The significance of flavour additives in the use of moist snuff and e-cigarettes

– with a focus on young people and the Nordic region

Nordic Welfare Centre

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Introduction

Measured in terms of morbidity and premature death, smoking tobacco is one of the greatest threats to public health in the Nordic region and the rest of the world. It is, however, a problem that can be prevented, which is why the Nordic countries are focused on the battle against smoking.

As well as smoking tobacco, there are other tobacco and nicotine products[1] with users on the Nordic markets, which helps to increase the overall proportion of tobacco and nicotine dependents. It is therefore also appropriate to focus on these in relation to people's health and public health in general.

In the Nordic countries in particular the smokeless tobacco moist snuff (snus) is widespread, but other smokeless tobacco products are also available on the markets, such as chewing tobacco and nasal snuff. In addition, electronic cigarettes (e-cigarettes) are to be found on the Nordic markets and the tobacco industry is continually developing new tobacco and nicotine products, such as Heat Not Burn and tobacco-free nicotine products, which are then launched on the Nordic markets where it is possible.

Both moist snuff and e-cigarettes differ from conventional tobacco products, such as cigarettes and roll-your-own tobacco, in terms of their content and the way in which they are used. Flavour additives[2], for example, are being phased out in conventional tobacco products but can be found in both moist snuff and e-cigarettes, which may be particularly appealing to young people.

This report focuses on the significance of flavour additives in the use of moist snuff and e-cigarettes, with a primary focus on young people and the Nordic region. It is based on the research that is available in the field, using a literature search of PubMed and Google Scholar.

[1] Approved medicinal preparations containing nicotine, such as medication for smoking cessation, are not included in the definition of nicotine products in this report.

[2] Flavour additives means all flavouring substances that are added to a product in order to give it a taste other than tobacco and which are not necessary for the manufacture of the product.

Background

The work of the Nordic countries – Iceland, Norway, Sweden, Finland (including Åland) and Denmark – on tobacco control and prevention is based on the World Health Organization (WHO) Framework Convention on Tobacco Control (the Framework Convention) of 2003, which all have ratified. The Framework Convention on Tobacco Control is the world's first international public health treaty negotiated under auspices of WHO and it contains evidence-based knowledge of the most effective initiatives and measures to combat tobacco and smoking, which the countries that have ratified it have a legal obligation to work with.

There are no rules on the order in which the tobacco control work is to take place and the pace at which it is to be carried out. This is the reason why there is a difference in terms of how far the Nordic countries have come with their tobacco control work and what they have so far prioritised and implemented. To support the countries in their work to implement the Framework Convention, the WHO has created the action-based MPOWER tool, based on the recommendations of the Framework Convention.

The European Union (EU) also supports the Framework Convention and so the EU's Tobacco Products Directive 2014/40/EU (the Tobacco Products Directive) also builds on evidence-based knowledge from there. The Tobacco Products Directive entered into force in 2014 and took effect from May 2016. The Tobacco Products Directive deals with laws and regulations governing the manufacture, presentation and sale of tobacco and related products, including smokeless tobacco products and electronic cigarettes. The EU's 28 Member States must at least comply with the provisions of the Tobacco Products Directive but may add further regulations if they so wish.

As members of the EU and/or the European Economic Area (EEA), the Nordic countries (with the exception of Greenland and the Faroe Islands, which are members neither of the EU nor the EEA), must incorporate the political priorities that come from the EU in relation to the single market into their legislation. There may, however, be individual exceptions. With regard to tobacco, therefore, the most recent Tobacco Products Directive applies.

Although Greenland and the Faroe Islands have not ratified the Framework Convention and are not members of the EU/EEA, they are also involved in the battle against tobacco and smoking.

Facts

Moist snuff

Moist snuff is a type of smokeless tobacco used in the mouth (orally). It is available in different forms, such as loose snuff and portion snuff, which comes in small bags resembling tea bags. Moist snuff, like other tobacco, contains carcinogenic substances and the addictive substance nicotine. Nicotine affects the brain and the nervous system, as it mimics important neurotransmitters in the body. The nicotine content can vary depending on the type of moist snuff and the manufacturer.

Moist snuff is often said to be a less harmful alternative to smoking, as the use of snuff does not harm the airways and the lungs like conventional tobacco smoking does. As there is no smoke associated with the use of moist snuff, it also does not affect the environment around the snuff user. However, there is still a general health risk involved in the use of moist snuff. Snuff use can be a contributory cause of cardiovascular diseases and type 2 diabetes and can increase the risk of cancer of the pancreas, mouth and oesophagus, for example. As moist snuff is used in the mouth, it can also cause severe damage to the mouth's mucous membranes, gums and teeth.

