Pragmatism and Smoking Cessation: The Role of Harm Reduction in Creating Healthier Smoke-Free Societies

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Interview Summary

Despite the extensive body of evidence demonstrating the risks of tobacco, many people continue to smoke. Medical science has not yet found a 'cure' for this. Instead, healthcare professionals (HCPs) have access to a range of strategies, including pharmacological and psychological interventions, to help support smoking cessation. Yet giving up is not easy and not everyone succeeds. The reasons why are as varied as they are complex, ranging from physical addiction to an emotional dependence on the habit. Barriers include a lack of adequate support from smoking cessation services or HCPs, withdrawal symptoms, and psychosocial factors such as the challenges of adapting to behaviour change.

For those people who are unable or unwilling to quit, harm reduction strategies can help reduce the risks associated with smoking, from cardiovascular disease to cancer. While the evidence base is still relatively immature, some studies have shown that products such as e-cigarettes and heated tobacco systems can deliver the addictive nicotine with significantly fewer toxicants and carcinogens than cigarettes.

In this interview, Krzysztof Filipiak, past President of the Polish Society of Hypertension (PTNT) and former Deputy Rector Magnificus and Dean for Science at the Medical University of Warsaw, Poland, and Nadjib Bouayed, President of the Algerian Association of Vascular Surgery of the University Hospital of Oran, Algeria, share their views on the pragmatic approach. They explain how finding the best intervention for each patient is of utmost importance and why harm reduction strategies have a place in smoking cessation services. They also review the current literature on products such as heat-not-burn (HnB) systems and identify gaps in the evidence base.

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TOXINS AND CARCINOGENS

Smoking is a major public health issue contributing to 8 million global deaths every year.[1] Yet, while people smoke because they are addicted to nicotine, it is not the nicotine that kills them: it is the substances that are generated during tobacco combustion. According to a report from the Royal College of Physicians' (RCP) Tobacco Advisory Group, most of the harm caused by smoking arises not from nicotine but from other components of tobacco smoke.[2]

Cigarette smoke contains thousands of chemicals including at least 70 carcinogens. When someone lights a cigarette, the tobacco combusts releasing toxicants that cross the alveolar barrier and enter the bloodstream. Filipiak explained that these chemicals elicit systemic oxidative stress and inflammatory responses that can lead to abnormal lipid profiles and pro-coagulation, while also affecting normal endothelial functions.[3]

This can result in a plethora of serious health problems including myocardial infarction, stroke, atherosclerosis, diabetes, lung and chronic obstructive pulmonary diseases, eye disease, and rheumatoid arthritis.[4] Filipiak explained that together with older age, male sex, diabetes, arterial hypertension, and elevated serum cholesterol levels, smoking is one of the most important risks for cardiovascular disease. It also has the potential to cause cancer almost anywhere in the body, from the mouth and throat to the lungs, stomach, liver, kidneys, and cervix.[5]

Smoking can also have a significant impact on quality of life, explained Bouayed: "When someone is addicted to cigarettes, his appetite decreases. His complexion becomes dull, his voice becomes hoarse, and his taste and smell are altered. His teeth turn yellow-ish and crumble, and he runs out of breath on exertion due to bronchial obstruction. For all these reasons his quality of life slowly but surely decreases."

The consequences of tobacco smoking, the professors pointed out, do not stop at the individual. "Historically, we have been focused on active smoking, but we now know that passive smoking is also very important. We now know that those who spend time with a smoker can also become victims of smoking," said Filipiak. In fact, of the 8 million deaths linked to smoking around the world every year, 1.2 million are the result of non-smokers being exposed to second-hand smoke.[1]

The impact on healthcare systems, where cardiovascular disease and cancer are the main causes of mortality and morbidity, is also significant, said both professors. Data have shown that smoking-related diseases are responsible for 1.5–6.8% of national health system expenditures."[6]

MOUNTING EVIDENCE

None of this is news. The evidence on the dangers of smoking has been mounting for decades and has informed a wide range of public health strategies designed to discourage and dissuade people from the habit. Advertising and sponsorship bans, restrictions on smoking indoors, and wide-spread education programmes have all raised awareness of the dangers.

