

ERS Position Paper on Tobacco Harm Reduction

Statement prepared by the ERS Tobacco Control Committee

What is harm reduction?

The International Harm Reduction Association, in line with the World Health Organization (WHO), defines harm reduction as “policies, programs and practices that aim primarily to reduce the adverse health, social and economic consequences of the use of psychoactive drugs without necessarily reducing drug consumption”^{1 2}. Harm reduction began to be discussed after the threat of HIV spreading among drug users was first recognised. Harm reduction prioritises a public health perspective aiming to stop or reduce immediate harms when at-risk individuals do not respond to treatment. The question of long-term abstinence from drug use is either unaddressed or left open³.

Why it is important to discuss harm reduction and what is meant by harm reduction in tobacco control?

The epidemic of disease caused by smoking in the 20th century ranks among the greatest public health catastrophes of the last century, and it has been estimated that smoking will kill around one billion people in the 21st century⁴. Smoking is not a lifestyle choice or a bad habit, but a chronic disorder⁴. Cigarettes are addictive, similarly to heroin and cocaine, and nicotine, a psychoactive substance, is the primary agent of addiction⁵. Changes in tobacco manufacturing have significantly increased the risk of nicotine addiction among smokers⁵.

A harm reduction strategy for smokers includes recommending the use of alternative nicotine delivery products such as smokeless tobacco, e-cigarettes or new heated tobacco products to smokers instead of conventional cigarettes, thus replacing a very harmful product with a less, but still, harmful product. The concept is intuitive and attractive and therefore very tempting for smokers, health professionals and politicians. Unfortunately, it is much more complex.

While opioid substitution therapies such as methadone are given only to those who are addicted and at the highest risk and are administered by a health professional, the nicotine-containing alternatives to smoking, such as e-cigarettes and heated tobacco, are mass-marketed consumer products. In most countries they are easily accessible for the general population, including those who were never addicted to nicotine. While the average prevalence of high-risk opioid use among adults is estimated at 0.4 % of the EU population ⁶ almost every fifth adult European is a smoker ⁷.

We present seven arguments for why a harm reduction strategy should not be used as a population-based strategy in tobacco control.

1. The tobacco harm reduction strategy is based on incorrect claims that smokers cannot or will not quit smoking

This premise is simply wrong – in reality the majority of smokers want to quit ^{8 9}. A large European study showed that only ten percent of smokers definitely did not want to stop ¹⁰. A high proportion of smokers also dislike being nicotine dependent and want to quit smoking in order to “regain control of their life” ^{11 12}. Worldwide, millions of smokers have quit and most have stopped by will-power only ¹³, without the use of nicotine replacement therapy (NRT) or any smoking cessation medication. Therefore, regarding tobacco addiction, the main goal is to motivate and support tobacco users to quit ¹⁴. Evidence-based tobacco dependence treatments exist and are safe and cost-effective. The goal is cessation and relapse prevention to achieve long-term abstinence ¹⁵. Most nicotine-delivery products, including heated tobacco and e-cigarettes, are devices of nicotine inhalation. This administration route reaches the brain remarkably rapidly, resulting in a high risk of maintenance of addiction and posing challenges to smoking cessation treatment ¹⁶.

In conclusion, the majority of smokers want to quit and a high proportion dislike being nicotine dependent. Alternative nicotine containing products are highly addictive. Evidence-based tobacco dependence treatment exists and is safe and cost-effective - we should not give up on smokers.

2. The tobacco harm reduction strategy is based on undocumented assumptions that alternative nicotine delivery products are highly effective as a smoking cessation aid

Very few randomised trials have been conducted to test whether *e-cigarettes* are more effective than established smoking cessation medication^{17 18}. A randomised controlled trial (RCT) from the United Kingdom found that e-cigarettes were twice as effective as NRT after one year, when combined with intensive smoking cessation counselling¹⁷. However, 80% of ex-smokers continued to use e-cigarettes after they quit conventional cigarettes, and of those who continued to smoke, at least 25% also used e-cigarettes at the end of the study¹⁷. Another RCT, aimed at smoking reduction, also found an effect on smoking cessation. On the other hand, two large pragmatic (not clinic-based) randomised trials comparing e-cigarettes to NRT^{19 20} or pharmacotherapy²⁰ found no significant difference in six-month abstinence rates^{19 20}. Furthermore, a meta-analysis of longitudinal studies on the effectiveness of e-cigarettes also showed that while two clinical trials indicated beneficial effects of e-cigarettes on smoking cessation rates, 14 out of 15 longitudinal real-life studies showed that use of e-cigarettes significantly undermined abstinence²¹. It seems that the effect depends on whether e-cigarettes are used in a clinical setting combined with professional advice, or in a “real-life” setting. The same has been observed with NRT: high-quality evidence from RCTs²² and smoking cessation clinics²³ exists, which shows that all forms of NRT increase smoking cessation rates, whereas the use of NRT bought over-the-counter is associated with significantly lower odds of abstinence than no use of smoking cessation medication²³.

