reflects the current state of scientific knowledge and insights but come to the conclusion that this is not the case. We present a number of serious cases of selective citation and omission of important information by the NET, which would have led to substantially different advice. Following the publication of the NET Fact Sheet, new studies have been published and are also quoted.

Looking at the literature as a whole and considering it fairly, we arrive at the following findings:

1. Vaping is the most effective way to stop smoking.
2. Other flavors have a substantially higher chance of success than when only tobacco flavors are available.
3. Flavors may cause more people to start vaping, but there are many more people in the Netherlands who (try to) quit than start smoking because of flavors.
4. Smokers who have successfully continued to quit gradually reduce their need for vaping. Should there be any significant harmful effects of vaping, these are of limited duration.
5. Much research into the composition of vapor has been done with first-generation devices. These have already produced far fewer harmful substances than smoking. The current (4th) generation devices produce significantly fewer undesirable substances compared to the 1st generation.
6. There is no evidence that nicotine increases the risk of cancer.
7. No sound scientific evidence seems to support the claim that nicotine inhibits brain development in young people. However, there is evidence that smoking inhibits brain development in young people, but this should not be equated with nicotine use.
8. The actual effect of nicotine on cardiovascular disease requires long-term epidemiological research. On balance, this could even have a positive effect, as was the case with caffeine.
9. There is no evidence from end-point studies that vaping causes respiratory diseases.
10. With regard to the presence of heavy metals in vapor, a distinction is rarely or never made between the various subtypes.
11. Dual use (vaping plus smoking) is no more harmful than smoking alone. A clear definition of dual use is lacking, making it impossible to determine how many people do so. Vaping plus the occasional cigarette is not sufficient to qualify a person as a dual user.
12. In fact, a flavor ban seems to result in more novice smokers.

Acvoda believes that a flavor ban is disproportionate to the legislation on other stimulants such as alcohol and soft drugs. Furthermore, a flavor ban is not enforceable and will lead to uncontrolled, illegal market practices which could easily lead to new affairs à la EVALI affair in the US.

We acknowledge that there are substances that should not be present in the liquids used in certain concentrations. We are available to a remunerated Vaping Products Admissions Committee, which sets out rules and criteria for this. In that capacity, we would also like to (further) reduce dual use by allowing users to switch entirely to the e-cigarette.

Finally, we are making alternative additional proposals to keep young people away from smoking, without promoting vaping in the process.



## INTRODUCTION

State Secretary Blokhuis intends to allow only tobacco flavors and ban other vaping flavors. He bases that intention on the solicited advice of the National Tobacco Control Expertise Centre (NET). The NET puts forward the following main arguments in its Factsheet Electronic Cigarettes<sup>21</sup>:

- A. Other devices are just as effective in quitting smoking as vaping devices.
- B. Flavors reduce the threshold to start vaping.
- C. Vaping is a steppingstone for smoking.
- D. Vaping itself is so bad for one's health that even if it did not lead to smoking, flavors should still be banned.

However, before the House of Representatives agrees with the State Secretary's intention, it should check whether NET's arguments are valid and have sufficient weight. Together with a number of other matters, she should demand an answer to the following questions:

1. What is the NET Fact Sheet based on?
2. Are other tools indeed as effective as vaping devices to stop smoking?
3. Are flavors more effective in quitting smoking?
4. Does the availability of flavors indeed lead to substantially more people who vape?
5. Does the availability of vaping devices or flavors lead to substantially more tobacco smokers?
6. How harmful is vaping?
7. Is a flavor ban reasonable, also in relation to (missing) measures on other stimulants?
8. Is a flavor ban enforceable and, if so, is it effective?
9. Are there any other ways to ensure that young people do not start smoking?

### 1. WHAT IS THE NET FACT SHEET BASED ON?

It is, as stated in the Fact Sheet on page 2, based on literature reviews already done by others, complemented by own literature research and a number of studies on the Dutch situation. The most important literature review is that of the *National Academies of Science, Engineering and Medicine* (NASEM) from 2018<sup>22</sup>. This is a very extensive and recent literature review, and the Fact Sheet frequently refers to it.

The Fact Sheet also claims to be based on a report by *Public Health England*, the English RIVM. This report is discussed in this paper under the heading Conclusion and Discussion.