It has been illegal to sell and market moist snuff in the EU Member States since 1992, but when Sweden joined the EU in 1995, they were given dispensation for this and moist snuff is therefore a legal product on the market in Sweden. Norway, the Faroe Islands and Greenland are not members of the EU and moist snuff is also here a legal product on the market. In those countries where moist snuff is sold, the individual country's own legislation applies in relation to this. Norway is for example the first country in the world, to have introduced standardised/neutral packaging for moist snuff.

However, the moist snuff industry is keen to see itself on the EU market. Most recently, Swedish Match, the largest supplier of moist snuff to the Swedish and Norwegian markets, has attempted to achieve a relaxation of the ban on the sale of moist snuff in the EU, as it applies in the Tobacco Products Directive, through the English courts. The reason why Swedish Match is taking the matter to the courts is that they consider the current ban on the sale of moist snuff is not based on the latest research. The English courts have worked with the European Court of Justice in relation to the judgment in this case. The European Court of Justice has found that no new circumstances have arisen that could affect the validity of the Tobacco Products Directive. This means, therefore, that it

will continue to be prohibited to sell moist snuff within the EU, except in Sweden.

Even though the sale of moist snuff is prohibited in for example Finland, Denmark and Åland, data collected by the countries themselves shows that moist snuff is also used there. The three countries all border on Sweden, which can make the import of moist snuff easily accessible.

In Denmark and Iceland, however, there are other types of smokeless tobacco on the market, which are not subject to restrictions under EU legislation and regulations. In Denmark, for example, chewing tobacco is sold and in Iceland nasal snuff (neftóbak) is available, although this is mostly used as moist snuff.

There are also some new, alternative moist snuff products that are worthy of attention regarding their way into the markets in the Nordic region, such as tobacco-free nicotine products and nicotine-free and tobacco-free moist snuff.

E-cigarettes

The electronic cigarettes, also called e-cigarettes, that are familiar to us today, came onto the market in 2003. The e-cigarette itself (the equipment part) is available in many varieties, colours, brands and designs. This also means that an e-cigarette is not a unique product, but a combination of several things. Some of these are designed for single use and others for multiple use. E-cigarettes do not use tobacco, but an e-liquid (which you can use to refill your e-cigarette, for multiple use), which is heated and vaporised using a battery in the e-cigarette. The e-liquid is vaporised when the e-cigarette is used and the user sucks on the mouthpiece of the e-cigarette. With conventional cigarette smoking, the user inhales the smoke from the burning of the tobacco in the cigarette, but with e-cigarette use, it is the heated vapour from the e-liquid that the user inhales.

The e-liquid used in e-cigarettes can be obtained both with and without nicotine and in around 7,000 different flavours, which, in addition to the taste of tobacco and menthol, include fruits, sweets, chocolate, various soft drinks, alcohol and so on. How many of the 7,000 or so flavours are available on the Nordic markets is not known.

Due to the lack of long-term studies there continues to be great uncertainty about the use of e-cigarettes but they could potentially be associated with adverse impacts on health. It depends very much on the content of the e-liquid and the toxicological compounds. There may also be a risk associated with the e-cigarette itself, as it may overheat and explode.

Under the Tobacco Products Directive, some regulations have been issued in relation to the sale of e-cigarettes and e-liquids in the EU. These concern aspects such as the nicotine content of e-liquids and how the products are to be registered with the national authorities. However, the individual countries may add further regulations through their own legislation. Finland, for example, is the only country in the Nordic region to ban the purchase and sale of e-cigarettes and nicotine-containing e-liquids online and by post. In Norway, it is illegal to sell e-cigarettes containing nicotine, but this ban will be lifted during 2019, in line with the Norwegian government's decision of December 2016.

It is possible, however, to buy e-cigarettes and e-liquids online from countries outside the EU. Depending on where in the world you buy the products from, there may be less restrictive regulations in relation to e-cigarettes and the content of e-liquids, which can represent an increased risk to health and safety.

E-cigarettes, among other things, are a recommended aid to quit smoking in England, but at the present time none of the health authorities in the Nordic countries recommend e-cigarettes as an aid for smoking cessation.

Legislation on flavour additives in tobacco, moist snuff and e-cigarettes

Under the Tobacco Products Directive, the marketing of tobacco products with flavour additives is prohibited in the EU Member States, precisely in order to avoid giving the impression that some tobacco products have health benefits or constitute a limited health risk. Among other things, this is in order to protect young people and non-established smokers.