A prospective study, based on a sample of the general population in the United Kingdom, found that daily use of e-cigarettes while smoking appears to be associated with subsequent increases in rates of attempting to stop smoking and reducing smoking, but not with smoking cessation²⁴. This finding is mirrored in other prospective studies of smokers’ use of e-cigarettes^{25 21 26 27 28}. The reason could be that e-cigarettes are promoted as being “safe” and therefore a means to enjoy nicotine anywhere, which could discourage cessation.

Some argue that alternative nicotine containing products are a much better smoking cessation aid than no aid. A large representative population-based study showed that e-cigarettes users were less likely to report abstinence than users of established quitting methods and that they were not more likely to report abstinence than those using no aid ²⁹.

E-cigarettes only seem to be effective in a clinical setting combined with repeated counselling; however, less than 5% of all smokers in the United Kingdom and approximately 1% of smokers in Denmark (two countries with well-developed and free-of-charge smoking cessation services) use the national smoking cessation services ^{30 31}. In many parts of the world professional guidance is even less prevalent, indicating that there will be no effect, or a negative effect, on smoking cessation. Even though some smokers who use e-cigarettes may not go to cessation clinics, it does not seem that this would result in more smokers quitting.

Few randomised trials have tested long-term efficacy of *smokeless tobacco* as a smoking cessation tool ^{32 33 34} and they have shown no effect; one tobacco company actually abstained from publishing the results of a negative randomised trial of snus due to very low quit rates ³⁵. No independent studies have tested the effect of *heated tobacco* on long-term smoking cessation, and two major manufacturers of e-cigarettes and heated tobacco state that their product is not intended for smoking cessation ^{36 37}. In conclusion, there is lack of evidence proving the effect of alternative nicotine delivery products as effective smoking cessation tools. In a real-life setting, use seems to undermine smoking cessation instead.

3. The tobacco harm reduction strategy is based on incorrect assumptions that smokers will replace conventional cigarettes with alternative nicotine delivery products

A majority of *e-cigarette* users (typically 60-80%) continue to smoke ^{38 39 40 41 42 43} and there may not be a significant reduction in their consumption of conventional cigarettes ^{44 45 46}. It is claimed that dual use of conventional and e-cigarettes is just a short transition period. However, it seems that even though dual users are more likely to try to quit cigarettes in the general population, they are no more likely to become completely abstinent of cigarettes or other tobacco products in the longer term ⁴⁷. A

large population-based study from the United Kingdom concluded that: “If use of e-cigarettes while smoking acted to reduce cigarette consumption in England between 2006 and 2016, the effect was likely very small at a population level”⁴⁸. There is little evidence for health effects of dual use of e- and conventional cigarettes. One study found that dual use was not associated with a reduction in carcinogen or toxin levels⁴⁹, while another large study found that toxicant exposure was higher (10% to 36%) among dual users than among smokers of conventional cigarettes only⁴³. Dual use is also very frequent in *smokeless tobacco* users^{42 50}.

We have limited evidence on *heated tobacco* products, but an independent study found that all current users continued to use cigarettes⁵¹. In a study among young Korean adults, all users of heated tobacco stated to be triple users of both conventional cigarettes, e-cigarettes and heated tobacco⁵¹. The effects of this cocktail are unknown. Also, alternative nicotine delivery products are very different from conventional cigarettes and might generate unique toxicant exposures or exposures to toxicants not presently designated as harmful, such as those associated with e-cigarette flavourings.

In conclusion, most persons use alternative nicotine delivery products as a supplement to conventional cigarettes, not as an alternative to smoking. Therefore, there will be no health benefit for the majority of smokers, and for some there might even be an increased risk of harm.