### 2. ARE OTHER DEVICES AS EFFECTIVE AS VAPING DEVICES TO QUIT SMOKING?

The NET fact sheet states yes, on page 1, but the literature used for the substantiation states otherwise. The NASEM report concludes, at <https://t.ly/W45K> > Smoking Cessation Among Adults > Conclusions:

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*Conclusion 17-4. While the overall evidence from observational trials is mixed, there is moderate evidence from observational studies that more frequent use of e-cigarettes is associated with an increased likelihood of cessation.*

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This conclusion was later confirmed by three other studies, namely, observational studies by Levy et al<sup>16</sup> and Johnson et al<sup>12</sup>, and a randomized clinical trial (RCT) by Hajek et al<sup>8</sup>.

The NET also found these studies in its additional literature review. However, of the first two, it states in its fact sheet (p. 13) *only* that they found that the use of e-cigarettes was associated with the number of quit attempts. It omitted to mention that the studies concluded that they were associated with successful quit attempts. This is a very questionable form of selective citation because it is a crucial point.

Hajek et al<sup>8</sup> found in their RCT that the chance of still being quit after a year was almost twice as high for vapers as for users of sec nicotine substitutes (18% vs. 9.9%). The NET tries to trivialize this research on page 13 with three arguments:

1. It states that 80% of the successful stoppers in the vaping group still used their device after that year, compared to 9% in the other group. However, if vaping is not very harmful itself (more about that later), that's a good trade-off. Moreover, Farsalinos et al<sup>3</sup> found that ex-smokers who started to vape reduced the amount of vaping, from 16.8% after 1 year to only 0.7% after 6 years.
2. It puts forward an inconsistent argument about the success rates in the Netherlands showing that the NET does not understand or, in this case, does not want to understand the essence of RCTs. It also implicitly states that the quality of sec nicotine substitutes in England would not be good but does not provide any evidence for this. It should be noted that the same sec nicotine substitutes available in the Netherlands are also freely available on the English market.
3. The NET states that whoever buys an e-cigarette does not receive the guidance that was offered in the research. But that is just as true for sec nicotine substitutes, so also that point is lacking any ground.

The above examples show that the NET has not included all relevant information, research and data available in its fact sheet. This suggests that there are strong doubts as to whether the NET has succeeded in providing a neutral, accurate and complete overview of the state of affairs in this science in its fact sheet.

A body that is the de facto standard for scientific literature research in the international medical world is the Cochrane Library. The latest Cochrane review<sup>10</sup> on e-cigarettes found that vaping is up to 70% more effective than sec nicotine substitutes with a reasonable degree of certainty. That vaping devices are more effective is not surprising. Smoking addiction consists of three components: the nicotine, the flavor sensation and the action ("the ritual"). The vaping device is the

only product that replaces all three without containing tobacco. (In addition to the vaping device, there is also the heat-not-burn cigarette, which heats tobacco instead of burning it). Furthermore, the preference of the smoker who wants to quit should be taken into account in this judgement. Smokers prefer a vaping device (= e-cigarette). Hummel et al<sup>11</sup> carried out European research into this and found that an e-cigarette was used in 43.8% of the quit attempts in the Netherlands, compared to only 18.9% for other devices (including medicines and sec nicotine substitutes).

Hummel et al<sup>11</sup> also found that in England, a country where the vaping device is promoted as an aid by health authorities, as many as 46.3% of smokers had attempted to stop smoking in the previous 12 months, compared to the significantly lower percentage of 31.5% in the Netherlands. One might suspect that there might also be other causes causing such a difference. However, Levy et al<sup>17</sup> pooled the results of three English national surveys and found:

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*(S)ubstantial reductions in smoking prevalence occurred in England from 2012 to 2019, coinciding with the growth in nicotine vaping product use.*

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It is striking that two of Hummel's fellow researchers for the NET work(s), and one of them even co-authored the NET fact sheet - without Hummel et al<sup>11</sup> being included as an article. This again suggests that the NET has been misguidedly selective in its literature research.