Yet, while there has been a drop in the number of smokers in recent years (e.g., in England, the proportion of the adult population who smoked fell from 19.8% in 2011 to 14.4% in 2018[7]), it remains a significant health problem. "We have adopted changes in smokers' habits, we have created special places for them to smoke, banned smoking in public places, schools, hospitals, and restaurants, but it did not change a lot," said Filipiak.

Some people, he went on, even continued to smoke after a cardiac event such as acute coronary syndrome, a percutaneous coronary intervention, or coronary artery bypass graft surgery. Bouayed agreed: "In my daily practice as a vascular surgeon treating serious tobacco-related illnesses, I spend my day advising people to quit. Despite all the suffering and surgery they undergo, only around 10% stop smoking: the rest continue."

PHYSICAL AND EMOTIONAL ADDICTION

Asked why people continued to smoke despite the huge volume of evidence demonstrating its harms, Bouayed said there was a multitude of factors, both physical and psychological. "When

a smoker wants to stop, deprived of his dose he becomes anxious, irritable, sleepless, and he increases in weight." These physical withdrawal symptoms, which may also include dizziness, depression, frustration, impatience, and headaches, can be extremely uncomfortable,[8] and some people will start using tobacco again to ease them, he added.

Others will give up for a period, after an acute cardiac event perhaps, and then relapse, said Bouayed, pointing to the emotional element of the struggle. "The smoker experiences great pleasure when smoking, and he does not want to quit this pleasure. He thinks that when he is confronted by a social or professional problem, a cigarette is the only thing that can help him."

The difficulty lies, then, in there being no single barrier to successful cessation; rather, there are a variety of interconnected structural, individual, and psychosocial factors.

SUPPORTING CESSATION

There is no one-size-fits-all approach to providing smoking cessation support, but Filipiak said more HCPs should follow the European Society of Cardiology's (ESC) 'Five As' rule:[9]

1. Ask: systematically enquire about smoking status at every opportunity.
2. Advise: unequivocally urge all smokers to quit.
3. Assess: determine the person's degree of addiction and readiness to quit.
4. Assist: agree on a smoking cessation strategy including setting a quit date, behavioural counselling, and any pharmacological support.
5. Arrange: schedule a follow-up appointment to discuss progress and offer any additional support that might be necessary.

Scientific societies and medical experts recommend a stepwise approach to supporting smoking cessation.[9,10] It starts with education on the harms of smoking before moving on to pharmacological treatment with cytisine, varenicline, or bupropion if this proves ineffective. Nicotine replacement therapies, which might include nicotine gum, lozenges, patches, nasal sprays, and inhalers, may also be needed at this stage. Second-line therapies might include a combined preparation of bupropion and naltrexone.

Filipiak emphasised that people should be offered comprehensive medical and psychological counselling via a smoking cessation clinic at every step of this pathway. Psychological interventions with proven efficacy include individual counselling, group therapy, and programmes specifically aimed at groups such as pregnant women, young people, or people living with health conditions such as chronic obstructive pulmonary disease.

People need expert and specialist advice, said Bouayed. "Weaning is not easy. It is necessary to support addicts in their quest for abstinence," he added.

HARM REDUCTION

Despite the evidence to support this approach, it is important to remember that it will not work for everyone. Some people will continue to smoke despite the efforts of HCPs, smoking cessation services, and pharmacological assistance. This raises the question of harm reduction strategies.

While complete smoking cessation is always preferable, Bouayed and Filipiak said there was a role for pragmatic harm reduction strategies for those who were unable or unwilling to quit.

The concept of harm reduction is not unique to smoking cessation. Examples from the substance misuse sector include needle exchanges and providing safer injection facilities for people who inject drugs to protect them from blood-borne viruses, overdose prevention programmes, and opioid substitution treatment.[11] The objective of such policies is to mitigate the risks associated with the behaviour and thus reduce hospitalisations and deaths, explained Bouayed.