The final phasing-out of tobacco products with flavour additives that were on the market before the Tobacco Products Directive entered into force is now underway. This applies to tobacco products with the added flavour of menthol, which can no longer be sold on EU markets after 20 May 2020.

As the sale of moist snuff is banned in the EU, the Tobacco Products Directive does not apply to flavour additives in moist snuff. Instead, this is a Swedish issue in accordance with the principle of subsidiarity in the EU.

In the case of e-cigarettes and e-liquids with flavour additives, the EU Member States have individual responsibility for the rules that apply at national level. Finland is the only one of the Nordic countries to ban the sale of e-cigarettes and e-liquids (both with and without nicotine), with flavour additives in addition to the taste of tobacco.

How prevalent is the use of tobacco, moist snuff, and e-cigarettes?

Generally speaking, the prevalences of tobacco smoking have been declining in the Nordic countries for many years. This is the result of structural changes in terms of prevention and in society in general, in relation to tobacco smoking. However, there is still much work to be done to combat tobacco smoking and to secure a smoke-free future, which is the objective of several of the Nordic countries by 2025 (Sweden) and 2030 (Finland and Denmark) respectively.

In addition to tobacco smoking, it is also important to focus on reducing the use of other tobacco and nicotine products, such as moist snuff and e-cigarettes, on the grounds of public health.

Table 1: Proportion of people who daily smoke conventional tobacco, use moist snuff/smokeless tobacco and/or e-cigarettes

		Smoke tobacco daily (%)			Use moist snuff daily (%)			Use e-cigarettes daily (%)
Year	**Country**	**Men**	**Women**	**Total**	**Men**	**Women**	**Total**	**Total**
2018	Iceland (18+ years)	8.9	8.9	8.9	6.2[a]	0.6[a]	3.4[a]	4.8
2018	Sweden (16–84 years)	7	7	7	18	4	11	1
2018	Denmark (15+ years)	17	17	17	1.5	0.2	0.8	3
2018	Norway (16–74 years)	12	11	12	18	7	12	1.2[b]
2018	The Faroe Islands (18+ years)	24	15	20	n/a	n/a	n/a	n/a
2017	Finland (20–64 years)	15	12	13	5	1	3	1
2016	Åland (18–79 years)	9	6	8	13	1	7	0.3
2014	Greenland (18+ years)	56	57	57	6.1	1.3	3.2	n/a

n/a = data unavailable.

[a] The figures cover smokeless tobacco as a whole and include neftóbak, moist snuff, etc.

[b] Data on the use of e-cigarettes is based on figures calculated from the IPSOS survey for the period 2015–2017.

(References: The Danish Health Authority, 2019. Danskernes rygevaner 2018; Terveyden ja hyvinvoinnin laitos, 2018. Tupakkatilasto 2017; Statistics Norway, 2019. Tobacco, alcohol and other drugs; The Public Health Agency of Sweden, 2018. Bruk av cigaretter, snus och e-cigaretter i den vuxna befolkningen; Directorate of Health Iceland, 2018. Surveillance of Determinants of Health; Danish National Institute of Public Health, 2016. Befolkningsundersøgelsen i Grønland 2014; Fólkaheilsuráðið, 2018. Daglig royking er metlág í nýggjari Gallup kanning; Statistics and Research Åland, 2016. Ålänningars alkohol-, narkotika-, och tobaksbruk samt spelvanor 2016)

As Table 1 shows, Sweden and Norway have among the Nordic region's lowest prevalences for daily tobacco smoking, but in contrast the prevalences for daily use of moist snuff is high. Moist snuff is a particular preference in terms of the choice of tobacco among men. In Norway, the proportion of men who use moist

snuff daily is 6 percentage points higher than those who smoke daily. In Sweden, the difference is 11 percentage points between the proportion of men who smoke daily and men who use moist snuff daily.

As previously mentioned, e-cigarettes are a more recently arrived product on the Nordic markets and not all countries have systematic data on their use. Data is slowly starting to filter through, as questions about the use of e-cigarettes more often are becoming an integral part of national public surveys. It appears at the moment that the highest consumption of e-cigarettes in the Nordic countries is in Iceland, where figures from 2018 show that the proportion of men and women (total) (18+ years) using e-cigarettes daily is 4.8 per cent.

Table 2: Proportion of the younger age groups who daily use moist snuff/smokeless tobacco and/or e-cigarettes

		Use moist snuff daily (%)			Use e-cigarettes daily (%)
Year	**Country**	**Men**	**Women**	**Total**	**Total**
2018	Iceland (18–24 years)	12.9[a]	3[a]	7.3[a]	5.5
2018	Sweden (16–29 years)	16	3	10	1
2018	Denmark (15–29 years)	4.9	0.5	2.6	4.3
2018	Norway (16–24 years)	22	16	19	n/a
2017	Finland (20–34 years)	9	1	n/a	n/a
2016	Åland (18–24 years)	n/a	n/a	10	n/a
2014	Greenland (16–24 years)	n/a	n/a	11	n/a
	The Faroe Islands	n/a	n/a	n/a	n/a

n/a = data unavailable.