### 3. ARE FLAVORS MORE EFFECTIVE IN QUITTING SMOKING?

The answer is 'yes'. Friedman and Xu<sup>6</sup> researched and found this very recently:

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*Vaping nontobacco flavors (rather) than vaping tobacco flavors (...) was associated with increased adult smoking cessation (AOR in adults, 2.28, P=0.4).*

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AOR stands for *adjusted odds ratio*, a statistical term, and indicates that the chance of a successful quit attempt with flavors was 2.28 times greater. The P-value, which expresses the chance of coincidence, must be 0.5 or smaller (= a chance of 1:20 or smaller).

Romijnders et al<sup>25</sup> made a similar finding, namely that the availability of flavors was the most important thing for Dutch smokers to (completely) switch to the e-cigarette. They also found that single vapers (vaping only, no more tobacco use) more often used flavors than dual users (see later for their relevance). This research is briefly touched upon in the NET fact sheet, but does not get the attention it deserves.

#### 4. DOES THE AVAILABILITY OF MANY DIFFERENT FLAVORS LEAD TO SUBSTANTIALLY MORE VAPING?

The NET fact sheet states that it does, and there is indeed reason to assume that it does. However, if vaping is not particularly harmful itself (see chapter 6), this is not a major problem. The NET fact sheet writes on page 7 that a complete switch from smoking to vaping will bring health benefits in the short term. So, if vaping makes many more people quit rather than start smoking, the attractiveness of flavors can be seen as desirable.

The Fact Sheet on page 10, right column, based on their own research<sup>30</sup>, writes the following about this:

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*96,8% van de (wel eens) dampers in 2018 gebruikte eerst reguliere tabaksproducten (...) alvorens een e-sigaret geprobeerd te hebben, terwijl 3,2% eerst de e-sigaret gebruikte voordat ze reguliere tabaksproducten probeerden.*

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So, there are indeed many more people in the Netherlands who (try to) quit smoking by using an e-cigarette instead of those who start smoking by using an e-cigarette. In this case, the availability of flavors is not taken into account. Therefore, on balance, the attractiveness of flavors can have a positive effect on public health.

#### 5. DOES THE AVAILABILITY OF VAPING DEVICES OR FLAVORS LEAD TO SUBSTANTIALLY MORE TOBACCO SMOKERS?

The NET fact sheet states that this is true, or at least it states that there are more and more indications that would support this statement. However, when Kim et al<sup>13</sup> analyzed the same data, it appeared that the reasons for starting to smoke traditional tobacco products were mainly different than the use of an e-cigarette.

There is also the study by Shabab et al<sup>28</sup> which found that less than 1% of young people who had used e-cigarettes would turn out to be tobacco smokers. At the end of the day, it's all about the regular users. All other surveys regarded respondents who had smoked a single cigarette in a previous period as smokers. However, this could never be considered realistic. After all, a person who has had one glass of wine in a certain period of time is not considered to be an alcoholic. In this context it is about regular smoking.

Shabab et al<sup>28</sup> found that young people who started using an e-cigarette *were significant less likely* to become regular smokers than young people who immediately started using tobacco.

Furthermore, the aforementioned Friedman and Xu<sup>6</sup> found that other flavors were no more associated with smoking than tobacco flavors:

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*Vaping nontobacco flavors was no more associated with youth smoking initiation than vaping tobacco flavors.*

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This makes the so-called *common liability theory* much more likely than the *gateway* theory (= steppingstone). Flavors, and even vaping devices in general, are unlikely to lead to regular smoking. Becoming a regular smoker has other causes, such as an innate tendency to become addicted to psychotropic substances.

## 6. HOW HARMFUL IS VAPING?

This question is important because smokers who switch to vaping may continue to do so. First, we will look at the vapers themselves i.e., the (produced) components. Then the question whether vaping combined with smoking (*dual use*) is more harmful than smoking alone.

Nicotine-containing vaping liquid consists, as the NET fact sheet also states, of three (groups of) ingredients: nicotine, (natural) flavorings, and the base liquid in which they are dissolved. This base liquid is called the carrier and consists of water and propylene glycol and/or glycerol (= vegetable glycerine), the two (P)G's.