In the tobacco arena, harm reduction strategies usually centre on substituting cigarettes with less harmful products and are intended for adults who would otherwise continue to smoke.[12] Substitutes might include e-cigarettes, which work by heating a nicotine-containing liquid to produce a vapour, or HnB products, which heat,

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rather than burn, tobacco to create an aerosol that contains nicotine and tobacco flavour, but with significantly fewer toxicants than cigarette smoke.[13]

THE EVIDENCE FOR HARM REDUCTION PRODUCTS

Such strategies do not eliminate risk, but the evidence, while still relatively immature, suggests that they may be able to reduce it.

A consensus study from the USA National Academies of Science, Engineering, and Medicine, published in 2018,[13] stated that there was conclusive evidence to show that e-cigarettes increase airborne concentrations of particulate matter and nicotine in indoor environments, when compared with background levels. In addition, most e-cigarette products "contain and emit numerous potentially toxic substances," which may include acetaldehyde, acrolein, and formaldehyde, the authors said.[13]

An independent report by Public Health England (PHE) said the long-term impact of nicotine delivered by e-cigarettes on lung tissue is not yet known, and that the evidence does not yet demonstrate how addictive the devices are, when compared to tobacco cigarettes.[14] However, the report also estimated the overall risk of harm associated with e-cigarettes to be less than 5% of that from smoking tobacco, and the risk of cancer at less than 1% of that of smoking tobacco.[14] It also said that, compared to cigarette smoke, heated tobacco products were "likely to expose users and bystanders to lower levels of particulate matter and fewer harmful and potentially harmful compounds." The extent of that reduction, it went on, varied between studies, which were few in number at the time of publication.[13] "The limited evidence on environmental emissions from use of heated tobacco products suggests that harmful exposure from heated tobacco products is higher than from e-cigarettes, but further evidence is needed to be able to compare products," said the report.[14]

It is worth noting that there are also data to suggest that harm reduction products are often used by smokers as smoking cessation or reduction aids. PHE's vaping evidence update, which was published earlier this year, for example, found that >50,000 people who would otherwise have continued to smoke stopped with the help of an e-cigarette product in 2017. It also said that cessation strategies that included vaping products had some of the highest success rates, of between 60% and 74% in 2019 and 2020.[15]

The ESC smoking prevention guidelines, published in 2016, say that e-cigarettes are probably less harmful than traditional tobacco cigarettes as they deliver the addictive nicotine without the majority of harmful chemicals coming from the combustion process.[9]

According to the guidelines, some studies and real-world data have indicated that e-cigarettes are "moderately effective" as smoking cessation and harm reduction aids.[16-18] Interestingly, they found that changes in behaviour, rather than in nicotine delivery, was a significant contributing factor to this outcome. The document went on to say that there were many unanswered questions about e-cigarette safety, on their efficacy in terms of harm reduction and smoking cessation, and their impact on public health.[9] "Although no safety issues have been observed in the short-term (2 years), determining the long-term health effects of e-cigarettes (and in particular dual use with cigarettes) will require more research," said the authors.[9]

Heated tobacco products were not included in the scope of the recommendations as the scientific evidence base was immature at the time of publication. Since then, however, evaluation has demonstrated that the aerosol created by HnB systems does not contain carbon-based nanoparticles and that, when compared to burned tobacco, levels of cardiovascular toxicants are reduced by an average of approximately 90%. A German Federal Institute for Risk Assessment (BfR) analysis of a commercially available HnB product, for example, concluded that the system delivered a comparable amount of nicotine to a cigarette, but with approximately 80–90% fewer aldehydes and 97–99% fewer volatile organic compounds. The authors concluded that levels of major carcinogens were markedly reduced in the HnB product emissions when compared to those of conventional tobacco cigarettes.[19]

Outlining the available evidence, Filipiak said cardiovascular benefits had been observed with heated tobacco products when compared to

cigarette smoke. "The adhesion of monocytic cells to human coronary arterial endothelial cells *in vitro* is significantly lower following exposure to the aerosol than after exposure to reference cigarette smoke.[18] There are also some data to show that switching to heated tobacco halted the progression of cigarette smoke-induced atherosclerotic changes *in vivo,*"[20] he said.