[a] The figures cover smokeless tobacco as a whole and include neftóbak, moist snuff, etc.

(References: The Danish Health Authority, 2019. Danskernes rygevaner 2018; Terveyden ja hyvinvoinnin laitos, 2018. Tupakkatilasto 2017; Statistics Norway, 2019. Tobacco, alcohol and other drugs; The Public Health Agency of Sweden, 2018. Bruk av cigaretter, snus och e-cigaretter i den vuxna befolkningen; Directorate of Health Iceland, 2018. Surveillance of Determinants of Health; Danish National Institute of Public Health, 2016. Befolkningsundersøgelsen i Grønland 2014; Statistics and Research Åland, 2016. Ålänningars alkohol-, narkotika-, och tobaksbruk samt spelvanor 2016)

If we compare the figures in Table 1 with those for the younger age groups in Table 2, we can see that daily use of moist snuff and e-cigarettes is generally higher for the younger age groups than the average for all age groups, Table 1. However, data for the use of e-cigarettes among the younger age groups are missing for many of the Nordic countries.

Among the younger age groups, it is also predominantly men who use moist snuff. Norway differs from the other Nordic countries, however, in having some remarkably high prevalences for the daily use of moist snuff among young

people aged 16–24 years. 22 per cent of men, or more than every five, use moist snuff on a daily basis, while for women the figure is 16 per cent.
Taken in to account that moist snuff is illegal to sell in Denmark, Finland and Åland, there is still a consumption of moist snuff in these countries, especially among the younger age groups.

The data used is the data referred to by the individual health authorities themselves. The age group ranges are also defined by the individual countries themselves and as they are not congruent, the data cannot be used to make direct comparisons between the Nordic countries. However, it can help to provide an indication of the situation in each country in relation to daily tobacco smoking and use of moist snuff and e-cigarettes. The figures also do not indicate what proportion use tobacco, moist snuff/smokeless tobacco and/or e-cigarettes with flavour additives.

Method

The report's investigations are based on a simple search of the scientific literature available on the significance of flavour additives in the use of moist snuff and e-cigarettes, with a focus on young people and the Nordic region. The searches have been conducted in the American database PubMed[3] and in the web search engine Google Scholar, which are both free to use.

This search has been made for the purpose of obtaining an overview of the scientific literature returned by such a search.

Table 3: The search is based on the following search terms under each category

Flavour additives:	Smokeless tobacco:	E-cigarettes:	Target group:	Nordic countries:
Taste*	Snus	E-cigarette*	Adolescent*	Norway
Flavor* OR flavour*	Snuff	Electronic cigarette*		Sweden
	Smokeless tobacco	Vaping		Finland
				Denmark
				Iceland

In addition to the search terms in Table 3, combinations of words were also tried, such as: Smoke-free tobacco, oral tobacco, Swedish snus, Swedish tobacco, Swedish tobacco snuff, tobacco snuff, non-heating type tobacco, snuff-dipping, moist snuff tobacco, chewing tobacco, novel tobacco, refill container, e-juice, e-liquid, sweetener, aroma, young adult and children, but the combination of these words provided no new or relevant hits for the overall result of the search and they are therefore not included in the search strings used.

Search string with the Nordic countries: (taste* OR flavor* OR flavour*) AND (Snus OR snuff OR "smokeless tobacco" OR e-cigarette* OR "electronic cigarette*" OR vaping) AND adolescent* AND (Norway OR Sweden OR Finland OR Denmark OR Iceland)

Search string without the Nordic countries: (taste* OR flavor* OR flavour*) AND (Snus OR snuff OR "smokeless tobacco" OR e-cigarette* OR "electronic cigarette*" OR vaping) AND adolescent*

[3] PubMed is developed and maintained by the National Center for Biotechnology Information (NCBI), at the U.S. National Library of Medicine (NLM), located at the National Institutes of Health (NIH). PubMed include the fields of biomedicine and health, covering portions of the behavioral sciences, life sciences etc. PubMed comprises more than 29 million citations from, for example, MEDLINE.

Both search strings were tried in PubMed, but with different time ranges in terms of the publication date of the articles. This has been done in order to see the development in the number of articles that match both search strings.