### 6.1. Propylene glycol and glycerol

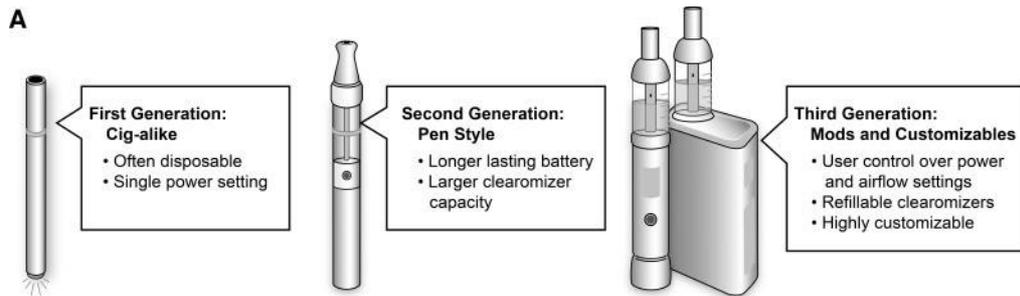
The two (P)G's have been used for decades in cosmetics (including ophthalmic cosmetics) and disinfectant gel, as a wetting agent. They are used in vaping liquids because when heated they change into a visible aerosol form, which forms the vapor. This visible vapor has a psychological effect on the (ex-)smoker: it helps to loosen up the tobacco addiction.

The Fact Sheet states that the two (P)G's can cause irritation of the respiratory tract. However, if this were really the case in practice, users would automatically quit. Probably this is a laboratory finding that has been extrapolated to daily life. Or it is a self-solving problem.

In addition, the Fact Sheet makes no distinction between unwanted irritation and the desired throat irritation that forms an essential part of the taste experience. The Fact Sheet also states that when glycerol is heated, harmful substances can be produced, including aldehydes (formaldehyde and acetaldehyde), referring to the literature review of Chun et al<sup>1</sup>. This review is based on the research of Sleiman et al<sup>29</sup>, to which we will return in a moment.

Chun et al<sup>1</sup> also state that the development of vaping devices, which is (has been) a rapid one, is one from light to heavy (the image below is from their review). This means that the temperature in the evaporating element, which can contain one or more *coils*, can be increasingly lower to produce the same amount of vapor (= output).

This can be compared to an engine capacity of 1 liter versus 3 liters. The pistons in a 3-liter car can take it much slower to reach the same speed (= output).



The just mentioned Sleiman et al<sup>29</sup> write about this in their summary (bold print by us):

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*Emission rates (...) were significantly higher for a single-coil vs a double-coil vaporizer (by up to an order of magnitude for aldehydes).*

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So, the forming/emission of harmful substances can strongly depend on the power of the heating element. This also means that a lot of research has to be done again, with modern vaping devices, given that first-generation vaping cigarettes are hardly used anymore.

In addition, a replication study by Farsalinos et al<sup>4</sup> found that other researchers had mistreated the vaping devices by dropping them dry. A user would then stop immediately because the taste of a burnt-out element is extremely unpalatable. The user then immediately refills the fluid reservoir and, if necessary, replaces the element. In normal use, therefore, many times fewer aldehydes are formed than in a number of studies on which the NET has been 'proven' to be based.

Furthermore, the permissible safe values must be carefully observed. For example, Klager et al<sup>14</sup> found that the concentration of formaldehyde in inhaled vapor is on average 626 mcg/1000 liters, whereas 370 in continuously inhaled air is the safe limit.

One normally breathes about 17,280 times a day (12/min x 60/h x 24/day), as opposed to at most 400 breaths from a vaping device (the equivalent of 2 packs of cigarettes x 20 pieces x 10 strokes). Assuming proper ventilation, the extra amount of formaldehyde that would be ingested through vaping is close to zero.

The NET also writes that when glycerol is heated, acrolein can form. This substance is further treated under the heading 'Heavy metals and other substances'.

## 6.2. Nicotine

### 6.2.1. Carcinogenic?

With regard to nicotine, the NET fact sheet, on page 4, states that it can promote the development of tumors. It refers to the NASEM report. However, this report writes on <https://t.ly/W45K> > Section I > Nicotine > Carcinogenesis (fat print by us):

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*While it is biologically plausible (≠ bewezen, Acvoda) that nicotine **can** act as a tumor promoter, the existing body of evidence indicates this is **unlikely** to translate into increased risk of human cancer. (...) Based on the existing body of evidence, it is reasonable to infer there is likely **no significant increase** in risk of cancer from exposure to nicotine delivered by e-cigarettes.*

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It is clear that the NET has quoted the NASEM report incorrectly. However, this has far-reaching consequences, because the NASEM's final conclusion is that nicotine does not increase the risk of cancer, whereas the NET fact sheet concludes exactly the opposite. Such a gross error is scientifically unforgivable.