Another paper, which was an independent randomised, cross-over study, compared the effects of HnB devices, e-cigarettes, and traditional cigarettes on oxidative stress, antioxidant reserve, platelet activation, flow-mediated dilation, blood pressure, and satisfaction scores. In all, 20 participants used all three products, with an inter-cycle wash-out period of one week. Single use of all the products led to an adverse impact on oxidative stress, antioxidant reserve, platelet function, flow-mediated dilation, and blood pressure. "A hierarchy of effects was apparent for some measures, with HnB and e-cigarette less impactful than traditional cigarette on some dimensions of oxidative stress, antioxidant reserve, platelet function, and blood pressure," said the authors. "In addition, HnB had less acute effects on soluble Nox2-derived peptide, 8-iso-PGF2α-III, and vitamin E, and appeared more satisfying and capable of decreasing desire for continuing smoking than e-cigarette."[20]

The reduced exposure to harmful and potentially harmful constituents may have a positive impact on smokers' health. This was demonstrated during a six-month, USA-based clinical study involving 984 adult smokers. It analysed a range of measures of biological responses that are known to be negatively affected by smoking and positively affected by cessation. These clinical endpoints, all of which are associated with smoking-related disease, were linked to lipid metabolism, endothelial function, inflammation, oxygen delivery, oxidative stress, lung function, platelet function, and carcinogenesis. After switching from smoking to an HnB product for six months, all biomarkers showed favourable changes in the same direction as that with smoking cessation, and smokers who predominantly used HnB showed improved biological effects relative to those who continued smoking, with similar nicotine levels in both groups, said the authors.[21]

GROWING THE EVIDENCE BASE

Taking all the available evidence into account, Filipiak said he believed that switching from cigarettes to HnB devices had the potential to reduce the risk of smoking-related diseases when compared with continued smoking. There is still, however, a limited number of clinical studies investigating the effect of heated tobacco products on cardiovascular diseases.

Filipiak explained that his team was planning a study to help to fill the gap. "It will be a locally initiated research programme on how switching from cigarettes to heated tobacco affects cardiovascular biomarkers of potential harm in patients with stable coronary artery disease," he said. "We would like to assess how switching will affect biomarkers associated with atherosclerosis and coronary artery disease or its equivalent: atherosclerosis in other vascular beds such as carotid artery disease, atherosclerotic aorta, peripheral arterial disease. We are looking forward to learning more about heated tobacco products and their possible role in smoking cessation."

PRAGMATISM UNTIL CESSATION

Summing up, Bouayed said nicotine addiction is a huge problem that requires a systemic solution.

"It is absolutely necessary to have strategies to reduce the risks of smoking. When we see the great suffering of patients who have lung cancer, stroke, or critical ischaemia of the limbs, we cannot remain insensitive and do nothing," he said. "The most effective way to avoid becoming addicted to smoking is to never start. Young people must, therefore, be informed and educated from school on the harmful effects of tobacco and its huge consequences. I believe that every effort should be made to ensure that people never start smoking."

In the meantime, the professors agreed, HCPs should do whatever they can to help all smokers, including those who use products that could potentially reduce the risks, to stop completely. However, they also need to accept that this is not always possible.

When someone is either unwilling or unable to quit, harm reduction strategies are an effective,

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pragmatic approach to cutting the risks for the individual, their communities, and healthcare systems. There is a growing body of scientific evidence to suggest that HnB products, which heat tobacco and deliver nicotine via an aerosol, significantly reduce exposure to harmful toxicants and carcinogens. They could, then, play an important role in future harm reduction strategies.

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