Table 4: The number of articles that match the search strings over time

Time range	Number of articles with the Nordic countries	Number of articles without the Nordic countries
01.11.2016–31.10.2018 (2 years)	3	72
01.11.2013–31.10.2018 (5 years)	**4**	**120**
01.11.2008–31.10.2018 (10 years)	4	128
01.11.2003–31.10.2018 (15 years)	4	133
No time range	4	141

Focusing on the period of the past 5 years (marked in bold in Table 4), it can be seen that only 4 articles match the search string with the Nordic countries. The search string has therefore also been tried without including the Nordic countries, in order to obtain more articles that match the part of the study which deals with the significance of flavour additives in the use of snuff and e-cigarettes by young people.

To obtain a more accurate picture of the search distribution, the search terms used in the search string are combined individually without the Nordic countries. This is also done on the basis of the period 01.11.2013–31.10.2018 (the past 5 years), in order to select the latest knowledge and filter out the older knowledge.

Table 5: Overview of the individual searches in PubMed for the period 01.11.2013-31.10.2018

No.	Search term	Number of resulting articles	Number of relevant articles
1	Taste* AND snus AND adolescent*	3	1
2	Taste* AND snuff AND adolescent*	2	1
3	Taste* AND "smokeless tobacco*" AND adolescent*	2	1
4	Taste* AND e-cigarette* AND adolescent*	19	5
5	Taste* AND "electronic cigarette*" AND adolescent*	6	1
6	Taste* AND vaping AND adolescent*	10	2
7	Flavor* OR flavour* AND snus AND adolescent*	19	6
8	Flavor* OR flavour* AND snuff AND adolescent*	18	6
9	Flavor* OR flavour* AND "smokeless tobacco" AND adolescent*	16	5
10	Flavor* OR flavour* AND e-cigarette* AND adolescent*	92	19
11	Flavor* OR flavour* AND "electronic cigarette*" AND adolescent*	32	5
12	Flavor* OR flavour* AND vaping AND adolescent*	23	5

Looking at the 12 individual searches in PubMed, it can be seen that by far the most articles (Number of resulting articles column) appear for searches using words from the e-cigarettes category, rather than words from the smokeless tobacco category.

As the report is based on the study of the significance of flavour additives in the use of moist snuff and e-cigarettes, articles that focus primarily on subjects such as health risks and illness, chemistry and toxicology, politics and policy, etc., are disregarded. The selection has been made by a manual validation, in which the resulting articles have been screened, firstly on the basis of the title in order to filter out the obviously irrelevant articles and subsequently on the basis of the abstract.

The Number of relevant articles column shows the number of relevant articles that are validated to match the study, and which are returned by the various individual searches. In Table 5, duplicates have not yet been taken into account, among the relevant articles for the individual searches.

To investigate whether there are more articles on the significance of flavour additives in the use of moist snuff and e-cigarettes, based on data from the Nordic countries, the search string with the Nordic countries was also tested in Google Scholar. It is not possible to adjust the dates of the time range in Google Scholar, therefore 2014–2018 was selected as it is closest to the range chosen for the PubMed searches. The Google Scholar search returned 587 hits, the majority of which are irrelevant or overlap with articles from the PubMed searches which was conducted first. The Google Scholar search was last tested on 06-11-2018.

Limitations of the method

The report's methodology is to be viewed solely as a way of providing an overview of the scientific literature that is available on the subject, using a simple search in PubMed and Google Scholar. No further investigations have been carried out with regard to the references and sources of the relevant articles, and the report should not be considered as an object of research. The method is based solely on results from the search strings used in PubMed and Google Scholar, with any errors and biases this may involve. It cannot be ruled out that other scientific literature is available on the subject and will be identified by the use of another method of investigation, other search terms, and of more and different databases.

As the study has been conducted using English search terms primarily, it is also impossible to rule out the existence of relevant articles in the Nordic languages.

Results

The objective of this report is to focus on the significance of flavour additives in the use of moist snuff and e-cigarettes, with a particular focus on young people and the Nordic region. Two search strings have been drawn up and a literature search has been made in PubMed and Google Scholar.

On validating the resulting articles and other hits, 7 articles containing Nordic data were found, but they were not relevant to the study in this report and are not to be found among the relevant articles.

After reviewing the relevant articles from the individual searches (Tabel 5), with duplicates removed, the total number of relevant and included articles from the PubMed and Google Scholar searches is **23 articles** (see appendix A for included articles).