#### 6.2.2. Cardiovascular disease?

Regarding the risk of cardiovascular disease, the NET writes that nicotine is associated with an increase of this risk, again referring to the NASEM report. However, the report itself is far from certain about this.

At <https://t.ly/W45K> > Section I > Nicotine > Cardiovascular Effects NASEM writes (fat print by us):

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*[E]xposure to nicotine from e-cigarettes likely elevates the risk in people with pre-existing cardiovascular disease(s), but the risk in people without cardiovascular disease(s) is **uncertain**.*

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The caffeine story is mentioned. For decades, caffeine has been believed to be bad for your health because it can cause heart rhythm irregularities. However, long-term epidemiological research has shown that it doesn't matter whether one drinks normal or caffeine-free coffee. And that two to five cups of coffee a day reduces the risk of heart disease (and one stroke) by 10%, on diabetes II even by 30%<sup>35</sup>.

Nicotine dampens the appetite, and when people stop smoking and use nicotine substitutes, they gain less weight<sup>2</sup>. In view of the fact that obesity is becoming a growing problem in the Netherlands, with substantial health consequences, it may well be that long-term epidemiological research into the use of nicotine substitutes, including vaping, will not find a negative effect on cardiovascular diseases on balance. Perhaps even a positive effect.

### 6.2.3. Brain development inhibited in young people?

The NET fact sheet also states that nicotine inhibits brain development in adolescents. It bases this on two reports by the American *Surgeon General*<sup>23,24</sup>. However, the 2016-report<sup>24</sup> refers to that part of the report to the 2014-report<sup>23</sup> and that report only refers to brain development in young *smokers*. It does **not** include young e-cigarette users. Tobacco combustion produces, among other things, carbon monoxide, which is a very potent consciousness-reducing substance (which must therefore also be mentioned on tobacco packaging), to name but one of the differences that are largely responsible for inhibited brain development.

The Fact Sheet bases its findings on a third source for this point, namely a WHO report<sup>37</sup>. That report refers to three reviews of the literature, that of Kutlu et al<sup>15</sup>, Yuan et al 2015<sup>40</sup> and Hall et al<sup>9</sup>. All three are *narrative reviews*.

However, none of the three appear to provide a solid foundation for the WHO's thesis. Kutlu et al<sup>15</sup>, on the other hand, do state the following in their summary (bold print by us):

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*Studies clearly demonstrate that nicotine mediates acquisition and extinction of fear as well as anxiety through the modulation of specific subtypes of nicotinic acetylcholine receptors (nAChRs).*

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Nicotine demonstrably takes away fear and unrest. Two placebo controlled RCTs, those of Lewis et al<sup>18</sup> and Janes et al<sup>40</sup>, later provided additional support for this assertion. Lewis et al<sup>18</sup> found in their exploratory research that nicotine reduced aggression and irritability in patients with autism. Janes et al<sup>40</sup> found that nicotine normalized a major brain dysfunction in major depressive disorders (MDD) in non-smokers:

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*These results indicate that nicotine normalizes dysfunctional cortico-striatal communication in unmedicated non-smokers with MDD.*

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The third review that the WHO is relying on (Hall et al<sup>9</sup>) is about what is happening in the brain when a prolonged supply of nicotine suddenly stops. It is not a study of the development of young brains under the influence of nicotine. And where it draws a conclusion about the relationship between nicotine and brain functions, it states something completely different in the summary (fat print by us):

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*(S)mokers generally report that other consequences of nicotine use, including the ability of nicotine to alleviate negative affective states or cognitive impairments, as reasons for continued smoking. These states could result from nicotine withdrawal, **but may also be associated with premorbid differences in affective and/or cognitive function.***

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According to them, it could just as well be that already existing differences in brain functions of certain people precede becoming dependent on nicotine use. This is something quite different from what the WHO states.