4. The tobacco harm reduction strategy is based on undocumented assumptions that alternative nicotine delivery products are generally harmless

Conventional cigarettes have devastating health consequences; therefore, all products we compare it with will be less harmful. Less harmful, however, is not the same as harmless. Using only e-cigarettes instead of combustible cigarettes will probably reduce users’ exposure to toxicants⁵², but a reduction in exposure to toxicants does not necessarily lead to significant reduction in harm in humans. Evidence supports a significant effect of very low dose combustible tobacco smoke exposure (i.e. a few cigarettes per day or occasional use) in causing ischemic heart disease⁵³; there is a non-linear dose-response and

the excess risk in smokers of only five cigarettes per day is about 50%⁵⁴. Reducing smoking-related health risks requires complete cessation. Moreover, in relation to tobacco use, long-term follow-up of smokers provides no evidence that heavy smokers who cut down their daily cigarette consumption reduce their risk of premature death significantly^{55 56}. There is no safe use of tobacco.

We have considerable evidence that *e-cigarette* aerosols contain metals, that aerosols can induce acute endothelial cell dysfunction and promote formation of reactive oxidative stress/inflammation, and that chemicals present in aerosols are capable of causing DNA damage and mutagenesis⁵². In *vivo* experiments as well as animal studies demonstrate airway inflammation and remodelling/scarring^{57 58 59 60 61} and impairments in lung function^{62 63}. Exposure to e-cigarette fluid promoted respiratory viral infection⁶⁴ and bacteria became more virulent when exposed to e-cigarette vapour⁶⁰. Human experiments have shown airway obstruction⁶⁵ and dysregulation in normal human lung homeostasis after short-term inhalation⁶⁶. In addition, there is moderate evidence from population based studies for increased cough and wheeze in adolescents and an increase in asthma exacerbations⁵², even when only exposed to second-hand vapour from e-cigarettes⁶⁷. Thus, most independent studies indicate potential harm^{68 69 52}, but evidence is so far limited and we have no evidence on the long-term health effects of using e-cigarettes.

There is some evidence on the long-term use of *smokeless tobacco*, which shows an increased risk of fatal myocardial infarction among users, and the increase in risk has been calculated to be highest in the European region, based on the use of Swedish moist snuff/snus⁷⁰. All smokeless tobacco products contain carcinogenic tobacco-specific nitrosamines, though the levels differ between products⁷¹. Smokeless tobacco is responsible for a large number of cancer deaths worldwide^{72 73}, while the evidence of risk of cancer due to use of Swedish moist snuff/snus is inconclusive^{74 75 76 77 78-80 71}.

We have very little knowledge of the health effects of *heated tobacco* devices and most studies have been performed by the tobacco industry. Industry animal data showed pulmonary inflammation⁸¹ and human data showed no improvement of lung function after switching from combustible to heated tobacco⁸². The tobacco industry's own data also fail to show a consistently lower risk of harm in humans using a heated tobacco product instead of a conventional cigarette⁸². Independent researchers found that heated tobacco products, in a manner very similar to cigarette smoke, have

the potential to increase oxidative stress and inflammation, infections, airway remodelling, and initiate other changes in the airways of users of these devices related to chronic lung disease ⁵⁹. Other independent studies have shown that harmful substances are not reduced by 95%, as often claimed by the tobacco industry ^{83 84 85}, and in fact the concentrations of some harmful constituents were instead found to be higher. A combination of animal and human data indicate potential liver injury ⁸⁶ and lung injury ⁸⁷.

As studies with a conflict of interest find no harm significantly more often than studies without a conflict of interest ⁶⁸, it is important that more independent high-quality studies are conducted.

In conclusion, there is no evidence that alternative nicotine delivery products are safe – on the contrary, many studies have documented adverse health effects and the uncertainty seems to be around the degree of harm rather than the presence of harm related to these products.

5. Alternative nicotine delivery products can have a negative impact on public health even if “stick-by-stick” they turn out to be less harmful than conventional cigarettes

The harm reduction strategy focuses strictly on smokers, but smokers are a minority in the population. The impact of use of alternative nicotine delivery products on the non-smoking majority of the population, the never- and ex-smokers, must be considered – as well as the potential risk of re-normalisation of smoking in society. Even though the long-term impact of alternative nicotine delivery products on population health is hard to predict ^{88 89 90}, widespread promotion may have a range of negative population-level health effects ⁹¹.

A quarter of young *e-cigarette* users in Australia have never smoked ¹⁷. E-cigarettes with candy or fruit flavours strongly appeal to children and adolescents ⁹² and have appealed to youth at low risk of taking up smoking ⁹³. Some parts of the world have seen a significant spread of e-cigarettes amongst youth ^{94 95 17}. The Food and Drug Administration (FDA) Commissioner stated that the United States are experiencing epidemic-level rises in youth e-cigarette use ⁹⁶. It is also important to note that use of e-

cigarettes does not prevent smoking. On the contrary, there is substantial evidence that adolescents' e-cigarette use increases their risk of smoking initiation of conventional cigarettes^{52 97 98}.