The included articles fall into the following categories:
Smokeless tobacco: 2 articles
E-cigarettes: 16 articles
Tobacco and e-cigarettes in general: 5 articles

All the articles are American and are based on US data. There is a preponderance of articles on e-cigarettes compared with those on smokeless tobacco. This may be linked to the fact that more young people in the USA use e-cigarettes rather than conventional tobacco products and smokeless tobacco and these are therefore the subject of more studies. As smokeless tobacco can take many different forms, there may be differences between what is used in the USA, and is therefore included in the studies in these articles, compared with the moist snuff and other smokeless tobacco used in the Nordic countries.

A: Flavour additives in conventional tobacco products, smokeless tobacco and e-cigarettes are something that appeals to young people and non-established smokers, smokeless tobacco users and e-cigarette users. **Flavour additives are a leading cause of young people trying tobacco products or e-cigarettes** (see, for example, article nos. 2, 6, 8, 20, and 22 in appendix A). Besides flavour as a leading cause of why young people try e-cigarettes, **the curiosity of young people with regard to e-cigarettes also has major significance, while the behaviour of their peers in relation to the use of e-cigarettes also has an influence** (see, for example, article nos. 12, 13, and 17 in appendix A).

B: E-cigarettes are the products for which the most flavours are available, compared with smokeless tobacco and conventional tobacco products (where flavour additives are being phased out). What young people prefer in terms of flavour depends on whether or not they already use other tobacco products. **New users have a preference for the particularly sweet flavours, such as those of sweets, fruit, chewing gum, soft drinks, etc.** (see, for example, article nos. 11, 16, and 23 in appendix A).

C: Flavour additives are therefore significant in the use of e-cigarettes by young people, but in addition **young people also have a perception that e-cigarettes with the flavour of fruit, for example, are less harmful to health than e-cigarettes with the flavour of tobacco** (see, for example, articles 13, 18, and 21 in appendix A).

D: With more than 7,000 different flavours to choose from, it is easy to experiment with flavour. If some flavours are also perceived to be less harmful to health than others, this can lead to repeated use. **If the product also contains nicotine, this may lead to dependence and potentially interest in trying other, more harmful tobacco products** (see, for example, articles 4 and 7 in appendix A)

E: Flavour additives are a leading cause of young people trying tobacco products and e-cigarettes. **Restrictions and regulations on flavour additives in e-cigarettes and e-liquids will therefore most likely have an impact on the use of these products by young people** (see, for example, articles 1 and 10 in appendix A).

Summary

Smoking tobacco is one of the greatest threats to public health in the Nordic region and the rest of the world and the fight against tobacco smoking is ongoing. In addition to tobacco for smoking, the Nordic countries must also take a view on other tobacco and nicotine products on the market, including moist snuff and e-cigarettes, which are also potential threats to people's health and to public health in general.

Although it is illegal to sell and market moist snuff in the EU Member States (with the exception of Sweden), there is also consumption of moist snuff in countries such as Denmark and Finland, both of which border Sweden and Norway, where moist snuff is the most commonly used tobacco product. E-cigarettes appear to be the most used in Iceland, but there is still a lack of systematic data in this area.

Under the Tobacco Products Directive, flavour additives in conventional tobacco products are being phased out in the EU, among other things, in order to protect young people and non-established smokers. Flavour additives in e-cigarettes and e-liquids are not covered by the same EU provisions, but are national matters. Finland is the only one of the Nordic countries to have chosen to ban flavoured e-cigarettes and e-liquids.

The data presented shows the proportion of people using moist snuff and e-cigarettes in the Nordic region, but it does not indicate the proportion using flavoured products. The data shows that there is generally a higher consumption of moist snuff and e-cigarettes among the younger age groups than the average for all age groups.

The results section shows, among other things, that flavour additives are the leading cause of young people starting to use e-cigarettes, that sweet flavours are preferred by new users and that young people have a perception that e-cigarettes with the flavour of fruit, for example, are less harmful than e-cigarettes with the flavour of tobacco. Although the articles are based on American data, this gives reason to believe that the same can apply to the young people of the Nordic countries.

Future focus

Moist snuff and e-cigarettes are both established products on the Nordic markets, subject to the legal restrictions stipulated within the EU and in the individual Nordic countries. Moist snuff and e-cigarettes help to increase the overall proportion of nicotine dependents in the Nordic region and these products are particularly popular among the younger age groups. With the products on the markets, there is a need to produce continuously new knowledge and evidence that can be used in a structural and preventive manner. If we want to limit the number of young people who start using moist snuff and e-cigarettes in the Nordic region, then surveys about flavour additives may be a good place to start.