All in all, the WHO is also guilty of writing unsubstantiated or poorly substantiated statements. There seems to be no sound scientific evidence for the proposition that nicotine inhibits brain development in young people. This evidence does exist with respect to smoking, but it should not be equated with nicotine use.

### 6.3. Flavorings

The Fact Sheet on page 5 states that certain flavors have been found in vapor liquid (butter flavoring [diacetyl] and cinnamon) and that they cause lung problems in humans, with reference to the NASEM report. However, that report does not state anything about these substances, as far as we could find. On <https://t.ly/W45K> > Section II > Respiratory Diseases we did find the following conclusion regarding e-cigarettes and respiratory treatments (fat print by NASEM):

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*Conclusion 11-1. There is **no available evidence** whether or not e-cigarettes cause respiratory diseases in humans.*

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Melvin et al<sup>19</sup> found that the concentrations of diacetyl in vapor remained below the generally used toxicological limits. The misquotation/reference by the NET has been observed more often and is increasingly undermining the credibility of the fact sheet and the NET.

The Fact Sheet also states that by the use of flavorings it is possible that benzene alcohols, terpenes, pyrazines, menthol and sweeteners such as ethylmaltol can end up in the vapor. The latter two are intentional, while the other substances fall far short of the list of similar substances in coffee<sup>36</sup>. (See also subsection 6.4 on the importance of dose).

Nevertheless, there may be or will be flavorings that do cause problems. We advocate legal regulation, whereby only liquids with a certain level of safety may be sold by Dutch sellers. We make ourselves available to sit on a remunerated Vaping Products Approval Committee, which draws up rules, procedures and criteria for this.

### 6.4. Heavy metals and other substances

With regard to heavy metals and some other potentially harmful substances, we also note that they have been found in vapor. However, it is usually not made clear which subtypes of heavy metals are concerned.

For example, chromium is an indispensable element in the daily diet<sup>34</sup>, but chromium-6 is a toxic substance. This also accounts for substances such as lead, mercury and cadmium, which also contain fewer and more harmful forms, including atoms versus ions (= charged atoms). It is therefore essential to interpret these subtypes of substances precisely.

Each substance has its safe and toxic dose. For example, even arsenic is permitted in certain quantities in food products<sup>33</sup>. The same applies to acrylamide<sup>32</sup>), a substance that the Fact Sheet also mentions.

Furthermore, Goniewicz et al<sup>7</sup> has done good research into the concentration of the most worrisome substances in vapor, in the urine and blood of vapers versus people who had never smoked and had never vaped.

Urine/blood tests are necessary. After all, if substances are not or hardly absorbed by the lungs because they are blown out again, they are much less harmful. The concentrations found in the study should be compared with those of never-anything-users, because it could take a long time before substances in smokers who quit smoking have completely disappeared from the body.

Goniewicz et al<sup>7</sup> are the only ones who have done such research so far. Their findings were that such concentrations in vapers were slightly higher than those of never-anything-users, but not to such an extent as to give cause for great concern (see figure 1 of the article, which is attached as an appendix). This also applies to the acrolein mentioned in subsection 6.1. Nevertheless, we recognize that there may be major differences between the various brands, types and/or flavors. And, of course, we agree that harmful heavy metals, etc. should only be present in vapor in acceptable concentrations of these substances in vapors, at most. This also applies to the acrolein mentioned in subsection 6.1.

Nevertheless, we recognize that there can be major differences between the various brands, types and/or flavors. And of course, we agree that harmful heavy metals etc. should only be present in vapor in acceptable concentrations. This is also something we would like to include in the tasks of the Vaping Products Admission Committee.

## 6.5. Dual use

The NET fact sheet states that switching completely from smoking to vaping has health benefits in the short term, but also states that *dual use* (both smoking and vaping) is more harmful than smoking alone. Findings of Goniewicz et al<sup>7</sup>, however, indicate that dual use also brings health gains, it said to a much lesser extent than if one did not smoke or vape at all. The NET's claim about the harmfulness of dual use does not appear to be based on sound scientific evidence.

However, the question is how many - real - dual users actually exist in the Netherlands. It has already been substantiated in section 5 that the questioning in such surveys can lead to large differences in outcome and that questions should relate to regular users. This is no different with dual use. It is an unbelievable proposition that if one goes back to smoking an occasional cigarette from a pack of cigarettes per day with the help of vaping, that would be more harmful than if one continues to smoke a pack of cigarettes per day.