A repeated face-to-face survey on smoking in a representative sample of the Italian general population showed that among e-cigarette users, those (re)starting smoking after using e-cigarettes outnumbered those who stopped smoking after using e-cigarettes⁹⁹. Among ever users, 13% stopped smoking after trying e-cigarettes while 22% started smoking or relapsed after using e-cigarettes. The corresponding estimates among regular users were 25% and 28%, respectively⁹⁹.

Longitudinal studies indicate that use of *smokeless tobacco*, like e-cigarette use, does not prevent later smoking but on the contrary increases the likelihood of smoking initiation^{100 101 102}. A large longitudinal study showed that use of snus/snuff had no beneficial effect on cessation, reduction or prevention of smoking initiation among young men in Switzerland¹⁰¹. Longitudinal studies from the United States indicate that switching behaviours from smoking to smokeless tobacco use is very uncommon, while it is very common to switch from smokeless tobacco to smoking (in up to every fourth user)¹⁰³. The tobacco industry always highlights Sweden as a role model in harm reduction: as the country has very low smoking prevalence, a high prevalence of snus use, and lung cancer rates of half or a third of that of other European countries. Elements that are "overlooked" by the tobacco industry includes that Sweden already had much lower lung cancer rates in the 1950s-1970s prior to the increase in men's use of snus; that Swedish women's smoking prevalence has decreased without use of snus; and that an increasing proportion of snus/snuff users are never-smokers¹⁰⁴. In the United States, high prevalence of snuff use has been found in states with high smoking prevalence¹⁰⁵. Thus, there is no indication that smokeless tobacco is an effective way to decrease smoking at a population level.

In Italy, nearly half of users of *heated tobacco* and over half of the people interested in heated tobacco are never smokers¹⁰⁶. The smart design and the claims of being a generally harmless product most likely appeals to adolescents and young adult smokers, as well as non-smokers.

In conclusion, when evaluating the pros and cons of alternative nicotine delivery products we must consider their impact on the whole population, not only on the smokers, who are a minority. From a

public health point of view, these products may have an unfavourable net effect, especially because of increasing uptake by never smokers. There is substantial evidence that youths' use of alternative nicotine containing products increases their risk of future smoking.

6. Smokers see alternative nicotine delivery products as a viable alternative to the use of evidence based smoking cessation services and smoking cessation pharmacotherapy

Effective evidence based smoking cessation medication and services exist and are effective ^{107 108}. A large survey in 28 countries in the European Union showed that the use of *e-cigarettes* for smoking cessation assistance had increased in the last five years, while the use of pharmacotherapy (including NRT) and of smoking cessation services had simultaneously declined ¹⁰⁹. In the United Kingdom, the number of smokers making a quit attempt using the NHS smoking cessation services has decreased by 66% in the last six years ³⁰, and while e-cigarette use for harm reduction (not cessation) has increased, NRT use among smokers has decreased ¹¹⁰. Trends might be independent, but we cannot rule out that e-cigarettes have displaced the use of evidence-based smoking cessation services and medically tested pharmacotherapy. We have no information on the impact of *smokeless tobacco* and *heated tobacco* on the use of smoking cessation services and medically tested pharmacotherapy.

In conclusion, a decrease in use of smoking cessation services and medically tested pharmacotherapy has been observed in parallel with an increase in the use of e-cigarettes, indicating that alternative nicotine containing products may be replacing evidence based, effective smoking cessation tools.

7. The tobacco harm reduction strategy is based on incorrect claims that we cannot curb the tobacco epidemic

Many effective strategies exist to reduce smoking at a population level ^{111 8}. The decline of smoking due to tobacco control measures is surely one of public health's greatest successes ⁵. Countries with strong

tobacco control (i.e. high prices on tobacco, plain packaging, point of sale display ban, strong enforcement of minimum age of purchase, comprehensive marketing bans, intensive anti-smoking campaigns, free national smoking cessation services) have experienced impressive and rapid declines in smoking prevalence. Daily smoking prevalence between 10-12% is a reality in countries with previously high smoking rates, for example Norway, Sweden, Canada, Brazil, Hong Kong and the state of California. In countries with weak tobacco control, such as Denmark ¹¹², a stagnation in smoking prevalence has been reported for many years. In France one million smokers have quit in a single year due to improved tobacco control (higher cigarette pricing, plain packaging, campaigns, national tobacco-free month and a dedicated national smoking reduction programme), and a decline in smoking among teenagers and those on low incomes has also been observed ¹¹³.