In terms of Nordic co-operation, it would therefore be interesting to focus in the future on:

- All the Nordic countries collecting systematic data on the use of both moist snuff and e-cigarettes, on equal terms with tobacco smoking, in order to monitor consumption trends.
    - What proportion uses flavoured products?
- Research examining how great an impact flavour additives have on young people in the Nordic region using or starting to use moist snuff and e-cigarettes.
    - What are the young people's perceptions of flavoured moist snuff and flavoured e-cigarettes?
- Comparing the effects of national legislation on e-cigarettes across the Nordic countries.
    - What impact, for example, does Finland's ban on the sale of flavoured e-cigarettes and e-liquids have on the use of these products by young people?

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Appendix A: Included articles

No.:	Main author and year for publication:	Titel:	Summary of results:	Data type/method:
1	Berg, 2016	Preferred flavors and reasons for e-cigarette use and discontinued use among never, current, and former smokers.	Never, current, and former smokers had distinct reasons for e-cigarette use and discontinued use and differed in flavor preferences.	Online survey. Never, current, and former smokers (n=1,567; age 18-34)
2	Bold, 2016	Reasons for Trying E-cigarettes and Risk of Continued Use	Several reasons for first trying e-cigarettes predicted continued e-cigarette use, including good flavors, does not smell bad, can hide from adults, low cost, friends use, can use anywhere, to quit smoking regular cigarettes, and because they are healthier than cigarettes.	Longitudinal surveys. Middle and high school students (n=340)
3	Chaffee, 2017	Perceived Flavored Smokeless Tobacco Ease-of-use and Youth Susceptibility.	Smokeless tobacco susceptibility was greatest among tobacco never-users who perceived flavored ST as easier to use.	2013-2014 Population Assessment of Tobacco and Health study (PATH) Tobacco never-users (n=7,718; age 12-17)
4	Cooper, 2016	Flavorings and Perceived Harm and Addictiveness of E-cigarettes among Youth.	Ever and current e-cigarette users had higher odds of reporting that flavored e-cigarettes were "less harmful" than non-flavored e-cigarettes, compared to youth who did not use e-cigarettes.	Data from a rapid response surveillance system. Students (sample [n]=3,704 from a population of students [N]=434,601; grade 6, 8, and 10)
5	Corey, 2015	Flavored Tobacco Product Use Among Middle and High School Students--United States, 2014.	The popularity of flavors across the range of tobacco products e.g. e-cigarettes and hookah suggest that flavoring might have broad appeal to young tobacco users.	2014 National Youth Tobacco Survey (NYTS). Middle and high school students (n=22,007).
6	Couch, 2017	ST product characteristics and relationships with perceptions and behaviors among rural adolescent males: a qualitative study.	Participants associated flavored smokeless tobacco with appealing non-tobacco products, such as chewing gum and alcohol. Availability of different varieties and flavors stimulated interest and curiosity in sampling or switching between smokeless tobacco products.	Interview. Adolescent males and smokeless tobacco users (n=23)
7	Dai, 2016	Flavored Electronic Cigarette Use and Smoking Among Youth.	Use of flavored e-cigarettes was associated with higher odds of intention to initiate cigarette use, lower odds of intention to quit tobacco use, and a lower prevalence of perception of tobacco's danger.	2014 National Youth Tobacco Survey (NYTS). Middle and high school students (n=21,491).
8	Dai, 2018	Single, Dual, and Poly Use of Flavored Tobacco	Use of flavored tobacco products is prevalent among youths. E-cigarettes were the leading flavored product and	2014 National Youth Tobacco Survey (NYTS). (n=21,926)