Yet the NET counted everyone who has *occasionally used* one product next to the other as dual users. On page 10 the Fact Sheet states:

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*Van de mensen die **wel eens** een e-sigaret gebruiken was in 2018 72,2% een dual user.*

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The percentage of regular dual users is unclear. However, given that 96.8% of the Dutch vapers were smokers before (see chapter 4), it can be assumed that people started to smoke in order to quit smoking. Then we find it unreasonable to assume that 72.2% are real dual users.

That does not alter the fact that real dual use should be seen as a bad habit for the time being. We are therefore in favor of including a leaflet with vaping devices and liquids that makes it clear that if one completely switches to vaping, substantial health benefits are to be expected, but that doing both regularly does not result in any health gains.

## 7. IS A FLAVOR BAN REASONABLE IN RELATION TO (LACK OF) MEASURES CONCERNING OTHER STIMULANTS?

Even if one would want to ignore all the above, the question remains whether a flavor ban is reasonable in relation to the (lacking) measures on other stimulants. Our answer is: no. As far as public health is concerned, the government would do much better to ban tobacco rather than vaping flavors.

In addition, there is an enormous discrepancy between the (intended) policy on weed versus vaping flavors. Where one product will be cultivated by municipalities, another will be banned, while weed contains even more tar and other harmful substances than tobacco<sup>38</sup>.

In addition, there are many other stimulants that are hardly hindered, such as alcohol, products with a lot of sugar and products with a lot of saturated fat. The intended ultra-strict approach to vaping and flavors in particular is in stark contrast. Such a ban would not pass the test of reasonableness and fairness, two indispensable characteristics of enacted legislation.

The NET itself states that the long-term consequences of vaping are not yet clear. It writes on page 1 of its fact sheet, as one of its key points:

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*Er zijn veel beperkingen in het beschikbare onderzoek naar e-sigaretten. Ook zijn nog veel onderwerpen niet voldoende onderzocht om een gebalanceerd eindoordeel te kunnen vellen over het netto volksgezondheidseffect van de e-sigaret.*

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*There are many limitations in the available research on e-cigarettes. Also, many topics have not yet been sufficiently researched to be able to make a balanced final assessment of the net public health effect of the e-cigarette.*

But while the harmful long-term effects of (over-consumption of) a range of other products are clear, they are virtually unaffected, and vaping flavors should be banned? In our opinion, this is testimony to a malicious bias against vaping products and vaping flavors in particular.

## 8. IS A FLAVOR BAN ENFORCEABLE AND DOES IT WORK?

That question too must be answered with 'no' for four reasons:

1. The criterion when something tastes like tobacco or something else is difficult to determine.
2. Internet sales. In many EU countries flavors are not forbidden and there is free trade between EU member states. Flavors would probably have to fall under the Opium Law in order to be exempted from this free trade. But that would result in a very unbelievable opium law: other flavors are forbidden but tobacco flavors are not.
3. Chances are that it will create a black market that will produce liquids of dubious quality.
4. Many flavors are also used in the food industry, even in liquid form. So, it's very easy to make a non-flavor vaping liquid into a flavored liquid with the help of a legal substance.

Points 3 and 4 also create the danger of mixing errors that can have acute, serious consequences. This is how the EVALI crisis arose in the USA, where users suffered serious lung damage in a short period of time, because the THC oil (THC is the most important psychoactive substance in cannabis) available on the black market was diluted with a completely legal oil that was completely unsuitable for this purpose. It goes without saying that legal manufacturers of vaping liquids have much more know-how than illegal ones and users.

And even if one would think one knows solutions to all these problems, there is still the question: does a flavor ban work? Here too the answer is 'no'. Yang et al<sup>39</sup> investigated the effect of the flavor ban in San Francisco and wrote in their summary:

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*(L)ocal bans can (...) significantly reduce overall e-cigarette use (...) but may increase cigarette smoking.*

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A counterproductive effect when it comes to smoking. In addition, according to the authors, the enforcement of the flavor ban was poor. If it improves, there is a good chance that *may increase* will change into *will increase*.