In conclusion, tobacco control is one of public health's greatest successes and countries with strong tobacco control have experienced impressive declines in smoking prevalence. We know what works. We need brave leaders to implement the evidence-based effective methods.

Alternative nicotine delivery products are the tobacco industry's adaptation to declining tobacco consumption and acceptability of smoking, and increased regulation of cigarettes

It must be acknowledged that many health professionals, tobacco control professionals and decision makers who recommend the harm reduction strategy have very good intentions. They see harm reduction as a pragmatic way of reducing the devastating health effects of the tobacco epidemic. However, good intentions must always be supported by strong evidence before a large-scale implementation. We have seen catastrophic consequences when this is ignored ¹¹⁴. Evidence on the safety and the effectiveness of alternative nicotine delivery products as a smoking cessation tool is still lacking, while use of nicotine containing products is spreading to non-smokers, which is very alarming. Harm reduction in tobacco control should be reserved for a minority of high-risk smokers; it is not a population-based strategy.

Another fact that cannot be ignored is that alternative nicotine delivery products are primarily manufactured by the tobacco industry, and the tobacco industry has a strong economic interest in spreading these products to as many individuals as possible - smokers as well as non-smokers. The tobacco industry has manufactured so called “safer” tobacco products (i.e. filter, light, mild, ultra-light, low tar cigarettes etc.) since the 1950s. Publicly available internal tobacco industry documents show that the tobacco companies have attempted to deter smokers from quitting by developing products that appeared to be less harmful, less addictive or more socially acceptable: “Quitters may be discouraged from quitting, or at least kept in the market longer... The safe cigarette would have wide appeal, limited mainly by the social pressures to quit.” ¹¹⁵. The industry had knowledge that such products had no health advantage ¹¹⁶. Further, even though a tobacco industry scientist warned that: “The effect of switching to a low tar cigarette may be to increase, not decrease, the risks of smoking” ¹¹⁷, the tobacco industry still launched and marketed the product as being much safer. The industry also had knowledge that such products did not help smokers to quit ¹¹⁶. It is very naïve to believe that the tobacco industry has changed since then.

After the launch of their heated tobacco products, a major tobacco company last year announced that they plan to phase out the manufacturing of cigarettes and move into other smoke-free products ¹¹⁸. The tobacco industry is attempting to rehabilitate its reputation, to appear as responsible members of society and as a part of the solution, so that they can more effectively influence decision makers. Internal industry documents show that the tobacco companies have no intention to stop manufacturing conventional cigarettes, as they claim ¹¹⁹. On the contrary, they are using vast resources against efforts to reduce conventional smoking ¹²⁰ and to expand the sale of conventional cigarettes in low income countries ^{119 121}.

Many smokers are tempted by alternative nicotine containing products. Instead of seeking professional assistance to quit in a smoking cessation service, they switch to one of these so-called safer products, in the belief that these are safe. When a person quits smoking completely (but not partially) he or she will experience many health benefits, as there is no longer any exposure to harmful substances. Smokers who switch to alternative products will still have a long-term exposure

to toxic and carcinogenic substances. Although reduced, this continued exposure to toxicants is a bad alternative to quitting smoking.

What does ERS recommend?

The tobacco harm reduction strategy is based on well-meaning but incorrect or undocumented claims or assumptions. Emergent tobacco and nicotine delivery devices with alleged harm reduction potential are examples of inadequate harm reduction approaches. In her keynote speech at the opening of the eighth session of the Conference of the Parties (COP8), Vera Luiza da Costa, Head of the World Health Organization's Framework Convention on Tobacco Control (WHO FCTC) Secretariat stated on new emerging products: "Parties should expedite implementation of article 5.3 Guidelines and ensure that it's applicable to all commercial and vested interests of the tobacco industry, including addressing unproven claims of harm reduction" ¹²². Almost 40 countries have already banned e-cigarettes and/or nicotine e-liquid.

The Hippocratic Oath requires a physician to swear to uphold specific ethical standards and "first do no harm". The human lungs are created to breathe clean air, not "reduced levels of toxins and carcinogens", and the human body is not meant to be dependent on addictive drug. ERS cannot recommend any product that is damaging to the lungs and human health. Therefore, ERS strongly supports implementation of WHO's FCTC, and cannot recommend tobacco harm reduction as a population-based strategy.

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