		Products Among Youths	often concurrently used with other flavored tobacco products.	
9	Evans-Polce, 2018	Reasons for Vaping Among U.S. 12th Graders.	Three distinct classes of vapers were identified: adolescents who were Vaping for Taste + Entertainment, Vaping to Experiment, and Vaping to Replace Cigarettes.	2015 and 2016 Monitoring the Future study. Students, 12th graders.
10	Harrell, 2017	Flavored Tobacco Product Use among Youth and Young Adults: What if Flavors Didn't Exist?	Most of the youth and young adult tobacco users reported using flavored tobacco. Three-fourths of flavored product users said they would no longer use the product if it was not flavored. This was highest for e-cigarettes and hookah and lowest for cigarettes.	Texas Adolescent Tobacco and Marketing Surveillance System (TATAMS). Youth (n=2,483) and Marketing and Promotions across Colleges in Texas (M-PACT). Young adults (n=4,326)
11	Hoffmann, 2016	Flavour preferences in youth versus adults: a review.	Tobacco products in flavours preferred by young people may impact tobacco use and initiation, while flavours preferred by adults may impact product switching or dual use.	Review study. (n=59 studies)
12	Kong, 2015	Reasons for Electronic Cigarette Experimentation and Discontinuation Among Adolescents and Young Adults.	The top reasons for experimentation with e-cigarettes were curiosity, appealing flavors, and peer influences.	Focus group and survey. Students (n=1,302; age 12-22)
13	Kowitt, 2017	Perceptions and Experiences with Flavored Non-Menthol Tobacco Products: A Systematic Review of Qualitative Studies.	Positive perceptions of flavored tobacco products and flavors led to experimentation and/or initiation of flavored tobacco products.	Review study. (n=20 studies)
14	Miech, 2017	What are kids vaping? Results from a national survey of US adolescents.	Among students who had ever used a vaporiser, 65-66% last used 'just flavouring' in 12th, in 10th and in 8th grade, more than all other responses combined. Nicotine use came in a distant second, at about 20% in 12th and 10th grade and 13% in 8th grade.	Survey. Students (n=44,892; grade 8, 10, and 12)
15	Modesto-Lowe, 2017	E-cigs . . . Are They Cool? Talking to Teens About E-Cigarettes.	Electronic cigarettes have gained wide acceptance among adolescents, especially those with sweet flavors such as bubble gum and cheesecake. This article outlines the basics of e-cigarettes and potential health hazards.	Motivational interviewing
16	Morean, 2018	Preferring more e-cigarette flavors is associated with e-cigarette use frequency among adolescents but not adults.	Compared to adults, a larger proportion of adolescents preferred fruit, alcohol, and "other"-flavored e-liquids, whereas adults disproportionately preferred tobacco, menthol, mint, coffee, and spice-flavored e-liquids.	School-based survey. Adolescents (n=396), and MTurk survey. Adults (n=590).

17	Patrick, 2016	Self-reported reasons for vaping among 8th, 10th, and 12th graders in the US: Nationally-representative results.	Overall, results suggest that decisions to vape are based on curiosity, taste, and pleasure, rather than for reasons such as quitting regular cigarettes or substituting for regular cigarette smoking.	2015 Monitoring the Future study. Students (n=4,066; grade 8, 10, and 12)
18	Pepper, 2016	Adolescents' interest in trying flavoured e-cigarettes.	Adolescents were more likely to report interest in trying an e-cigarette offered by a friend if it were flavoured like menthol, candy or fruit compared with tobacco. Adolescents believed that fruit-flavoured e-cigarettes were less harmful to health than tobacco-flavoured e-cigarettes. Perceived harm mediated the relationship between some flavours and interest in trying e-cigarettes.	Phone survey. Adolescents (n=1,125; ages 13-17)
19	Schiffman, 2015	The Impact of Flavor Descriptors on Nonsmoking Teens' and Adult Smokers' Interest in Electronic Cigarettes.	The e-cigarette flavors tested appealed more to adult smokers than to non-smoking teens, but interest in flavors was low for both groups.	Online survey. Non-smoking teens and adult smokers (n=648; age 13-80)
20	Shang, 2018	The impact of flavour, device type and warning messages on youth preferences for electronic nicotine delivery systems: evidence from an online discrete choice experiment.	Fruit/sweets/beverage flavours significantly increase the probability of choosing ENDS among youth and flavour has the most pronounced impact among three attributes.	Online survey.
21	Tsai, 2016	Reasons for Electronic Cigarette Use Among Middle and High School Students - National Youth Tobacco Survey, United States, 2016.	Among students who reported ever using e-cigarettes, the most commonly selected reasons for use were use by "friend or family member", availability of "flavors such as mint, candy, fruit, or chocolate"; and the belief that "they are less harmful than other forms of tobacco such as cigarettes". Availability of flavors as a reason for use was more commonly selected by high school users than by middle school users.	2016 National Youth Tobacco Survey (NYTS). Student U.S. middle school (grades 6-8) and high school (grades 9-12).
22	Villanti, 2017	Flavored Tobacco Product Use in Youth and Adults: Findings From the First Wave of the PATH Study (2013-2014).	Flavor was a primary reason for using a given tobacco product, particularly among youth. Eighty-one percent of youth and 86% of young adult ever tobacco users reported that their first product was flavored versus 54% of adults aged ≥25 years.	2013-2014 Population Assessment of Tobacco and Health study (PATH) Adults and youth (n=45,971; age >12)

23	Zare, 2018	A systematic review of consumer preference for e-cigarette attributes: Flavor, nicotine strength, and type.	Consumers preferred flavored e-cigarettes, and preference varied with age groups and smoking status. Several flavors were associated with decreased harm perception while tobacco flavor was associated with increased harm perception.	Review study. (n=66 studies)

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