## 9. ARE THERE OTHER WAYS TO ENSURE THAT YOUNG PEOPLE DO NOT START SMOKING?

We have already argued why the proposition that vaping of flavors leads to smoking is unsustainable. But even if one wants to stick with that statement, there are other ways to make sure that young people do not start smoking or smoke at a lower rate:

- A. Better enforcement of the tobacco purchase age. Cigarettes are commonly sold over the Internet, and age verification by the mailman is regularly not done<sup>31</sup>. In the U.S., a much better method is used: automated banking age verification on Internet purchases. The banks already know the date of birth of their cardholders anyway, and at such webshops the age is already asked for, so privacy problems do not arise.

Furthermore, physical stores are periodically visited by so-called mystery-shoppers of the NVA, to check whether the seller complies with the age limit.

- B. Information at secondary schools. All these schools should give Health & Lifestyle lessons, in which among other things the harmful effects of tobacco smoking are highlighted. In our experience such lessons are rarely or never given.

Furthermore, a number of additional measures have recently been introduced or are still on the agenda, such as a further increase of the tobacco price, keeping the stock out of sight, a neutral packaging, and the smoking ban in the schoolyards. We support all these measures, but their combined effect can already be so great that a vaping flavor ban is reasonably no longer necessary.

## CONCLUSION AND DISCUSSION

A ban on non-tobacco flavors in e-cigarettes will have all the signs of the proverbial child being thrown away with the bath water. It is precisely the very real and likely chance that the ban will be counterproductive and may have a negative impact on public health.

That was also the conclusion of a voluminous report by English scientists commissioned by *Public Health England* (PHE), the English RIVM<sup>20</sup>. The main conclusion was that vaping is estimated to be 95% less harmful than smoking.

The NET fact sheet stated on page 8 regarding that report that it was only an opinion piece without scientific substantiation, and that there would be a conflict of interest of the authors of the report. In doing so, the NET shows that it did not review the 2018 version of the report, in which the propositions are once again confirmed, or that it deliberately produced a false representation of them.

The PDF version of the report shows on page 221 et seq. that it is based on the same extensive literature review as the NASEM report<sup>22</sup>. And on pages 7-8 that *none* of the authors, all of whom work in addiction or related care or science, has any conflict of interest.

Perhaps some of the authors of some of the underlying studies will have such a conflict of interest. But the opposite is just as true, as the Conflict-of-Interest statement of Rubinstein et al<sup>27</sup> shows (the *cessation device* mentioned therein is a computer tool).

Furthermore, in 2016 the *British Royal College of Physicians* conducted a very extensive literature study<sup>26</sup> that came to exactly the same conclusion as the PHE literature study. It is therefore more likely that the scientific content of the NET fact sheet itself is substandard.

This analysis shows that the NET fact sheet is severely deficient in some essential points and is guilty of selective selection and omission of important information. The resulting bias - the question is even whether this is not scientific deception - is further highlighted by the implicit statement in the fact sheet on page 6, which states that vaping should be further restricted because there is a risk of explosion from e-cigarettes if users start modifying the battery of the device. This argument applies to all electronic consumer goods that contain a battery, including cell phones. This can never be a reason to discourage e-cigarettes.

It could be argued that the NET's opinion has no far-reaching implications because it does not recommend a total ban on vaping, but only a ban on non-tobacco flavors. But if that does not work or is even counterproductive, it still remains a bad advice, which, from a scientific point of view, is unworthy of an organization such as the NET.

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Attached articles have been released for duplication by the respective publisher. All shortened URLs were functional at the time of publication of this document. For the URLs, the difference between the lowercase letter l and the uppercase letter I and between the number 0 and the uppercase letter O was noted. An electronic version of this note with clickable full **URLs is available at URL (Acvoda site) insert here.**

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## ANNEX OVERVIEW

The annexes consist of the following documents, all of which have been released by the publisher for duplication:

**Nationaal Expertisecentrum Tabaksontmoediging (NET 2020).** Factsheet Elektronische Sigaretten (E-sigaretten). April 2020.

**Friedman AS, Xu S (2020).** Associations of flavored e-cigarette uptake with subsequent smoking initiation and cessation. *JAMA Netw Open.* 2020;3(6):e203826.

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